OC Community Services

A G E N D A

ORANGE COUNTY VETERANS ADVISORY COUNCIL

May 13, 2026
2:00 PM
www.veterans.ocgov.com/advisory

Location:
OC Veterans Service Office
1300 S. Grand Ave., Building B
Newport Conference Room #232
Santa Ana, CA. 92705

****In compliance with the Americans with Disabilities Act, those requiring accommodation for this meeting should notify the Orange County Community Service office 72 hours prior to the meeting at (714) 480-6450****

The Orange County Veterans Advisory Council shall not hold a meeting unless the number of members participating constitutes a quorum of the Council.

This agenda contains a brief description of each item to be considered. Except as provided by law, no action shall be taken on any item not appearing in the agenda. Members of the public who wish to speak on an item(s) may complete a Speaker Request Form(s) identifying the items prior to the beginning of the meeting. To speak on a matter not appearing on the agenda, but under the jurisdiction of this Advisory Council, you may do so during Public Comments. Council members may not discuss or take action on issues raised during public comment unless the issue is listed in this agenda. Speaker request forms must be completed prior to the beginning of the meeting, the reading of the individual agenda items and/or the beginning of Public Comments. When addressing the Council, it is requested that you state your name and place of residence for the record prior to providing your comments. Address the Council as a whole through the Chair. Comments to individual Members or staff are not permitted. Speakers are limited to three (3) minutes.

Materials/handouts can be accessed up to 72 hours in advance of the meeting by visiting www.veterans.ocgov.com/advisory or calling (714) 480-6555.

AGENDA **May 13, 2026**

1. CALL TO ORDER: Vice Chair, Kathryn Morrison

2. PLEDGE OF ALLEGIANCE

3. COUNCIL ROLL CALL: OC Community Services Representative

4. PRESENTATIONS:

Frictionless Therapy At Scale
Dr. Brian L. Mayhugh, Chief Executive Officer
MindStreet, Inc.

5. PUBLIC COMMENTS:
At this time, members of the public may address the Council regarding any items within the subject jurisdiction, provided that no action is taken on off-agenda items unless authorized by law. (Comments shall be limited to three (3) minutes unless the Chair pre-identifies a different time at the start of meeting for all public speakers).

6. EXECUTIVE COMMITTEE REPORT: Vice Chair, Kathryn Morrison

7. OCVSO UPDATE: Eric Ensley, Veterans Service Officer

8. OC4VETS UPDATE: Tracy Rick, Orange County Health Care Agency, Senior Manager

9. COMMITTEES:
   i. Communications Standing Committee Report: Council Member, Robert McDonald
   ii. Events/Outreach Standing Committee Report: Council Member, Michael Radigan

10. COUNCIL COMMENTS:
At this time, members of this Advisory Council may comment on agenda or non-agenda matters within the subject jurisdiction, provided that NO action be taken on off-agenda items unless authorized by law.

11. ADJOURNMENT: 4:00pm (or earlier if business is completed).

Next Meeting:
June 10, 2026
2:00 PM Location – TBD

"Have We Helped A Veteran Today?"

MindStreet, Inc.

Frictionless Therapy at Scale

January 2024

Why

Imagine if you could…

Prevent

Reintegrate

Save

Suicide

Veteran

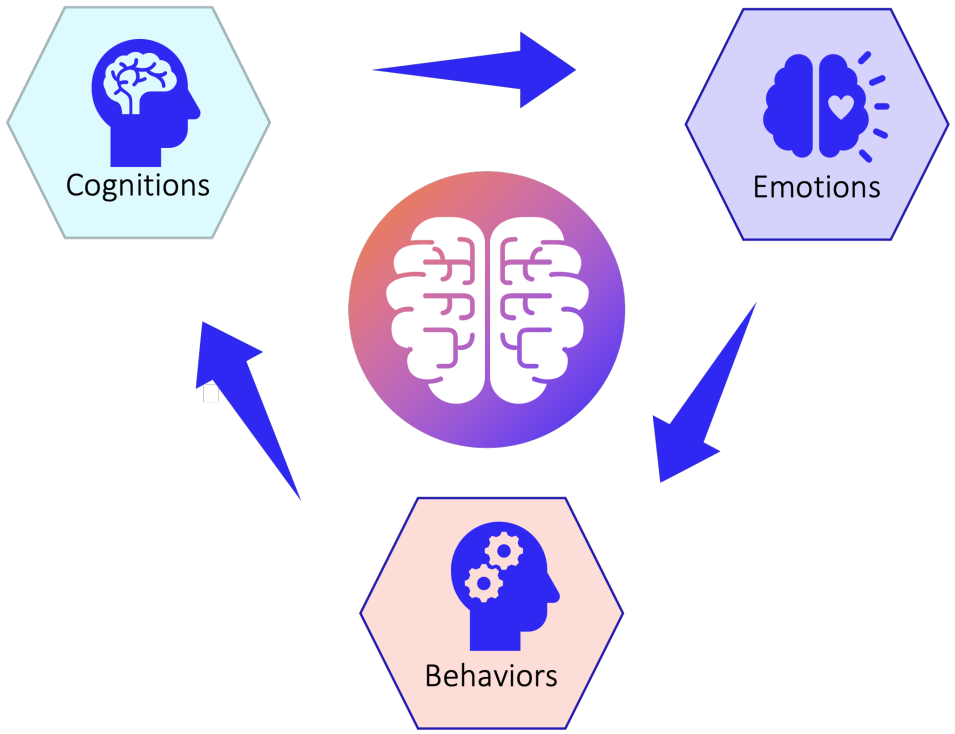
Family

…for $1/User/Month

Product

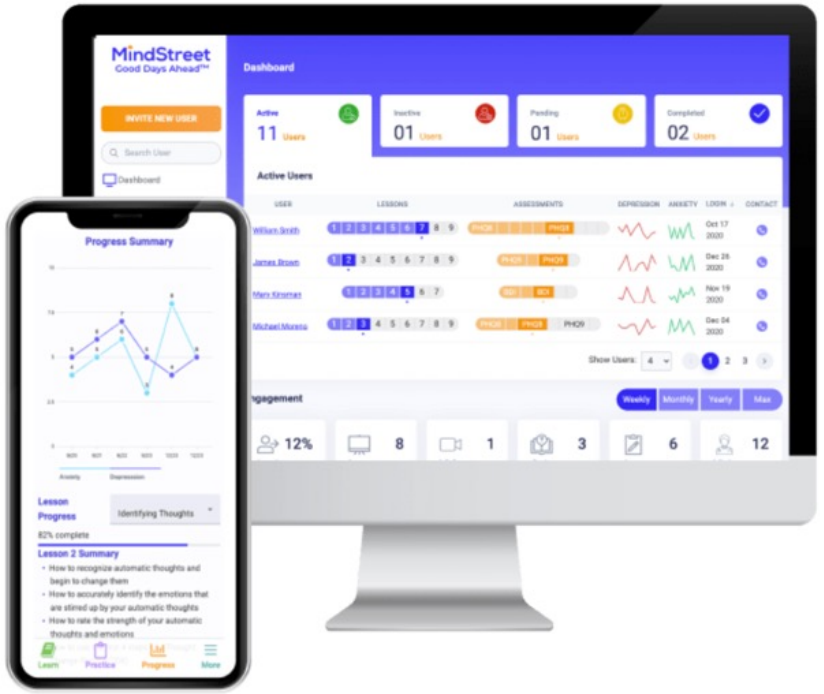
Computer-assisted cognitive behavioral therapy

CBT[1]



CCBT[2]

Clinician Portal

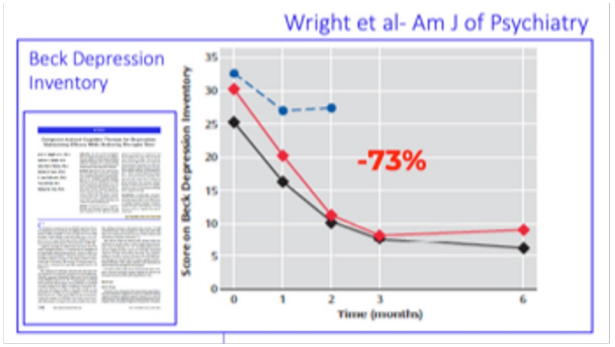


Patient App

[1] Cognitive Behavioral Therapy, 50+ years of clinically validated treatments
[2] Computer-assisted Cognitive Behavioral Therapy, 20+ years of clinical validation

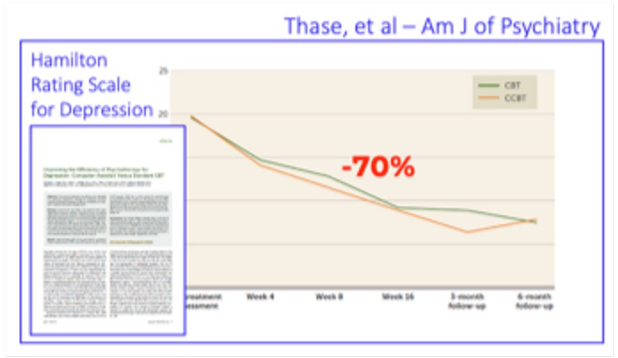
Validation

25+ years of clinical studies demonstrate the efficacy, efficiency, and safety of MindStreet's CCBT



