

Problem-Solving Therapy Versus Supportive Therapy in Geriatric Major Depression With Executive Dysfunction

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Objective: *The authors compared the efficacy of problem-solving therapy (PST) and supportive therapy (ST) in a group of elderly subjects with impairment in executive functions. This group was targeted because it has been shown to be at the risk for poor response to pharmacotherapy. Methods:* *A total of 25 elderly subjects with major depression and abnormal scores in initiation/perseveration and response inhibition tasks were randomly assigned to receive weekly sessions of PST or ST for 12 weeks. The subjects were systematically evaluated by raters blind to the study hypotheses. Results:* *PST was more effective than ST in leading to remission of depression, fewer post-treatment depressive symptoms, and less disability. A substantial part of the change in depression and disability was explained by the subjects' improvement of skills in generating alternatives and in decision-making. Conclusion:* *This preliminary study suggests that PST is effective in reducing depressive symptoms and disability in elderly patients with major depression and executive dysfunction. If these findings are confirmed, PST may become an important therapeutic alternative for a patient population who may otherwise remain symptomatic and disabled. (Am J Geriatr Psychiatry 2003; 11:46-52)*

Impairment in executive functions, including initiation, perseveration, and response inhibition, is common in depressed elderly patients.^{1,2} Abnormal performance in tests of initiation/perseveration (I/P) and response inhibition were noted to increase the risk of poor and unstable response of geriatric major depression to a variety of antidepressants, including nortriptyline^{3,4} and citalopram.⁵ The relationship between I/P scores and poor or slow antidepressant response was

noted regardless of the presence or absence of a dementia syndrome.³ Moreover, the relationship of I/P and response inhibition to poor and unstable antidepressant response appears to be specific to these impairments, as overall cognitive dysfunction and memory dysfunction alone were not associated with antidepressant response.³⁻⁵

This study focuses on a group of elderly subjects with impairment in executive functions shown to in-

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crease the risk for poor response to pharmacotherapy, and it compares the efficacy of two psychotherapies. This group is targeted because the risk of poor response to pharmacotherapy necessitates identification of a therapeutic alternative. Problem-solving therapy (PST) was selected as the experimental treatment for several reasons. PST targets depression by systematically teaching patients skills for improving their ability to deal with their own specific everyday problems and life crises, rather than developing generic skills.

PST has been found to be effective in major depression in younger patients,^{6,7} older adults,⁸ medical patients,⁹⁻¹¹ and mildly retarded adults.^{12,13}

Moreover, PST has been shown to improve initiation and completion of tasks in patient populations with significant executive dysfunction, for example, schizophrenic patients.¹⁴

Finally, PST has the "therapeutic ingredients" (behavioral activation and increased exposure to positive events; interpersonal sensitivity; and remediation of deficits in communication) necessary for addressing the symptom profile of depressed elderly patients with executive dysfunction, that is, lack of interest in activities, psychomotor retardation, reduced insight, suspiciousness, a rather mild vegetative syndrome,¹⁵ and pronounced behavioral disability.^{16,17} The comparison condition was supportive therapy (ST), a standardized treatment that encompasses nonspecific therapeutic factors common to all approaches, including facilitating affect expression, helping the patient to feel understood, offering empathy, providing a treatment ritual, offering success experiences, and imparting therapeutic optimism.

The study tested three hypotheses: 1) PST is more effective than ST in reducing depressive symptoms over a period of 12 weeks in elderly patients with executive dysfunction; 2) PST is more effective than ST in reducing disability; and 3) PST's effect on depression and disability is mediated by improvement in generation of alternatives and decision-making.

