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ORIGINAL ARTICLE

Efficacy of a Problem-Solving Therapy for Depression and Suicide Potential in Adolescents and Young Adults

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Abstract Short-term and structured cognitive behavioral problem-solving therapy (PST) is a developmentally relevant mode of action for the treatment of emotional problems in young people. This study aimed at testing the efficacy of a problem-solving therapy in treating depression and suicide potential in adolescents and young adults. A total of 46 self-referred high school and university students who were randomly assigned to a problem-solving therapy (n = 27) and a waiting list control (n = 19) conditions completed a controlled cognitive behavioral problem-solving treatment trial. Participants were administered the measures of depression, suicide potential, problem solving, self-esteem and assertiveness. Twenty-two of the 27 participants from the PST condition could be reached after 12-months for follow-up. Participants completed depression and problem-solving measures at follow-up. Results showed that post-treatment depression and suicide risk scores of participants within the PST condition decreased significantly compared to the pre-treatment scores but post-waiting and pre-waiting depression and suicide risk scores of participants within the WLC condition were unchanged. Likewise, post-treatment self-esteem and assertiveness scores of participants within the PST condition increased significantly compared to the pre-treatment scores while post-waiting and pre-waiting self-esteem and assertiveness scores of participants within the WLC condition were unchanged. At post-treatment, 77.8% of the participants in the PST but only 15.8% of those in the WLC condition achieved full or partial recovery according to BDI scores. Similarly, 96.3% of participants in the PST but only 21.1% of those in the WLC condition achieved full or partial recovery according to HDRS scores. The improvements were maintained at 12-months follow-up. Therefore, it is concluded that problem-solving therapy should

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be considered as a viable option for the treatment of depression and suicide potential in adolescents and young adults.

Keywords Efficacy · Problem-solving therapy · Adolescent · Young adult · Depression · Suicide · Follow-up

Introduction

Adolescence is a developmental period characterized by rapid changes in physical, psychological and social functioning. Although many young people pass this developmental period problem free, the changes render some of the adolescents vulnerable to psychological problems. Studies indicate that, compared to childhood, the frequencies of mental health problems during adolescence increase (Kim 2003). Compared to the past the data have shown an increase in emotional problems during adolescence (Collishaw et al. 2004).

One of the most common mental health problems in young people is depression (Hamrin and Pachler 2005). Although lifetime prevalence rates of depression are less than 3% for children, the rates of depression for adolescents rise to 14% (Lewinsohn et al. 1998). In a study with 966 adolescents, Schichor et al. (1994) reported that 22% of the sample felt themselves frequently depressed. Depression is associated with reduced psychosocial functioning. Untreated depression in young people is a serious risk factor for mental health problems (Steinhausen et al. 2006; Wilcox and Anthony 2004) and obesity in adulthood (Franko et al. 2005). Depression is mostly comorbid with anxiety disorders (Ferdinand et al. 2005), and is a serious risk factor for suicidal behavior in young as well as in adults (Kish et al. 2005; Thompson et al. 2005).

Self-esteem and assertive social-skills are the two possibly protective factors against depression in young people. Adolescent psychiatric patients are in general characterized by low self-esteem compared to controls (Guillon et al. 2003). In early adolescents, MacPhee and Andrews (2006) found low self-esteem to be the strongest predictor of depression. Following a group of adolescents over a 6 years period Pelkonen et al. (2003) found that baseline low self-esteem scores were predictive of depression. Likewise, adolescents with identifiable levels of psychopathology are characterized by low level of social skills such as inappropriate assertiveness (Landazabal 2006). Chan (1993) with Chinese university undergraduates found nonassertive responses to correlate with depression. Assertiveness in adolescence promotes the establishment of socially supportive interpersonal relationships. In a cross-cultural study involving Swedish and Turkish adolescents, Eskin (2003) showed that more assertive adolescents in both groups reported having more friends and receiving more social support than their less assertive peers.

A related mental health problem in young people is suicide. Though rare during childhood, suicide is the leading cause of death in young people and hence constitutes a significant mental health concern (Brener et al. 2000; Johnson et al. 2000). Not only suicidal deaths but also nonfatal suicidal behaviors are common in adolescents and young adults. Empirical evidence shows that lifetime prevalence of suicidal attempts is about 10% while the lifetime prevalence of suicidal thoughts is approximately 30% in youth (Evans et al. 2005). In one study with 1,262 Turkish university students, Eskin et al. (2005) found that 42% of the sample reported suicidal ideation during the past 12 months or lifetime, and 7% reported that they attempted to kill themselves during their lifetime or in the past 12 months. Past suicidal thoughts and

attempts in young people are risk factors for future suicidality (Clark et al. 1989; Joiner et al. 2000; Lewinsohn et al. 1994; Rudd et al. 1996).

As with depression, self-esteem and assertive social skills are the two possibly protective factors against suicidal behavior in young people. Gröholt et al. (2000), demonstrated that low self-worth was a predictor of adolescent suicide attempts. Further, the work of Wild et al. (2004) showed that low self-esteem in the family context was an independent predictor of adolescent suicide ideation and attempts. In a similar, fashion suicidal young people were characterized by inadequacies in assertive social skills. With a longitudinal research design Sourander et al. (2001) showed that suicidal adolescents were characterized by low social competence. Eskin (1995) found that deficiencies in positive assertion skills were related to suicide risk scores of Swedish and Turkish high school students. Further et al. (1990) showed that lack of assertiveness was related to suicidal intent in a group of suicide attempted adolescent psychiatric inpatients.

