Randomized Controlled Trial of Peer-Led Recovery Education using Building Recovery of Individual Dreams and Goals through Education and Support (BRIDGES)

Judith A. Cook, Pamela J. Steigman, Susan A. Pickett, Sita Diehl, Anthony Fox, Patricia Shipley, Rachel McFarlane, Dennis D. Grey, Jane K. Burke-Miller

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***University of Illinois at Chicago, Department of Psychiatry; **National Alliance on Mental Illness; ***Tennessee Mental Health Consumers Association, ****Core Center, Chicago, IL**

Corresponding author: Dr. Judith A. Cook, University of Illinois at Chicago, Department of Psychiatry, 1601 West Taylor Street, 4th Floor, M/C 912, Chicago, IL 60612, 312-355-1696, Fax 312-355-4189; E-mail: cook@ripco.com

Abstract

Objective: The purpose of this study was to test the efficacy of a peer-led, mental illness education intervention called Building Recovery of Individual Dreams and Goals through Education and Support (BRIDGES).

Method: Subjects were recruited from outpatient community mental health settings in eight Tennessee communities. Using a single-blind, randomized controlled trial design, 428 individuals with serious mental illness (SMI) were interviewed at baseline and assigned to BRIDGES or to a services as usual wait list control condition. Two-and-one-half hour classes were taught once a week for 8 weeks by peers who were certified BRIDGES instructors. Subjects were followed-up at immediate post-intervention and 6-months later. The primary outcome was self-perceived recovery, measured by the Recovery Assessment Scale (RAS). A secondary outcome was hopefulness as assessed by the State Hope Scale (SHS). An exploratory hypothesis examined the impact of depressive symptoms on both recovery outcomes.

Results: Eighty six percent of participants were followed up. On average, participants attended five sessions. Intent-to-treat analysis using mixed-effects random regression found that, compared to controls, intervention participants reported: 1) significantly greater improvement in total RAS scores as well as subscales measuring personal confidence and tolerable symptoms; and 2) significantly greater improvement in hopefulness as assessed by the agency subscale of the SHS. While study subjects with high levels of depressive symptoms had significantly poorer outcomes, outcomes were superior for BRIDGES participants regardless of depressive symptoms.

Conclusions: Peer-led mental illness education improves participants' self-perceived recovery and hopefulness over time, even controlling for severity of depressive symptoms.

Keywords: illness self-management; recovery education; peer-led education

1. Introduction

Education about mental illness self-management is fundamental for promoting recovery from serious mental illness (SMI) (Mueser et al., 2002). Growing out of the recent focus on patient-centered care as a means of enhancing healthcare quality (Institute of Medicine, 2001), self-management education provides people with the knowledge, skills, and supports they need to live independently, self-direct their care, and pursue valued social roles in the community (Onken, 2007). Recognized as an evidence-based practice in the treatment of chronic physical illnesses, its application in the field of mental health is relatively recent (Cook et al., 2009). Even more recent is the development of education programs created and taught by peers who are also recovering from SMI (Cook et al., 2011; Resnick et al., 2005). Some have suggested that peer-led self-management programs offer the additional advantage of providing role models for wellness and instilling hope for recovery (Davidson et al., 2006; Druss et al., 2010).

Several studies of peer-led recovery education interventions for this group suggest that they increase participants' knowledge of the causes and treatment of mental illness, enhance feelings of empowerment, and improve quality of life. A single group, pre-post evaluation of a 6-month curriculum of advocacy, recovery, and rehabilitation skills taught by trained peer instructors found positive impacts on quality of life, empowerment, and employment opportunities (Gammonley & Luken, 2001). A one-group pre-post evaluation of a 12-week, workbook-focused recovery education intervention called Pathways to Recovery (Ridgway et al., 2002) found significant increases in self-esteem, self-efficacy, social support, and spiritual well-being among 47 participants with SMI (Fukui et al., 2010). A randomized controlled trial of a 12-week education program based on Spaniol and colleagues' Recovery Workbook (1994) taught by a peer and professional instructor dyad, found that compared to controls, intervention participants showed significant improvement in empowerment, hopefulness, and personal

recovery (Barbic et al., 2009). Taken together, these studies provide support for the notion that peer-led recovery education may be an important augment to traditional services.