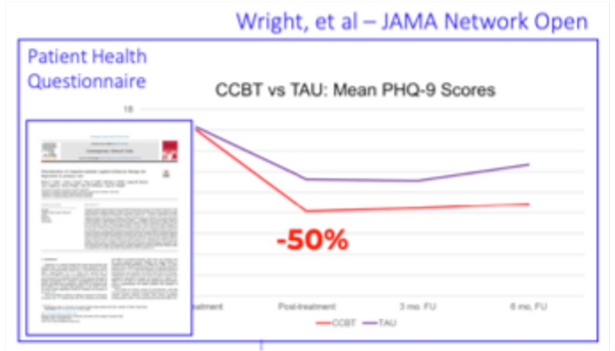
RCT[1] 1 | Effectiveness v. 1:1 CBT

2005



RCT 2 | Efficiency v. CBT Time, Cost

2018



RCT 3 | Expansion - TAU v. TAU + CCBT

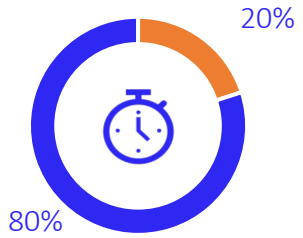
2022

510(K)

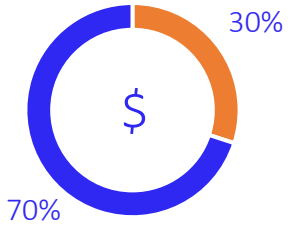
2023

Leverage

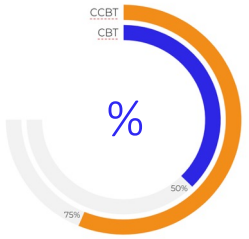
5x Time



3x Cost



1.5x Completion



10x Providers

[1]Randomized controlled trial

Program

Good Days Ahead™ (GDA)

- 360° mental resiliency program for populations
- Assessment, triage[1], monitoring[1], and pulsing[2]
- Immediate, convenient, effective, and measurable
- Starting at $1 PMPM[2] with an option to step up care

1. Leverage existing resources and coverages such as EAP, medical benefits, telehealth platforms, on-site care, etc.
2. Optional, may incur additional fees based on need and frequency of pulsing, level of user support, step up (prescription level) care etc.

Conditions

GDA programs include a growing collection of digital therapies built on MindStreet's CCBT platform, tailored to address the most prevalent mental health conditions affecting university populations

Current

Roadmap

Depression[1]

Anxiety[2]

Pain[3]

Stress[4]

Addiction[5]

Adolescent

Adherence

PTSD

Psychosis

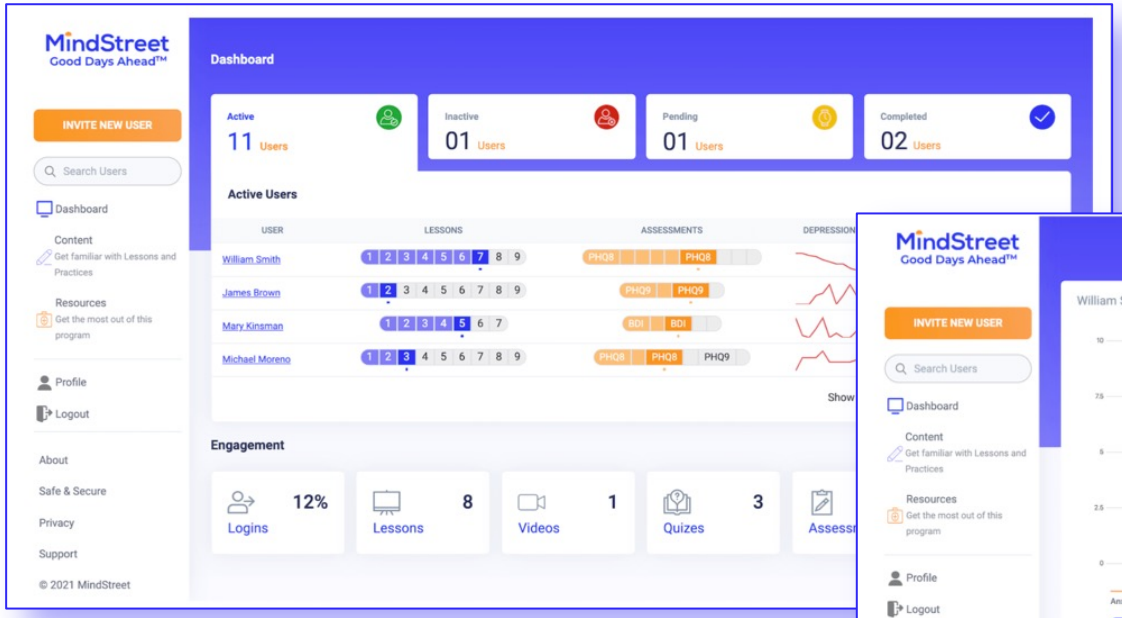
Lifetime prevalence (Sources)

1. 29%, Gallup
2. 34%, National Library of Medicine
3. 21%, Centers for Disease Control
4. 70%, World Health Organization
5. 33%, National Institute on Drug Abuse

Reports

Measure what matters to build resilient populations

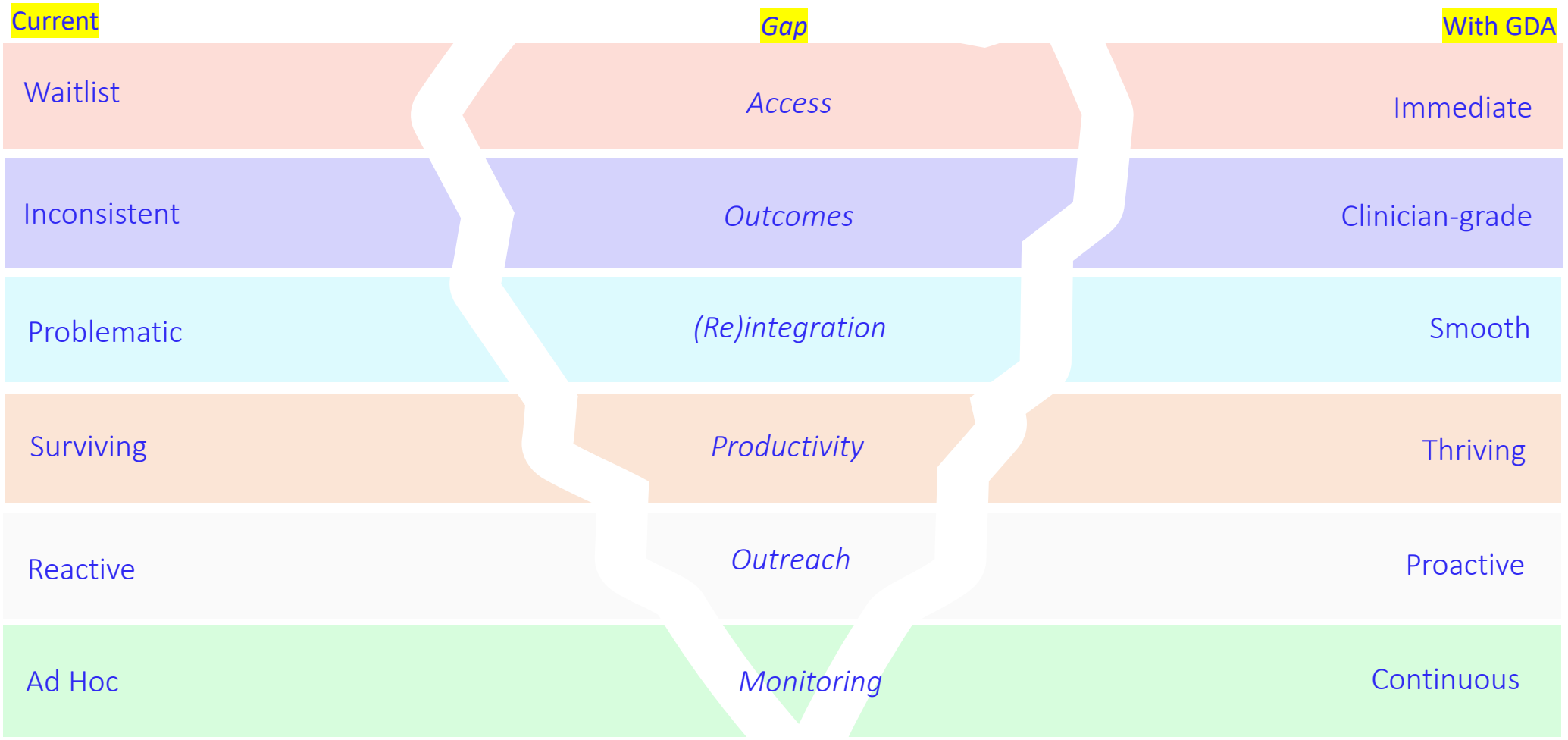
Organization | Anonymized population mental health status report



Members| Individual symptom and severity progress report

Benefits

Good Days Ahead™ fills critical coverage and care gaps to cultivate resilient, productive populations

