Self-System Therapy as an Intervention for Self-Regulatory Dysfunction in Depression: A Randomized Comparison with Cognitive Therapy

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Abstract:

Self-system therapy (SST) is a new therapy based on regulatory focus theory (E. T. Higgins, 1997) for depressed individuals unable to pursue promotion goals effectively. The authors conducted a randomized trial comparing SST with cognitive therapy (CT) in a sample of 45 patients with a range of depressive symptoms to test 2 hypotheses: that SST would be more efficacious for depressed individuals characterized by inadequate socialization toward pursuing promotion goals and that SST would lead to greater reduction in dysphoric responses to priming of promotion goals. There was no overall difference in efficacy between treatments, but patients whose socialization history lacked an emphasis on promotion goals showed significantly greater improvement with SST. In addition, SST patients showed a greater reduction in dysphoric responses to promotion goal priming than did CT patients. The results illustrate the value of a theory-based translational approach to treatment design and selection.

Keywords: depression | cognitive therapy | regulatory focus theory | self-system therapy | translational research | self-regulatory dysfunction

Article:

Despite the availability of efficacious treatments for depression, a priori identification of optimal treatment for individual patients remains elusive (Craighead, Hart, Craighead, & Ilardi, 2002; Norcross, Beutler, & Caldwell, 2002). Matching treatments to the characteristics of individual patients requires theory-based procedures for assessment and selection (Hollon, Thase, &

Markowitz, 2002; Strauman & Merrill, 2004). Translational approaches to treatment development and matching could provide additional options for treatment as well as reliable and valid bases for treatment selection (National Institute of Mental Health, 2000).

In this article, we report a randomized trial of a new therapy for depression, self-system therapy (SST; Vieth et al., 2003). SST is based on a model of depression as a disorder of motivation and goal pursuit resulting from chronic failure to attain certain kinds of personal goals. The trial examined whether SST would be more effective than cognitive therapy (CT; Beck, Rush, Shaw, & Emery, 1979) for the treatment of depressed individuals whose socialization history lacked an emphasis on promotion goals and who therefore could be vulnerable to depression because they were less able to pursue such goals effectively.

Self-Regulation, Goal Pursuit, and Depression

Research in personality and social psychology has identified potential mechanisms by which problems in self-regulation, defined as the ongoing process of evaluating one's progress toward important personal goals (Carver, 2004), could contribute to the onset and maintenance of depression. Regulatory focus theory (Higgins, 1997) is a model of self-regulation that proposes two kinds of goals, each associated with specific motivational states and strategies for goal pursuit. Promotion goals involve advancement, growth, and achievement; pursuing promotion goals means making good things happen, which is associated with either joyful or dysphoric mood depending on one's perceived progress. Prevention goals involve security, safety, and responsibility; pursuing prevention goals involves keeping bad things from happening, which is associated with either quiescent or anxious affect also depending on one's perceived progress. Individual differences in regulatory focus are conceptually and empirically distinct from individual differences in constructs such as mastery, self-esteem, or self-efficacy (Förster, Grant, Idson, & Higgins, 2001).

Regulatory focus theory stipulates that individuals whose socialization histories did not include a consistent emphasis on promotion will have difficulty attaining promotion goals during adolescence and adulthood (Higgins, 1989; Higgins, Roney, Crowe, & Hymes, 1994). Such individuals would be unlikely to construe social interactions as opportunities to pursue promotion goals (Higgins, Shah, & Friedman, 1997) and, as a result, would have fewer opportunities to experience the positive motivational and affective states associated with making progress toward a promotion goal (Förster et al., 2001). Drawing on studies indicating that inability to attain promotion goals is predictive of dysphoric mood and depressive symptoms (e.g., Scott & O'Hara, 1993). Strauman (2002) proposed a self-regulation model of depression, postulating that individuals who are unable to pursue promotion goals effectively are at risk for mood disorders via a final common pathway (Akiskal & McKinney, 1973) of dysphoric affect, decreased incentive motivation, and negative self-evaluation because of their chronic inability to make good things happen via progress toward their promotion goals.

Depression results from and maintains disruption of the psychological and biological mechanisms of incentive motivation (e.g., Dickson & MacLeod, 2004; Sutton & Davidson, 1997; Tomarken & Keener, 1998; Watson, Wiese, Vaidya, & Tellegen, 1999), and dysfunction of self-regulation is a risk factor for depression (e.g., Karoly, 1999; Kasch, Rottenberg, Arnow, & Gotlib, 2002; Lewinsohn, Allen, Seeley, & Gotlib, 1999). Recent evidence suggests a role for individual differences in orientation to promotion goals in vulnerability to depression. Using functional MRI, Merrill, Dolcos, Cabeza, and Strauman (2006) found that individuals whose self-reported socialization history lacked an emphasis on pursuing promotion goals manifested significantly weaker left prefrontal cortical activation when their promotion goals were activated than did individuals who reported consistent socialization for promotion goal pursuit. In turn, individual differences in left prefrontal cortical activation have been associated with both dispositional positive affectivity and vulnerability to depression (Sutton & Davidson, 1997). Consistent with this model, Merrill, McLean, Dolcos, Cabeza, and Strauman (2006) observed that depressed patients manifested significantly weaker left prefrontal cortical activation after priming of their own promotion goals than did matched nondepressed controls.

Researchers have begun to examine the impact of treatment for depression on psychological mechanisms of goal pursuit. Strauman et al. (2001) found that three empirically supported treatments—Beck's cognitive therapy (CT; A. T. Beck, Rush, Shaw, & Emery, 1979; J. S. Beck, 1995), interpersonal psychotherapy (Klerman, Weissman, Rounsaville, & Chevron, 1984), and pharmacotherapy with selective serotonin reuptake inhibitors—were less effective for depressed individuals with chronic self-perceived failure in promotion goal pursuit than for other patients. If those patients were vulnerable to depression because of inadequate socialization toward pursuing promotion goals, then interventions to enhance promotion goal pursuit might help them recover more completely.