METHODS

The study was conducted at two centers, the Cornell Intervention Research Center and the University of San Francisco. The subjects were consecutively recruited over a 2½-month period. They were included if they

were 65 years of age or older, met DSM-IV criteria¹⁸ for unipolar major depression, and had a score of 18 or higher on the 24-item Hamilton Rating Scale for Depression (Ham-D¹⁹), a Stroop Response Inhibition²⁰ score below 26, and a Mattis Dementia Rating Scale-Initiation/Perseveration Domain (DRS-IP)²¹ score below 34; these scores were one standard deviation (SD) below the mean of our normal elderly sample. These executive function tests were selected because in earlier studies, they were shown to be associated with high risk for poor and unstable response to antidepressant pharmacotherapy.³⁻⁵ Exclusion criteria were 1) a history of other psychiatric disorders, except personality disorders, before the onset of depression; 2) suicidal ideation (score greater than 1 on the Suicidal Ideation item of Ham-D); 3) severe or acute medical illness (e.g., metastatic cancer, brain tumors, myocardial infarction within 3 months before the study); 4) neurological disorders (e.g., delirium, stroke, Parkinson disease, history of head trauma, and multiple sclerosis); and 5) a Mini-Mental State Exam (MMSE)²² scale score below 24. All subjects signed consent forms.

Diagnostic evaluation was conducted with the SCID²³ and the DSM-IV criteria. Severity of depression was quantified with the 24-item Ham-D. Functional status was assessed with the World Health Organization Disability Assessment Schedule II (WHODAS-II²⁴). The WHODAS-II is a 36-item instrument that assesses six domains: 1) understanding and communicating; 2) getting around; 3) self-care; 4) getting along with others; 5) household and work activities; and 6) participation in society. It offers a comprehensive view of domains of disability that affect quality of life.

Overall cognitive impairment was assessed with the MMSE. Executive dysfunction was examined with the DRS-IP as well as the Stroop Response Inhibition Test. The IP domain tests: 1) verbal I/P, for example, naming supermarket items over 1 minute; 2) performing alternating movements; and 3) reproducing graphomotor designs, for example, "XOXO". The Stroop tests the ability to suppress a response to a stimulus (reading the word of a color) incongruous to the correct stimulus (identifying the color of the print of a word). Problem-solving skills were assessed with the Social Problem-Solving Inventory (SPSI).²⁵ The SPSI is a reliable ($\alpha = 0.94$) self-report of problem-solving ability;²⁵ it assesses five domains of problem-solving, specifically, problem orientation, problem definition, alternative generation, decision-making, and solution implementa-

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tion and verification. Two domains of the SPSI are hypothesized to mediate the effects of PST on improvement of depression and disability. The Alternative Generation domain evaluates the ability to brainstorm a list of solutions for a given problem; it has a reported reliability coefficient of 0.84.²⁵ The Decision-Making domain assesses the ability to decide which solution among a list will most effectively solve a problem; it has a reliability coefficient of 0.80.²⁵ The Ham-D, WHODAS-II, MMSE, DRS-IP, Stroop, and SPSI were repeated at the end of the treatment (at 12 weeks) or at exit from the study in subjects who had to be terminated. All instruments were administered by trained research assistants who were blind to the hypotheses of the study.

In each center, the subjects were randomly assigned to PST or ST by use of random numbers. A total of 12 weekly sessions were offered. Therapists, three in each center, were trained in both PST and ST and monitored for treatment fidelity according to the procedures described below. Each therapist was assigned both PST and ST cases.

Training in PST and ST consisted of a 1-day workshop during which therapists were provided with a manual, watched a videotaped demonstration of each intervention, and role-played administration of PST and ST. After the workshop, therapists treated three practice cases, who had major depression and executive dysfunction as defined by the inclusion and exclusion criteria of the study. These cases were audiotaped and reviewed by the investigators (PA and PR). Each tape was rated according to standard protocols, and feedback was given to therapists. Once therapists had completed three cases and had achieved an average score of 4 (Very Good) on the adherence scale in each case (CALPAS-TUI-R²⁶ for ST and PSTAS for PST [Hegel M, Areán PA: Problem Solving Therapy Adherence Scale; unpublished]), they were assigned treatment cases for this study. To obtain treatment fidelity during the study, therapists audiotaped all their sessions and sent the tapes to the investigators, who listen to the first, sixth, and last psychotherapy session for half of the subjects in each treatment. ST tapes were rated using the CALPAS, and PST tapes were rated using the PSTAS. Reviewers provided feedback to the therapists on a weekly basis.

