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A Self-Help Problem Solving Therapy Intervention to Improve Psychological Well-Being

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Abstract of the Dissertation

A Self-Help Problem Solving Therapy Intervention to Improve Psychological Well-Being

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The efficacy of a six-week, self-help Problem Solving Therapy intervention for improving psychological well-being was examined in a sample of 69 college students. Participants were randomly assigned to either a treatment group (n = 39) or a waitlist control group (n = 30). Intent to treat analyses were performed (n = 34, treatment group; n = 27 waitlist control group), as were completer analyses (n = 29, treatment group; n = 24 waitlist control group). Self-Help Problem Solving Therapy (SHPST) is based on traditional Problem Solving Therapy, and it is intended for people who experience ongoing difficulty with everyday problems and stress. SHPST is a cognitive-behavioral intervention that develops constructive problem solving attitudes and skills. The SHPST manual that was used in this intervention, *Solving Life's Problems* (Nezu, Nezu, and D'Zurilla, 2007), outlines what problem solving is; defines important terms including problem, solution, and stress; and provides instruction in the five major problem-solving steps that are central to Problem Solving Therapy. We found that SHPST significantly improved participants' psychological well-being as measured by the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). Additionally, improvements in well-being as measured by the BDI-II, the Beck Anxiety Inventory (BAI; Beck et al., 1988), and the Self Acceptance scale and the Purpose in Life scale of the Scales of Psychological Well-Being (SPWB; Ryff & Essex, 1992) were found to correlate with improvements in global problem solving ability. Implications for clinical practice are discussed.

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Introduction

Problem-Solving Therapy (PST) is a cognitive-behavioral intervention designed to increase a person's ability to respond effectively to the problems that are encountered in daily life. It focuses on developing constructive problem-solving attitudes and skills with the goal of reducing psychopathology, preventing relapse, and preventing the development of new clinical problems, in addition to enhancing psychological and behavioral functioning. PST is informed by the social problem-solving model that was outlined by D'Zurilla and Goldfried (1971). The theory and practice of PST has evolved since then due to contributions from D'Zurilla, Nezu, and their associates (D'Zurilla, 1986; D'Zurilla & Nezu, 1982, 1999, 2007; D'Zurilla, Nezu, and Maydeu-Olivares, 2002; Nezu, Nezu, & D'Zurilla, 2013; Nezu, Nezu, Friedman, Faddis, & Houts, 1998; Nezu, Nezu & Perri, 1989).

The efficacy of PST for a wide range of patient problems has been demonstrated by more than 20 years worth of outcome studies (Malouff, Thorsteinssin, & Schutte, 2007, Nezu, Nezu, & D'Zurilla, 2013). PST has been shown to be beneficial for a wide variety of people, ranging from hospitalized inpatients to typically functioning people who wish to optimize their personal and social functioning. PST is an appropriate treatment choice for psychological symptoms including depression, anxiety, suicidal ideation, and social phobia. It has also been used successfully to address parent-child stress and relationship stress. Additionally, PST has been used with a wide range of medical patients including those with back pain, head injuries, and cancer. For a review of the PST outcome literature please see Chang, D'Zurilla, & Sanna, 2004; D'Zurilla & Nezu, 2007, 2010; Nezu, Nezu, & D'Zurilla, 2013.

The major aim of PST is to help individuals to cope more effectively with the problems of everyday living that cause them stress thereby reducing and preventing psychopathology and enhancing positive well-being. This is accomplished by teaching skills necessary to (a) change a situation for the better and/or (b) reduce the emotional distress caused by the situation. Theoretical support for PST is found in two interrelated conceptual models: (1) the social problem-solving model and (2) the relational/problem-solving model of stress and well-being.

The social problem-solving model consists of two distinct dimensions of problem solving orientation and three distinct problem-solving styles. The two problem orientation dimensions are (1) positive problem orientation and (2) negative problem orientation. *Positive problem orientation* is a constructive problem-solving cognitive set that increases the likelihood that a person will (a) view a problem as a challenge rather than a threat, (b) believe that problems are solvable, (c) have a sense of self-efficacy related to problem-solving, (d) believe that time, effort, and persistence are necessary to solve a problem, and (e) commit to solving problems rather than avoiding them. *Negative problem orientation* is a dysfunctional cognitive-emotional set that is characterized by (a) viewing problems as threats to well-being, (b) having a poor sense of self-efficacy related to problem-solving, and (c) becoming easily frustrated and upset when confronted with the problems of everyday life.

The three distinct problem-solving styles are (1) rational problem solving, (2) impulsive/careless problem solving, and (3) avoidance style. *Rational problem solving* is a

constructive problem solving style that employs the rational, deliberate, and systematic application of four problem-solving skills (problem definition and formulation, generation of alternative solutions, decision making, and solution implementation and verification). *Impulsivity/carelessness style* is a dysfunctional problem solving style in which a person's attempts to solve problems are typically impulsive, hurried, careless, and incomplete. *Avoidance style* is a second dysfunctional problem solving style that is characterized by inaction, passivity, and procrastination.

The five dimensions of social problem-solving ability described above are measured by the Social Problem-Solving Inventory- Revised (SPSI-R; D'Zurilla, Nezu, & Maydeu-Olivares, 2002). High scores on the positive problem orientation scale and the rational problem solving scale and low scores on the negative problem orientation scale, the impulsivity/carelessness style scale, and the avoidance style scale indicate that a person has adaptive social problem-solving abilities. Low scores on positive problem orientation and rational problem solving and high scores on negative problem orientation, impulsivity/carelessness style, and avoidance style indicate that a person has poor social problem-solving abilities.

The relational/problem-solving model of stress and well-being views social problem solving as a versatile coping strategy that increases adaptive functioning and positive well-being, which, as a result, reduces and prevents the negative impact of stress on well-being and adjustment (D'Zurilla & Nezu, 2010). It is an expansion of Richard Lazarus's relational model of stress (Lazarus, 1999; Lazarus & Folkman, 1984) which views stress as the product of a person-environment relationship in which the demands of the situation are perceived by the person as taxing, exceeding coping resources, and/or threatening to well-being. In the relational/problem-solving model, stress is viewed as the product of the reciprocal relations among three variables: (1) stressful life events, (2) well-being, and (3) problem-solving coping (D'Zurilla & Nezu, 2010). This model is depicted in Figure 1.

As the figure illustrates, the relational/problem-solving model incorporates two types of stressful life events: *major negative events* (death of a loved one, divorce, job loss, major illness) and *daily problems* (job difficulties, interpersonal conflict, substance abuse, frequent tardiness). In a person's life, major negative events and daily problems can develop independently of each other, or, they can be causally related. A major negative life event like the loss of one's job often creates new daily problems (e.g., financial difficulties, loss of health insurance, difficulty finding a new job). Conversely, daily problems can lead to major negative life events. For example, poor eating habits, excessive alcohol consumption, and poor access to health care can make major health problems more likely. For a discussion of the relationship between stressful life events and well-being, see Bloom (1985).

In the model, the concept of *well-being* refers to psychological (i.e., emotional, cognitive, behavioral), social, and physical functioning. The model assumes that stressful life events have a direct effect on well-being as well as an indirect effect that is mediated or moderated by the cognitive appraisal and coping behaviors.

The remaining component of the relational problem-solving model, *problem-solving coping*, should be regarded as the most important piece of the model. It is a process that integrates all of the cognitive appraisal and coping behaviors that occur within the social problem-solving framework. As outlined in D'Zurilla and Nezu (2010), a person who uses problem-solving coping effectively (1) perceives a stressful life event as a "problem-to-be-solved," (2) believes that he or she is capable of solving the problem successfully, (3) defines the problem carefully and sets a realistic goal, (4) generates a variety of potential solutions or coping

options, (5) chooses the most effective solution or option, (6) implements the solution or option effectively, and (7) carefully observes and evaluates the outcome of the problem solving process.

A useful feature of problem-solving coping is that it can be used for both problem-focused goals and emotion-focused goals. When a particular problematic situation is perceived as modifiable, a person has the option to set problem-focused goals (i.e., changing the situation for the better). When a situation seems difficult or impossible to modify, a person has the option to set emotion-focused goals (e.g., acceptance, relaxation, making some good come of the problem). In situations that have some aspects that are modifiable and others that are not modifiable a person is able to set both types of goals.