Self-System Therapy

SST is a new therapy designed for depressed individuals unable to pursue promotion goals effectively (see Vieth et al., 2003, for an extended presentation of the rationale, structure, and interventions of SST). SST incorporates techniques from a number of empirically supported psychotherapies (cf. Beutler, Clarkin, & Bongar, 2000), including CT, interpersonal psychotherapy, and behavioral activation therapy (Jacobson, Martell, & Dimidjian, 2001). However, SST was designed to translate the principles of regulatory focus theory into an intervention for examining and modifying the individual's goals and strategies for pursuing them (Avants, Margolin, & Singer, 1994; Moretti, Higgins, & Feldman, 1990). SST can be summarized in four questions: *What are your promotion and prevention goals? What are you doing to try to attain them? What is keeping you from making progress? What can you do differently?* SST was designed so that within an overall emphasis on self-regulation, specific interventions from other therapies could be incorporated easily, allowing the patient and therapist to bring a broad range of techniques to bear on the patient's difficulties in goal pursuit. For example, SST emphasizes the use of behavioral activation, as do behavioral activation therapy

and other therapies. However, in SST, behavioral activation is used in the service of enhancing promotion goal pursuit—that is, "What can you do today that would help you make progress toward that goal?" To the extent that SST is differentially efficacious for depressed individuals with problems in self-regulation, such efficacy would derive from its overall emphasis rather than from any specific techniques or interventions.

We conducted a randomized trial to determine whether SST would be more efficacious than CT for depressed patients with a poor promotion socialization history, who according to regulatory focus theory would have difficulty pursuing promotion goals. CT was used as a comparison treatment because of its extensive support, the availability of trained CT therapists at our clinic, and the possibility of replicating findings (Strauman et al., 2001) that CT and other efficacious treatments were not optimal for depressed patients with poor promotion goal pursuit. This first trial of SST included patients with a range of depressive symptoms, and treatment length was unconstrained. We tested two hypotheses: (a) that SST would be more efficacious than CT for depressed individuals characterized by inadequate socialization to pursue promotion goals (i.e., differential efficacy) and (b) that SST would lead to greater decrease in dysphoric responses to priming of promotion goals (i.e., differential mechanism of action) than CT.

Method

Participants

Patients were recruited from 1999 to 2000 via announcements on local television news broadcasts and in newspapers, intake at a university psychiatric clinic or women's health clinic, or referral from a university counseling center. The university psychiatric clinic served as the site for the study. A total of 110 individuals made an initial inquiry about the study.

The primary eligibility criteria were meeting *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., or *DSM–IV*; American Psychiatric Association, 1994) criteria for major depressive disorder or dysthymic disorder, as well as scoring at least 16 on the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and on the 17-item version of the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960; Williams, 1988) at intake. Recruitment difficulties led us to include 6 individuals who missed meeting criteria for major depressive disorder or dysthymic disorder by a single item because their BDI and HRSD scores were above threshold. Individuals with a history of mania or psychosis, significant antisocial or borderline symptomatology, or current substance abuse were not eligible. Participants could not be receiving other treatments for depression concurrently, including individual or group psychotherapy, antidepressant medication, or putative herbal remedies; anxiolytic or sleep medications such as benzodiazepines were permitted. We also excluded individuals with health conditions that required medications (e.g., steroids) that could exacerbate depression. A total of 65 of the 110 individuals screened were excluded by these criteria.

The remaining 45 individuals were randomized after completing pretreatment measures; 39 (SST = 21, CT = 18) attended at least 12 sessions of psychotherapy and were classified as completers for purposes of data analysis, whereas 6 (SST = 3, CT = 3) did not and were classified as dropouts. Reasons for dropping out were an out-of-state move ($n = 1$), diagnosis of a serious illness in a family member ($n = 1$), and increased work demands or change of schedule ($n = 3$). The remaining noncompleter did not respond to numerous attempts at contact. Follow-up data were obtained for 4 of the 6 noncompleters; for the other 2 noncompleters, pretreatment data were used in the intent-to-treat analyses. Figure 1 summarizes the flow of prospective patients through the study. There were no statistically significant differences between completers and noncompleters on any measured patient characteristic (all $ps > .15$).
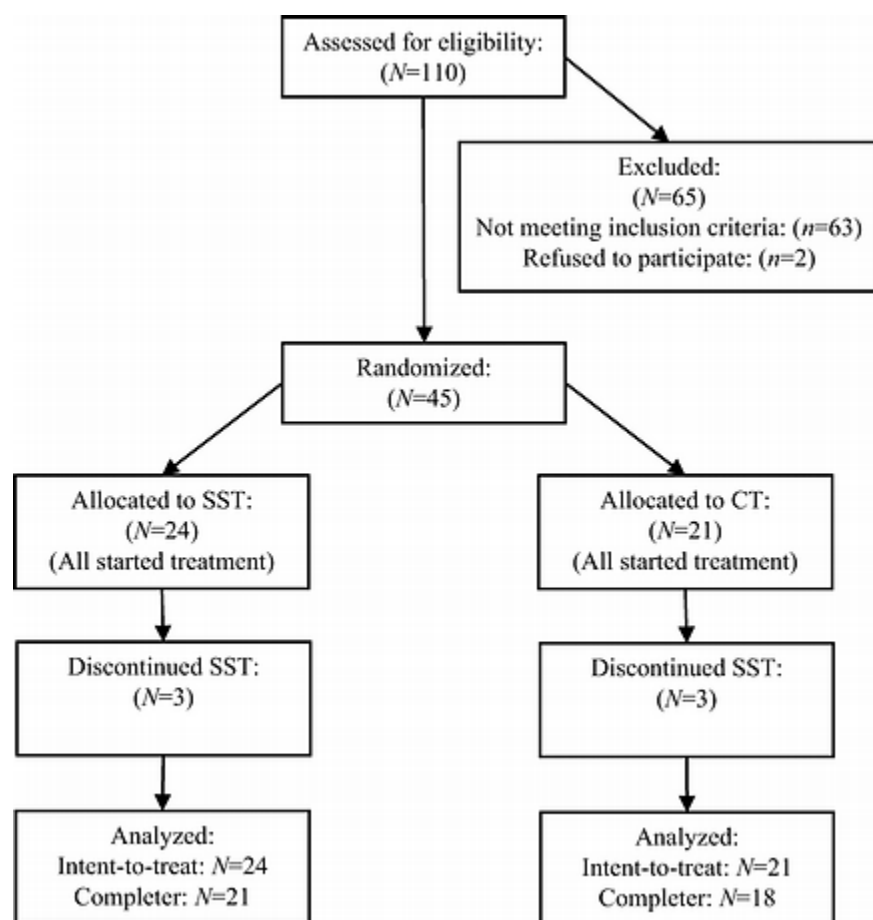