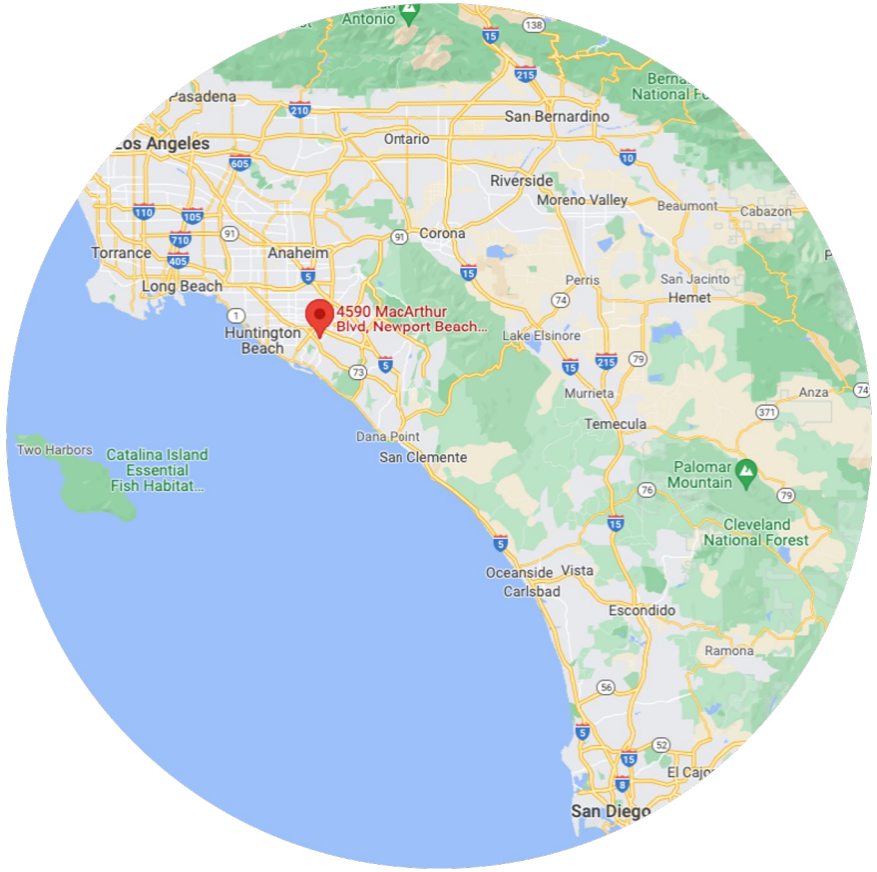


Customers

Thousands of users and alums at leading institutions

Contact

MindStreet, Inc. | Frictionless Therapy at Scale



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Psychotherapy and Psychosomatics

Innovations

Psychother Psychosom 2020;89:307–313
DOI: 10.1159/000508143

Received: November 13, 2019
Accepted: April 16, 2020
Published online: May 12, 2020

Improving Cost-effectiveness and Access to Cognitive Behavior Therapy for Depression: Providing Remote-Ready, Computer-Assisted Psychotherapy in Times of Crisis and Beyond

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Keywords
Computer-assisted cognitive behavior therapy · Depression · Cost-effectiveness

Abstract
Introduction: There is growing evidence that computer-delivered or computer-assisted forms of cognitive behavior therapy (CCBT) are helpful, but cost-effectiveness versus standard therapies is not well established. ***Objective:*** To evaluate the cost-effectiveness of a therapist-supported method for CCBT in comparison to standard cognitive behavior therapy (CBT). ***Methods:*** A total of 154 drug-free major depressive disorder outpatients were randomly assigned to either 16 weeks of standard CBT (up to twenty 50-min sessions) or CCBT using the *Good Days Ahead* program (including up to 5.5 h of therapist contact). Outcomes were assessed at baseline, weeks 8 and 16, and at 3 and 6 months post-treatment. Economic analyses took into account the costs of services received and work/social role impairment. ***Results:*** In the context of almost identical efficacy, a form of CCBT that used only about one third the amount of therapist contact as conventional CBT was highly cost-effective compared to conventional therapy and reduced the adjusted cost of treatment by USD 945 per patient. ***Conclusions:*** A method of CCBT that blended internet-delivered modules and abbreviated therapeutic contact reduced the cost of treatment substantially without adversely affecting outcomes. Results suggest that use of this approach can more than double the access to CBT. Because clinician support in CCBT can be provided by telephone, videoconference, and/or email, this highly efficient form of treatment could be a major advance in remote treatment delivery.

Introduction

Cognitive behavior therapy (CBT) is the best-studied form of psychotherapy and is considered to be a first-line option for depressed outpatients in contemporary practice guidelines [1, 2]. The efficacy of CBT in randomized controlled trials (RCTs) is comparable to that of antidepressant medications [3–5] and, when effective, the benefits may be more long-lasting than pharmacotherapy [6, 7]. Nevertheless, the public health impact of CBT is lim-

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ited by factors such as cost, the perceived inconvenience of traveling to weekly face-to-face sessions, and a shortage of trained therapists, particularly in public mental health settings or rural regions [8–10]. Computer-assisted models of CBT (CCBT) have been introduced over the past 25 years to reduce such barriers [11, 12]. Several models of CCBT are accessible via the internet, thus facilitating remote treatment delivery [13–15]. The efficacy of CCBT is documented by meta-analyses of RCTs [16–18]. However, in studies that test CCBT as a "stand alone" intervention (i.e., no clinical support is provided), the observed effects are typically smaller than observed when CCBT includes at least several hours of therapist support [18, 19]. One approach to CCBT specifically developed for use as an adjunct to individual therapy, *Good Days Ahead (GDA)* [15], blends a 9-module multimedia program with abbreviated sessions with a clinician. Research conducted to date suggests that *GDA* has efficacy comparable to conventional CBT despite a substantial reduction in therapist contact [20, 21]. The current report examines the cost-effectiveness of *GDA* in the second, larger-scale RCT [21].

Methods

A detailed description of this two-center study is published elsewhere [21]. To summarize, the study was open to adult outpatients presenting for treatment of major depressive disorder (Structured Clinical Interview for DSM-IV) [22]. After completion of baseline evaluations, eligible, unmedicated patients scoring ≥14 on the Hamilton Rating Scale for Depression (HAMD) [23] were randomized to receive either CCBT or CBT for 16 weeks of acute-phase therapy. Experienced therapists (n = 9) conducted both interventions; mode-specific consultation was provided by two of the investigators (G.K. Brown and J.H. Wright) and centered on review of audio recordings to ensure protocol adherence.

The face-to-face component of CCBT consisted of a 50-min introductory session and eleven 25-min sessions. The first 9 sessions focused on one of the 9 internet-delivered *GDA* modules. The *GDA* software was accessible on PCs, laptops, or tablets; it was not fully operational on smartphones. Workstations with PCs were available for patients who did not have own their own devices. Patients were encouraged to work through each module at their own pace; generally, it took between 30 and 60 min to finish each module. After completion of the 9 modules, the final three 25-min "booster" sessions focused on mastery of skills and practice of relapse prevention strategies. CCBT thus consisted of a maximum of 5.5 h of therapist contact.

Conventional CBT utilized the methods of Beck et al. [24], as updated by Beck [25] and Wright et al. [26]. To ensure a strong test of the efficacy of *GDA*, we employed a relatively intensive CBT protocol consisting of twenty 50-min sessions (twice weekly for 4 weeks, weekly for 12 weeks; maximum therapist time: 16 h 40 min) [27, 28]. Outcome assessments were conducted after 8 and 16 weeks of acute-phase therapy and repeated at 3 and 6 months post-treatment.

Cost-effectiveness analyses were guided by the earlier reports of McCrone et al. [29, 30]. The Client Service Receipt Inventory (CSRI) [31], which was administered at baseline, week 16, and 3 and 6 months post-treatment, was used to record information on primary care and hospital-based services, as well as other community-based services and medications. The specific costs of CCBT were relatively small (total: USD 100 per patient, including the manufacturer's suggested license fee and hardware maintenance). Otherwise, the difference in cost of CBT and CCBT was largely determined by the study's design, as the CCBT group incurred only about one third of the cost attributable to therapist time of the CBT group. The costs of other services were based on local Medicaid, Medicare, and private insurer prices in addition to overheads for clinical space. Lost income was estimated using the human capital approach by combining lost workdays with average daily hourly earnings [31]. For the purposes of the cost-effectiveness evaluation, the Quality of Well Being Scale – Self Administered (QWB-SA) [32] was used to generate quality-adjusted life years (QALYs), which permitted comparison of the results of the interventions evaluated here with other clinical interventions. Service costs and total costs (including lost workdays) were compared between the treatment groups using regression models, controlling for baseline differences. Bootstrap methods were used to produce confidence intervals around the cost differences due to the likely skewness in the distribution of regression residuals. The cost-effectiveness of CCBT and CBT was compared by combining service cost data and information on symptoms and QALYs [33]. If either intervention had both lower costs and better outcomes than the other, it would be the preferred option. Uncertainty in cost-effectiveness estimates was explored by calculating cost and outcome differences on 1,000 bootstrapped re-samples and plotting these on a cost-effectiveness plane. This analysis showed the probability that, when compared to CBT, CCBT could result in (i) lower costs and worse outcomes, (ii) higher costs and worse outcomes, (iii) lower costs and better outcomes, or (iv) higher costs and better outcomes. Cost-effectiveness acceptability curves were used to indicate the probability that CCBT or CBT was the most cost-effective option for different values placed on a unit improvement in outcome, i.e., one extra QALY.