Concurrently, a number of studies have documented the negative impact of depressive symptoms on the likelihood of recovery from SMI. In an exploratory analysis of correlates of recovery among 825 individuals with schizophrenia, Resnick and colleagues (2004) found that the strongest relationship was a negative association between severity of depressive symptoms and numerous recovery domains including hope, life satisfaction, knowledge, and empowerment. Shahar and Davidson (2003) studied 260 individuals with SMI participating in a relationship-focused recovery intervention and found that subjects' baseline depression scores predicted decreases in self-esteem during the first 4 months but not the last 5 months of the intervention. They suggested that depressive symptoms act as "demoralizing forces" (p. 898) that diminish peoples' self-esteem and belief in their ability to recover even when offered appropriate interventions. Ritsher and Phelan (2004) examined the link between depressive symptoms and internalized stigma among 82 outpatients with SMI, and found that, controlling for baseline depression severity, those with high levels of stigma had significant increases in depressive symptom severity at 4-month follow-up. This link was especially strong for stigma related to alienation, social withdrawal, and endorsement of negative stereotypes about people with SMI. While these studies have demonstrated the deleterious effects of depressive symptoms on recovery, no research has investigated the potential impact of depressive symptoms on the efficacy of peer-led recovery education.

Building Recovery of Individual Dreams and Goals through Education and Support (BRIDGES) is a curriculum written by people with SMI, advocates from the National Alliance on Mental Illness of Tennessee (NAMITN), and staff from the Tennessee Department of Mental Health and Developmental Disabilities (TDMHDD) (Diehl & Baxter, 2001). Classes offer

detailed information on mental illness and available treatments, self-help and the philosophy of recovery, and independent living skills such as job readiness, interpersonal communication, and assertiveness. Since 1994, BRIDGES has been taught statewide and more than 3,500 individuals participate in BRIDGES annually. In a pre-post evaluation of BRIDGES that was part of the federally-funded multi-site Consumer Operated Programs Study (Rogers et al, 2007), participants reported increased knowledge and feelings of empowerment (Hix, 2005).

The present study tested three hypotheses: first, that BRIDGES participants would report larger increases than controls in self-perceived recovery and that this effect would be maintained over time; second, that they would report greater increases in hopefulness than controls, also maintained longitudinally; and third, that participants would display more positive recovery outcomes than controls, even adjusting for levels of depressive symptoms over time.

2. Methods

2.1. Study Design

The design for this study was a randomized controlled trial in which BRIDGES was compared with services as usual using a wait list control design. In eight urban, suburban, and rural communities of Tennessee, subjects were recruited from publicly-funded outpatient mental health settings: Chattanooga, Knoxville, Memphis, Nashville, Dickson, Gallatin, Oak Ridge, and Cookeville. Three criteria guided selection of specific sites: 1) regional diversity; 2) presence of a sufficient number of certified BRIDGES teachers; and 3) BRIDGES classes not being taught there recently. All participants provided written informed consent using procedures approved by the University of Illinois at Chicago (UIC) Institutional Review Board, and the study was registered at ClinicalTrials.gov (NCT01297985).

2.2. Participants

All research participants met criteria for serious mental illness (SMI) as defined by federal Public Law 102–321 regarding diagnosis, duration, and level of disability (Epstein et al., 2002). They had at least one 12–month *DSM-IV* (American Psychiatric Association, 2000) disorder (other than substance use) along with "severe impairment" defined by Tennessee statute (33-6-301) as "…severe deterioration in routine functioning evidenced by repeated and escalating loss of cognitive or volitional control over the person's actions" (State of Tennessee Code, 2009). Additional inclusion criteria were age (18+ years), ability to comprehend spoken English, and no prior exposure to BRIDGES.