Figure 1. Flow diagram for patients through the posttreatment assessment, including attrition

Procedure

Screening

Individuals were informed about the study, which had been approved by the University of Wisconsin–Madison Medical Center Institutional Review Board, and were screened for

depressed mood, history of mania, current substance use, and current mental health treatment. Those not excluded were given questionnaires to complete. Of the 110 individuals who made an inquiry about the study, 60 were given the questionnaire packet. From among the 55 who completed and returned the questionnaires, 50 scored above threshold on the BDI and were scheduled for an intake appointment approximately 1 week later. All individuals deemed ineligible were given information about treatment alternatives in the local community.

At intake, informed consent was obtained, the Structured Clinical Interview for the *DSM–IV* Axis I Disorders (SCID; First, Gibbon, Spitzer, & Williams, 1995) and a goal interview (see below) were administered, and the intake clinician completed an HRSD. Eligible patients were scheduled for an additional visit before the start of treatment, at which an assessment of affective responses to promotion goal priming and the Wisconsin Personality Disorders Inventory–IV (Klein et al., 1993; Smith, Klein, & Benjamin, 2003) were administered. Upon completion of all pretreatment measures, each participant was paid $50. Eligible patients were randomized by a research assistant via a random-numbers table. As explained earlier, of the 39 completers, 21 received SST and 18 received CT. This sample size provided 72% statistical power to detect a medium effect size (Cohen's $d = 0.5$) in a hierarchical multiple regression analysis (Cohen, 1988).

Course of treatment

Treatment was provided without charge, and length of treatment was unconstrained. Approximately every fourth session was videotaped or audiotaped. For the first six sessions, therapists and patients met weekly; subsequent sessions were conducted at least once every other week (average: for SST, once every 8.1 days; for CT, once every 7.2 days). Treatment was ended when the therapist indicated the final task of the treatment (discussion of relapse prevention for both CT and SST) was completed. For 3 of the 39 patients designated as completers (2 SST, 1 CT), treatment was terminated by the patient before all treatment tasks had been completed. Approximately 2 weeks after treatment ended, participants repeated a subset of the measures taken at pretreatment, including the BDI and an HRSD administered by research staff blind to treatment condition, and were paid $50.

Therapists/intake clinicians

Nine therapists (two faculty clinical psychologists, four clinical psychology postdoctoral fellows, and three clinical psychology predoctoral interns) provided treatment. Seven therapists saw patients in both treatment conditions, one in CT alone, and one in SST alone. The therapists' average age was 33.8 years ($SD = 6.6$), and their average years of therapy experience was 7.0 ($SD = 4.1$; range = 4–15). The predoctoral- and postdoctoral-level therapists all had undergone prior training in CT, had a minimum of 3 years of CT experience, and received weekly individual supervision on their CT cases from one of the faculty-level therapists. In addition, study therapists attended a formal weekly CT didactic seminar conducted by Timothy J.

Strauman, who is a Fellow of the Academy of Cognitive Therapy. All study therapists received training in SST before as well as during the study. Therapists were required to study the SST manual (Strauman et al., 2001) and to attend weekly group meetings for discussion, case presentations, and videotape or audiotape review. Study therapists also administered SCID interviews at intake before randomization, and posttreatment assessments were conducted by study personnel who were blind to treatment condition.

Measures

Background questionnaire (pretreatment)

Participants completed a background questionnaire designed for the study. In addition to standard demographic questions, the measure inquired about the respondent's history of mental health diagnoses and treatment.

SCID–Patient Edition, Version 2.0 (pretreatment)

The SCID (First et al., 1995) is a widely used semistructured interview for diagnosis of Axis I disorders as described in the fourth edition of the *DSM* (American Psychiatric Association, 1994). Intake clinicians completed all nonoptional modules except for Module G (Somatoform Disorders), which was completed if time permitted.