Results

As reported elsewhere in detail [21], there were 154 patients in the intent-to-treat sample (n = 77 per group). The mean age of participants was 45 years, two thirds were female, three quarters were white, and about 50% had attended at least some years of college; there were no significant between-group differences at baseline. Acute-phase completion rates were 79.2% for CBT (16.0 [SD = 5.0] sessions; 13.3 h of therapist contact) and 81.8% for CCBT (8.1 [SD = 2.1] *GDA* modules; 11.0 [SD = 3.0] therapy sessions; 5.0 h of therapist contact). CCBT met *a priori* criteria for noninferiority to CBT. In the intent-to-treat sample, for example, the CBT group had a mean HAMD score of 9.2 (SD = 6.3; 95% CI: 7.6–10.8) at week

Table 1. Use of services at baseline and 6-month follow-up

	N (%) using service				Mean (SD) contacts by those using service			
	baseline		6-month follow-up		baseline		6-month follow-up	
Service	CBT	CCBT	CBT	CCBT	CBT	CCBT	CBT	CCBT
Cognitive behavior therapy	0 (0)	0 (0)	58 (100)	57 (100)	–	–	17.2 (2.8)	11.7 (1.1)
Primary care physician	39 (51)	42 (55)	28 (48)	27 (47)	1.6 (0.8)	2.5 (3.8)	1.5 (0.6)	1.2 (0.4)
Psychiatrist	9 (12)	6 (8)	4 (7)	4 (7)	2.1 (0.9)	2.3 (1.9)	1.7 (0.6)	2.0 (0.8)
Other doctor	33 (43)	41 (53)	23 (40)	27 (47)	3.8 (4.7)	4.9 (8.7)	1.7 (0.9)	2.2 (2.3)
Emergency room	11 (14)	13 (17)	6 (10)	9 (16)	1.0 (0.0)	1.1 (0.3)	1.2 (0.4)	1.1 (0.3)
Practice nurse	9 (12)	11 (14)	4 (7)	2 (4)	1.3 (0.7)	1.2 (0.4)	1.3 (0.5)	2.0 (1.4)
District nurse	2 (3)	0 (0)	0 (0)	0 (0)	1.5 (0.7)	–	–	–
Other nurse	2 (3)	1 (1)	1 (2)	0 (0)	1.5 (0.7)	1.0 (–)	20.0 (–)	–
Health visitor	0 (0)	0 (0)	1 (2)	1 (2)	–	–	20.0 (–)	6.0 (–)
Psychologist	7 (9)	5 (7)	4 (7)	2 (4)	10.8 (18.3)	7.8 (10.0)	4.7 (1.2)	2.0 (–)
Counselor	6 (8)	9 (12)	4 (7)	2 (4)	6.3 (4.0)	3.8 (2.9)	2.7 (1.5)	1.5 (0.7)
Other therapist	5 (7)	7 (9)	4 (7)	2 (4)	5.4 (2.9)	3.3 (2.1)	6.8 (8.9)	7.5 (6.4)
Alternative medicine	12 (16)	7 (9)	6 (10)	3 (4)	6.1 (7.1)	7.4 (7.7)	5.3 (7.3)	2.3 (2.3)
Occupational therapist	3 (4)	0 (0)	1 (2)	0 (0)	6.3 (3.5)	–	1.0 (–)	–
Social worker	4 (5)	5 (7)	2 (3)	1 (2)	2.8 (1.7)	6.2 (7.9)	2.5 (2.1)	1.0 (–)
Homecare worker	0 (0)	0 (0)	1 (2)	1 (2)	–	–	20.0 (–)	4.0 (–)
Housework	0 (0)	0 (0)	0 (0)	0 (0)	–	–	–	–
Volunteer	3 (4)	6 (8)	1 (2)	2 (4)	1.3 (0.6)	3.5 (4.2)	2.0 (–)	24.5 (33.2)
Inpatient (days)	2 (3)	2 (3)	4 (7)	4 (7)	2.3 (0.4)	0.8 (0.4)	6.8 (9.5)	3.5 (2.5)

16 or endpoint, whereas the CCBT group had a mean HAMD score of 8.9 (SD = 5.6; 95% CI: 7.5–10.3). Remission rates also were almost identical (CBT: 41.6%; CCBT: 42.9%). Improvements were sustained at the 3- and 6-month post-treatment follow-ups; fewer than 10% of remitters relapsed.

Service use and cost data in the 6 months prior to intake are summarized in Tables 1 and 2. Although total service use costs were slightly higher for the CCBT group, the difference was not significant because of substantial variability. About half of each group saw their primary care providers; most of the other services were seldom. At follow-up, these findings were largely unchanged, and therapy assignment did not affect subsequent service utilization (see Table 1). The total cost of care was significantly higher for CBT (USD 2,166) than CCBT (USD 1,247) (mean difference adjusted for baseline: USD 945; 95% CI: USD 200–1,925; see Table 2). Mean QALYs over the follow-up were almost identical (CBT: 0.3412; CCBT: 0.3415). Adjusting for baseline quality of life and site resulted in 0.0007 more QALYs for CCBT (95% CI: –0.0141 to 0.0164). The cost-effectiveness plane demonstrated a 99.7% likelihood that CCBT resulted in lower cost than CBT (see Fig. 1). Within the two quadrants representing simulations in which CCBT was significantly less costly, outcomes were almost evenly distributed: there was a 53.7% likelihood that CCBT resulted in greater QALYs than CBT and a 45.8% likelihood of fewer QALYs than CBT (see Fig. 1). At a threshold of USD 50,000 per QALY, there was a 96% likelihood that CCBT was the more cost-effective option.

Discussion

Several methods of CCBT have been introduced to improve access to this effective form of psychotherapy of depression. Collectively, these therapies promise to reduce cost, enhance the convenience of treatment, allow for fully remote delivery, and maximize the impact of a limited number of trained therapists [34]. In parallel with these clinical developments, there has been substantial growth in research on CCBT for depression. One recent meta-analysis identified 40 RCTs from a wide range of countries [35]. Because all forms of CCBT use less therapeutic support than conventional psychotherapy, it is has been assumed that CCBT is a cost-effective strategy [10, 19, 34, 35]. However, only a small number of earlier studies included the components necessary to assess cost-effectiveness in comparison to standard, first-line interven-

Table 2. Mean (SD) service costs at baseline and follow-up (2013 USD)

Service	Baseline		6-Month follow-up	
	CBT	CCBT	CBT	CCBT
Cognitive behavior therapy	0 (0)	0 (0)	1,232 (203)	555 (39)
Primary care physician	105 (125)	175 (394)	94 (114)	73 (85)
Psychiatrist	41 (123)	30 (130)	20 (76)	23 (90)
Other doctor	267 (590)	430 (1111)	114 (167)	170 (316)
Emergency room	102 (252)	130 (301)	86 (270)	125 (306)
Nurse	23 (57)	18 (44)	76 (512)	17 (87)
Psychologist	62 (360)	40 (223)	25 (95)	9 (50)
Counsellor	42 (171)	38 (132)	14 (60)	3 (23)
Other therapist	20 (118)	28 (103)	44 (260)	21 (155)
Alternative medicine	63 (231)	45 (202)	36 (180)	8 (45)
Occupational therapist	24 (132)	0 (0)	2 (13)	0 (0)
Social worker	4 (18)	5 (20)	3 (15)	3 (15)
Homecare worker	0 (0)	0 (0)	28 (215)	6 (43)
Volunteer	1 (3)	2 (14)	<1 (1)	26 (196)
Inpatient	49 (307)	16 (107)	394 (2356)	208 (908)
Total cost, USD	**778 (958)**	**957 (1,332)**	**2,164 (3,465)**	**1,247 (1,423)**[a]

[a] Adjusting for baseline costs, the mean difference at follow-up was USD 945 favoring CCBT (bootstrapped 95% CI: USD 202–2,123).