2.3. Measures

The primary outcome was self-perceived recovery from SMI measured by the Recovery Assessment Scale (RAS) (Giffort et al., 1995). Comprised of 41 items rated on a 5-point scale from "strongly agree" to "strongly disagree," the RAS conceptualizes recovery along multiple components. In addition to a total score, subscales measure personal confidence, willingness to ask for help, goal orientation, reliance on others, and having tolerable levels of symptoms (Corrigan et al., 2004). In prior studies, RAS scores were positively related to other measures of recovery, self-esteem, empowerment, and quality of life, and negatively related to psychiatric symptoms (McNaught et al., 2007). In the current study, internal consistency reliability was good, with Cronbach's α=0.91 for the total scale and alphas from 0.91 to 0.66 for the subscales.

A secondary outcome was hopefulness, assessed with the State Hope Scale (SHS), an instrument that measures hope as a cross-situational, long-term trait in general populations (Snyder et al., 1991). Twelve items are rated on a 4-point response scale ranging from "definitely false" to "definitely true" and summed to produce a total score. Two subscales measure belief in one's capacity to initiate and sustain actions (agency), and ability to generate routes for reaching

goals (pathways). These two constructs are assumed to be reciprocal, additive, and positively related to one another, but not synonymous, since people may feel able to act without knowing how to achieve a goal and vice versa (Lyndall, 2002). Research has found SHS scores to be positively associated with goal-related activities and coping strategies. (Snyder et al., 1996) Internal consistency for the total scale was α=0.82, with α=0.80 for the agency subscale and α=0.63 for the pathways subscale.

Depressive symptoms were measured using the depression subscale of the Brief Symptom Inventory (BSI) (Piersma et al.,1994). The BSI is a patient self-report instrument showing high concordance with clinician symptom assessment and strong test–retest and internal consistency reliabilities (Derogatis et al., 1983). Factor analytic studies of the scale's internal structure have demonstrated the construct validity of a 6-item depression subscale including items such as "feeling lonely," "thoughts of ending your life," and "worthlessness." All items are rated on a five-point scale from 0 (symptom not present) to 4 (extremely severe) and converted to area t-scores based on BSI scoring algorithms (Derogatis, 1993).

2.4 Sample recruitment

Recruitment was conducted collaboratively with the statewide consumer coalition, Tennessee Mental Health Consumer's Association (TMHCA), and the statewide National Alliance for Mental Illness (NAMI), NAMI Tennessee. A representative from each organization coordinated the study locally, with responsibility for BRIDGES fidelity monitoring and quality control. Other collaborators included the Tennessee Department of Mental Health and Developmental Disabilities, and each site's local outpatient clinics, community mental health centers (CMHCs), and recovery programs. Study enrollment occurred from March 2007 through March 2009. Subjects were recruited through their clinicians, self-referral, peer referral, newspaper advertisements, and word-of-mouth. Recruitment activities occurred in CMHCs,

residential programs, self-help groups, and peer-run programs. The study's local coordinators traveled to programs to speak with clients about the study and describe the BRIDGES course. They then answered questions and helped potential participants contact UIC researchers to be screened and enrolled. Screening for SMI involved confirming that the subject was enrolled in a publicly-funded program for clients with SMI as defined by the State of Tennessee and/or by scoring a 13 or higher on the K-6 Screening Scale for SMI (Kessler et al., 2003).

As shown in Figure 1, of 611 individuals contacted about the study, 183 were excluded after initial assessment either because they were found to be ineligible or they failed to complete the screening process (n=63), or because they declined participation or were lost to follow-up after screening but prior to interview and randomization (n=120). The remaining 428 participants were randomly assigned to either the control (n=216) or experimental (n=212) condition. Of 212 experimental subjects, 161 (76%) received the intervention and 51 (24%) did not. Given the "intent-to-treat" study design (Gross & Fogg, 2004), data from all subjects were included in the analysis.