Regulatory Focus Questionnaire (RFQ; pretreatment)

The RFQ (Higgins et al., 2001) is a 22-item self-report measure of individual differences in orientation to promotion and prevention goals consisting of four subscales: Promotion History (5 items assessing the extent to which the respondent was socialized as a child to construe situations in terms of promotion goals, e.g. having parents who celebrated the respondent's accomplishments), Promotion Pride (6 items assessing the extent to which the respondent feels a sense of pride and well-being from the pursuit of promotion goals, e.g., becoming more motivated by accomplishments), and corresponding Prevention History (5 items assessing the extent to which the respondent was socialized as a child to construe situations in terms of prevention goals, e.g., having parents who pointed out possible dangers) and Prevention Pride (6 items assessing the extent to which the respondent feels a sense of pride and well-being from the pursuit of prevention goals, e.g., feeling good about following rules) subscales. Merrill, Dolcos, et al. (2006) reported internal consistency values (coefficient alpha) of .78, .74, .79, and .81 for the Promotion History, Prevention History, Promotion Pride, and Prevention Pride subscales, respectively, and observed that the two History subscales were uncorrelated ($r = .08$), whereas the Pride subscales were moderately correlated ($r = .41$). Furthermore, the History subscales were not significantly correlated with depressive symptoms in the Merrill, Dolcos, et al. (2006) study (both $r < .10$), whereas the Pride subscales were ($r = .42$ for Promotion Pride and .38 for Prevention Pride). Thus, we anticipated that the History subscales were more likely to predict treatment outcome.

Goal interview (pretreatment)

To assess patients' promotion goals, we administered an interview version of the Selves Questionnaire (SQ; Higgins, Bond, Klein, & Strauman, 1986) in which patients were asked about their ideals (hopes and aspirations), which constitute important promotion goals (Higgins et al., 1997). The SQ, a free-response measure on which participants are asked to describe their actual self, their ideal self, and their "ought" self, was administered individually. In the interview, the patient was asked about his or her own beliefs as well as her or his perceptions of what significant others (e.g., a spouse or parent) would say about them. Responses to the ideal- and ought-self questions in the interview were most often trait attributes such as "successful," "loving," "conscientious," "hardworking," "kind," or "independent." Stimuli for the goal-priming task (see below) were selected from each patient's set of responses to the interview.

Assessment of affective responses to promotion goal priming (pretreatment and posttreatment)

We assessed affective responses to priming of promotion goals using a previously developed childhood memory task (Strauman, 1992). Participants were presented with a series of words and were instructed to use each word to verbalize the first memory that came to mind. Unknown to participants, the word list had been created in part on the basis of their responses to the goal interview and included two types of goals. Five promotion goals were selected from among a participant's ideal-self responses that were unique to the ideal domain. Five yoked-control cues were selected from the promotion goals of other participants (and so were positively valenced as well). These cues were not semantically related to any goal generated by the participant in the goal interview. The yoked-control cues tested the alternative hypothesis that the words themselves, rather than their status as goals, influenced participants' responses. The same word list was used for the pretreatment and posttreatment assessment.

Each participant was told that she or he would be presented with words to help her or him remember experiences from childhood. For each word, the participant was to describe aloud the first memory that came to mind. Participants had 30 s to retrieve a memory, after which the trial was considered a memory failure and they were given the next word. Two practice trials using the words *pleasant* and *content* were conducted. Words were presented in random order, and verbalized memories were audiotaped and later transcribed. Memories of recent events were not scored as memory failures, but participants were reminded to report memories from childhood. No participant had more than five responses that were not sufficiently remote in time (average = 1.0). Memory failures occurred at approximately the same incidence (6.2% for promotion goal cues and 14% for control cues) as in previous studies (e.g., Strauman, 1992). After the posttreatment assessment, each participant was asked whether she or he had any guesses about study hypotheses. No participant identified her or his promotion goals as the purpose of the memory task.

Failure in promotion goal pursuit reliably predicts level of dysphoric affect following priming of promotion goals (Strauman, 1989, 1992). We used the sadness/depression score from the Linguistic Inquiry and Word Count (LIWC) computerized text analysis program (Pennebaker, Francis, & Booth, 2001; Pennebaker & King, 1999) to measure the dysphoric content of each memory as an index of affective responses to promotion goal priming.

Treatment adherence

To assess adherence, we constructed a rating scale that was based on the Collaborative Study Psychotherapy Rating Scale (CSPRS; Evans, Piasecki, Kriss, & Hollon, 1984). SST items were generated from the SST manual (Strauman et al., 2001). The scale contained 69 items across four subscales: Session Quality (14 items from the CSPRS; $\alpha = .84$), assessing nonspecific aspects (e.g., rapport, bond); Common Features (21 items; $\alpha = .72$), assessing aspects of therapy shared by SST and CT (e.g., agenda setting, scheduling activities, assigning homework, all drawn from the CSPRS); SST (19 items; $\alpha = .87$); and CT (15 items from the CSPRS; $\alpha = .90$). Sixty-three sessions were rated, including at least one tape from each participant and at least one tape from each therapist–treatment modality combination. Two postdoctoral fellows and one 4th-year psychiatry resident were trained to serve as raters. To assess interrater reliability, we calculated intraclass correlation coefficients (ICCs; Shrout & Fleiss, 1979) between ratings obtained from two of the three possible raters on 22 tapes (selected at random from 22 different patients). Three of the four subscales showed acceptable interrater reliability (Common Features = .76, SST = .66, CT = .93, all $p < .001$), but the ICC for the Session Quality subscale was not significantly different from 0. The lack of agreement on this scale likely resulted from the difficulty of operationalizing those more qualitative constructs for reliable rating of therapist–patient interactions (Hill, O'Grady, & Elkin, 1992). As a result, the Session Quality subscale was not used in adherence analyses.

Results

Patient Characteristics

The average age of the completers was 39.4 years ($SD = 14.2$; range 19–72 years). Most were White (92.5%) and female (75%), and almost all reported prior treatment for depression. Table 1 summarizes patient characteristics by treatment condition. The only statistically significant difference observed was that the SST condition had more patients with a comorbid anxiety disorder than the CT condition (38% vs. 11%, $p < .05$). However, the presence or absence of a comorbid anxiety was not predictive of change from pretreatment to posttreatment on the HRSD ($\beta = .06$, $p > .5$) or BDI ($\beta = -.07$, $p > .40$).