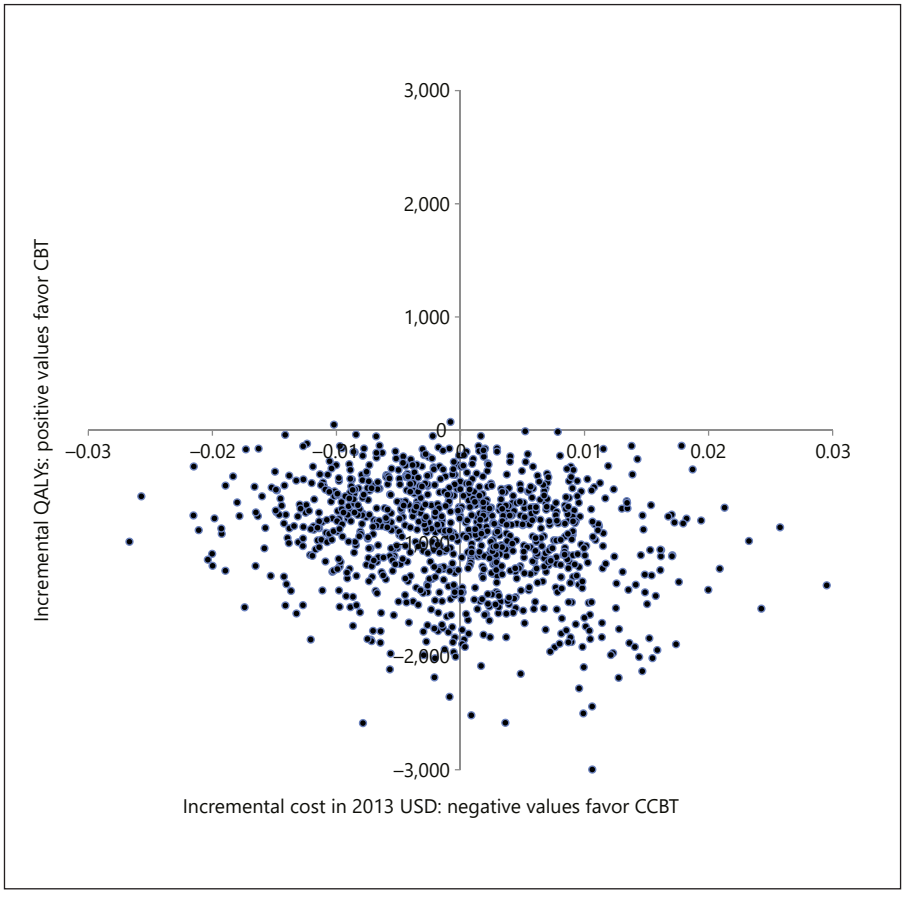

Fig. 1. Cost-effectiveness plane comparing CBT and CCBT: impact on QALYs and incremental costs.

tions (i.e., randomization to a credible, active comparison group and a detailed assessment of service utilization, costs, and lost economic potential) [36–41]. Keeping in mind these limitations, results of a meta-analysis of the earlier RCTs suggested that CCBT may be more cost-effective than standard CBT [42].

The findings of the current report provide the strongest evidence of cost-effectiveness of CCBT to date. Not only did we find that the clinical benefits of a 16-week course of treatment with the *GDA* model of CCBT were noninferior to those of a relatively intensive course of individual CBT [21], such therapeutic equivalence was achieved with a cost savings of USD 945 per patient. One practical implication of the reduced use of therapist time is that nearly three times as many depressed people could be treated without any loss of clinical benefit if this approach was routinely used instead of conventional CBT as a first-line therapy.

The current study has several limitations [21]. Our therapists were highly experienced with conventional CBT and most learned to use *GDA* in order to participate in this study. As such, it is not known if less experienced or more eclectically oriented therapists could achieve comparable results. Conversely, it is possible that nondoctoral therapists or counselors could be trained to deliver CCBT, which could result in an even greater increase in cost-effectiveness.

A second limitation is that the "dose" of therapist time – up to 5.5 h across 16 weeks – is larger than used in most other investigations of CCBT. Because results of several meta-analyses suggest that as little as 1–3 h of therapist support may be sufficient to facilitate CCBT in some settings [18, 19, 35], the cost-effectiveness of *GDA* could be further increased by a judicious reduction in therapist time. The importance of therapist support for treatment in clinical populations should not be minimized, however, as one large primary care study [43] that offered only a small amount (less than 10 min on average) of technical support found no clinical advantage compared to usual care.

At a time in which remote or "at home" access to therapy is urgently needed [34], a third limitation of our study is that therapeutic support was provided face-to-face. The web-based platform of the current edition of *GDA* is well suited to a range of remote applications and, since completing this study, our groups have gained extensive experience using telephone and videoconferencing. In our experience, both of these forms of support are judged to be useful by therapists and highly acceptable by depressed patients [44]. Other investigators have reported successful use of email or chat room support for delivery of CCBT [35]. Although videoconferencing has not yet been researched extensively, we predict that this method will be at least as effective as providing therapeutic support by telephone – a method with established efficacy for CBT [45–47].

Although the emphasis of this component of our research was on the cost-effectiveness of CCBT for depression, the impact of the COVID-19 pandemic underscores the potential public health significance of broader dissemination of modes of therapy for both depressive and anxiety disorders that do not require the patient and therapist to be in the same room [34]. Both voluntary quarantines and mandated social distancing policies preclude all forms of conventional psychotherapy at the very time that our anxious and depressed patients' worries and isolation may warrant even greater therapeutic support. In this regard, the availability of a range of programs that reliably deliver proven therapies at low cost has potentially great public health significance. Given the rapid progress in information technology and the growing sophistication of web-based therapeutic applications, there is good reason for optimism that even more efficient, accessible, and affordable therapies will be increasingly available to address common psychiatric conditions.

Acknowledgments

The authors wish to express their appreciation to the therapists for this study (Louisville: Don Kris Small, PhD, Virginia Evans, LCSW, Mary Hosey, LCSW, and Thomas Heddon, LCSW; Philadelphia: Elizabeth Hembree, PhD, Kevin Kuehlwein, PsyD, J. Russell Ramsay, PhD, and Rita Ryan, PhD). At the Philadelphia site, one of the authors (M.E.T.) treated 2 patients during a staff shortage. We thank Kitty de Voogd, Jordan Coella, Christine Johnson, and Carol Wahl for their assistance. Andrew S. Wright, MD, and Aaron T. Beck, MD, coauthored the prototype for the *GDA* program along with one of the researchers (J.H.W.). Eve Phillips, MBA, provided support for the *GDA* software.

Statement of Ethics

All participants provided written informed consent for research participation. The Institutional Review Boards of our respective university medical centers approved the consent documents and the study was conducted according to the principles of ethical research practice outlined by the Declaration of Helsinki.

Disclosure Statement

Dr. Thase reports the following other relationships during the past 3 years. He has been an advisory/consultant to Acadia, Akili Inc., Alkermes, Allergan (Activis, Naurex), BioHaven, Boerhinger-

Ingleheim, Calla Pharmaceuticals, Clexio Pharmaceuticals, GenoMind, Johnson & Johnson (Janssen, Ortho-McNeil), Lundbeck, Otsuka, Pfizer, Sunovion, and Takeda. He received grant support from the Agency for Healthcare Research and Quality, Alkermes, Allergan (Forest Pharmaceuticals), Assurex, Axsome, BioHaven, Intracellular Therapeutics, Johnson & Johnson (Janssen), Otsuka Pharmaceuticals, and Takeda. Dr. Thase received royalties from the American Psychiatric Press, Guilford Publications, Herald House, and W.W. Norton & Company, Inc. Dr. Thase's spouse, Dr. Diane Sloan, works for Peloton Advantage, which does business with a number of pharmaceutical companies. None of the other authors at the Penn and University of Pittsburgh sites report disclosures or conflict of interest. Neither the Penn authors nor the University of Pennsylvania have any financial relationship with Empower Interactive or Mindstreet.

Dr. Jesse Wright is an author of *Good Days Ahead (GDA)* and has an equity interest in Empower Interactive and Mindstreet, developers and distributors of *GDA*. He receives no royalties or other payments from sales of this program. His conflict of interest is managed by an agreement with the University of Louisville. All other authors have no disclosures or conflict of interest regarding *GDA* and no other disclosures pertaining to this research.

Funding Sources

This research was supported by grants R01-MH082762 (to J.H.W.) and R01-MH082794 (to M.E.T.) from the National Institute of Mental Health.

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Article

Computer-Assisted Cognitive Therapy for Depression: Maintaining Efficacy While Reducing Therapist Time

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Objective: The aim of this investigation was to compare the efficacy of computer-assisted cognitive therapy against standard cognitive therapy and a control group without treatment for outpatients with nonpsychotic major depressive disorder.

Method: Medication-free participants (N=45) with major depressive disorder were randomly assigned to cognitive therapy (N=15), computer-assisted cognitive therapy (N=15), or a wait list (N=15). Both active treatments consisted of nine sessions over 8 weeks. Therapist time was reduced after the first visit for computer-assisted cognitive therapy, with 25-minute sessions rather than 50-minute sessions. Assessments were completed pretreatment, after 4 and 8 weeks of therapy, and 3 and 6 months posttreatment.

Results: Computer-assisted cognitive therapy and standard cognitive therapy were superior to the wait list control group for treatment of depression and did not differ from each other on the primary outcome variables. Very large between-group effect sizes were observed. Improvement in depression for both computer-assisted cognitive therapy and standard cognitive therapy was maintained at the 3- and 6-month follow-up evaluations. Computer-assisted cognitive therapy had more robust effects, relative to being wait-listed, than standard cognitive therapy in reducing measures of cognitive distortion and in improving knowledge about cognitive therapy.

Conclusions: A multimedia, computer-assisted form of cognitive therapy with reduced therapist contact was as efficacious as standard cognitive therapy. Computer-assisted therapy could decrease costs and improve access to cognitive therapy for depression.