There is an urgent need for effective treatment methods for depression and suicide potential in young people. The literature suggests that treatment effectiveness for adolescent and young adults is far less investigated than it is for adult populations. The use of Selective Serotonin Reuptake Inhibitors (SSRI, the most widely used pharmacological agents for the treatment of depression) in children and adolescents for treating depression include safety concerns. For instance the use of SSRIs was found to be associated with increased risk for suicidal behavior (Newman 2004; Richmond and Rosen 2005; Wohlfarth et al. 2006). However, the number of depressed children and adolescents for whom psychotherapy/mental health counseling during outpatient visits are prescribed decreased significantly over time (Ma et al. 2005). For Ryan (2005) the debate about the best approach to treat child and adolescent depression continues. Therefore, there is a need for the determination of effectiveness of short and structured psychosocial interventions for child and adolescent depression and suicide potential.

A wide variety of research findings indicate deficits in problem-solving ability to have a key role in the development and maintenance of depression and suicidal behavior. Deficits in problem-solving ability were shown to be an important predisposing factor for the development of depression (Nezu 1986; Nezu and Ronan 1988; Marx et al. 1992; Priester and Clum 1993) and suicidal behavior (Levenson and Neuringer 1971; Schotte and Clum 1987; Sadowski and Kelley 1993; Reinecke et al. 2001; Chang 2002; Pollock and Williams 2004). Recently, Speckens and Hawton (2005) reviewed the studies investigating the relationship between problem solving and suicidal behavior in young people. They conclude that ineffective problem solving is an important vulnerability factor for suicidal behavior in youth. Moreover, McAuliffe et al. (2002) found repeaters of parasuicide to exhibit more deficits in problem solving than nonrepeaters.

Thus, one can presume that a problem-solving approach is an important intervention strategy for the treatment of depression and suicide risk in young people. In line with this, problem solving was identified as a prevention strategy for adolescent emotional problems (Heppner et al. 1984; Spence et al. 2003). Empirical evidence suggests that problem-solving therapy (PST) is an effective treatment for depression (Arean et al. 1993; Biggam and Power 2002; Dowrick et al. 2000; Nezu 1986) and suicidal problems (Lerner and Clum 1990; Salkovskis et al. (1990; Townsend et al. 2001) in adults and to some extent young adults. Most recently, Malouff et al. (2007) conducted a meta-analysis of 31 studies involving mostly adult participants (n = 2,895) on the effectiveness of problem-solving therapy. They showed that PST was significantly more effective than no treatment, treatment as usual and attention placebo in reducing mental and physical health problems.

Adolescence and young adulthood are the life periods characterized by changes in biological, psychological and social domains. The young individual has to cope with these

multiple domain challenges/changes. Therefore, young people need effective coping strategies or skills in order to gain resilience against multiple domain changes/challenges. Problem solving is an important life skill for coping and tackling with life difficulties and challenges during these stages of life. Thus, the overall objective of this study was to assess the efficacy of a problem-solving therapy in treating depression and suicide proneness in adolescents and young adults. A second objective was to evaluate whether or not PST leads to improvements in self-appraised problem-solving ability. A third objective was to investigate the impact of PST on protective factors such as self-esteem and assertiveness.

Methods

Design

A randomized, controlled trial was carried out to compare a problem-solving treatment for major depression and suicide potential to a waiting list control condition in a group of high school and university students.

Recruitment

Participants were recruited through announcements describing the symptoms of major depression according to DSM-IV (APA 1994). The announcements were placed on the boards of 10 high schools in the city of Aydin and a university campus area in Ankara.

Exclusion Criteria

Students who did not meet the DSM-IV criteria for major depression, students who were currently under medical treatment, those who were psychotic and students with bipolar illness, and students whose parents did not consent were excluded from the study.

Site of the Study

The part of the study involving high school students was conducted at the psychiatry department of Adnan Menderes University School of Medicine in Aydin. The part involving the university students was done at the Health Center of the Middle East Technical University in Ankara.

Participants

A total of 54 high school and 28 university students (n = 82) responded to the announcements. Assessment with the Structured Clinical Interview-Clinical Version (SCID-I/CV) (First et al. 1997) for DSM-IV Axis I diagnoses revealed that all university and 25 of the high school students (n = 53) received a diagnosis for major depression. Twenty-nine students not receiving a depression diagnosis were excluded. Of participants who received a depression diagnosis, 27 (high school = 13; university = 14) were randomly assigned to a PST condition and 26 (high school = 12; university = 14) were randomly assigned to the WLC condition. One high school and eight university students who were assigned to the WLC condition dropped out. At the end, all (high school = 13; university = 14) participants who were

assigned to the PST condition and 19 (high school = 11; university = 8) who were assigned to the WLC condition (n = 46) completed the study. To see if attrition in the WLC condition might have affected the findings, participants who dropped out of the WLC condition were compared with those who stayed in the WLC condition on demographics and pre-treatment scores and were found to be similar. Twenty-two participants (81.5%) from the PST condition (high school = 10; university = 12) could be reached for follow-up after 12-months.