Intent-to-treat analysis was used to test the proposed hypotheses. For the first two hypotheses, we first conducted mixed-effects models analysis. Where there was a trend toward significance, effect-size estimates were determined, and *t*-tests (for continuous variables)

or chi-square tests (for dichotomous variables) were conducted on post-treatment data. These steps were necessary because of the small sample size. The third hypothesis was tested by examining the main effects of treatment assignment and its interactions with time on the variables hypothesized to mediate the effects of treatment. The effect sizes were estimated. Then, hierarchical regression was performed, in which treatment assignment was first entered, followed by the two variables hypothesized to mediate treatment effects on depression and disability. Two-tailed alpha levels of significance above 0.05 were used. To determine treatment and interaction effect sizes, we used Cohen's formula. Specifically, \hat{c} indicates "raise to the power of" and Δ indicates change score): $\text{mean } \Delta 1 - \text{mean } \Delta 2 / [(\text{N}1-1) * \text{SD}1^2 + (\text{N}1-2) * \text{SD}2^2] / (\text{N}1-1) + (\text{N}2-1)$.

RESULTS

A total of 25 subjects were recruited over 2½ months after we had screened 43 candidates. The mean age of the sample was 74 years (range: 66–88), and the mean education level was 13.7 years (range: 8–19; Table 1). Of these, 12 were studied at Cornell and 13 at UCSE. There were no significant differences in demographic or clinical variables between subjects of the two centers. The treatment and research assessment procedures were well accepted by the subjects. None of the 25 subjects dropped out. Three subjects (one PST subject and two ST subjects) were terminated by the therapists in consultation with the investigators because worsening of their clinical state necessitated referral for pharmacotherapy. These subjects were included in the intent-to-treat analysis.

TABLE 1. Sample demographics

Variable	n (%)
Female	13 (52)
Ethnicity	
White	19 (76)
Black	5 (20)
Asian	1 (4)
Employed	3 (12)
	Mean (SD)
Age, years	74.12 (7.27)
Education, years	13.76 (3.33)

Note: SD: standard deviation.

Treatment Impact on Depression

Use of mixed-effects models for continuous data revealed a significant main effect for time ($F_{[1, 22]} = 71.68$; $p < 0.0001$). The PST-treated group had greater change in Ham-D scores (baseline to treatment end [Table 2]) than the ST group (Mann-Whitney $U_{[23]} = 23.5$; $p < 0.01$).

In the PST group, 9 of the 12 subjects (75%) achieved remission (Ham-D < 10), whereas 3 of the 13 subjects (22%) remitted in the ST group ($\chi^2_{[1]} = 6.74$; $p < 0.01$). The effect of PST on remission was evident even in the subjects with the most pronounced executive dysfunction. For example, the two subjects who failed to achieve remission had Stroop scores of 16, 17, and 21 (mean: 18), whereas the subjects who achieved remission had Stroop scores of 13, 14, 18, 19, 19, 19, 20, 21, and 22 (mean: 18.3).

Treatment Impact on Disability

The mixed-effects model on WHODAS-II revealed a significant main effect of time ($F_{[1, 22]} = 12.93$; $p < 0.01$), a significant main effect for treatment (PST was more effective than ST [Table 2]; $F_{[1, 22]} = 27.11$; $p < 0.0001$), and a significant time-by-treatment interaction ($F_{[1, 22]} = 4.44$; $p < 0.05$); that is, PST led to a more rapid improvement in WHODAS-II scores. The effect size for the time-by-treatment interaction was 0.58. The PST group had less disability (higher WHODAS-II scores) at the end of treatment than the ST group ($t_{[23]} = 4.69$; $p < 0.001$). The beneficial effect of PST on WHODAS-II was evident even in the subjects with the most pronounced executive dysfunction. Subjects with scores below the Stroop median (score of 19) had WHODAS-II change in response

to PST (mean: 23.57; SD: 7.76) similar to that of subjects with Stroop scores above the median (mean WHODAS-II change: 20.60; SD: 4.63).