(Am J Psychiatry 2005; 162:1158–1164)

Computer programs for psychotherapy have been recommended as methods for making effective treatments readily available to more people (1–3). Potential benefits could include reduced health care costs, improved access to psychotherapy, enhanced delivery of psychoeducational information, and promotion of self-help.

Cognitive therapy for depression has been tested in many controlled studies (4, 5) and meets the standards of an empirically validated treatment (6). However, there is a paucity of appropriately trained therapists to provide standard cognitive therapy to the large numbers of patients with depression. The amount of clinician time required for treatment has typically ranged from 8 to 20 hours (4, 7).

One strategy for reducing clinician time has been the development of computer programs for psychotherapy. The first computer program for depression was developed in the 1980s by Selmi et al. (8). A randomized, controlled trial found that this program was as effective as standard cognitive therapy for mild to moderate depression. Because the software by Selmi et al. relies solely on text presentations and has not been updated, it is not used in clinical practice. Colby and Colby (9, 10) introduced a computer program in 1990 that uses written text to provide information on depression and a module that simulates dialogue between a therapist and a patient. A small controlled study of the program by Colby and Colby with depressed inpatients found that use of this software did not improve treatment outcomes (11).

The software that was tested in the current study was developed as an alternative to these earlier forms of computer-assisted therapy (12, 13). A multimedia format is used to engage patients, teach core methods of standard cognitive therapy, and reinforce learning. The computer program contains a variety of interactive self-help exercises designed to build skills for using cognitive and behavioral therapy. Video, audio, graphics, and checklists are used extensively throughout the program.

Our goal in this study was to demonstrate that computer-assisted standard cognitive therapy is effective in treating depression while reducing clinician time.

Method

Study Design

Medication-free outpatients with nonpsychotic major depression were randomly assigned to 8 weeks of computer-assisted cognitive therapy or standard cognitive therapy or to a wait list control group. Block randomization equated assignment of participants with a secondary diagnoses of dysthymia. All partici-

pants were treated at the Norton Psychiatric Center, which is affiliated with the University of Louisville.

Treatment with computer-assisted cognitive therapy included nine sessions with a therapist (first session=50 minutes, subsequent sessions=25 minutes) and eight computer sessions (20–30 minutes) that followed immediately after sessions 1–9. Standard cognitive therapy was delivered in nine sessions with a therapist (50 minutes). Selection of an 8-week format is consistent with the mean treatment duration reported by Dobson (4) for his meta-analysis of studies of standard cognitive therapy for depression (for nongeriatric studies of individual standard cognitive therapy, mean=9.9; for studies in which standard cognitive therapy was compared to a wait list, mean=6.6); it is also consistent with our goal to test the feasibility of a brief form of computer-assisted cognitive therapy as a strategy to improve the efficiency of treatment.

Assessments were completed by independent raters before treatment, after 4 and 8 weeks of therapy, and 3 and 6 months posttreatment. Study completers were those who attended at least six therapy sessions. Treatment, if any, in the follow-up period was not controlled or measured.

Participants

Participants (N=45) included women and men, ages 18–65, recruited by advertisements and by referral, who were screened for inclusion by a research nurse using the Structured Clinical Interview for DSM-IV Axis I (SCID) (14). Diagnoses were confirmed by interview with a clinical psychologist. Additional inclusion criteria were a 10th-grade education or General Equivalency Diploma, a ninth-grade reading ability on the Wide-Range Achievement Test (15), and a Beck Depression Inventory (16) score of at least 14.

Exclusion criteria were the following:

1. A diagnosis of schizophrenia or other psychotic disorder, bipolar disorder, depression secondary to substance abuse or medical condition, chronic major depression, obsessive-compulsive disorder, anorexia nervosa or bulimia nervosa, borderline personality disorder, dementia or other cognitive disorders, any substance use disorder other than nicotine, or anxiety disorder of greater severity than depression
2. Current suicidal ideation or plan (Beck Depression Inventory suicide item 2 or higher or clinician judgment) or a history of two suicide attempts or episodes of self-mutilation
3. Previous felony conviction, two arrests as a juvenile, or currently on probation
4. Past treatment with cognitive therapy
5. A medical condition that would interfere with participation in therapy

The study was approved by an institutional review board, and written informed consent was obtained from all participants.

Assessments

Assessments were performed by independent, evaluators blind to the study design who were trained to administer the SCID-II and the 17-item Hamilton Depression Rating Scale (17). Interrater reliability on the Hamilton depression scale was 0.96 (intraclass correlation coefficient; see reference 18) before starting the study. Reliability was monitored by videotape at 3-month intervals throughout the investigation. Primary outcome measures were the Hamilton depression scale, the Beck Depression Inventory, the Automatic Thoughts Questionnaire (19), and the Dysfunctional Attitude Scale (20). Knowledge of cognitive therapy was measured with the Cognitive Therapy Awareness Scale (13).

Therapists

Before initiation of the study, cognitive therapists (three master's- and two doctoral-level clinicians) completed a course of weekly group supervision and treated at least two sample cases of both computer-assisted cognitive therapy and standard cognitive therapy. All sessions were audiotaped and were reviewed by an external rater. Ratings of 40 or higher on the Cognitive Therapy Scale (21) were required on at least two sequential audiotapes for qualification as a study therapist. Psychotherapy supervision was provided throughout the investigation.

Treatment Conditions

Participants took no antidepressants, mood stabilizers, or antipsychotic medications for at least 2 weeks before starting the study (4 weeks for participants who had taken fluoxetine) and during the 8 weeks of treatment. Occasional use of antianxiety drugs was allowed on less than a daily basis. Alprazolam was not allowed because of possible antidepressant effects (22). Sedative-hypnotics were permitted for sleep.

Treatment manuals for computer-assisted cognitive therapy and standard cognitive therapy were developed following the general guidelines in *Cognitive Therapy: Basics and Beyond* (23). Therapist contact was reduced in computer-assisted cognitive therapy by using a multimedia computer program as part of therapy. In sessions 1–9, the patients initially saw the clinician and then adjourned to a separate office to work alone on the computer program. A research assistant was present during the beginning of the first session to instruct the patients on the use of the computer. Computer-assisted cognitive therapy included methods for integrating computer sessions into the overall treatment process (e.g., therapist inquiries about experiences with the computer, review of computer-assigned homework).

The software was produced first on laser disc (used in this study) and has subsequently been converted to DVD-ROM (12, 24). The learning environment, multimedia features, and initial testing of this program have been described previously (13). For this study, specific content from the program was provided at each session: 1) orientation, basic cognitive model; 2) identifying automatic thoughts and cognitive errors using thought records; 3) revising automatic thoughts, finding rational alternatives; 4) behavioral methods, scheduling activities and pleasant events; 5) further behavioral exercises, graded task assignments; 6) identifying and modifying core beliefs; 7) and 8) review and further rehearsal.

Therapists performed both types of treatment (computer-assisted cognitive therapy and standard cognitive therapy) in equal or close-to-equal proportions. Audiotaped sessions (two for each participant) of computer-assisted cognitive therapy and standard cognitive therapy were selected at random for rating on the Cognitive Therapy Scale by an external expert.

A total of 62 audiotapes were rated. Mean Cognitive Therapy Scale scores for computer-assisted cognitive therapy (mean=44.4, SD=8.4, range=23–62) and standard cognitive therapy (mean=47.3, SD=8.1, range=39–63) ($t=1.29$, $df=60$, n.s., independent samples) suggested adequate competency for both treatment modalities.

Compliance with the standard cognitive therapy and computer-assisted cognitive therapy protocols was assessed with Adherence Rating Scales, developed for this study. Adherence scores were based on completion of predetermined procedures for each therapy session and were computed as a percentage of the maximum possible points for each session. Mean percentage adherence for standard cognitive therapy sessions was 95.1% (SD=8.1, range=54.5–100), whereas mean percentage adherence for computer-assisted cognitive therapy sessions was 90.5% (SD=11.4, range=45–100). Although adherence was lower in computer-assisted cognitive therapy than standard cognitive therapy (Mann-Whitney $U=255$, $N=62$, $p<0.02$, two-tailed), the therapists closely followed the requirements of both treatment protocols.