There is a wide body of literature that supports the relationship between social problem-solving ability and psychological well-being. As described in D'Zurilla and Nezu (2007), poor social problem-solving ability has been associated with increased levels of depression in high school students (Sadowski et al., 1994), adolescent inpatients (Reinecke et al., 2001), college undergraduates (Chang, 2002; Chang &D'Zurilla, 1996), adult community residents (Kant, D'Zurilla, & Maydeu-Olivares, 1997), and adult inpatients (D'Zurilla et al., 1998; Garland et al., 2000). A number of studies have found all scales of the SPSI-R to be related to state and/or trait anxiety (Belzer, D'Zurilla, & Maydeu-Olivares, 2002; Bond et al., 2002; Kant et al., 1997; and Nezu et al., 1999). There have been two recent meta-analyses of this literature (Bell & D'Zurilla, 2009b; Cuijpers, van Straten, & Warmerdam, 2007). Additional research exists on the relationship between social problem-solving ability and suicide, schizophrenia, substance abuse, addictive disorders, and criminal behavior. Please see Nezu, Nezu, & D'Zurilla (2013) for a complete review.

In addition to the well documented direct relationship between social problem-solving ability and psychological well-being, social problem-solving also influences well-being when it functions as a mediator or moderator of the relationship between stress (both daily stress and major negative life events) and well-being. For example, social problem-solving ability has been shown to be a moderator of the relationship between major negative life events and internalizing symptoms such that the magnitude of the relationship between the events and the symptoms is less when social problem-solving ability is higher rather than lower (see reviews by Nezu, 2004; Nezu, Wilkins & Nezu, 2004; Nezu, Nezu, & D'Zurilla, 2013).

With regard to social problem-solving ability as a mediator, there are two popular mediational models. The first model is based on the A-B-C (antecedent-behavior-consequences) model that is found in behavior therapy. Stress (A) sets the stage for problem-solving (B), which results in effects on well-being (C). The second mediational model views social problem-solving as a variable in a causal chain such that stress negatively impacts problem-solving, which in turn negatively impacts well-being. As described in D'Zurilla and Nezu (2010), social problem-solving ability has been found to mediate the relationship between daily stress and emotional well-being (Folkman & Lazarus, 1988), depression (Kant, D'Zurilla, & Maydeu-Olivares, 1997; Nezu & Ronan, 1985; Nezu, Perri, & Nezu, 1987), anxiety (Kant et al., 1997), and, internalizing symptoms and externalizing symptoms (Bell & D'Zurilla, 2009a).

The relational/problem-solving model of stress and well-being, along with the empirical evidence supporting it, is important because it provides a theoretical and empirical rationale for PST. Additionally, it provides a framework for assessment prior to the beginning of treatment. During the assessment stage, it is possible to identify major negative life events, daily problems, problem orientation deficits, problem-solving style deficits, and solution implementation deficits, as well as maladaptive responses to stress.

The two major goals of PST are (1) to increase positive problem orientation and decrease negative problem orientation, and (2) to provide training in four major problem solving skills: (a) problem definition and formulation, (b) generation of alternative solutions, (c) decision making, and (d) solution implementation and verification. PST targets all aspects of the social problem-solving model and it provides training in problem orientation and the four problem solving skills listed above. The problem orientation component of PST promotes the adoption of a positive problem orientation and it also facilitates the likelihood that people will confront problems rather than avoid them. A person with a positive problem orientation would likely have a sense of optimism about the solvability of problems and they would likely have a strong sense of self-efficacy.

The problem definition and formulation component of PST teaches skills that help people to identify and define the problem-solving task at hand, to gather all the existing relevant information about the problem, to set realistic goals regarding the outcome of the problem, and to identify possible obstacles to solving the problem. The generation of alternative solutions component teaches a variety of brainstorming techniques with the goal of increasing the likelihood that the best solution to the problem at hand will be discovered. The decision-making component of PST teaches people to systematically evaluate the potential solutions that they previously generated. This involves taking into account how likely it is that each potential solution will meet the goals that they specified in the problem definition and formulation phase, how realistic it is that the person who will solve the problem will be able to execute the solution plan, personal and social consequences of the potential solutions, and short and long term effects of the potential solutions.

The final component of PST focuses on developing skills related to solution implementation and verification. People are taught to implement solutions in a way that is rational, deliberate, and systematic and to monitor and evaluate the outcome of the solution that they implemented and to compare the actual outcome with their previous expectations. Individuals are taught to troubleshoot the problem-solving process if the outcome fell short of their expectations, or to self-reinforce their good work if the problem was successfully resolved.

In 2013, Nezu, Nezu, and D'Zurilla published a comprehensive PST therapists' manual. The manual details the historical development of PST, the theoretical and empirical support for the intervention, the details of the intervention itself, as well as case examples, illustrations, patient forms, and numerous handouts. The book is intended for use by a range of professionals including psychologists, social workers, psychiatrists, primary care physicians, nurses, and teachers. As explained by Nezu, Nezu, and D'Zurilla, Problem Solving Therapy is a directive approach to psychotherapy and skills training, and it has been adapted for a wide range of populations in numerous clinical and non-clinical settings.

Self-Help Problem-Solving Therapy

In 2007, Nezu, Nezu, and D'Zurilla published a PST self-help manual entitled *Solving Life's Problems*. It was intended for people who experience continued difficulty with everyday problems and strains, people who have difficulty following their doctor's recommendations regarding medication, exercise, or other lifestyle habits, and/or people who are confronting a new problem that is very complex or intense. Over the course of nine chapters, readers are given instruction in the five major problem-solving steps. Additionally, the self-help manual provides

an overview of what problem solving is, and it defines important terms including problem, solution, and stress.

During the past 15 years, a number of important research papers and meta-analyses have been published that highlight the efficacy of empirically based, cognitive-behavioral self-help interventions. It is very distressing, however, that the multi-billion dollar self-help industry also includes so many books and other materials that are useless at best, and exploitive and potentially harmful at worst. It is critical, though, that spurious materials are not allowed to detract from the many legitimate benefits that empirically supported treatments have to offer.

Although bona fide self-help interventions have been widely available for over thirty years, and although there have been previous waves of efficacy research, the renewed interest that is reflected in the literature today is likely due to rising healthcare costs and an increasingly overburdened healthcare system. As outlined in Scogin et al. (2003), self-help therapies have a number of advantages over traditional types of therapy. They eliminate virtually all of the geographical and transportation barriers to therapy; they allow people to engage in treatment at their own pace from home or from wherever they choose; they are more cost effective than traditional psychotherapy and pharmacotherapy; and they typically facilitate a smooth transition between the treatment stage and the post-treatment stage.

Self-help therapy, which is sometimes referred to in the research literature as bibliotherapy or self-administered treatment, has been demonstrated to be effective for a number of presenting problems. Gould and Clum (1993) conducted a meta-analysis that included 40 studies containing a total of 61 treatments for assorted presenting problems. Using no-treatment, waitlist, and placebo comparison groups, the authors found an overall effect size of 0.76 at post-treatment, and an effect size of 0.53 at follow-up. Further analyses showed that some presenting problems (depression, sleep difficulties, headache, and fear) were more responsive to the self-help format as compared to other presenting problems. The effects size for depression was d = .74 and the effect size for fear reduction was d = 1.11.

den Boer, Wiersma, and Van Den Bosch (2004) performed a meta-analysis of treatment studies for depression and anxiety. They found an effect size of .84 at post-treatment and an effect size of .76 at follow-up when self-help treatments were compared to control conditions. They found an effect size of -.03 at post-treatment and an effect size of -.07 at follow-up when self-help treatments were compared to other active treatments.

In 2007, a meta-analysis that included 24 studies on self-help treatments for depression and anxiety was conducted by Menchola, Arkowitz, and Burke. Self-help treatments had a large effect size when compared to no-treatment control (d = 1.00), but results were less strong when self-help treatments were compared to therapist-administered treatments (d = -.31). Menchola and colleagues also reported findings from several previous meta-analyses. Marrs (1995) conducted a meta-analysis that included 70 samples. The effect size that compared self-help treatments for depression with other treatments for depression was d = .57. The effect size for self-help interventions that targeted anxiety was d = .91. Cuijpers (1997) calculated an effect size of d = .82 using a sample of six studies on depression in which self-help interventions were compared to waitlist control. The results from other studies reviewed by Menchola and colleagues are reported elsewhere in this paper.

Gregory et al. (2004) conducted a meta-analysis on treatments for depression that included 29 studies. The overall weighted effect size (including both single-group pretest vs. posttest designs as well as between group designs) was .99. The 17 studies with between-group designs (pretest-posttest waiting list control group) had an effect size of .77. The authors also

reported findings from a previous meta-analysis that targeted depression. Cuijpers (1998) found an effect size of .65 based on 10 studies that compared manualized self-help interventions and wait-list-control.

Scogin at al. (2005) conducted a review of therapies for depression in older adults and found that cognitive self-help therapy was one of six therapies that were found to be beneficial. The other therapies were (1) behavior therapy, (2) cognitive-behavioral therapy, (3) problem-solving therapy, (4) brief psychodynamic therapy, and (5) reminiscence therapy.

Cuijpers, van Straten, and Smit (2006) performed a meta-analysis of assorted treatments for depression in older adults and found an overall effect size of .72 across various types of interventions. No differences were found among individual, group, or self-help treatment formats.