Correlates of Change

To determine whether improvement in Ham-D and WHODAS-II are mediated by improvement in the SPSI domains of alternative-generation and decision-making, the effects of PST and ST on these SPSI domains were first studied. PST improved more than ST scores (main effect) on the alternative-generation ($F_{[1, 22]} = 6.24$; $p < 0.001$) and the decision-making domains ($F_{[1, 22]} = 2.02$; $p < 0.01$). The effect size for generating alternatives was 0.32. PST-treated subjects had greater improvement in alternative-generation than the ST group post-treatment ($t_{[23]} = 3.04$; $p < 0.01$). The effect size for decision-making was 0.45. PST-treated subjects had greater improvement in decision-making than ST-treated subjects post-treatment ($t_{[23]} = 2.56$; $p < 0.05$).

To determine whether treatment effects on depression (Ham-D) and disability (WHODAS-II) are mediated by improvement in the two SPSI domains, we conducted hierarchical regressions in which treatment assignment (PST versus ST) was first entered, and then the two SPSI domains. The model predicted a substantial part of the variance in depression (Ham-D) change ($R^2_{[22]} = 0.41$; $p < 0.01$). The interaction of treatment by the two SPSI domains (mediation) contributed an additional 20% of the variance to the entire model ($F_{[1, 22]} = 3.9$; $p < 0.01$).

Similar results were noted on the disability model. The entire model accounted for the majority of the explained variance in WHODAS-II change ($R^2_{[22]} = 0.65$;

TABLE 2. Problem-solving therapy (PST) versus supportive therapy (ST) in elderly patients with major depression and executive dysfunction

Variable	PST Group (n = 12)		ST Group (n = 13)	
	Baseline	Treatment End	Baseline	Treatment End
Age, years	75.45 (7.77)	73.07 (6.9)		
Stroop Response Inhibition Test	18.45 (2.84)	24.50 (12.13)	19.36 (7.20)	22.33 (6.51)
DRS-IP	29.63 (4.56)	28.71 (7.50)	31.64 (4.61)	31.00 (5.57)
Ham-D	23.90 (3.38)	7.09 (6.25)	25.35 (5.51)	13.92 (6.29)
WHODAS-II	79.55 (26.76)	45.18 (10.26)	89.21 (25.47)	76.85 (20.23)
SPSI				
Alternative-Generation	8.09 (5.26)	12.09 (2.34)	6.93 (4.9)	7.75 (4.28)
Decision-Making	11.09 (6.20)	13.18 (3.34)	9.21 (5.61)	9.41 (3.70)

Note: Values are mean (standard deviation).

DRS-IP: Mattis Dementia Rating Scale, Initiation/Perseveration Domain; Ham-D: 24-item Hamilton Rating Scale for Depression; WHODAS-II: World Health Organization Disability Assessment Schedule; SPSI: Social Problem-Solving Inventory.

$p < 0.001$). Again, the interaction between treatment and the two SPST domains contributed an additional 25% of the variance ($F_{1, 221} = 5.05$; $p < 0.001$).

DISCUSSION

The principal finding of this study is that PST was more effective than ST in inducing remission and reducing depressive symptoms and disability in elderly patients with major depression and impairment in aspects of executive functioning associated with poor and unstable response to antidepressant drugs. The mechanisms by which psychotherapy improved depression and disability involve, in part, improvement in the subjects' ability to generate alternatives and make decisions.