The demographic characteristics of participants are presented in Table 1. As the table shows, a majority of the participants were of urban background, female and perceived their family income as medium and had on average two siblings. Of participants who obtained a diagnosis for major depression, two also obtained a diagnosis for social phobia, one for posttraumatic stress disorder, one for dysthymia and another one obtained a diagnosis for specific phobia.

Participants in the treatment and control conditions were found to be similar in terms of group (high school vs. university), sex, background (urban vs. rural), perceived family income, number of siblings, age, and paternal education, but mothers of participants in the problem-solving condition had greater number of school years (mean = 10.1 years, SD = 4.3) than the mothers of those in the control condition (mean = 6.6 years, SD = 5.1), $t(44) = 2.5$, $P < 0.05$.

Similarly, the two groups (high school and university) were similar in terms of sex, background (urban vs. rural), condition, perceived family income, number of siblings, and

Table 1 Demographic characteristics of participants

Variables	Group											
	Problem-solving therapy				Waiting list control				Total			
	n	%	M	SD	n	%	M	SD	n	%	M	SD
N	27	58.7			19	41.3			46	100		
Sex												
Male	7	25.9			7	36.8			14	30.4		
Female	20	74.1			12	63.2			32	69.6		
School												
High school	13	48.1			11	57.9			24	52.2		
University	14	51.9			8	42.1			22	47.8		
Background												
Urban	22	81.5			13	68.4			35	76.1		
Rural	5	18.5			6	31.6			11	23.9		
Perceived family income												
Low	1	3.7			3	15.8			4	8.7		
Medium	26	96.3			15	78.9			41	89.1		
High	0	0.0			1	5.3			1	2.2		
Number of siblings			1.7	1.8			2.3	2.6			2.0	2.1
Age			19.0	3.2			19.3	3.7			19.1	3.4
Maternal education (number of school years)			10.1	4.3			6.6	5.1			8.7	4.9
Paternal education (number of school years)			11.5	4.5			9.3	5.0			10.6	4.8

maternal education, but fathers of university group had greater number of school years (mean = 12.8 years, SD = 3.5) than the fathers of high school group (mean = 8.5 years, SD = 5.0), t(44) = 3.3, $P < 0.005$. The mean age of the high school group was 16.4 years (SD = 1.1) and it was 22.1 years (SD = 2.3) for the university group.

Measures

Hamilton Depression Rating Scale

The 17-item clinician-administered Hamilton Depression Rating Scale (HDRS) was used to assess severity of the depressive symptoms (Hamilton 1960). The validity and reliability of the Turkish version of the HDRS was well established (Akdemir et al. 1996). The test–retest reliability coefficient of the Turkish HDRS was 0.85 and the internal consistency reliability coefficient was 0.75. The Turkish HDRS had a correlation coefficient of 0.48 with Beck Depression Inventory. The total HDRS scores range from 0 to 52. Higher scores indicate greater depression. Patients with HDRS scores of 7 or less were considered to have clinically recovered; patients with scores of 8–12 were regarded as partially recovered; and patients with scores of 13 or more were seen as not recovered (Frank et al. 1991).

Beck Depression Inventory

A 21-item Beck Depression Inventory (BDI 1978 version) (Beck et al. 1979) is used to assess self-rated depressive symptoms. The BDI is the most widely used self-report measure of depression. Hisli (1988) translated the BDI into Turkish and assessed its psychometric properties. The respondent rates the frequency and the intensity of symptoms on a four-point scale. The Turkish BDI had an internal consistency reliability of 0.80 and a split-half reliability of 0.74. It had a correlation coefficient of 0.50 with the MMPI depression subscale. The total BDI scores range from 0 to 63. Higher scores indicate greater depression. Patients with BDI scores of 9 or less were considered to have clinically recovered; patients with scores of 10–15 were regarded as partially recovered; and patients with scores of 16 or more were considered as not recovered (Shaw et al. 1985).

Suicide Probability Scale

The Turkish version of the Suicide Probability Scale (SPS) (Cull and Gill 1988) was used to assess suicide potential. The SPS is a 36-item self-report measure of suicide risk to be used with adolescents and adults. Participants rate each item on a 4-point Likert scale according to the frequency with which they experience a specific emotion or behavior by selecting scale anchors ranging from "None or a little of the time" to "Most or all of the time." It consists of four empirically derived subscales based on current theories of suicidal behavior. The subscales are: (1) Hopelessness; (2) Suicide ideation: (3) Negative self-evaluation; and (4) Hostility. The SPS was previously translated into Turkish and was found to be a reliable and a valid instrument by Eskin (1993). The Turkish SPS had a test–retest reliability coefficient of 0.95 over a 48.7 days period and it had an internal consistency coefficient of 0.89. It correlated inversely with perceived social support from family −0.60 and perceived social support from friends −0.75. The total SPS scores range from 36 to 144. Higher scores indicate greater suicide proneness.