Hirai and Clum (2006) conducted a meta-analysis that included 33 studies that examined assorted treatments for anxiety problems. They found a post-treatment effect size of .62 for self-help treatments compared to control groups, and a follow-up effect size of .51. When self-help interventions were compared to therapist directed interventions they found a post-treatment effect size of -.42, and a follow-up effect size of -.36.

In 2006, Barth, Critchley, and Bengel conducted a meta-analysis and review of assorted psychosocial interventions for smoking cessation in patients with coronary heart disease. They found that self-help techniques were similar to telephone support and also to behavioral therapies, OR = 1.47, 95% CI = 1.10-1.97 for self-help; OR = 1.58, 95% CI = 1.26-1.98 for telephone support; OR = 1.65, CI = 1.28-2.13 for behavioral therapies.

Apodaca and Miller (2003) conducted a meta-analysis of 22 studies that evaluated the effectiveness of self-help interventions for alcohol problems. The mean weighted effect size for self-referred participants was .31, and the mean weighted effect size for people identified through screening procedures was .21. A between group comparison of self-help versus more extensive interventions yielded an overall effect size of -.03.

In addition to the previously mentioned meta-analyses, there are also a large number of individual published studies that have evaluated the effectiveness of self-help treatments for a wide range of presenting problems. These studies found that self-help interventions are beneficial for a wide range of problems including panic, smokeless tobacco use, insomnia, binge eating, bulimia, social phobia, test stress, and perfectionism. Thus far, however, no study has examined the efficacy of self-help PST in a college-age or adult sample. For a comprehensive review of the self-help literature see Harwood and L'Abate, 2010.

Study Aims and Hypotheses

The present study has two main aims. The first aim is to evaluate the effectiveness of Self-Help Problem Solving Therapy (SHPST) for improving well-being. (SHPST is operationally defined as the reading and application of the self-help manual *Solving Life's Problems*.) The second aim of the study is to examine the theory that underlies the intervention—that is, that SHPST will enhance well-being by increasing social problem-solving ability. The study has two hypotheses:

1. SHPST will significantly improve participants' psychological well-being as measured by tests of psychological distress (i.e. depression, anxiety, and anger) and positive well-being (i.e., self-acceptance and sense of purpose in life). We have chosen to examine psychological well-being (rather than social well-being or physical well-being) because of the relatively brief

nature of our intervention. Longer interventions are generally required in order to effect changes in the quality of social relationships and in health status. For our measures of psychological distress, we chose to look at depression, anxiety, and anger because they are common negative reactions to stress. We chose self-acceptance and sense of purpose in life as our measures of positive well-being because they have a known relationship with social problem-solving ability (Chang, D'Zurilla, & Sanna, 2009).

2. The second hypothesis has two parts. (a) SHPST will increase overall problem-solving ability as measured by the SPSI-R and (b) improvements in well-being will be significantly correlated with improvements in social problem-solving ability. In addition to providing data that are relevant for the theory underlying SHPST, part (a) will also provide evidence for treatment integrity—that is, that the self-help intervention was successful in increasing the participants' knowledge and use of constructive problem solving attitudes and skills.

Method

Participants

The participants in this study consisted of 61 undergraduate students (50 female, 11 male) at a large northeastern public university. Participants were recruited from the university's psychology department subject pool, and all fulfilled a course requirement through being in this study. Participants ranged in age from 18-28 years, and had a mean age of 19.95 (*SD* = 1.94). The ethnic composition of the sample was as follows: Caucasian/White (42.6%), Asian/Asian American (32.8%), Indian or South Indian (8.2%), Hispanic (6.6%), African American/Black (1.6%), Other (6.6%), and Did not respond (1.6%). Regarding sexual attraction, 88.5% of participants reported being only attracted or somewhat more attracted to a different gender, 4.9% of participants reported being equally attracted to all genders, and 6.5% of participants reported being only attracted or somewhat more attracted to people of the same gender.

Our original sample included 69 undergraduate students. Upon reexamination of inclusion/exclusion criteria it was found that five individuals did not meet criteria for inclusion. Additionally, three individuals were found to have provided random and unusable data during the screening process and were excluded from all analyses.

Inclusion Criteria, Exclusion Criteria, and Screening

In order to be enrolled in the study, participants needed to (a) be students at our university in the northeast and at least 18 years old, (b) be willing to provide informed consent, (c) meet criteria for significant psychological distress, (d) have access to a computer with email and internet access on at least a weekly basis, (e) be able to open and read .pdf files.

Significant psychological distress was defined as a score equal to or greater than a pre-selected cutoff score on at least two out of three of our measures of psychological distress. For all three measures, our participants needed to score at or above one standard deviation above the mean for a normal sample as reported in the manual for the measure.

We used a cutoff score of 23 on the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). A score of 23 falls within the "moderate" range based on cut score guidelines published in the manual for the BDI-II that are based on a sample of psychiatric outpatients. (A score of 0-13 is in the minimal range, a score of 14-19 is in the mild range, a score of 20-28 is in the moderate range, and a score of 29-63 is in the severe range.)

We used a cutoff score of 21 on the Beck Anxiety Inventory (BAI; Beck et al., 1988). As was the case for the BDI-II, the manual for the BAI includes cut score guidelines that are based on a clinical sample. A score of 21 falls within the moderate range. (A score of 0-7 is in the minimal range, a score of 8-15 is in the mild range, a score of 16-25 is in the moderate range, and a score of 26-63 is in the severe range.)

We used a cutoff score of 25 on the State Anger scale of the State-Trait Anger Inventory-2 (STAXI-2; Spielberger, 1999). The manual for the STAXI-2 reports means and standard deviations on the State Anger scale for normal adults separately for males and females. We averaged across the two groups to calculate our cutoff score. Cut score guidelines are not

included in the manual for the STAXI-2. As a point of comparison, the mean for psychiatric patients on the State Anger scale is 23.38 and the standard deviation is 9.57.

Exclusion criteria were (a) having previously read *Solving Life's Problems*, (b) having taken the host university's course, Clinical Behavior Modification, and (c) current use of either psychotherapy or medication for psychological problems.

In all, 398 potential participants completed the screening questionnaire which included the BDI-II, the BAI, and the State Anger scale of the STAXI-2 as previously described. Of the 398 potential participants, 69 met inclusion criteria and, of them, 39 were randomly assigned to the treatment group and 30 were randomly assigned to the waitlist control group. Of the 39 participants in the treatment group, three dropped out after their initial assessment, one provided random data at Time 1, two provided random data at Time 2, and four answered questions at their Week 6 assessment that required them to be excluded from the study (starting psychiatric medication, having previously read our treatment manual, etc.). Of the 30 participants assigned to the waitlist control group, two dropped out after their initial assessment, two provided random data at Time 1, one provided random data at Time 2, and one answered questions one the Week 6 questionnaire that required him or her to be excluded. Participants who became ineligible during the course of the study were excluded and participants who provided unusable data at Time 1 were excluded. This yielded 34 participants in the treatment group and 27 participants in the waitlist control group. Intent to treat analyses were performed using Time 1 data for the participants who dropped out or who provided random data at Time 2.

Participants who met study criteria at Time 1 were randomly assigned to either the treatment group or the waitlist control group. The participants who were assigned to the waitlist control group were told that they were being assigned to the waitlist group. We explained to them that the purpose of the study was to evaluate the effectiveness of a self-help book that is designed to improve a person's ability to cope effectively with stress, which, in turn, is expected to improve psychological well-being. Participants who were enrolled in our project received five Subject Pool credits for successful completion of the study. (Waitlist control participants who complete the pretest and posttest assessments but who declined to participate in the intervention itself also received five subject pool credits.) Individuals who did not meet our criteria received one subject pool credit for completing the demographic questionnaire and the measures. They were also given a short explanation as to why they did not meet criteria, and they were provided with the phone numbers of the University Counseling Center (which offers its services free of charge to all students) and another on campus mental health clinic. We provided them with a copy of the treatment manual at their request. None of the ineligible potential participants requested a copy of the treatment manual, however, one waitlist control participant requested a copy after Time 2 data was collected.

Data were screened for missing values, outliers, normality, and fabricated response patterns. For an excellent discussion of the identification of problematic responses in survey data see Mead and Craig, 2012.

Data Collection and Administration of Intervention

All consent procedures, data collection, and the administration of SHPST took place online at www.psychdata.com. Online data collection has emerged as a cost effective and convenient resource for researchers, and it allows participants greater flexibility regarding where and when they provide data as compared to traditional lab or clinic based settings.

Psychdata.com is a secure website that is widely used by social science researchers who do internet-based data collection. All measures for this study were password protected.