2.5. Randomization and assessments

Structured telephone interviews lasting approximately 60 minutes were conducted by UIC Survey Research Laboratory (SRL) staff using Computer Assisted Personal Interviewing (CAPI) software. Baseline (T1) interviews were administered during the six weeks prior to the start of BRIDGES classes. Time 2 (T2) interviews occurred six weeks after the end of BRIDGES classes. Time 3 (T3) assessments were completed six months post-T2. Participants received a research stipend of $20 for the first interview, $25 for the second, and $30 for the third, with a $10 bonus for completing all three. Immediately following the baseline interview, random assignment occurred using computer-assisted block randomization stratified according to center (Doig & Simpson, 2005) to ensure that the number of participants assigned to each condition was

not far out of balance at each study site. A random allocation sequence that was programmed into the CAPI administration software guaranteed allocation concealment up to the point of assignment (Bellg et al., 2004). At T2 and T3, interviewers were blinded to subjects' study condition assignment. To monitor the integrity of the blind, following each interview, SRL staff reported whether subjects had revealed their study condition assignments during the interview. This occurred in only 7% of all T2 and T3 interviews.

2.6. Study Attrition

Of 428 subjects who completed T1 assessments, 86% (n=368) completed one or both follow-up interviews: 343 (80.1%) completed T2 and 320 (74.8%) completed T3 assessments. There were no statistically significant differences in follow-up rates between intervention and control conditions. However, there were significant differences by study site in T2 and T3 completion (respectively, $F=(7,420)=3.24$, $p=.002$), ($F=(7,420)=2.51$, $p=.015$)]. Thus, site was used as a control variable in all analyses.

2.7. Intervention and exposure

BRIDGES classes were delivered simultaneously across study sites, with five waves of classes taught over a two-year period. Classes were 2½ hours in length, taught once a week for 8 weeks. All classes were taught by certified BRIDGES instructors in recovery from SMI, with back-up teachers available for emergencies. Class sizes ranged from 4-13 participants and were taught in accessible community settings, free of charge. Classes were highly interactive, and included group discussions, illustrative anecdotes, and structured exercises designed to apply information to everyday situations. Course topics included recovery principles and stages; structured problem-solving and communication skills training; strategies for building interpersonal and community support systems; brain biology and psychiatric medications;

diagnoses and related symptom complexes; traditional and non-traditional treatments for SMI; and relapse prevention and coping skills.

Attendance was monitored throughout the study and efforts were made to ensure that participants received an adequate "dose" of the intervention. On average, participants attended 5 of 8 classes (mean=4.85, s.d.=3.34) either in person or by makeup session. There were no significant differences in attendance by wave of courses taught throughout the study (F(8,203)=1.23, p=.284). However, there were significant differences in attendance by site (F=(8,203)=4.27, p=.000), ranging from an average of 4 at one site to a high of 8 classes at another.

2.8. Fidelity assessment

BRIDGES instructors were observed on multiple occasions by one or both of the local study coordinators for quality control purposes and provision of detailed feedback. Model fidelity was assessed weekly using a detailed checklist to track adherence to prescribed topics, time frames, and instructional modalities. Following the NIH Behavior Change Consortium's recommendations for enhancing treatment fidelity in health behavior research, (Bellg et al., 2004) we monitored fidelity throughout the entire period of service delivery, reviewed fidelity checklist scores weekly with instructors, and followed procedures ensuring that any missed material was covered in subsequent sessions. Across all sessions taught in all waves, total course fidelity ranged from 92.7% to 98.6%, with a mean of 95.1% (s.d.=0.04). There were no significant differences in course fidelity by wave (F(4,19)=2.45, p=0.082) or by study site (F(7,16)=1.60, p=.207). Overall, results indicated excellent intervention fidelity.