Problem-Solving Inventory

The Problem-Solving Inventory (PSI) developed by Heppner and Petersen (1982) was used to measure self-appraised problem-solving ability. It has 32 items which the respondents rate for the frequency of engaging in specific problem-solving behaviors on a 6-point Likert scale ranging from "Always (1)" to "Never (6)." The PSI scores range from 32 to 192 and higher scores indicate lower self-appraised problem-solving ability. The PSI was adapted into Turkish by Şahin et al. (1993) and found to be a reliable and valid instrument. The internal consistency coefficient for the Turkish PSI was 0.88 and the split-half reliability coefficient was 0.81. The Turkish PSI had a correlation coefficient of 0.33 with BDI and it had a correlation coefficient of 0.45 with the trait anxiety scores on the STAI (Şahin et al. 1993).

Scale for Interpersonal Behavior

Assertiveness was measured by Scale for Interpersonal Behavior (SIB) developed by Arrindell and van der Ende (1985). The SIB is a 50-item multidimensional measure of assertiveness. The respondent rates each item on a 5-point Likert scale for the frequency of engaging in a specific assertive behavior. Forty-five of the 50 items are classified into four factorially derived categories of assertive behavior. The four SIB dimensions are: (1) Display of negative feelings; (2) Expression of and dealing with personal limitations; (3) Initiating assertiveness; and (4) Positive assertion. In addition to these subscales a total assertiveness score is computed by summing the 50 items. Psychometric properties of the Turkish version of the SIB were assessed and found to be highly reliable and valid (Eskin 1993). The test–retest reliability of the SIB was 0.71 and its internal consistency reliability was 0.90. It had a correlation of 0.35 with perceived social support from friends. The SIB scores range from 50 to 250 with higher scores indicating higher levels of assertiveness.

Rosenberg Self-Esteem Scale

The 10-item Rosenberg Self-Esteem Scale was used to measure self-esteem (Rosenberg 1965). It is a global measure of self worth scored on a 4-point Likert scale. It has been adapted into Turkish by Cuhadaroglu (1996). The scores range from 10 to 40, with higher scores representing higher self-esteem.

Therapeutic Alliance Scale

A 7-item short therapeutic alliance scale (TAS) designed by the first author was used to measure the extent to which participants perceived being supported and understood by their therapists. The TAS was designed to meet the specific requirements of the problem-solving treatment approach used in this study. The items of this scale were as follows:

1. I feel that my therapist understands my problems.
2. I feel that there is a warm relationship based on mutual trust between my therapist and me.
3. I feel that my therapist has the right approach for the resolution of my problems.
4. I feel that my therapist and I are in agreement about what my problems and distresses are.
5. I feel that my therapist and I are in agreement about the causes of my problems.
6. I feel that my therapist accepts me the way I am.
7. I feel that my therapist works in cooperation with me during my treatment.

Participants rated these items on 5-point Likert scales for how much they agree with the content of each item. Response alternatives ranged from "totally agree (5)" to "totally disagree (1)." The responses to seven items are summed to obtain a therapeutic alliance score. The scores range from 7, indicating minimum alliance between the therapist and the patient, to 35 indicating maximum alliance. The internal consistency coefficient (Cronbach's apha) for the TAS with 27 participants was 0.80.

Procedure

Announcements describing symptoms of major depression according to DSM-IV were placed on the announcement boards of high schools and a university to recruit the participants. Permissions from the local branch of the Ministry of Education and the governing body of the university were obtained to place the announcements. The announcements asked students to apply for the treatment project free of charge.

All participants and the parents of the high school students were asked to sign an informed consent form. Then, they were given an appointment for a SCID-I interview. Participants meeting the criteria for a major depression diagnosis were administered the Hamilton Depression Rating Scale and were also asked to fill in a questionnaire that included the above-mentioned measures as well as socio-demographics. Participants obtaining a diagnosis for major depression were designated as the study group. Then they were assigned randomly to a problem-solving therapy and a waiting list control conditions. For ethical reasons, the students not obtaining a major depression diagnosis were offered 2–3 sessions of counseling. In a similar fashion, participants who were assigned to the WLC condition were also offered six sessions of PST after the waiting period. Participants in the PST condition filled in the Therapeutic Alliance Scale (TAS) after the completion of the third session. Therapists recorded the session lengths and problems identified during the first sessions.

Treatment

An individual PST treatment using a manual consisting of 6 sessions was used. The PST used in this study was modeled according to the PST approach developed by D'Zurilla and Goldfried (1971) and D'Zurilla and Nezu (1999). Like the one used in the primary care by Gath and Mynors-Wallis (2000) the PST used in this study did not include a problem-orientation component. Two graduate students in clinical psychology (the second and third authors) received education and supervision on the PST from the first author. The manual developed by the first author included a brief introduction to the problem-solving treatment of psychological conditions. Then the manual described six sessions of PST that correspond to the six stages of problem solving. The treatment lasted for 6 weeks with weekly scheduled sessions. The sessions were in brief as follows:

Session 1: *Definition of problems:* The rationale behind the problem-solving treatment was explained to the participants. Then the therapist and the patient worked together to define a problem. Emotional symptoms of the patients were identified. The manual instructed therapists to relate emotional symptoms to problems and to define problems in behavioral terms.