Measures

The Social Problem Solving Inventory- Revised: Short Form (SPSI-R:S; D'Zurilla et al., 2002). The SPSI-R:S was our measure of problem solving ability. It is a 25-item self-report questionnaire that assesses how people think, feel, and behave when confronted with problems. Individuals are asked to indicate on a scale of 0-4 how true various statements are for them. The SPSI-R:S yields a total score that reflects an individual's global problem solving ability, and it also yields five sub-scale scores. The Positive Problem Orientation scale measures the extent to which an individual has a constructive orientation towards problems. People with high scores on this scale are likely to (a) view problems as challenges, (b) have a sense of optimism about problems, (c) have confidence in their ability to solve problems successfully, (d) believe that successful problem solving takes time and effort, and (e) commit themselves to solving problems rather than avoiding them. The Negative Problem Orientation scale (NPO) measures a dysfunctional or inhibitive cognitive-emotional set. People with high scores on this scale are likely to (a) view a problem as a threat to well-being, (b) have doubts about their ability to solve problems, and (c) become frustrated when confronted with problems. The Rational Problem Solving scale (RPS) assesses a person's understanding of adaptive problem solving strategies. Additionally, it reflects a person's ability to implement problem-solving strategies in a way that is rational, deliberate, and systematic. High scores on this scale indicate that an individual is likely to respond effectively in problem-solving situations. The Impulsivity/Carelessness Style scale (ICS) measures a maladaptive problem-solving style that is characterized by active attempts to apply narrow, impulsive, careless, rushed, and incomplete problem solving strategies. Individuals with high scores on this scale are likely to react impulsively in problem-solving situations. They often consider only a few solutions to a potential problem, they consider alternatives and consequences too quickly and carelessly, and their evaluations of outcomes are often inadequate. Finally, the Avoidance Style scale (AS) assesses a problem-solving style that is characterized by procrastination, passivity, and dependency. Individuals with high scores on this scale are likely to avoid their problems, to delay confronting them, to shift the responsibility for problem-solving to other people, and to wait and see if a problem is going to resolve itself. To summarize, constructive problem-solving strategies are reflected by higher scores on the total social problem-solving scale, PPO, and RPS and by lower scores on NPO, RPS, and ICS. The SPSI-R:S has good structural, concurrent, predictive, convergent, and discriminant validity. It has been shown to be stable across time while also being sensitive to the effects of therapeutic interventions. For a review, see D'Zurilla et al., 2002.

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996). The BDI-II was our measure of depressive symptomatology. It is a 21-item self-report measure that assesses the intensity of depression. Each item of the measure presents a symptom of depression as well as four descriptors of that symptom. The descriptors are arranged in order of increasing severity and are numbered 0-3. Respondents are asked to select the one descriptor in each group that best describes the way that they have been feeling during the past two weeks. Although the BDI-II contains an item that assesses suicidality, this item was excluded from the present study at the request of the host university's IRB. The measure yields a total score that is calculated by

summing all of the items. The BDI-II is one of the most widely used measures of depression in both research and clinical practice. Its reliability and validity are well known.

The Beck Anxiety Inventory (BAI; Beck et al., 1988). The BAI was our measure of anxious symptomatology. It is a 21-item self-report measure that assesses the intensity of symptoms of anxiety. The measure lists 21 symptoms of anxiety and asks respondents to rate the extent to which they have been bothered by each symptom during the past week. Respondents choose among "not at all," "mildly," "moderately," and "severely." To score the measure, a researcher or clinician assigns values of 0-3 to correspond with the qualitative descriptors previously listed and sum across all items. Like the BDI-II, the BAI has been used extensively in research and clinical settings. Its psychometric properties are widely regarded as excellent.

The State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999). We used the State Anger scale of the STAXI-2 to assess situationally determined feelings of anger. The State Anger scale contains 15 items that each consists of a short sentence that describes how people sometimes feel. Respondents are asked to read each item and indicate how they are feeling "right now." They can choose among "Not at all (1), "Somewhat (2)," Moderately so (3)," and "Very much so (4)." The State Anger scale is scored by summing across items. It yields a total score and three subscales: Feeling Angry (S-Ang/F), Feel like Expressing Anger Verbally (S-Ang/V), and Feel like Expressing Anger Physically (S-Ang/P). The manual for the STAXI-2 contains normative data that is based on more than 1900 individuals. The measure's concurrent validity is excellent, and it has been used extensively in research in a number of areas including behavioral medicine, posttraumatic stress disorder, and anger management. For a review, please see Spielberger, 1999.

The Scales of Psychological Well-Being (SPWB; Ryff & Essex, 1992). We used the Self Acceptance scale and the Purpose in Life scale of the SPWB to assess positive well-being in our sample. We used the mid-length version of the measure that contains 14 items per scale. This version has been shown to have psychometric properties similar to the original full-length version of the measure (Ryff, 1989), and better psychometric properties than the short-form version that contains only three items per scale (Ryff & Keyes, 1995). Participants are asked to respond to questions that address "how you feel about yourself and your life" on a 6-point Likert-type scale, ranging from "Strongly Disagree" to "Strongly Agree." The scales are scored by summing across items (some items need to be reverse scored). The coefficient alpha for the Purpose in Life scale is .88, and the coefficient alpha for the Self-Acceptance scale is .91 (Ryff & Essex, 1992).

Pretreatment Assessment

At the very start of the screening procedure, all potential participants were assigned participant identification numbers so that data could be collected anonymously. Participants used their assigned number rather than their name when they completed the study measures. A master list of the participants' identification numbers and their corresponding names was maintained in a locked and secure location in the event that any of the participants lost track of their assigned number.

Administration of SHPST

The members of the treatment group received weekly emails that contained the relevant chapters of *Solving Life's Problems* and a reminder to read the chapters and take a brief open-

book quiz at www.psychdata.com. The quizzes contained 4-5 brief short answer questions that required participants to summarize the main points of the weekly reading. They were intended to provide a guaranteed minimum level of contact with the study manual for the treatment group participants. The chapters and reminders were sent out on Mondays, and participants had until the following Sunday to complete the reading and take the quizzes. During the first week of the study, participants were responsible for reading the first chapter of *Solving Life's Problems*, the second chapter, and part of the third chapter. This amounted to approximately 20 pages.

Chapter one provided a rationale for reading the book, and it defined some basic terms and concepts that recurred throughout the book. Chapter two provided a brief overview of the five steps that are involved in effective problem solving. Chapter three prompted readers to assess their personal problem-solving strengths and limitations. Chapter three also contained a "problem-solving test" that was based on the SPSI-R and instructions on how to score and interpret the test. Participants in this study were not provided with the test and the accompanying instructions because the SPSI-R is an outcome measure in this study and the problem-solving test and its accompanying information might cause bias in post-treatment assessment. We redacted the portion of chapter three where the test and instructions normally appear. During the second week of the study, participants read chapter four of the manual which focused on problem-solving attitudes and emotions that people sometimes feel when confronted with a problem (pages 27-42). During week three, participants read chapter five (pages 43-56), which focused on defining and describing problems and setting realistic goals. In week four, participants read chapters six and seven. Chapter six (pages 57-65) taught skills related to generating alternative solutions to problems and chapter seven (pages 67-76) taught how to select a solution or combination of solutions, as well as how to predict consequences. In week five, participants read chapter eight (pages 77-85), which focused on solution implementation and the evaluation of the outcome. In the sixth and final week of the intervention, participants read chapter nine (pages 87-103), which reviewed the entire problem-solving process.

Post-Treatment Assessment

All study measures were readministered to both groups at posttest. Participants in the treatment group were required to complete the posttest assessment within one week of completing the intervention. Waitlist control participants received an email six weeks after they completed the pretest assessment that prompted them to complete the posttest assessment within the next week. Waitlist control participants had the option to participate in the intervention after the waiting period had ended. They were not obligated to participate if they preferred not to, and they were awarded five subject pool credits regardless of their choice.

Follow-up Assessment

During the post-treatment assessment we asked participants in the treatment group for permission to contact them in six months so that they could complete a follow-up assessment. We planned to re-administer all study measures at follow-up, conducting data collection at www.psychdata.com. Due to time considerations and the complications inherent in having multiple participants enrolled in multiple waves of the study simultaneously, follow-up data has not been collected at this time.

Results

Prior to running analyses, data were screened for outliers using scatterplots. Two outliers were found on our measure of depression, (see Figure 2) and all study analyses were performed with and without outliers. Also prior to running analyses, we tested for pretreatment differences between the treatment group and the waitlist group and also for gender differences on all study measures using 2-tailed *t*-tests, with equal variances assumed. No group membership differences at pretest were found, regardless of whether outliers were included or excluded. A gender difference was found for the Negative Problem Orientation (NPO) dimension of overall problem solving ability. When compared to males, females were found to have higher negative problem orientation ($t = -2.25$, $p < .05$, $ES = -2.25$). Because of this significant difference, we controlled for gender statistically in analyses involving NPO.