To our knowledge, this is the first study to demonstrate efficacy of a psychotherapy in geriatric major depression with executive dysfunction. However, these findings are consistent with studies demonstrating that PST is effective in geriatric depression without cognitive dysfunction.⁸ Moreover, therapies such as PST, which is based on learning-theory principles, have been found effective in the treatment of patients with depression and nonspecific cognitive dysfunction reaching the level of mild dementia.²⁷ These findings suggest that depressed cognitively impaired patients can be treated effectively with therapies that enhance skill development.

The observation that PST is effective in improving disability is encouraging for several reasons. Elderly patients with major depression and executive dysfunction experience greater functional compromise than depressed elderly patients with comparable severity of depression.^{16,17} Disability is a distinct dimension of health status, with multifactorial etiology and unique prognostic significance.²⁸⁻³² Demographic and clinical variables, including age, severity of depression, and medical burden were shown to account for only 38% of the variance in disability of elderly patients with major depression.³³ Therefore, improvement of disability by PST is a benefit above and beyond that of improvement of depression.

It is noteworthy that PST was effective across a wide spectrum of depressive symptoms and executive dysfunction. This sample had comparable severity of depression as samples used in randomized controlled trials of antidepressant drugs.³⁴ Moreover, the degree of ex-

ecutive dysfunction did not appear to influence treatment response. These observations suggest that the efficacy of PST may not be limited to a subset of mildly depressed patients with minimal cognitive impairment.

Improvement of depression was accompanied by some improvement of executive functions, although the mean final executive function scores did not reach normal levels. This observation is consistent with findings of others,¹ and it suggests that PST may remove the effect of depression on executive functions but does not correct the neuropsychological impairment itself.

Improvement in depression and disability from psychotherapy may be mediated by development of skills in generation of alternatives for problem-solving and in decision-making. Although this study demonstrates such an effect, another possibility is that skills in these areas became evident after depression subsided and the subjects' overall competence increased.

Although this study suggests that PST is more effective than ST, we should point out that ST itself reduced both depressive symptoms and signs and disability during the study period. The lack of an appropriate control group does not permit us to establish the efficacy of ST. However, because this treatment includes many of the nonspecific therapeutic factors of psychotherapies, improvement of depression and disability is not surprising.

The principal limitation of this study is its small sample, permitting only tentative conclusions. Replication of this study in a large sample is necessary. Another potential limitation is the absence of a "no-treatment" control group. We considered but decided against a waiting-list control group. Our subjects had rather severe depression. A waiting-list control group condition meeting ethical standards would have required frequent contact, support, and encouragement of the subjects. Therefore, such a waiting-list condition would have differed little from supportive therapy. Another potential limitation may be that the raters were not blind to the treatment assignment, although they were unaware of the study hypotheses. Therefore, it is possible that the raters' own views of the efficacy of PST and ST may have influenced their ratings.

The subjects of this study had a limited evaluation of cognitive functioning. It is possible that the Stroop Interference task and the DRS-IP are influenced by cognitive deficits beyond executive skills—in particular, attention, mental processing, and psychomotor speed. Therefore, the subjects of this study may have had a cognitive impairment broader than cognitive dysfunction.

tion. Nonetheless, earlier studies suggested that abnormal scores in Stroop and DRS-IP were associated with poor, slow, and unstable response to antidepressants, whereas overall cognitive dysfunction and memory dysfunction alone were not associated with antidepressant response.³⁻⁵

In conclusion, this preliminary study suggests that PST is effective in elderly patients with major depression and executive dysfunction. Because these patients may be at high risk for poor response to pharmacotherapy, PST may be an important treatment alternative

for a patient population who may otherwise remain symptomatic and disabled. The heuristic value of this study is that it offers information on the potential mechanisms by which psychotherapeutic interventions may alleviate depression and disability in cognitively impaired patients. Such information may help develop treatment models with higher efficacy.

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Psychiatric Medical Director

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