Session 2: *Goal setting:* In this session, the therapeutic task is to set goals. Goals are set in collaboration. The manual instructs that the goals should be attainable, objective and

realistic. It is also necessary to identify the strengths and resources of the patient at this session.

Session 3: *Generating alternative solutions:* At this session the participant is encouraged to produce alternative solutions to the problem defined during the first session. "Brainstorming" and "advice to a friend who has the same problem" methods are applied to facilitate generating more alternative solutions. Therapist instructs the participant to be nonjudgemental and produce as many solutions as possible.

Session 4: *Decision making:* The therapeutic task in this session is to choose the best solution to the problem. The best solution should be applicable by the patient and should reach the goal set during the second session.

Session 5: *Solution implementation:* In this stage the solution should be implemented. In order to implement the chosen solution, the patient is taught necessary skills. To counteract the skill deficit, the therapist may use techniques such as role-playing and the like to teach the participant necessary skills for the implementation of the selected solution.

Session 6: *Assessment and verification:* In the last session, the solution implementation is assessed and verified.

Statistical Analyses

The data were analyzed by SPSS-9.0 for Windows. Repeated measures Analysis of Variance (ANOVA) procedures were used to analyze the results, with condition and group as the grouping factor, and time being the 'within groups' factor. A total of six conditions (PST and WLC) by group (high school and university) by time (pre-/post-treatment/waiting) ANOVAs were performed to compare the groups on five main outcome measures. Since condition by time interaction effect tests the treatment efficacy, it is presented first in the results. Pre-treatment/waiting and post-treatment/waiting means and standard deviations of measures according to condition are presented in Table 2.

To further determine and quantify the efficacy of PST, controlled and uncontrolled (Feske and Chambless 1995) effect sizes (Cohen's d; Cohen 1988) were calculated. A controlled effect size was calculated by subtracting the post-treatment mean of the treatment group from the post-waiting mean of the control group divided by the standard deviation of the control group. An uncontrolled effect size was calculated by subtracting the post-treatment mean of

Table 2 Means and standard deviations of outcome measures according to condition

Measures	Problem-solving therapy				Waiting list control			
	Pre-treatment		Post-treatment		Pre-waiting		Post-waiting	
	M	SD	M	SD	M	SD	M	SD
Depression								
Beck Depression Inventory	26.7	9.4	10.7	10.4	28.0	9.0	22.0	5.5
Hamilton Depression Rating Scale	16.1	6.6	4.3	3.3	17.8	5.5	16.6	5.7
Suicide potential	84.1	15.1	71.9	15.5	77.9	16.4	75.2	14.9
Assertiveness	152.9	19.0	167.6	24.0	157.1	18.4	158.0	21.9
Problem solving	111.6	16.6	100.9	20.6	107.2	18.7	104.6	20.3
Self-esteem	23.8	4.6	28.0	5.2	23.3	4.8	23.4	5.1

the treatment group from its pre-treatment mean divided by the standard deviation of the treatment group (Butler et al. 2006).

Nonparametric tests were used to compare the scores of groups involving fewer than thirty participants. In this case one cannot assume normal distribution of data. The Mann–Whitney *U*-test which uses median rather than mean was used to compare the scores of two independent groups. Scores of two related groups were compared by means of Wilcoxon Signed Ranks Test procedure. Proportions of participants who fully and partially recovered and not recovered were computed. Chi-square tests were used to test the association between two dichotomous variables. Pearson product-moment correlation coefficients were calculated between the PSI difference scores (differences between baseline and follow-up scores) and depression scores.

Results

Number and Length of Sessions

All participants in the PST condition received six sessions of problem-solving therapy. Session lengths ranged from 30 to 60 min with an average session length of 37.6 min (SD = 6.9). Session lengths were longer in the university (mean = 42.6 min, SD = 5.3) than in the high school group (mean = 32.1 min, SD = 3.3), Z = 4.2, $P < 0.0001$.

Therapeutic Alliance

Mean therapeutic alliance scale score was 30.9 (SD = 2.5). High school students scored significantly higher (mean = 32.1, SD = 1.9) than the university students (mean = 29.8, SD = 2.2) on the therapeutic alliance scale, Z = 2.8, $P < 0.01$.

Depression

BDI

The means and standard deviations for depression, suicide potential, problem solving, self-esteem and assertiveness are given in Table 2. The ANOVA produced a significant condition by time interaction effect, F(1, 42) = 10.3, $P < 0.01$. The ANOVA revealed also a main effect for time, F(1, 42) = 43.8, $P < 0.0001$, a main effect for condition, F(1, 42) = 9.7, $P < 0.01$, and a main effect for group, F(1, 42) = 20.3, $P < 0.0001$.

Although post-treatment/waiting BDI scores were smaller than the pre-treatment/waiting scores, baseline BDI scores of participants within the PST and WCL conditions were similar (Z = 0.6, $P > 0.05$) but post-treatment BDI scores of participants within the PST condition were lower than the post-waiting BDI scores of participants within the WLC condition (Z = 5.3, $P < 0.0001$). Concerning the main effect for time, baseline BDI scores were higher (mean = 27.0) than post-treatment/waiting scores (mean = 16.3). Regarding the main effect for condition, mean BDI scores of students in the PST condition were lower (mean = 18.8) than the scores of students in the WLC (mean = 24.4). The group main effect showed that BDI scores of high school students were higher (mean = 25.7) than the university students' scores (mean = 17.6).