Means, standard deviations, coefficient alphas, and bivariate correlations at pretest

The means and standard deviations and coefficient alphas for all study measures are presented in Table 1 for participants who completed the study successfully (n = 53), and they are presented again in Table 2 including participants that were included in our intent to treat analyses (n = 61). As the tables show, the coefficient alphas range from .70 to .93 indicating good internal consistency for all study measures. One-tailed bivariate correlations among all study measures at pretest are presented in Table 3 and Table 4.

For study completers, when the two outliers on the BDI were included in the analyses, global problem-solving ability was positively correlated with sense of purpose in life, self-acceptance, and the positive problem orientation and rational problem solving dimensions of overall problem-solving ability. Global problem-solving ability was negatively correlated with depression, and the negative problem orientation, impulsivity/carelessness style, and avoidance style dimensions of overall problem-solving ability. When the two outliers were excluded from correlational analyses involving the BDI, the relationship between depression and the impulsivity/carelessness style dimension of problem solving ability became significant. No other correlations changed.

When intent to treat participants were included in the correlational analyses, several changes were observed. There were three changes involving the impulsivity/carelessness (ICS) dimension of problem solving ability and three changes involving the avoidance style dimension of problem solving. The relationship between ICS and the BDI became significant at the $p < .05$ level when outliers were included, the relationship between ICS and negative problem orientation became significant at the $p < .05$ level, and the relationship between ICS and sense of purpose in life became significant at the $p < .05$ level. Lastly, a correlation at the $p < .05$ was observed between the avoidance style (AS) dimension of problem solving ability and the BDI when outliers were included and when outliers were excluded, and a previously negative correlation between AS and our measure of anger became insignificant.

SHPST will significantly improve participants' psychological well-being

Our first hypothesis, that SHPST will significantly improve participants' psychological well-being, was originally proposed to be examined with two 2 (pretest vs. posttest) x 2 (treatment vs. waitlist control) MANOVAs (one for psychological distress and one for positive well-being). Because our outcomes were not as highly correlated as expected, we proceeded with univariate 2 (pretest vs. posttest) x 2 (treatment vs. waitlist control) ANOVAs for each of our five outcome measures.

Analyses for Measures of Psychological Distress

In the intent to treat ANOVA analysis using the most complete set of data that included individuals who dropped out of the study and who did not provide usable Time 2 data where depression was the outcome measure of interest, there was a main effect of time $F(1, 59) = 6.12$, $p < .05$, $d = .64$, but no main effect for group $F(1, 59) = 2.14$, $p = .15$, $d = .37$ indicating that depression scores decreased over time regardless of group membership status. There was no interaction between group and time, $F(1, 58) = .51$, $p = .48$, $d = .18$. When outliers were excluded, there was a main effect for time $F(1, 57) = 8.44$, $p < .01$, $d = .76$, but no main effect for group $F(1, 57) = 2.67$, $p = .12$, $d = .43$ indicating that depression scores decreased over time regardless of group membership status. The interaction of group and time approached significance $F(1,57) = 3.74$, $p = .058$, $d = .51$.

In the completer analyses, when outliers were included, there was a main effect for time, $F(1,51) = 6.29$, $p < .05$, $d = .69$, suggesting that depression scores decreased regardless of group membership. There was no main effect for group $F(1, 51) = .54$, $p = .47$, $d = .20$ There was no interaction between group and time $F(1, 51) = .62$, $p = .43$, $d = .18$, but the interaction became significant when outliers were excluded $F(1, 49) = 4.24$, $p = .045$, $d = .58$. There was also a main effect for time, $F(1, 49) = 9.02$, $p < .01$, $d = .85$, but not for group $F(1, 49) = .83$, $p = .37$, $d = .26$ when outliers were excluded.

In the intent to treat ANOVA analysis using the most complete set of data that included individuals who dropped out of the study and who did not provide usable Time 2 data where anxiety was the outcome measure of interest, there was a main effect of time, $F(1, 59) = 5.60$, $p < .05$, $d = .61$, indicating that anxiety scores decreased over time regardless of group membership status. There was no main effect for group $F(1, 59) = .03$, $p = .86$, $d = .04$ and there was no interaction between group and time, $F(1, 59) = .29$, $p = .60$, $d = .14$. In the completer analyses there was no main effect for group $F(1, 59) = .00$, $p = .95$, $d = .01$, but there was a main effect for time, $F(1, 51) = 5.60$, $p < .05$, $d = .65$, indicating that anxiety scores decreased over time regardless of group membership status. The interaction was not significant $F(1, 51) = .24$, $p = .63$, $d = .14$.

In the intent to treat ANOVA analysis for anger using the complete data set there was no main effect for anger $F(1, 59) = .84$, $p = .36$, $d = .15$, no main effect for group $F(1, 59) = 2.19$, $p = .14$, $d = .38$, and there was no interaction between group and time $F(1, 59) = .84$, $p = .52$, $d = .65$. In the completer analyses there was no main effect for time $F(1, 51) = .87$, $p = .36$, $d = .26$, no main effect for group $F(1, 51) = 1.15$, $p = 1.15$, $d = .30$, and no significant interaction between group and time on anger $F(1, 51) = .44$, $p = .51$, $d = .18$.

Analyses for Measures of Psychological Well-Being

In the intent to treat ANOVA analysis for sense of purpose in life using the complete data set there was no main effect for time $F(1, 59) = .02$, $p = .89$, $d = .04$, no main effect for group $F(1, 59) = .03$, $p = .86$, $d = .04$, and there was no interaction between group and time $F(1, 59) = .01$, $p = .94$, $d = 03$. In the completer analyses there was also no significant main effect for time $F(1, 51) = .02$, $p = .89$, $d = .04$, no main effect for group $F(1, 51) = .15$, $p = .70$, $d = .11$, and no significant interaction between group and time $F(1, 51) = .01$, $p = .94$, $d = .03$.

In the intent to treat ANOVA analysis for self acceptance using the complete data set there was no main effect for time $F(1, 59) = .40$, $p = .53$, $d = .16$, no main effect for group $F(1, 59) = 1.75$, $p = .19$, $d = .34$, and there was no interaction between group and time $F(1, 59) = .86$, $p = .36$, $d = .24$. In the completer analyses there was no main effect for time $F(1, 51) = .43$, $p = .52$, $d = .18$, no main effect for group $F(1, 51) = .30$, $p = .59$, $d = .15$, and no significant interaction between group and time $F(1, 51) = .86$, $p = .35$, $d = .26$, $d = .03$.

SHPST will significantly increase problem solving ability as measured by the SPSI-R

The first part of our second hypothesis, that SHPST will significantly increase problem solving ability as measured by the SPSI-R, was examined with an initial MANOVA and a series of follow-up ANOVAs. The five dimensions of problem solving ability at pretest and posttest were entered into SPSS as dependent variables. Membership in the treatment group or the waitlist group was entered as the fixed factor. The results showed that there was no difference between the treatment group and the waitlist group on problem solving ability over time both for the analysis using the intent to treat sample and the analysis using the completer sample. Univariate tests also failed to reveal any differences between the treatment group and the waitlist group regardless of whether analyses were performed with the intent to treat sample or the completer sample. There were no main effects for any of the analyses.

Improvements in well-being will be significantly correlated with improvements in problem solving ability

The second part of our second hypothesis, that improvements in well-being will be significantly correlated with improvements in problem solving ability, was evaluated using a series of linear regressions attempting to predict the change score of the dependent variable from the change score on the SPSI, group membership, and the interaction of group membership and SPSI change score. Here we provide R^2 values as an index of effect size, where $R^2 = .02$ reflects a small effect size, $R^2 = .25$ reflects a medium effect size, and $R^2 = .4$ reflects a large effect size (Cohen, 1988).

Predicting depression change scores using problem solving change scores and group membership status (See Table 5)

For the intent to treat sample with outliers included, our three predictors significantly predicted a change in our participants' level of depression. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in depression scores. The main effect for group was not significant, indicating that changes in depression scores are likely to not be affected by group membership status. The interaction of the SPSI and group membership was also not significant, indicating that the association between the change

scores for the SPSI and depression did not differ in the treatment group as compared to the waitlist control group.

For the intent to treat sample with outliers excluded the overall regression result was significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in depression scores. The main effect for group was significant, indicating that changes in depression scores likely can be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and depression did not differ in the treatment group as compared to the waitlist control group.

For the completer participants with outliers included the overall regression result was significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in depression scores. The main effect for group was not significant, indicating that changes in depression scores were likely not affected by group membership status. The interaction of the SPSI and group membership was also not significant, indicating that the association between the change scores for the SPSI and depression did not differ in the treatment group as compared to the waitlist control group.

Predicting anxiety change scores using problem solving change scores and group membership status (See Table 6)

For the intent to treat sample the overall regression result was non-significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in anxiety scores. The main effect for group was not significant, indicating that changes in anxiety scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and anxiety did not differ in the treatment group as compared to the waitlist control group.