The patients assigned to the wait list received no treatment during the 8-week waiting period. After completing 8 weeks of

TABLE 1. Baseline and Improvement Scores for Depressed Subjects Receiving Computer-Assisted Cognitive Therapy, Standard Cognitive Therapy, or No Therapy Across 8 Weeks[a]

	Baseline Value					Change by Week 4 (completer group)				
			ANOVA					ANOVA		
Outcome Variable	Mean	SD	F	df	p	Mean	SD	F	df	p
17-item Hamilton Depression Rating Scale score			1.55	2, 41	<0.23			1.89	2, 37	0.02
Computer-assisted cognitive therapy	16.6	3.2				5.3	4.8			
Standard cognitive therapy	17.1	5.4				4.7	5.8			
Wait list control condition	19.9	6.8				1.7	4.8			
Beck Depression Inventory score			5.89	2, 42	0.001			1.64	2, 39	0.21
Computer-assisted cognitive therapy	31.4_a	8.2				10.7	8.1			
Standard cognitive therapy	24.4_b	6.8				9.7	8.5			
Wait list control condition	33.2_a	7.2				5.6	7.1			
Dysfunctional Attitude Scale score			1.94	2, 42	0.16			0.00	2, 39	1.00
Computer-assisted cognitive therapy	151.8	39.5				5.0	21.4			
Standard cognitive therapy	125.5	38.5				4.9	22.5			
Wait list control condition	134.5	33.4				4.8	14.9			
Automatic Thoughts Questionnaire score			4.27	2, 42	0.03			3.47	2, 39	<0.05
Computer-assisted cognitive therapy	58.3_a	20.7				22.4	14.4			
Standard cognitive therapy	41.9_b	16.0				20.3	18.7			
Wait list control condition	61.9_a	22.6				7.9	13.8			
Cognitive Therapy Awareness Scale score			1.50	2, 40	0.24			16.50	2, 36	0.00
Computer-assisted cognitive therapy	22.9	3.8				7.6_a	2.6			
Standard cognitive therapy	24.7	2.4				2.0	4.1			
Wait list control condition	25.0	4.0				0.4_b	3.7			

[a] Positive change scores indicate treatment benefit. F values and significance levels are provided for tests of differences between groups at each assessment period. Treatment groups with different subscripts were significantly different from each other, according to follow-up pairwise comparisons at p<0.05.

participation in the trial, they could elect to receive free treatment with computer-assisted cognitive therapy. Eleven of the 14 patients who completed the wait list period chose to receive subsequent computer-assisted cognitive therapy.

Results

Patient Characteristics

The mean age of the participants was 38.2 years (SD=9.8) for computer-assisted cognitive therapy, 41.9 (SD=9.0) for standard cognitive therapy, and 40.6 (SD=10.7) for the wait list control condition. The mean educational level was similar for all groups (computer-assisted cognitive therapy, mean=14.5 years, SD=3.2; standard cognitive therapy, mean=15.4, SD=2.7; wait list control condition, mean=15.3, SD=3.8). The percentage of female subjects in each group was computer-assisted cognitive therapy, 73.3%; standard cognitive therapy, 73.3%; and wait list control condition, 80%. Two participants dropped out of the computer-assisted cognitive therapy treatment group (by weeks 2 and 4), two from the standard cognitive therapy group (by weeks 2 and 4), and one from the wait list group (by week 3).

Baseline Severity

Examination of baseline severity variables indicated that random assignment failed to equate the treatment groups. According to one-way analysis of variance (ANOVA), the treatment groups differed significantly on the Beck Depression Inventory and the Automatic Thoughts Questionnaire. No other tendencies were evident (p values >0.15). Follow-up pairwise comparisons indicated that the standard cognitive therapy group had significantly lower severity of depression than the other two groups (Table 1).

Because of these differences, we examined differences in the degree of improvement across treatment with one-way ANOVA of change scores (e.g., pretreatment and week-8 scores) (25). Both intent-to-treat and completer analyses were conducted. Significant treatment effects (p<0.05) were examined with follow-up analyses by using Tukey's honestly significant difference to control alpha (26). Also, pairwise effect sizes (27) were computed for unadjusted change scores. Complete baseline data were available except for a missing Hamilton depression scale score for one person who received computer-assisted cognitive therapy.

Changes in Depression Severity

The results are summarized in Table 1. Patients treated with computer-assisted cognitive therapy and standard cognitive therapy achieved significantly more improvement in depression severity than the patients on the wait list condition as assessed by both the Hamilton depression scale and the Beck Depression Inventory. Examination of between-group effect sizes for the intent-to-treat groups' 17-item Hamilton Depression Rating Scale and Beck Depression Inventory change scores indicated large effects for the advantage of both computer-assisted cognitive therapy and standard cognitive therapy over the wait list control condition (average Cohen's d=1.14 for computer-assisted cognitive therapy and 1.04 for standard cognitive therapy) with no evidence for differences between the computer-assisted cognitive therapy and standard cognitive therapy conditions (d=0.10). Evalua-

Change by Week 8 (completer group)					Change by Endpoint (intent-to-treat group)				
		ANOVA					ANOVA		
Mean	SD	F	df	p	Mean	SD	F	df	p
		4.63	2, 36	<0.02			4.81	2, 41	<0.02
8.2_a	6.4				7.5_a	6.3			
8.4_a	6.3				8.3_a	6.6			
2.1_b	5.6				1.9_b	5.5			
		10.80	2, 37	0.001			7.56	2, 42	0.002
19.0_a	10.1				17.5_a	10.8			
15.2_a	7.1				14.7_a	8.0			
5.2_b	6.4				5.8_b	6.5			
		3.70	2, 37	<0.04			3.32	2, 42	<0.05
17.8_a	19.5				15.2_a	19.3			
5.3	18.7				4.7	17.4			
-2.1_b	19.2				-2.0_b	18.5			
		6.12	2, 37	0.005			4.82	2, 42	<0.02
32.4_a	23.2				29.6_a	23.1			
27.9_a	14.0				24.1	16.3			
11.1_b	10.6				10.4_b	18.9			
		17.3	2, 34	0.00			16.9	2, 40	0.00
9.2_a	3.5				8.3_a	4.0			
2.3	3.8				1.8	3.6			
1.1_b	4.0				0.8_b	3.8			

tion of the time course of treatment changes (week 4 results) indicated that tendencies toward differential outcomes were evident early in the trial, but these did not reach significance.

To ensure that we adequately addressed baseline differences in severity between groups, we also examined change scores after adjusting for baseline levels of severity with analysis of covariance, treating the baseline severity score as the covariate. Homogeneity of regression assumptions was met for these analyses. Pretreatment severity scores were linked with the degree of improvement for the Hamilton depression scale but not the Beck Depression Inventory. Patients with greater Hamilton depression scale severity at baseline tended to achieve greater improvement, perhaps reflecting regression toward the mean for patients at greater levels of severity or a "floor effect" for those with mild depression at baseline. As noted, patients in the standard cognitive therapy condition had lower severity scores at baseline, as assessed by the Beck Depression Inventory. Accordingly, use of the covariate tended to increase the magnitude of the difference between the active and control treatments, particularly for the standard cognitive therapy condition. In other words, both of our approaches to data analysis provided consistent evidence for the advantages of the active treatments over the control treatment.

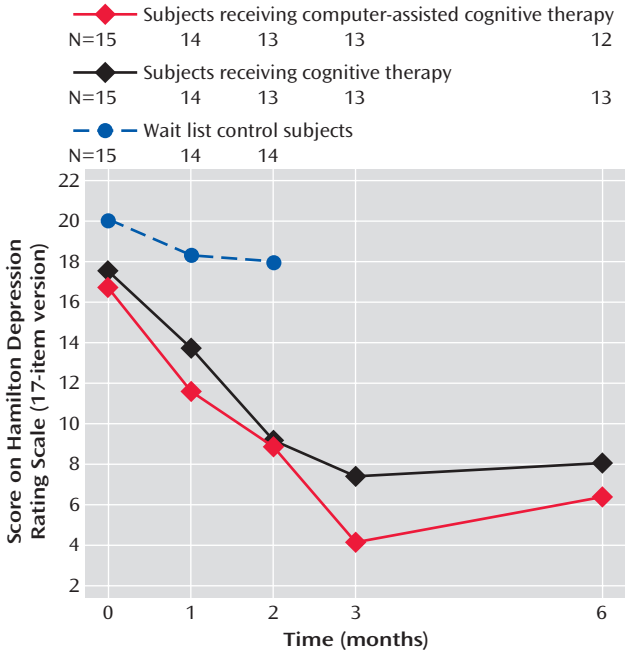
Maintenance of Treatment Gains

There was consistent evidence for the durability of treatment effects during the uncontrolled follow-up interval. Evaluation of depression severity at 3 and 6 months posttreatment indicated that the patients maintained their treatment gains, with mean improvement scores at least at the level of the acute treatment (week 8) results. As depicted in Figure 1 for the Hamilton depression scale, we found a mean improvement of 11.3 points (SD=6.7) at 3 months and 11.1 points (SD=4.0) at 6 months for the computer-assisted cognitive therapy condition and 10.0 points (SD=6.2) at 3 months and 9.6 points (SD=5.5) at 6 months for the standard cognitive therapy condition. For the Beck Depression Inventory (Figure 2), similar results were obtained; patients receiving computer-assisted cognitive therapy achieved a mean change score of 21.5 (SD=11.6) at 3 months and 21.5 (SD=9.4) at 6 months; similar longer-term benefits were evident for the standard cognitive therapy condition (a mean change in Beck Depression Inventory score of 17.6 points, SD=6.9, at 3 months and 18.9 points, SD=6.0, at 6 months). Each of these outcomes was significant for the within-group change (within-groups repeated-measures ANOVA, all p values <0.005), and the computer-assisted cognitive therapy and the standard cognitive therapy conditions did not differ significantly from each other.