2.9. Control Condition

Control group participants were assigned to a course waiting list and guaranteed an opportunity to receive BRIDGES once their third and final interview wave ended. Otherwise,

they continued to receive services as usual. To assess the integrity of this no-treatment condition, we measured receipt of BRIDGES or other peer-support interventions at each assessment point.

2.10. Statistical analysis

Data were downloaded into the commercially available database system SPSS Inc. (2006) and analyzed using MIXREG software version 1.2 (Hedeker & Gibbons, 1996). Chi-square and independent-samples t-tests were used to test for differences between study conditions in subjects' background characteristics. Multivariate, longitudinal random-effects linear regression analysis was conducted to test for differences between experimental and control subjects' outcomes over time (Gibbons et al., 1993). A two-level random intercepts random regression model (RRM) was fitted to the data, controlling for study site as a fixed effect. Using RRM allowed us to handle serial correlations among repeated observations within individual participants while including both time-varying and fixed covariates (Gibbons et al., 1993). This approach also assumes that data are missing at random and yields valid statistical inferences without imputation or exclusion of missing data (Laird, 1988).

3. Results

3.1. Baseline characteristics

Table 1 presents the demographic, clinical, and mental health service utilization characteristics of study subjects. There were no significant differences by study condition, indicating that randomization was successful. The depressive symptom severity mean for the total group (x=66.05, s.d.=10.4) was one and one-half standard deviations above the population norm, and 70% had scores of one standard deviation or greater than the norm indicating clinical depression (Rustgi et al., 2010).

3.2. Immediate post-intervention and 6-month outcomes

Table 2 shows unadjusted mean values over time for all outcomes by study condition. In the experimental group, total SHS and subscale scores improved from pre- to post-intervention, and then continued to rise over the 6-month follow-up period, while scores of control participants did not show this pattern of improvement over time. On the RAS total score, experimental group participants increased from pre- to post-intervention by almost 3 points on average, and then rose another point by the end of the 6-month follow-up. Control group RAS total scores showed less improvement and declined on average from the second to the third time point. This same pattern was observed in the experimental group's RAS subscale scores, which improved from baseline to post-intervention on average, without attenuation over the follow-up period; control subjects did not display this pattern.

To better understand the interrelationships between our primary and secondary outcomes, we tested the convergent validity of each measure's subscales, and the divergent validity of the two outcome measures. Inter-correlations between subscales of the RAS were all significant, with r values ranging from 0.25 to 0.71 ($p<.01$). Correlations between the agency and pathways subscales of the SHS were also significant, with $r=0.56$ ($p<.001$). A large but not perfect correlation between recovery and hope total scores ($r=0.73$, $p<.001$) indicated their convergent validity as measures of the recovery construct, while also showing that they do not address identical domains and should be examined separately.

Multivariable random-effects linear regression analysis (Table 3) for both outcomes showed positive and significant interactions of study condition by time. Compared to controls, experimental group participants reported significantly greater improvement than controls in self-perceived recovery as measured by total RAS score. Those who received BRIDGES also reported significantly greater improvement than controls in RAS subscales measuring personal

confidence and tolerable symptom levels, a trend toward significance (p=.05) for the goal orientation subscale, and no significant effects for subscales measuring willingness to ask for help and reliance on others. BRIDGES participants also reported significantly greater improvement than controls in the agency subscale of the SHS, but not in their total hope scores or the subscale measuring pathways. Controls were included for study site, but no significant patterns were observed, suggesting that there were no group membership effects.

In the final step of our analysis, we re-ran the MIXREG models in which BRIDGES showed significant intervention by time effects, controlling for subjects' levels of depressive symptoms as a time-varying variable (not shown). Depressive symptom severity had a significant negative effect on all outcomes, however, even controlling for depressive symptoms, BRIDGES participants had significantly better outcomes than controls on RAS total, RAS personal confidence, and SHS agency scores.