HDRS

The ANOVA gave a condition by time interaction effect, F(1, 42) = 37.7, $P < 0.0001$. There was a main effect for time, F(1, 42) = 55.7, $P < 0.0001$, a main effect for condition, F(1, 42) = 39.3, $P < 0.0001$, and a main effect for group, F(1, 42) = 9.3, $P < 0.01$.

Post-treatment HDRS scores were significantly lower than the pre-treatment scores within the PST condition (Z = 4.5, $P < 0.0001$) but pre- and post-waiting HDRS scores within the WLC condition were similar (Z = 0.4, $P > 0.05$). Time main effect showed that the baseline HDRS scores were higher (mean = 17.2) than the post-treatment/waiting scores (mean = 10.2). Regarding the main effect for condition the HDRS scores of students in PST were lower (mean = 10.2) than the scores of students in the WLC (mean = 17.8). The group main effect showed that the HDRS scores of high school students were lower (mean = 12.1) than the scores of university students (mean = 15.8).

An uncontrolled effect size from pre-treatment to post-treatment for HDRS was 2.4 and it was 1.6 for BDI. A controlled effect size between PST and WLC conditions was 2.2 for HDRS and it was 1.6 for BDI.

Suicide Potential

The ANOVA gave a condition by time interaction effect, F(1, 42) = 7.3, $P < 0.05$, a main effect for time, F(1, 42) = 16.3, $P < 0.0001$, and a main effect for group, F(1, 42) = 16.7, $P < 0.0001$.

Post-treatment SPS scores were significantly lower than the pre-treatment SPS scores within the PST condition (Z = 3.5, $P < 0.0001$) but pre- and post-waiting SPS scores within the WLC condition were similar (Z = 1.4, $P > 0.05$). The mean of the baseline SPS total scale scores was higher (mean = 80.4) than the mean of the post-treatment/waiting scores (mean = 73.1). The mean of the SPS total scale scores of university students was lower (mean = 69.1) than the mean scores of high school students (mean = 84.3).

An uncontrolled effect size from pre-treatment to post-treatment for SPS was 0.80. A controlled effect size between PST and WLC conditions was 0.21.

Assertiveness

The ANOVA revealed a significant condition by time interaction effect, F(1, 42) = 7.5, $P < 0.01$, and a main effect for time, F(1, 42) = 10.0, $P < 0.01$, on the SIB total scale scores.

Post-treatment SIB scores were significantly higher than the pre-treatment SIB scores within the PST condition (Z = 3.2, $P < 0.01$) but pre- and post-waiting SIB scores were similar (Z = 0.5, $P > 0.05$) within the WLC condition. Regarding the main effect for time, post-treatment/waiting SIB scores were higher (mean = 162.2) than pre-treatment/waiting SIB scores (mean = 154.4).

An uncontrolled effect size from pre-treatment to post-treatment for SIB was 0.68. A controlled effect size between PST and WLC conditions was 0.48.

Problem Solving

The ANOVA produced a nonsignificant condition by time interaction effect, F(1, 42) = 2.2, $P > 0.05$, but it gave a statistically significant main effect for time, F(1, 42) = 6.4, $P < 0.05$,

on the PSI total scale scores. Pre-treatment/waiting PSI scores were higher (mean = 109.4) than post-treatment/waiting PSI scores (mean = 102.5).

An uncontrolled effect size from pre-treatment to post-treatment for PSI was 0.58. A controlled effect size between PST and WLC conditions was 0.19.

Self-Esteem

The ANOVA gave a statistically significant condition by time interaction effect, $F(1, 42) = 7.1$, $P < 0.05$, and a main effect for time, $F(1, 42) = 7.3$, $P < 0.05$. A marginally significant main effect for condition, $F(1, 42) = 4.0$, $P < 0.10$, was also detected.

Post-treatment self-esteem scale scores were significantly higher than the pre-treatment self-esteem scale scores within the PST condition ($Z = 3.5$, $P < 0.01$) but pre- and post-waiting self-esteem scores were similar ($Z = 0.2$, $P > 0.05$) within the WLC condition. The main effect for time showed that post-treatment/waiting self-esteem scale scores were higher (mean = 25.6) than pre-treatment/waiting self-esteem scale scores (mean = 23.5). Marginally significant main effect for condition showed that self-esteem scale scores of participants in the PST condition tended to be higher (mean = 25.9) than the self-esteem scale scores of students in the WLC condition (mean = 23.3).

An uncontrolled effect size from pre-treatment to post-treatment for self-esteem was 0.89. A controlled effect size between PST and WLC conditions was 0.93.

Post-Treatment Recovery

BDI

Table 3 presents the recovery rates according to post-treatment/waiting BDI and HDRS scores by condition. A chi-square test between condition and recovery categories indicated that participants in the two conditions differed significantly from one another in relation to percentages of recovery according to BDI, $\chi^2 = 19.3$, d.f. = 2, $P < 0.0001$. As the table shows, 77.8% of participants within the PST condition achieved full or partial recovery but only 15.8% did so in the WLC condition.