For the completer sample the overall regression result was non-significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in anxiety scores. The main effect for group not significant, indicating that changes in anxiety scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and anxiety did not differ in the treatment group as compared to the waitlist control group.

Predicting anger change scores using problem solving change scores and group membership status (See Table 7)

For the intent to treat sample the overall regression result was non-significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in anger scores. The main effect for group was not significant, indicating that changes in anger scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and anger did not differ in the treatment group as compared to the waitlist control group.

For the completer sample the overall regression result was non-significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in anger scores. The main effect for group not significant, indicating that changes in anger scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and anger did not differ in the treatment group as compared to the waitlist control group.

Predicting sense of purpose change scores using problem solving change scores and group membership status (See Table 8)

For the intent to treat sample the overall regression result was significant. The main effect for the SPSI was significant, indicating that changes in SPSI scores may predict changes in sense of purpose scores. The main effect for group was not significant, indicating that changes in sense of purpose scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and sense of purpose did not differ in the treatment group as compared to the waitlist control group.

For the completer sample the overall regression result was significant. The main effect for the SPSI was non-significant ($p = .06$), indicating that changes in SPSI scores likely do not predict changes in sense of purpose scores. The main effect for group was not significant, indicating that changes in sense of purpose scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and sense of purpose did not differ in the treatment group as compared to the waitlist control group.

Predicting sense of self acceptance change scores using problem solving change scores and group membership status (See Table 9)

For the intent to treat sample the overall regression result was significant. The main effect for the SPSI was not significant, indicating that changes in SPSI scores likely do not predict changes in self-acceptance scores. The main effect for group was not significant, indicating that changes in self-acceptance scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and self-acceptance did not differ in the treatment group as compared to the waitlist control group.

For the completer sample the overall regression result was significant. The main effect for the SPSI was non-significant, indicating that changes in SPSI scores likely do not predict changes in self-acceptance scores. The main effect for group was not significant, indicating that changes in self-acceptance scores likely cannot be predicted by group membership status. The interaction of the SPSI and group membership was not significant, indicating that the association between the change scores for the SPSI and self-acceptance did not differ in the treatment group as compared to the waitlist control group.

Discussion

The results of this study offer at least partial support for some of our hypotheses. When outliers were included in our univariate analyses for depression no significant interaction effects were detected. However, when outliers were excluded, the interaction between group and time approached significance in the intent to treat participant group ($p = .058$) and was significant in the completer participant group ($p < .01$) indicating that it is likely that our treatment group participants improved on our measure of depressive symptomatology as compared to the waitlist control group participants. This means that at the conclusion of our study, treatment group participants had lower levels of symptoms of depression including sadness, hopelessness, and disruptions in sleeping and eating as compared to the waitlist group participants. The decision to exclude outliers from analyses involving our measure of depression was necessary because of ANOVAs vulnerability to non-normal data and also appropriate because of how qualitatively different the scores themselves were. One outlier scored more than two standard deviations above the mean for the BDI for the sample in this study, and the other scored more than three standard deviations above the mean. Both data points are clearly visible on the scatterplot (Figure 2).

We were surprised that we did not have any significant ANOVA interaction findings involving our measures of anxiety or anger. One issue with our design that we considered was that participants were able to screen into the study with an elevated score on only one of our three outcome measures. As a result, the mean scores for our outcome measures at Time 1 ended up being lower than the screen-in threshold. (Participants who screened in on one given measure had their elevated scores averaged with the lower scores of participants who screened in on other measures.) Perhaps our effects across all of our outcome variables would have been stronger if we required participants to screen in on all of our outcome measures of interest.

The Self-Help Problem Solving Therapy treatment effect for depression is consistent with the body of previous literature that provides empirical support for the efficacy of traditional, non self-help PST interventions for depression across a range of populations. Problem Solving Therapy has been shown to be effective with older adults (Arean & Perri, 1993), with a sample of adults recruited from the community (Nezu, Perri, Nezu, et al., 1989), and with a sample of adolescent girls and college women (Eskin, Ertekin, & Demir, 2007). Means and standard deviations for these non self-help studies are presented in Table 10. For reviews of the Problem Solving Therapy outcome literature, see Chang, D'Zurilla, & Sanna, (2004); D'Zurilla & Nezu, (2007, 2010); and Nezu, Nezu, & D'Zurilla, (2009). Although the change in mean scores for the present study is smaller as compared to the changes in the therapist administered studies mentioned above, our results, viewed in context with the strength of traditional Problem Solving Therapy, suggest that in future research, Self-Help Problem Solving Therapy might prove to have even greater clinical utility than what was observed in the present study. Arean & Perri's therapist administered intervention was 12 weeks long and Nezu & Perri's therapist administered intervention was 10 weeks long. Our design did not allow us to test the differential influence of treatment length as compared to treatment modality. A more detailed discussion regarding the optimization of self-help therapy study design follows toward the end of this section.

Overall problem solving ability, defined as the combined influence of the five dimensions of social problem solving (PPO, NPO, RPS, ICS, AS) was not found to improve over time for the treatment group as compared to the waitlist group. ANOVA analyses of the five dimensions of social problem solving were also non-significant. This result was surprising to us, as we hypothesized that change in problem solving orientation and skills would contribute to a decrease in depression. Despite the disappointing ANOVA results, an examination of the correlations between global problem solving ability and our outcome measures provides some support for the relationship between social problem solving ability and well-being.

As described in the Method section, our treatment participants were given weekly short-answer quizzes in an attempt to guarantee some amount of weekly minimum contact with our treatment manual. Although, all treatment participants completed the quizzes, the quizzes did not capture how deeply the participants read the material or how much time they spent thinking about what they had read. Additionally, we did not include any assessments of motivation to change. Also, our participants were recruited from the normal population. Perhaps if we had recruited from a population of treatment seeks our participants would have had higher inherent motivation to change.

Despite the lack of ANOVA results for the dimensions of problem solving, treatment participants were observed to experience a reduction in their symptoms of depression as compared to waitlist participants. Although it is possible that effect sizes were too small to be captured, or that our study was under-powered, we wondered what else might explain the reduction in depressive symptoms. It is possible that there was a therapeutic effect of simply being in the treatment condition. Treatment participants received weekly emails and occasional reminders from the researchers. Treatment participants had the knowledge that they were selected for a study for which others were not chosen. They were receiving five subject-pool credits for reading what a couple of participants described as a pleasant book.

The results of our regression analyses predicting depression change scores from problem solving change scores and group membership status are consistent with the idea that presence itself in the treatment group rather than the waitlist control group may underlie our previously discussed ANOVA findings. When outliers were excluded, we found a main effect for the influence of group membership on depression change scores for our intent to treat sample and our completer sample. No other main effects or interaction effects were significant, leading us to believe that for our participants depression change scores were strongly influenced by their enrollment in either the treatment group or the waitlist group.

Also regarding our regression analyses, we found a significant main effect ($p = .04$) for problem solving ability in our regression that included sense of purpose as the dependent variable. The main effect exists in the absence of any other main effects or interactions suggesting that regardless of group membership status, problem-solving ability can be used to predict level of depression. This makes sense in the context of the large literature regarding problem-solving ability and positive well-being.

The results of this study have useful clinical implications, particularly in the context of the strong body of work demonstrating the efficacy of Problem Solving Therapy for a range of clinical problems as well as in the context of the emerging literature in support of self-directed therapies in general. A treatment effect for depression was found when outliers were excluded from the ANOVA test. We believe that that our self-help PST intervention facilitated a reduction in depressive symptomatology in our treatment group participants. Given that traditional Problem Solving Therapy has been shown to be effective for a range of clinical problems,

including anxiety and anger, we were surprised that we did not have significant ANOVA results when testing the BAI and the STAXI. We are aware that there is much more outcome literature about self-help therapy and depression as compared to any other presenting problem including anxiety and anger. It may be that individuals with depression are uniquely motivated to engage in self-help treatment in a way that is more beneficial as compared to people with other types of symptoms.

We received several spontaneous anonymous comments from treatment participants who wished to express their satisfaction with the study. Comments included that the treatment manual was helpful, easy to read, and not boring. A couple of participants asked if they could refer their friends to the study. Although we had participants drop out from the study, as would be the case in any study, we received no negative feedback about the study itself. The implementation of this study, and of self-help treatments in general, was much less expensive than traditional, therapist-delivered therapy. Furthermore, it's comparatively easy to set up participants (or potential clients/patients) with the materials they need to get started with SHPST.

Given the partial support for our hypotheses and the advantages in general of self-help treatments, future research on SHPST is recommended. To our knowledge, this study represents the first randomized controlled trial of SHPST. Furthermore, college students stand to benefit in particular if the efficacy of SHPST could be further delineated. In our literature searching in the preparation of this manuscript, we did not come across any self-help studies for college students that were book-based. We view the college student population as being underserved by high quality self-help materials, and we believe that treatments such as SHPST have a lot to offer this group.