4. Discussion

We found that individuals participating in BRIDGES, a peer-led, mental illness educational intervention, showed significantly greater improvement than controls in self-perceived recovery and some aspects of hopefulness. This was true across rural, urban and suburban study sites, suggesting that BRIDGES is effective in diverse communities. We also found that peers could maintain a high level of intervention fidelity while delivering BRIDGES in five successive waves over a 2-year period, when provided with administrative support and ongoing check-ins to address logistical issues and resolve problems with group dynamics.

We also showed that severity of depressive symptoms had a negative influence on recovery outcomes of peer-led education recipients. At the same time, BRIDGES produced superior outcomes over time, despite participants' high depressive symptom severity. These findings suggest that the designers and deliverers of peer-led education should be cognizant of

how depression influences who enters and remains in their interventions, and how their models might help participants identify and deal with depressive symptoms. It may be that peer support and role modeling are especially effective in combating stigma and demoralization that accompanies depression among many people with SMI (Ritsher & Phelan, 2004; Resnick et al., 2004; Shahar and Davidson, 2003). There may also be factors that moderate the effects of co-occurring depression such as negative symptoms, cognitive capacities, and co-occurring medical conditions. In studies of patients with chronic medical conditions, co-occurring depression has been found to significantly moderate the effects of illness self-management interventions in a positive direction, so that those with co-morbid depression benefitted more than those without (Harrison et al., 2011; Jerant et al., 2008). While the opposite was true in our study, future research should explore other potential moderating effects on the efficacy of illness-self-management interventions.

Not all outcomes showed significant improvement, most notably the hope pathways subscale, and recovery subscales for willingness to ask for help, and reliance on others. This may indicate the need for additional services and supports such as access to supported employment, affordable housing, ongoing peer support, and health care as well as traditional clinical services. Also indicated may be the need for further development of the BRIDGES program to specifically target these areas.

Study limitations include recruitment from a single state rather than a nationally representative population, and reliance on self-report rather than clinician or researcher ratings. A longer follow-up period might have revealed different outcome patterns over time. Finally, our analysis did not explore more contextual factors that may have influenced outcomes, such as the recovery “climate” at local service delivery agencies.

BRIDGES is now being offered by consumer-run organizations in 12 states and provinces in the U.S. and Canada. The model's potential for more widespread replication is clear. Our findings suggest that the field could benefit from further development and studies of BRIDGES and other peer-led education interventions.

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Table 1
Baseline characteristics of BRIDGES study participants in each study condition