Table 3 Recovery rates according to post-treatment/waiting BDI and HRSD scores by condition

Recovery	Problem-solving therapy		Waiting list control	
	n	%	n	%
Beck Depression Inventory				
Recovered (BDI, 0–9)	14	51.9	0	0.0
Partially recovered (BDI, 10–15)	7	25.9	3	15.8
Not recovered (BDI, 16 and above)	6	22.2	16	84.2
Total	27	100.0	19	100.0
Hamilton Depression Rating Scale				
Recovered (HDRS, 0–7)	22	81.5	1	5.3
Partially recovered (HDRS, 8–12)	4	14.8	3	15.8
Not recovered (HDRS, 13 and above)	1	3.7	15	78.9
Total	27	100.0	19	100.0

HDRS

A chi-square test between condition and recovery showed that there was a significant association between the two variables, $\chi^2 = 31.1$, d.f. = 2, $P < 0.0001$. As it is seen in the table, 96.3% of the participants in the PST condition achieved full or partial recovery according to post-treatment HDRS scores, while only 21.1% did so in the control condition.

Follow-up

Depression

Mean follow-up BDI scores were found to be 7.6 (SD = 7.3). Follow-up BDI scores were statistically significantly lower than pre-treatment BDI scores, Z = 4.1, $P < 0.0001$, but similar to post-treatment BDI scores, Z = 1.6, $P > 0.05$. Mean follow-up BDI scores of university students were significantly lower (mean = 9.9, SD = 7.0) than the mean BDI scores of high school students (mean = 5.6, SD = 7.4), Z = 2.0, $P < 0.05$.

Mean follow-up HDRS scores were 3.7 (SD = 1.9). Follow-up HDRS scores were statistically significantly lower than pre-treatment HDRS scores, Z = 4.1, $P < 0.0001$, but similar to post-treatment HDRS scores, Z = 0.1, $P > 0.05$ (for pre- and post-treatment means see Table 2). Mean follow-up HDRS scores of university students were significantly lower (mean = 2.6, SD = 1.5) than the mean follow-up HDRS scores of high school students (mean = 4.9, SD = 1.7), Z = 2.6, $P < 0.05$.

According to predetermined criteria for remission, all the 22 patients (100%) achieved full remission on the basis of follow-up HDRS scores (scores ranged from 1 to 7). Considering the follow-up BDI scores, 17 participants (77.3%) achieved full remission, 2 (9.1%) achieved partial remission, and 3 (13.6%) were still depressed.

Problem Solving

Mean follow-up PSI scores were 88.6 (SD = 15.6). Follow-up PSI scores were significantly lower than pre-treatment, Z = 3.7, $P < 0.0001$) and post-treatment PSI scores Z = 2.0, $P < 0.05$ (for pre- and post-treatment means see Table 2). Follow-up PSI scores of university (mean = 90.4, SD = 8.2) and high school (mean = 86.1, SD = 18.7) students were similar, Z = 1.1, $P > 0.05$. The correlation coefficient between PSI difference scores and follow-up BDI scores was $r = -0.41$, n = 22, $P < 0.05$ (one-tailed), and with HDRS it was $r = -0.26$, n = 22, $P > 0.05$ (one-tailed).

Discussion

This study tested the efficacy of problem-solving therapy in treating depression and suicide potential in adolescents and young adults. Forty-six self-referred high school and university students who were randomly assigned to a problem-solving therapy and waiting list control conditions participated in the study. A manual-based PST was used. Participants assigned to the experimental condition received six sessions of PST for an average length of approximately 38 min per session. Participants in the problem-solving condition perceived their therapeutic alliance as being highly satisfactory. The results obtained from the study indicate

that problem-solving therapy is an effective and acceptable treatment method for emotional problems in adolescents and young adults.

Depression is common in young people and causes considerable impairment in physical, psychological, social, academic and vocational functioning. The potential of a problem-solving approach for the treatment of depression and suicide proneness was anticipated in the literature. In line with findings from Nezu (1986), the results obtained in this study supported this anticipation. Post-treatment depression scores of participants who received PST were found to be statistically significantly lower than their pre-treatment depression scores while pre- and post-treatment depression scores of participants in the WLC condition were unchanged. High effect sizes (Cohen 1988) were observed between treatment and no treatment conditions, and between pre- and post-treatment for depression. The effect sizes observed in this study make a strong case for the use of problem-solving therapy in treating depression in young people. The results of this empirical investigation are in line with findings from Arean et al. (1993), Dowrick et al. (2000), and Nezu (1986) with adults. Further, the results of this study replicate and extend the findings from Lerner and Clum 1990 with young adults and Biggam and Power (2002) with incarcerated young offenders to a sample that included high school students.

Predetermined criteria for remission according to BDI and HDRS scores indicated that the number of participants in the PST condition who recovered were greater than the number of participants who did so in the WLC condition. As Table 3 shows, 77.8% of participants in the PST condition achieved full or partial recovery while only 15.8% achieved only partial recovery in the WLC condition according to BDI scores. According to HDRS scores, 96.3% of participants in the PST condition achieved full or partial recovery while only 21.1% did so in the WLC condition. At follow-up, 86.4% were still in full or partial remission according to BDI scores whereas 100.0% were in full remission according to HDRS scores. The findings from the study showed that the improvements in depression were maintained over a 12-month follow-up period.