A likely limitation of the present study was sample size. Also, power issues were negatively impacted because participants only needed to meet inclusion criteria on one of our three measures of psychological distress to be included in the study as previously discussed. Another limitation of the present study was online data collection. Certainly there are many well-known advantages to online data collection. However, we discovered many cases of egregiously fabricated data during our data cleaning procedures (see Method section). Participants for this project were recruited through a university subject pool and participants fulfilled a course obligation by being involved. It would be unrealistic to expect that participants would have the same level of motivation as they might have had were they recruited from a clinical setting where they were actively seeking help for psychological symptoms. We should also acknowledge that the uncertain motivation of the participants might have contributed to an incomplete or rushed reading of study materials. We attempted to address this concern by requiring the participants to complete weekly online quizzes about the reading that they should have completed that week. The quizzes were kept brief and participants were able to use the treatment manual to answer the quiz questions. Future investigators might choose to balance treatment integrity against participant burden in another way.

It is also important to note that self-help materials are designed for a self-selecting subset of the population. Because we actively recruited our participants, we were unable to capitalize on the inherent motivation that someone deliberately self-selecting for self-help therapy would have. If this type of study were to be attempted again in a university setting, it might be interesting to recruit participants who actively are interested in improving on a given variable of interest to the study designers, while also holding stigmatized or otherwise negative beliefs about traditional therapy. Students who have limited access to traditional therapist-delivered therapy might also prove to be motivated for self-help therapy.

Also regarding the design of this study, we regret that we were unable to collect follow-up data. Given the short time-frame of our intervention and the limited amount of time that treatment participants had to consolidate treatment changes, it would have been interesting to see how outcome scores might have changed over time. Additionally, it should be noted that this project took place at a university, and that our sample consisted of undergraduate students. Although the sample did appear to be relatively diverse, results may not generalize to all other populations.

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Table 1
Means, Standard Deviations, and Coefficient Alphas, Completer Participants

		Time 1				Time 2			
		Treatment Group		WLC Group		Treatment Group		WLC Group	
		n = 29		n = 24		n = 29		n = 24	
Measures	Coefficient Alpha	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BDI	.87	18.90	8.63	19.38	9.95	13.86	11.26	16.75	9.90
BDI[a]	.86	18.89[b]	8.79	18.39[c]	8.90	12.61	9.17	17.22	9.85
BAI	.89	16.86	8.64	17.54	11.84	13.66	10.57	12.67	12.17
STAXI	.92	24.79	7.54	26.04	9.21	22.07	8.88	25.58	14.38
SPSI-R	.87	11.71	2.65	11.77	2.80	11.65	2.79	12.44	2.21
PPO	.81	10.86	4.10	10.08	4.35	10.72	3.40	12.21	4.22
NPO	.77	9.52	4.08	8.96	3.90	8.79	3.92	8.33	3.33
RPS	.80	11.03	3.63	10.25	4.57	11.07	2.96	10.96	3.64
ICS	.69	5.93	3.49	5.46	3.59	6.86	4.15	6.50	3.35
AS	.74	7.90	4.30	7.08	3.24	7.90	4.69	6.13	3.14
PinL	.84	56.62	10.31	57.46	12.68	56.76	12.44	57.88	10.62
Self Acc	.92	49.97	12.74	50.71	16.93	54.10	14.00	49.96	15.44

Notes: BDI[a] = Beck Depression Inventory, outliers excluded; n[b] = 23; n[c] = 28; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; STAXI = State-Trait Anger Expression Inventory-2; SPSI-R = Social Problem-Solving Inventory Revised Short Form; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style; PinL = Purpose in Life scale of the Scales of Psychological Well-Being; Self Acc = Self Acceptance scale of the Scales of Psychological Well-Being

Table 2
Means, Standard Deviations, and Coefficient Alphas, Intent to Treat Participants

		Time 1				Time 2			
		Treatment Group		WLC Group		Treatment Group		WLC Group	
		n = 34		n = 27		n = 34		n = 27	
Measures	Coefficient Alpha	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BDI	.88	18.03	9.29	20.37	10.01	13.74	11.23	18.04	10.25
BDI[a]	.87	18.00[b]	9.43	19.54[c]	9.21	12.67	9.49	18.50	10.16
BAI	.90	16.79	8.48	18.00	11.98	14.06	12.67	13.67	12.53
STAXI	.92	24.79	7.38	27.04	10.16	22.47	8.60	26.67	14.56
SPSI-R	.89	11.54	2.74	11.61	3.08	11.48	2.85	12.21	2.67
PPO	.82	10.44	4.11	10.26	4.49	10.32	3.51	12.15	4.36
NPO	.79	9.32	4.16	9.26	4.59	8.71	4.01	8.70	4.22
RPS	.80	10.62	3.84	10.26	4.04	10.65	3.32	10.89	3.50
ICS	.76	6.26	3.49	6.11	4.15	7.06	4.00	7.04	3.83
AS	.70	7.79	4.14	7.11	3.86	7.79	4.50	6.26	3.80
PinL	.86	56.06	11.23	55.44	13.47	56.18	12.93	55.81	11.86
Self Acc	.93	50.24	13.23	48.04	17.84	53.76	14.28	47.37	16.49

Notes: BDI[a] = Beck Depression Inventory, outliers excluded; n[b] = 33; n[c] = 26; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; STAXI = State-Trait Anger Expression Inventory-2; SPSI-R = Social Problem-Solving Inventory Revised Short Form; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style; PinL = Purpose in Life scale of the Scales of Psychological Well-Being; Self Acc = Self Acceptance scale of the Scales of Psychological Well-Being

Table 3
One-Tailed Bivariate Correlations Among Study Measures at Pretest, Completer Participants

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. BDI	--											
2. BDI[a]	--	--										
3. BAI	.24*	.26*	--									
4. STAXI	-.03	.02	.24*	--								
5. SPSI-R	-.42**	-.40**	-.04	.20	--							
6. PPO	-.39**	-.35**	.01	.34**	.86**	--						
7. NPO	.35**	.34**	.00	-.06	-.73**	-.60**	--					
8. RPS	-.29*	-.27*	.17	.09	.72**	.66**	-.29*	--				
9. ICS	.20	.26*	.23*	.08	-.36**	.00	.13	-.14	--			
10. AS	.19	.16	.11	-.26*	-.72**	-.59**	.45**	-.32**	.08	--		
11. PinL	-.62**	-.58**	.01	-.05	.50**	.52**	-.32**	.52**	-.06	-.26*	--	
12. Self Acc	-.62**	-.58**	.01	.01	.41**	.44**	-.42**	.35**	.13	-.31*	.77**	--

Notes: BDI[a] = Beck Depression Inventory, outliers excluded; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; STAXI = State-Trait Anger Expression Inventory-2; SPSI-R = Social Problem-Solving Inventory Revised Short Form; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style; PinL = Purpose in Life scale of the Scales of Psychological Well-Being; Self Acc = Self Acceptance scale of the Scales of Psychological Well-Being

* $p < .05$, one-tailed. ** $p < .01$, one-tailed.

Table 4
One-Tailed Bivariate Correlations Among Study Measures at Pretest, Intent to Treat Participants

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. BDI	--											
2. BDI[a]	--	--										
3. BAI	.26*	.28*	--									
4. STAXI	.08	.13	.30**	--								
5. SPSI-R	-.46**	-.45**	-.09	-.09	--							
6. PPO	-.36**	-.33**	.00	.30**	.85**	--						
7. NPO	.43**	.43**	.01	-.09	-.74**	-.59**	--					
8. RPS	-.28*	-.27*	.11	.00	.70**	.65**	-.25*	--				
9. ICS	.29*	.33**	.28*	.14	-.46**	-.11	.25*	-.19	--			
10. AS	.25*	.23*	.17	-.15	-.74**	-.60**	.47**	-.34**	.18	--		
11. PinL	-.64**	-.61**	-.09	-.12	.54**	.48**	-.40**	.48**	-.26*	-.27*	--	
12. Self Acc	-.66**	-.61**	-.09	-.13	.43**	.36**	-.41**	.36**	-.05	-.30*	.78**	--

Notes: BDI[a] = Beck Depression Inventory, outliers excluded; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; STAXI = State-Trait Anger Expression Inventory-2; SPSI-R = Social Problem-Solving Inventory Revised Short Form; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style; PinL = Purpose in Life scale of the Scales of Psychological Well-Being; Self Acc = Self Acceptance scale of the Scales of Psychological Well-Being

* $p < .05$, one-tailed. ** $p < .01$, one-tailed.