Table 1. *Patient Characteristics for Completers by Treatment Condition*

Characteristic	SST(N=21)		CT(N=18)		Statistic	p
	M	SD	M	SD		

Age	37.2	13.3	40.1	16.3	$t(37) = -0.67$	$p > .50$
	No.	%	No.	%		
Female	18	85.7	11	61.1	$x^2(1) = 3.37$	$p < .10$
Ethnicity					Fisher's exact test $p > .50$	
White	19	90.4	17	94.4		
Latino/Latina	1	4.8	1	5.6		
Other	1	4.8	0	0.0		
Marital status					Fisher's exact test $p > .30$	
Single, never married	7	33.3	3	16.7		
Married/cohabitating	10	47.7	11	61.1		
Widowed	0	0.0	1	5.6		
Separated/divorced	4	19.0	3	16.7		
Educational level					Fisher's exact test $p > .50$	
Some high school	1	4.8	0	0.0		
High school degree	7	33.3	6	33.3		
College degree	9	42.9	8	44.4		
Graduate or professional degree	4	19.0	4	22.2		
Mood disorder diagnosis					$x^2(3) = 0.61$	$p > .50$
Major depressive disorder	9	42.9	6	33.3		
Dysthymic disorder	4	19.0	4	22.2		
Both major depressive & dysthymic disorders	5	23.8	5	27.8		
Other	3	14.3	3	16.7		
Anxiety disorder diagnosis	8	38.1	2	11.1	$x^2(1) = 4.24$	$p < .05$
Axis II diagnosis	14	12	12	66.7	$x^2(1) = 0.00$	$p > .50$
Prior depression	18	85.7	16	88.9	$x^2(1) = 0.05$	$p > .50$
Prior antidepressant medication	9	42.9	11	61.1	$x^2(1) = 1.54$	$p > .20$
Prior psychotherapy	17	81.0	15	83.3	$x^2(1)$ 0.02	$p > .50$

Note. SST = self-system therapy; CT = cognitive therapy.

Treatment Characteristics

Quantity and adherence

SST completers received more sessions ($M = 21.7$) than CT completers ($M = 19.6$), but the difference was not statistically significant, $t(37) = 1.26$, $p > .25$, and the number of sessions did not predict change from pretreatment to posttreatment on the HRSD ($\beta = -.08$, $p > .4$) or BDI ($\beta = .04$, $p > .5$). We compared the mean scores for the three adherence subscales with acceptable reliability within the two treatment conditions. Because some patients were included more than once within the subset of rated tapes, a mixed-model analysis of variance was used to isolate treatment effects. CT and SST did not differ on the Common Features subscale—CT $M = 3.09$, SST $M = 2.98$, $F(1, 50) = 0.74$, $p > .5$—indicating comparable agenda-setting, homework assignments, and other common elements. The SST sessions contained significantly more SST-specific content than the CT sessions, CT $M = 1.15$, SST $M = 1.99$, $F(1, 50) = 8.42$, $p < .001$, whereas the CT sessions contained significantly more CT-specific content than the SST sessions, CT $M = 2.68$, SST $M = 1.49$, $F(1, 50) = -9.93$, $p < .001$.

Overall treatment efficacy

Table 2 presents unadjusted pretreatment and posttreatment mean HRSD and BDI scores by treatment condition, as well as adjusted posttreatment means, for both intent-to-treat and completer analyses. Because the analyses yielded similar findings, we focus here on the completer analyses. We conducted a hierarchical regression analysis with the posttreatment HRSD score as the criterion variable and the pretreatment HRSD score as well as treatment condition (SST, CT) as predictors. The main effect of treatment condition was not statistically significant, $F(1, 36) = 1.41$, $p > .2$. Both treatments were associated with a substantial decrease in depressive symptoms (Cohen's $d = 1.74$ combining across treatments, 95% confidence interval [CI] = 1.21, 2.28). For SST, the mean HRSD scores were 19.4 at pretreatment and 6.5 at posttreatment (Cohen's $d = 1.71$, 95% CI = 1.00, 2.42); for CT, the mean HRSD scores were 20.7 at pretreatment and 7.7 at posttreatment (Cohen's $d = 1.87$, 95% CI = 1.16, 2.70). In a similar hierarchical regression analysis with posttreatment BDI scores as the criterion variable, the main effect of treatment condition likewise was not statistically significant, $F(1, 36) = 1.56$, $p > .2$, Cohen's $d = 1.68$ combining across the two treatments, 95% CI = 1.15, 2.19. For SST, the mean BDI scores were 24.7 at pretreatment and 9.5 at posttreatment (Cohen's $d = 1.75$, 95% CI = 1.03, 2.48); for CT, the mean BDI scores were 24.6 at pretreatment and 10.7 at posttreatment (Cohen's $d = 1.65$, 95% CI = 1.12, 2.19). These findings (both HRSD and BDI) were not affected by inclusion of number of therapy sessions or comorbid anxiety disorders as additional predictors.

Table 2. *Means and Standard Deviations of Pretreatment and Posttreatment Depression Scores by Treatment Condition*

	Intent-to-treat analysis	
	CT (N = 21)	SST (N =24)

Measure	Pretreatment		Posttreatment		Adjusted Posttreatment		Pretreatment		Posttreatment		Adjusted Posttreatment	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
HRSD	19.2	4.8	9.8	6.7	8.9	5.9	18.8	4.2	8.9	4.9	8.1	5.8
BDI	24.0	5.9	12.8	8.9	12.0	9.1	24.6	4.8	10.2	6.9	10.0	6.6
Completer analysis												
CT (N = 18)							SST (N = 21)					
	Pretreatment		Posttreatment		Adjusted Posttreatment		Pretreatment		Posttreatment		Adjusted Posttreatment	
Measure	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
HRSD	20.7	4.9	7.7	6.6	8.0	6.1	19.4	4.3	6.5	5.5	6.9	5.9
BDI	24.6	6.2	10.7	7.1	10.2	8.1	24.7	5.1	9.5	6.8	7.9	6.2