Suicidal behavior is a major mental health concern among adolescents and young adults. Therefore, effective psychosocial treatment alternatives for the treatment of suicide problem are needed in these populations. The results obtained in the present study are encouraging. Post-treatment suicide risk scores (as measured by the SPS) of participants who received PST were found to be statistically significantly lower than their pre-treatment suicide potential scores while pre- and post-waiting suicide risk scores of participants in the WLC condition were unchanged. The effect size between treatment and no treatment obtained in the study was low but the effect size between pre- and post-treatment suicide risk was high. The present results are consistent with findings from Townsend et al. (2001) and Salkovskis et al. (1990) with adults. Comparing problem-solving therapy with supportive therapy for treating suicidal ideation of university students, Lerner and Clum (1990) found that the two treatments were similar. But problem-solving therapy was more effective at reducing depression, hopelessness and loneliness than supportive therapy. Unlike findings from Lerner and Clum (1990), current results indicate that problem-solving therapy is effective at reducing suicide potential. Thus, the results from this study suggest that problem-solving therapy can be taken as a viable treatment alternative for suicide problems in adolescents and young adults.

Traditional psychotherapy outcome studies have usually been conducted to investigate the efficacy of a given intervention in reducing the levels of psychopathology (i.e., depression, etc.). Very few studies were designed to see if a given intervention works in increasing the levels of protective factors such as self-esteem and assertiveness. These protective factors are important in a developmental period like adolescence and young adulthood during which global changes take place. Thus, the present study aimed also at testing if PST increases the levels of self-esteem and assertiveness while decreasing the levels of psychopathology. The

data showed indeed that this is the case. As with scores of depression and suicide potential, post-treatment self-esteem and assertiveness scores of participants in the PST condition were found to be significantly higher than their pre-treatment self-esteem and assertiveness scores while pre- and post-waiting self-esteem and assertiveness scores of participants in the WLC condition were unchanged. The PST leading to increases in assertiveness is not surprising because, according to therapist records, the problems identified to work with during the treatment were mainly of interpersonal nature.

Kazdin and Nock (2003) discussed the importance of mechanisms of therapeutic change in child and adolescent psychotherapy. Problem-solving therapy offers unique mechanism of therapeutic change that fit the developmental needs of young people. One might have anticipated an improvement in the post-treatment self-appraised problem-solving ability of participants who received problem-solving therapy compared to self-appraised problem-solving ability of participants in the WLC condition. Unlike findings from Nezu (1986) and Biggam and Power (2002), the current results did not confirm this anticipation. However, improvement in self-appraised problem-solving ability from baseline to follow-up was associated with lower depression (e.g., Dixon 2000) suggesting a causal relationship between problem-solving ability and depression. Although, post-treatment PSI scores of participants in the PST condition did not improve compared to the pre-treatment scores, follow-up PSI scores were statistically significantly lower than the pre-treatment scores. But this is valid only for participants within the PST condition. Lack of support for the above anticipation may be due to several reasons. First, PST may reduce psychopathology through other mechanisms of change than the development of problem-solving ability. Second, PST applied in this study may not be able to significantly improve global problem-solving ability as measured by the PSI. PSI scores reflect problem orientation variables (i.e., attitudes toward problems and one's own problem-solving ability) as well as problem-solving skills (e.g., problem definition, generation of alternative solutions). However, the present PST program focused only on problem-solving skills. It did not address problem orientation. Nevertheless, following treatment, an improvement in problem-solving performance that may have resulted from the PST program may have eventually resulted in an improvement in problem orientation (see D'Zurilla and Nezu 1999, 2007), which may be reflected in the significant improvement in the PSI scores of the PST participants from post-treatment to follow-up. Third, the measure of problem solving used in this study may not be an adequate instrument to show the development of problem-solving skills. Fourth, since participants in the control condition were placed on a waiting list there might have been a placebo effect.

Taken together, the findings from this study make a strong case for the use of problem-solving therapy for the treatment of depression and suicide potential in adolescents and young adults. The findings demonstrated that PST was able to reduce levels of psychopathology (depression and suicide potential) and to increase levels of protective factors (assertiveness and self-esteem). The improvements in depression were maintained over a 12-month follow-up period. However, the present findings should be approached with caution when generalizing to other samples for several reasons. First, therapists themselves administered the HDRS to participants. Since they were not blind to the conditions this may have caused bias. Second, the participants were a group of self-referred high school and university students. Therefore, further investigations are needed to clarify to what extent our findings apply to clinically referred adolescents and young adults. One outcome study on PST for depression in adults found that a PST program that included a problem orientation was significantly more effective than a PST program that focused only on problem-solving skills (Nezu and Perri 1989). It is possible that a similar effect might be found with PST for depression and suicide potential in adolescents and young adults. Third, a problem-orientation component was not part of the PST

offered in the study. Studies employing PST with a problem-orientation component are therefore warranted.

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