Table 5
Regression Results, Depression

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Err	Beta	*t*	Sig.
Depression					
Intent to Treat, Outliers Included					
Model : $F(3,57) = 7.15$, $p < .001$, $R^2 = .27$					
Main Effects: SPSI	-2.35	1.20	-.67	-1.95	.056
Group	-2.98	2.38	-.14	-1.25	.22
SPSI*Group	.41	.87	.16	.47	.64
Intent to Treat, Outliers Excluded					
Model: $F(3,55) = 7.12$, $p < .001$, $R^2 = .28$					
Main Effects: SPSI	-1.86	1.03	-.62	-1.81	.08
Group	-4.71	1.99	-.28	-2.37	.02*
SPSI*Group	.36	.74	.17	.49	.63
Completers, Outliers Included					
Model: $F(3,49) = 6.35$, $p = .001$, $R^2 = .28$					
Main Effects: SPSI	-2.38	1.28	-.68	-1.85	.07
Group	-3.55	2.71	-.16	-1.31	.20
SPSI*Group	.44	.93	.17	.47	.64
Completers, Outliers Excluded					
Model: $F(3,47) = 6.66$, $p = .001$, $R^2 = .30$					
Main Effects: SPSI	-1.84	1.09	-.62	-1.70	.10
Group	-5.57	2.25	-.31	-2.48	.02*
SPSI*Group	.35	.78	.17	.46	.65

Notes: SPSI-R = Social Problem-Solving Inventory Revised Short Form
* $p < .05$, one-tailed.

Table 6
Regression Results, Anxiety

	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Err	Beta	*t*	Sig.
Anxiety					
Intent to Treat					
Model : $F(3,57) = 1.95$, $p < .13$, $R^2 = .09$					
Main Effects: SPSI	-2.61	1.50	-.67	.09	.09
Group	1.41	2.95	.06	.48	.63
SPSI*Group	1.21	1.08	.43	1.12	.27
Completers					
Model : $F(3,49) = 1.70$, $p = .18$, $R^2 = .09$					
Main Effects: SPSI	-2.67	1.60	-.69	-1.66	.10
Group	1.49	3.39	.06	.44	.66
SPSI*Group	1.27	1.16	.45	1.09	.28

Notes: SPSI-R = Social Problem-Solving Inventory Revised Short Form

Table 7
Regression Results, Anger

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Err	Beta	*t*	Sig.
Anger					
Intent to Treat					
Model : $F(3,57) = .94$, $p = .43$, $R^2 = .05$					
Main Effects: SPSI	-1.67	1.52	-.43	-1.09	.28
Group	-2.08	3.02	-.09	-.69	.49
SPSI*Group	.74	1.12	.26	.66	.51
Completers					
Model : $F(3,49) = .84$, $p = .48$, $R^2 = .05$					
Main Effects: SPSI	-1.68	1.65	-.43	-1.02	.32
Group	-2.45	3.48	-.10	-.70	.49
SPSI*Group	.74	1.20	.26	.62	.54

Notes: SPSI-R = Social Problem-Solving Inventory Revised Short Form

Table 8
Regression Results, Sense of Purpose

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Err	Beta	*t*	Sig.
Sense of Purpose					
Intent to Treat					
Model : $F(3,57) = 6.88$, $p < .001$, $R^2 = .27$					
Main Effects: SPSI	3.27	1.56	.72	2.10	.04*
Group	.97	3.07	.04	.32	.75
SPSI*Group	-.72	1.13	-.22	-.64	.52
Completers					
Model : $F(3,49) = 5.92$, $p = .002$, $R^2 = .27$					
Main Effects: SPSI	3.26	1.68	.72	1.94	.06
Group	1.12	3.55	.04	.31	.76
SPSI*Group	-.71	1.22	-.22	-.59	.56

Notes: SPSI-R = Social Problem-Solving Inventory Revised Short Form
* $p < .05$, one-tailed.

Table 9
Regression Results, Self Acceptance

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Err	Beta	*t*	Sig.
Self Acceptance					
Intent to Treat					
Model : $F(3,57) = 4.16$, $p = .01$, $R^2 = .18$					
Main Effects: SPSI	2.77	2.16	.47	1.28	.21
Group	5.68	4.27	.16	1.33	.19
SPSI*Group	-.26	1.57	-.06	-.17	.87
Completers					
Model : $F(3,49) = 3.67$, $p < .05$, $R^2 = .18$					
Main Effects: SPSI	2.75	2.33	.46	1.18	.24
Group	6.58	4.92	.18	1.34	.19
SPSI*Group	-.23	1.69	-.06	-.14	.89

Notes: SPSI-R = Social Problem-Solving Inventory Revised Short Form

Table 10
Means and Standard Deviations at Pretest and Posttest in Therapist Administered PST

		Pretest		Posttest	
		Mean	SD	Mean	SD
Nezu &Perri (1989)					
	PST	26.00	2.96	6.57	3.29
	WLC	27.27	4.29	24.73	7.76
Arean et al. (1993)					
	PST	23.7	5.2	15.7	6.9
	WLC	23.0	4.3	21.2	6.0
Eskin, Ertekin, &Demir (2007)					
	PST	26.7	9.4	10.7	10.4
	WLC	28.0	9.0	22.0	5.5

Figure 1
The Relational/Problem-Solving Model of Stress

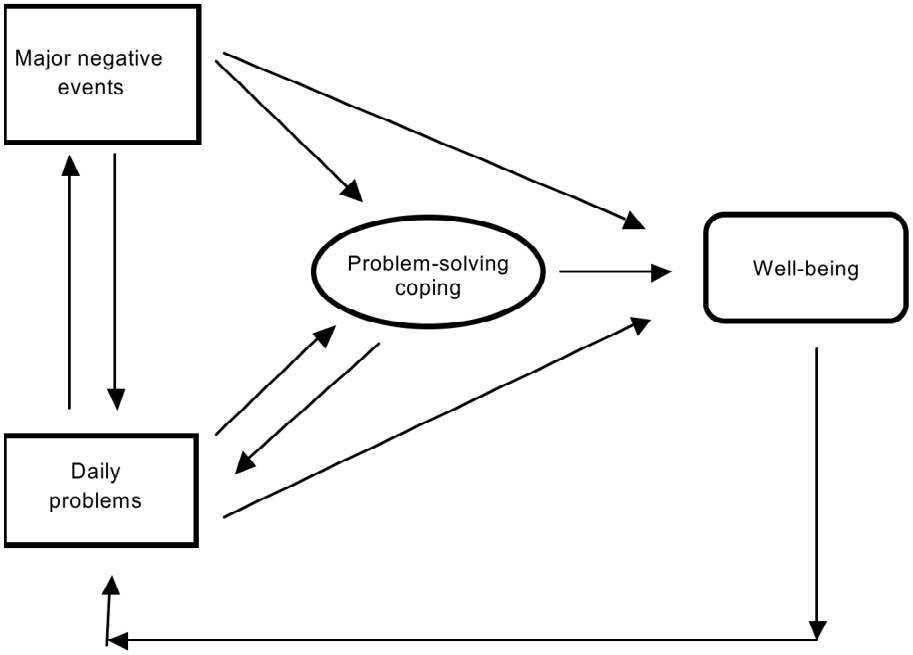
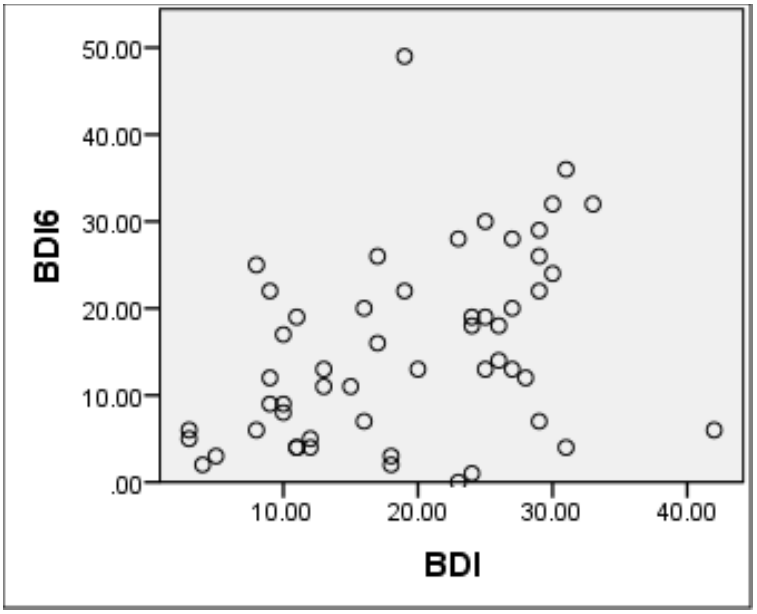


Figure 2
Scatterplot for Beck Depression Inventory



Notes: BDI = Beck Depression Inventory at pretest; BDI6 = Beck Depression Inventory at posttest