Note. CT = cognitive therapy; SST = self-system therapy; Adjusted posttreatment M and SD = adjusted for pretreatment mean; HRSD = Hamilton Rating Scale for Depression (Hamilton, 1960; Williams, 1988); BDI = Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

Clinically significant change

We determined which patients had a decrease greater than 50% on both HRSD and BDI scores (Hageman & Arrindell, 1999). For SST, 12 of 21 (57.2%) patients met these criteria; for CT, 9 of 18 (50.0%) did so. This difference was not statistically significant by Fisher's exact test ($p > .5$). Using the criterion for recovery from depression of the Treatment of Depression Collaborative Research Program (Elkin, 1994), we also determined which patients had a posttreatment score of 6 or less on the BDI. According to this criterion, 9 (47.6%) of the SST patients and 6 (33.3%) of the CT patients had recovered. This difference was not statistically significant by Fisher's exact test ($p > .15$).

Differential efficacy as a function of promotion history

To determine whether SST was more efficacious for patients with low scores on the Promotion History subscale of the RFQ, we conducted a hierarchical regression analysis with posttreatment HRSD score as the criterion variable. As we did in the section above, because the intent-to-treat and completer analyses yielded similar findings, we focus on the latter. In the first step, entering the pretreatment HRSD score accounted for 25% of the variance ($p < .001$, $\beta = .50$). In the second step, treatment condition was entered but did not account for a significant increment in variance ($\Delta R^2 = .04$, $p > .20$). In the final step, we entered the RFQ Promotion History subscale and its interaction with treatment condition. This step accounted for a significant increment in variance ($\Delta R^2 = .10$, $p < .05$); promotion history was not predictive of HRSD score ($p > .25$), but the Promotion History $\times$ Treatment Condition interaction was ($sR^2 = .09$, $p < .05$). To assess

discriminant validity, we repeated this analysis using the other RFQ subscales (Prevention History, Promotion Pride, and Prevention Pride); no significant main effect or interaction with treatment condition was observed for those subscales (all sR^2s < .03). We then probed the significant interaction by testing for differences in posttreatment HRSD as a function of treatment and promotion history. Following the method used by Cohen, Cohen, West, and Aiken (2003), we computed posttreatment HRSD scores for low (−1 SD), moderate (mean), and high (+1 SD) levels of promotion history within each treatment condition; Figure 2 depicts estimated HRSD scores by treatment condition and level of promotion history. Low-promotion-history patients receiving SST had significantly greater reduction in HRSD scores (from 20.2 to 4.8) than did low-promotion-history patients receiving CT (from 21.2 to 12.1), $F(1, 34) = 5.59$, $p <$ .05. No other pair of scores differed significantly from each other, indicating that the difference between treatments was limited to the lower end of the range of RFQ promotion history scores.
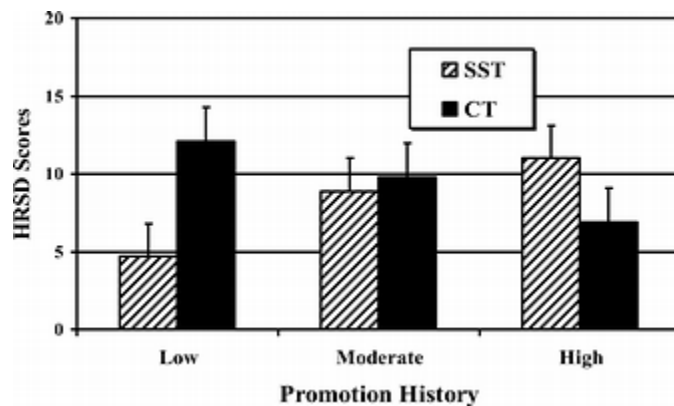
Figure 2. Predicted posttreatment Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960; Williams, 1988) scores by treatment condition and level of promotion history (1 standard deviation below the mean, mean, and 1 standard deviation above the mean), adjusted for pretreatment HRSD. Means and standard errors are presented for each treatment–promotion history combination. SST = self-system therapy, CT = cognitive therapy

We conducted a similar hierarchical regression analysis with the posttreatment BDI score as the criterion variable. In the first step, we entered the pretreatment BDI score, which accounted for 13% of the variance (β = .36, $p < .01$). In the second step, we entered treatment condition, which did not account for a significant increment in variance ($\Delta R^2 = .03$, $p > .25$). In the final step, we entered the RFQ Promotion History subscale and its interaction with treatment condition. This step accounted for a significant increment in variance ($\Delta R^2 = .09$, $p < .05$). The RFQ Promotion History subscale did not predict BDI scores ($p > .25$), whereas the Promotion History × Treatment Condition interaction approached statistical significance ($sR^2 = .07$, $p < .10$). Probing the interaction revealed the same pattern of slopes, with greatest difference observed between low-promotion-history patients receiving SST and those receiving CT. A simple slopes comparison test indicated that the low-promotion-history patients who received SST had a significantly greater reduction in BDI than the low-promotion-history patients who received

CT, t(35) = 2.42, p < .05. Repeating this analysis using the other three RFQ subscales, we found no significant main effect or interaction with treatment (all sR^2s < .03).