Assessment of Cognitive Changes

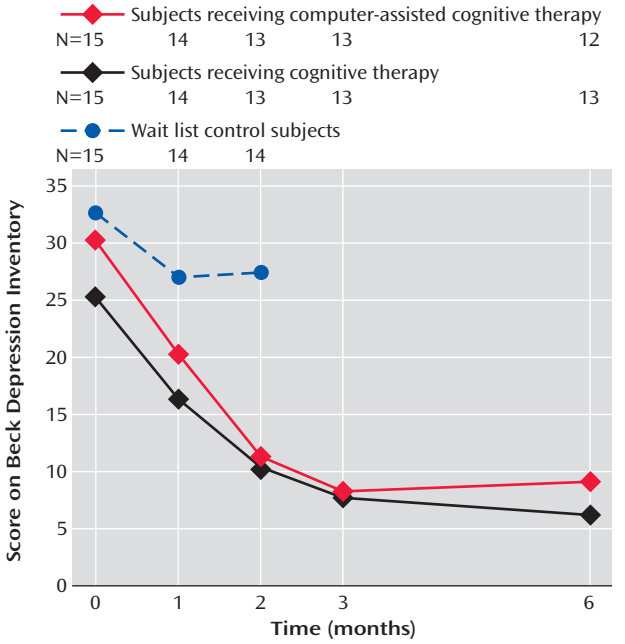
As presented in Table 1, differences on the Automatic Thoughts Questionnaire were evident at week 4 ($p<0.05$) for the ANOVA and reflected the advantage of both active treatments over the control condition. However, there were no significant reductions on the Dysfunctional Attitude Scale, a measure of core beliefs or schemas, after only 4 weeks of treatment. Results for the Cognitive Therapy Awareness Scale indicated an early superiority for com-

FIGURE 1. Mean 17-Item Hamilton Depression Rating Scale Scores for Depressed Patients Who Completed Computer-Assisted or Standard Cognitive Therapy or Were Put on a Wait List[a]



[a] Group sizes indicate the number of participants remaining in each group at each time point. At week 8, both active treatment groups improved significantly more than the wait list control group ($p<0.05$). There were no significant differences between the computer-assisted cognitive therapy and standard cognitive therapy groups at the 3- and 6-month follow-up assessments.

FIGURE 2. Mean Beck Depression Inventory Scores for Depressed Patients Who Completed Computer-Assisted or Standard Cognitive Therapy or Had No Therapy[a]



[a] Group sizes indicate the number of participants remaining in each group at each time point. At week 8, both active treatment groups improved significantly more than the wait list control group ($p=0.001$). There were no significant differences between the computer-assisted cognitive therapy and standard cognitive therapy groups at the 3- and 6-month follow-up assessments.

puter-assisted cognitive therapy in helping patients acquire knowledge about cognitive therapy.

At the endpoint of treatment, computer-assisted cognitive therapy, but not standard cognitive therapy, was associated with greater improvement in dysfunctional attitudes than no therapy. Computer-assisted cognitive therapy also was significantly better than no therapy in lowering scores on the Automatic Thoughts Questionnaire. Standard cognitive therapy was superior to the control condition only for the completer analysis for the Automatic Thoughts Questionnaire. Examination of the degree of change in knowledge of the cognitive approach to treatment indicated significant differences between groups, with greater increases in Cognitive Therapy Awareness Scale scores in the computer-assisted cognitive therapy group compared to both of the other conditions.

Discussion

The results of this study demonstrated that both computer-assisted cognitive therapy and standard cognitive therapy produced significant reductions in major depression over 8 weeks of treatment compared to a wait list control condition. Improvement on the two primary outcome measures (the Hamilton depression scale and the Beck Depression Inventory) was evident at the end of treatment and was maintained at the 3- and 6-month follow-ups. Between-group effect sizes for the Hamilton depression scale were very large (Cohen's d=1.14 and 1.04 for computer-assisted cognitive therapy and standard cognitive therapy, respectively). There was no evidence of differential outcome in terms of depression severity between the two active treatment conditions.

Both negative core beliefs and automatic thoughts—specific targets of cognitive therapy—were significantly reduced for patients who received computer-assisted cognitive therapy. However, only automatic thoughts were significantly lowered in standard cognitive therapy. Responses at 4 and 8 weeks on the Cognitive Therapy Awareness Scale revealed that participants in the computer-assisted cognitive therapy condition learned early in the treatment process and retained knowledge of the core concepts of cognitive therapy throughout the study.

The finding that treatment with computer-assisted cognitive therapy is associated with larger changes in dysfunctional cognitions and knowledge of cognitive therapy than standard cognitive therapy suggests that a computer adjunct may have advantages in teaching patients basic cognitive therapy methods to reduce negative thinking. Several possible explanations may warrant further study. First, the multimedia format uses video, audio, and interactive exercises to engage the patient and reinforce learn-

ing. These methods could help users better understand cognitive therapy principles and gain practice in building skills. Also, the computer program is designed to reliably deliver educational content every time it is used, whereas clinicians may choose to pay more or less attention to teaching skills for modifying dysfunctional thinking. Another possibility for the differences observed between computer-assisted cognitive therapy and standard cognitive therapy is that the computer program directly targets underlying schemas and dysfunctional attitudes for change.

The acceptability and tolerability of the active treatments, as judged by dropout rates (13%), were well within expectations for a psychosocial clinical trial (28) and approximately half that expected for antidepressant treatment trials (29). In a previous uncontrolled investigation, outpatients and inpatients reported high levels of satisfaction and acceptance of the software program, and no adverse effects were observed (13). Thus, computer-assisted cognitive therapy appears to be well accepted and tolerated by depressed patients.

Because the current sample consisted primarily of outpatients with mild to moderate depression, the extent to which the findings can be generalized to a broader or more severe population remains open to further study. Another problem in interpreting the results of this investigation is the duration of treatment. Effects were achieved with only brief treatment, consistent with our desire to study computer-assisted cognitive therapy as a strategy for aiding the efficiency of therapy. Additional studies will be required to examine the efficacy of longer forms of computer-assisted therapy. Finally, during the follow-up phase, we did not attempt to control treatment or monitor whether patients had sought additional treatment. Thus, a maintained response during this phase cannot be attributed unambiguously to the effects of acute therapy with computer-assisted cognitive therapy or standard cognitive therapy.

Several features of the research design support the integrity of the results obtained in this investigation. The study used specific inclusion and exclusion criteria, random assignment to treatment condition, evaluators blind to the condition, detailed treatment manuals, and measurement of therapist competence and adherence to treatment protocols. Although the group size was relatively small, and differences were noted between groups in baseline ratings on measures of depression, we adopted a conservative analytic strategy that assessed changes in severity from these levels. We also complemented significance testing with consideration of effect sizes.

The findings have implications for issues of treatment access and cost. Clinicians offering computer-assisted therapy were able to reduce treatment time by almost half while maintaining efficacy. This result encourages further study and application of computer-assisted methods, particularly in treatment settings in which clinician time or access to care are limited. In addition, treatment fidelity measures indicated that computer-assisted therapy was offered with a high level of precision. The ability to standardize aspects of treatment with computer-assisted cognitive therapy offers a strategy for aiding dissemination of cognitive therapy. This application may be particularly important given the low adoption rate of empirically supported psychotherapies (30, 31).

Challenges ahead for studies of computer-assisted cognitive therapy lie in examining efficacy in larger controlled trials and to ascertain effectiveness and transportability to community, primary care, and nontraditional settings. These investigations are needed to explore the promise of computerized psychotherapy: extending clinicians' expertise to more patients at lower cost while maintaining treatment benefit.

Presented in part at the 33rd annual meeting of the Association for the Advancement of Behavior Therapy, Toronto, Nov. 11–14, 1999; the 153rd annual meeting of the American Psychiatric Association, Chicago, May 13–18, 2000; and the World Congress of Cognitive Therapy, Vancouver, B.C., Canada, July 17–21, 2001. Received June 10, 2003; revisions received March 3, 2004, and June 11, 2004; accepted July 8, 2004. From the Department of Psychiatry and Behavioral Sciences, School of Medicine, University of Louisville; the University of Wisconsin School of Medicine, Madison; New York University School of Medicine, New York; the University of Texas, Southwestern, Dallas, Tex.; Massachusetts General Hospital, Boston; and Harvard Medical School, Boston. Address correspondence and reprint requests to Dr. Wright, Norton Psychiatric Center, Department of Psychiatry and Behavioral Sciences, University of Louisville School of Medicine, P.O. Box 35070, Louisville, KY 40232; jwright@iglou.com (e-mail).

Supported by NIMH grant MH-57470 and by a grant from the Norton Community Trust.

The authors thank the following: the clinicians who served as cognitive therapists for this study, Don Kris Small, Ph.D., Peter Steiner, M.D., Troy Raffield, M.A., Virginia Evans, L.C.S.W., and G. Randolph Schrodt, Jr., M.D.; research assistants Jeffery Kuykendall and Jeffery Hudgins; study consultants A. John Rush, Jr., M.D., and Judith Beck, Ph.D.; the independent raters; and the staff of the Norton Psychiatric Center.

Drs. Jesse and Andrew Wright may receive a portion of the profits, if any, from sales of software used in this investigation. All other authors will receive no royalties or other payments from software sales. A portion of the profits, if any, will be donated to the Foundation for Cognitive Therapy and Research and the Norton Foundation.

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