Effects of treatment on dysphoric responses to promotion goal priming

To test the differential mechanism of action hypothesis (that SST would lead to greater reduction in dysphoric responses to priming of promotion goals than CT), we conducted a repeated measures analysis of variance using the LIWC sadness/depression score as the dependent measure, time (pretreatment, posttreatment) and cue type (promotion goal, yoked-control) as within-subject variables, and treatment condition (SST, CT) as a between-subjects variable. The analysis revealed a significant main effect of time, $F(1, 35) = 12.04$, $p < .001$, as well as a significant Time × Treatment Condition × Cue Type interaction, $F(1, 35) = 4.49$, $p < .05$. There was a decrease in dysphoric memory content primed by promotion goals from pre- to posttreatment, compared with that primed by yoked control; however, that trend was qualified by the significant three-way interaction. Specifically, SST led to a significant decrease in dysphoric content following promotion goal priming (pretreatment $M = 1.0$; posttreatment $M = 0.4$), $F(1, 36) = 5.58$, $p < .05$, whereas CT did not (pretreatment $M = 0.8$; posttreatment $M = 0.7$), $F(1, 36) = 0.95$, $p > .5$; there were no significant changes in dysphoric content following yoked-control priming. As a further test, we examined the association between symptom reduction and change in affective response to promotion priming using simple change scores and calculating correlations within each treatment condition. For SST, the correlation between symptom and dysphoric affect change scores was statistically significant ($r = .35$, $p < .05$); for CT, the correlation was not statistically significant ($r = .11$, $p > .25$). However, the two correlations were not significantly different by Pearson's z transformation test ($p > .20$).

Discussion

SST is a new therapy based on a model of depression as a disorder of motivation and goal pursuit. Following previous research (Strauman et al., 2001), we hypothesized that SST would be differentially beneficial for depressed patients who were unable to pursue promotion goals effectively. In this randomized clinical trial, although both CT and SST were efficacious overall, SST was more efficacious for individuals whose self-reported socialization history lacked an emphasis on promotion and who therefore, according to regulatory focus theory, would be less able to pursue promotion goals effectively. SST also led to greater change in dysphoric responses to promotion goal priming, suggesting that the two treatments may have different mechanisms of action. We believe these findings illustrate the potential of a translational approach to the development and selection of treatments for depression.

The differential efficacy hypothesis tested in this study predicted that a specific individual difference variable, promotion history, would moderate treatment outcome (Kraemer, Wilson, Fairburn, & Agras, 2002). The moderation effect represented an average posttreatment difference of approximately 6 points on the HRSD—a substantial effect both statistically and clinically.

Although we did not assess patients' promotion goals during treatment (to avoid possible contamination of the therapy process), the findings suggest that SST helps to reduce negative affect associated with the individual's unmet promotion goals, which in turn would enhance an individual's ability to pursue such goals (Vieth et al., 2003). The other three RFQ subscales were not predictive of outcome (either as main effects or interacting with treatment condition), a pattern that provided support for the discriminant validity of our predictions.

Why might individual differences in promotion history be predictive of response to SST versus CT? The RFQ Promotion History subscale is intended to measure the extent to which an individual was socialized during childhood toward construing life events in terms of making good things happen (Higgins, 1989, 1997; Manian, Papadakis, Strauman, & Essex, in press). As such, the score on the Promotion History subscale should predict one's ability to pursue promotion goals effectively. Promotion history is only minimally correlated with extraversion, suggesting that it is not a measure of individual differences in behavioral activation system strength (Merrill, Dolcos, et al., 2006). Promotion history is also predictive of intensity of left prefrontal cortical activation following promotion goal priming in healthy controls (Merrill, Dolcos, et al., 2006), and a similar measure of orientation to promotion goals was predictive of left frontal resting EEG activity (Amodio, Shah, Siegelman, Brazy, & Harmon-Jones, 2004). Extrapolating from those studies, we proposed that depressed individuals reporting low levels of promotion-focused socialization during childhood may not have learned how to make good things happen and so would be vulnerable to depression via a pathway involving chronic failure to make progress toward promotion goals (Strauman, 2002). The emphasis in SST on the distinction between promotion and prevention, each of which involves specific strategies for goal pursuit, may have provided a perspective and skill set that allowed these individuals to initiate a self-reinforcing process of pursuing promotion goals.

In contrast, prevention history represents the extent to which an individual was socialized toward construing life events in terms of keeping bad things from happening and was not predictive of outcome. The Promotion Pride and Prevention Pride subscales, which in nonpsychiatric samples are moderately correlated with depressive symptoms, likewise were not predictive of response to either CT or SST. We had not expected the Promotion Pride and Prevention Pride subscales to be predictive of outcome because they represent the individual's current assessment of her or his overall success in goal pursuit and that judgment covaries with extent of depressive symptoms.

The present findings are consistent with research on the motivational and affective consequences of individual differences in regulatory focus, as well as with models of depression emphasizing motivational deficits in response to approach goals (e.g., Mayberg, 2003; Watson et al., 1999). Replication with other measures of promotion goal activation and pursuit could shed additional light on how, and for whom, SST might be effective. Furthermore, a randomized clinical trial making a priori predictions regarding response to SST would subject the differential efficacy and mechanism of action hypotheses to "grave danger of refutation" (Meehl, 1978, p. 806).

To conclude that SST was more efficacious for a subset of patients, we must show that CT was delivered with sufficient fidelity. In our adherence data, CT and SST did not differ on the Common Features subscale, whereas each was rated significantly higher on its corresponding subscale. That is, CT and SST were rated as equivalent with regard to shared features such as agenda setting and homework but differed with regard to treatment-specific interventions. The means for the SST and CT conditions on the Common Features subscale, as well as on the mean CT subscale score for the CT condition, were equivalent to those reported in prior studies using the CSPRS (e.g., Hill et al., 1992).

The CT in this study also can be assessed via benchmarks (Merrill, Tolbert, & Wade, 2003). Our CT condition led to an average 63% reduction in HRSD scores (from 20.7 to 7.7). DeRubeis et al., (2005) reported estimated average reductions in HRSD scores for a 16-week course of CT of approximately 58% at one site (from approximately 24 to 10) and approximately 48% at another (from approximately 23 to 12). Similarly, Blackburn and Moore (1997) reported an average reduction in HRSD scores of 44% for a 16-session course of CT (from 19.2 to 10.7). Although our patients were less depressed on average than in those in the studies by Blackburn and Moore (1997) and DeRubeis et al., (2005), the degree of improvement in patients in our CT condition was comparable (although our CT patients received on average 18.2 sessions, whereas the two studies cited as benchmarks used 16-week and 16-session protocols, respectively).

We also compared our findings with findings for the CT condition reported by Strauman et al. (2001, Study 2). In that trial, depressed patients receiving CT manifested an average 57% reduction in HRSD scores (from 21.9 to 9.6) during a course of treatment with the number of sessions comparable to the number of sessions in the present study (16.9 sessions)—an average outcome consistent with the CT condition in the current study. For the subset of patients with chronic failure to attain promotion goals who received CT, Strauman et al. (2001) reported an average 42% reduction in HRSD scores (from 22.0 to 12.8), compared with an estimated average 43% reduction in HRSD scores (from 21.7 to 12.4, according to regression analysis) for similar patients in the present trial. Thus, there are several indirect sources of evidence suggesting that CT was delivered competently in the present study.

Although this study indicated that a subset of depressed patients benefited differentially from SST and that SST had a greater impact than CT on affective responses to promotion goals, other treatment approaches might be effective for such patients. We did not attempt to modify or lengthen CT or to train therapists providing CT to focus their efforts on identifying problematic goals and goal pursuit strategies. CT has been shown in numerous studies to be both efficacious and flexible, so it provided a strong comparison condition. It will be important to explore whether CT (or other treatments) could be modified to help patients with poor promotion goal pursuit attain recovery. Follow-up analyses will also help to clarify questions of the utility of SST versus CT for relapse prevention within subsets of depressed patients.

One advantage of a translational approach to treatment development is the possibility of identifying theory-based targets for change (Strauman & Merrill, 2004). In this trial, almost all patients' courses of treatment were ended when the set of tasks or milestones stipulated within that treatment model had been addressed. However, other criteria might have been used (including a fixed number of sessions per patient, which we chose not to do in the absence of data regarding the average number of sessions in a course of treatment with SST; see below). It may be possible to develop a "treat-to-criterion" strategy for SST, in which treatment length and session content are guided by the patient's progress on measures of promotion goal pursuit. Another advantage of translational research is that findings obtained in studies applying theory to intervention can be relevant to the underlying theory itself and to models of how treatments work. For example, we found no difference between SST and CT as a function of patients' ratings of their overall success or failure in goal pursuit (the RFQ Promotion Pride and Prevention Pride subscales). This may indicate that both treatments address self-evaluation processes, whereas SST may be better suited for patients with relative deficits in goal pursuit.

Because this was the first comparative trial of SST, we elected not to fix the length of treatment, introducing a naturalistic element within a controlled design. This decision allowed us to gather data regarding characteristics of SST, but it also limited the conclusions that could be drawn. In particular, although treatment length was not correlated with outcome, the possibility that therapists inadvertently ended treatment differentially according to treatment condition or promotion history cannot be ruled out entirely. Replication studies should ensure that treatment conditions being compared are of identical duration. The present findings suggest that it should be possible to deliver SST, like CT, within a structured 16-week course of treatment.

The possibility of allegiance and therapist effects also must be considered because the study was conducted by SST's developers. Although the data suggest that CT and SST were delivered with appropriate adherence and we found no evidence for substantial allegiance effects, replication by unaffiliated investigators is still required. Also, although seven of the nine therapists provided both treatments, one provided only CT and another only SST; in addition, therapists saw different numbers of patients in each treatment condition. As a supplementary analysis, we conducted a mixed-model repeated measures analysis of variance with pretreatment and posttreatment HRSD scores as dependent variables, treatment condition and promotion history as fixed effects, and therapist as a random effect. This analysis revealed no statistically significant main effects or interactions involving the therapist random effect (all $p > .20$). However, our sample size provided sufficient power only to detect a large effect size in this case (Cohen's $d = 0.9$), so more subtle therapist effects may have escaped detection.

There are a number of other limitations of the study that should be acknowledged. First, the inclusion of multiple affective disorder diagnostic categories (specifically, 14 of the 40 patients did not meet all criteria for major depressive disorder) resulted in a sample that was somewhat less depressed than those in other clinical trials involving CT. Second, although efforts were made to ensure the equivalence of training and supervision across the two treatments, the fact

that therapists all had prior training and experience in CT but learned SST specifically for this study implies that there were at least minimal differences between the two conditions in terms of training experiences. Third, only CT and SST were included; a larger study including additional modalities (psychological and pharmacologic) would provide important data regarding the generalizability of the differential outcome and mechanism of action findings across available treatments.

Finally, the mechanisms of action by which SST and CT are hypothesized to lead to changes in psychological processes deserve further attention. Our analysis of treatment effects on dysphoric responses to promotion goal priming was a first step in elucidating one possible modality-specific mechanism, but more fine-grained analyses would be helpful. For example, it would be useful to determine whether the promotion and prevention goals identified by each patient before treatment became focal topics during treatment and whether the extent to which such goals were topics of discussion could be predictive of outcome in either condition. Likewise, it would be important to consider whether additional techniques might be included in SST to enhance its impact on self-regulation. Elucidating the shared and unique mechanisms of action of CT and SST could enhance the ability of therapist–patient dyads to maximize outcome. Nonetheless, we are encouraged that a self-regulation perspective on depression may be of value for treatment and that a translational approach to treatment development and matching may indeed be useful.

Footnotes

[1] We also conducted hierarchical regression analyses predicting posttreatment HRSD and BDI scores that included number of therapy sessions and the presence or absence of a comorbid anxiety disorder as covariates. Neither covariate influenced the overall pattern or statistical significance of the findings reported above.

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