	Total (N=428)	Experimental (n=212)[a]	Control (n=216)[a]
Sex	n (%)	n (%)	n (%)
Male	190 (44.4)	98 (46.2)	92 (42.6)
Female	238 (55.6)	114 (53.8)	124 (57.4)
Race/Ethnicity			
Caucasian	229 (53.5)	112 (52.8)	117 (54.2)
Black	146 (34.1)	75 (35.4)	71 (32.9)
Hispanic/Latino	18 (4.2)	10 (4.7)	8 (3.7)
Asian/Pacific Islander	1 (0.2)	1 (0.5)	0
American Indian/Alaskan	25 (5.8)	10 (4.7)	15 (6.9)
Other	7 (1.6)	3 (1.3)	4 (1.8)
Education			
< High School	129 (30.1)	67 (31.6)	62 (28.7)
High School/GED	173 (40.4)	79 (37.3)	94 (43.5)
Some College or Greater	126 (29.4)	66 (31.1)	60 (27.8)
Married or Cohabiting	64 (15.0)	27 (12.7)	37 (17.1)
One or More Children	251 (58.6)	122 (42.5)	129 (59.7)
Lives in Own Home/Apt.	205 (47.9)	104 (49.1)	101 (46.8)
Employed	38 (8.9)	20 (9.4)	18 (91.7)
Mean (SD) age, years	42.8 (10.9)	42.7 (9.9)	43.0 (11.8)
Mean (SD) BSI Depression T-Score	66 (10.4)	66 (10.1)	66 (10.7)
Ever Psychiatric Inpatient Tx	312 (72.9)	151 (71.2)	161 (74.5)
Self-Reported DSM-IV Diagnosis			
Schizophrenia	66 (15.4)	37 (17.5)	29 (13.4)
Schizoaffective	23 (5.4)	9 (4.2)	14 (6.5)
Bipolar	169 (39.5)	85 (40.1)	84 (38.9)
Depressive	77 (18.0)	38 (17.9)	39 (18.1)
Other	37 (8.6)	15 (6.9)	22 (10.0)
Services Received at Baseline			
Case management	304 (71.2)	149 (70.6)	155 (71.8)
Medication management	339 (79.4)	164 (77.4)	175 (81.4)
Individual therapy	303 (70.8)	151 (71.2)	152 (70.4)
Group psychotherapy	120 (28.1)	63 (29.7)	57 (26.5)
Employment services	109 (25.5)	49 (23.1)	60 (27.9)
Residential services	152 (35.5)	77 (36.3)	75 (34.7)
Substance abuse treatment	60 (14.0)	32 (15.1)	28 (13.0)
Study Site			
Chattanooga	97 (22.7)	48 (22.6)	49 (22.7)
Knoxville	67 (15.7)	33 (15.6)	34 (15.7)
Memphis	87 (20.3)	43 (20.3)	44 (20.4)
Nashville	87 (20.3)	44 (20.8)	43 (19.9)
Dickson	20 (4.7)	10 (4.7)	10 (4.6)
Gallatin	25 (5.8)	12 (5.7)	13 (6.0)
Oak Ridge	34 (7.9)	17 (8.0)	17 (7.9)
Cookeville	11 (2.6)	5 (2.4)	6 (2.8)

[a] Chi-square and analysis of variance tests revealed no significant differences by study condition.
Variations in n due to missing data
BSI=Brief Symptom Inventory

Table 2

Unadjusted mean scores and standard deviations for outcome measures

Measure by Time Point	Intervention		Control	
	Mean (SD)	No.	Mean (SD)	No.
Recovery Total				
Baseline	91.90 (13.65)	212	90.72 (13.33)	212
Postintervention 1	94.84 (12.83)	170	91.01 (14.35)	171
Postintervention 2	96.13 (12.76)	157	91.97 (14.58)	159
Recovery Personal Confidence				
Baseline	33.79 (6.23)	212	33.29 (6.11)	214
Postintervention 1	35.18 (5.8)	171	33.53 (6.25)	171
Postintervention 2	35.69 (5.61)	157	33.78 (6.21)	160
Recovery Willingness to ask for Help				
Baseline	12.53 (1.98)	212	12.25 (2.14)	216
Postintervention 1	12.82 (1.93)	171	12.37 (2.16)	171
Postintervention 2	12.96 (1.91)	157	12.45 (2.39)	161
Recovery Goal Orientation				
Baseline	20.09 (3.60)	212	20.00 (3.71)	216
Postintervention 1	20.35 (3.70)	171	19.61 (3.90)	171
Postintervention 2	20.52 (3.47)	157	19.89 (3.85)	161
Recovery Reliance on Others				
Baseline	15.60 (3.07)	212	15.50 (3.03)	214
Postintervention 1	16.20 (2.60)	171	15.40 (3.29)	171
Postintervention 2	16.31 (2.71)	157	15.91 (2.97)	161
Recovery No Symptom Domination				
Baseline	9.88 (2.71)	212	9.82 (2.72)	216
Postintervention 1	10.38 (2.86)	170	10.09 (2.78)	171
Postintervention 2	10.67 (2.82)	157	9.91 (2.84)	160
Hope Total				
Baseline	22.64 (4.31)	212	22.68 (4.77)	211
Postintervention 1	23.12 (3.73)	170	22.77 (4.80)	169
Postintervention 2	23.24 (3.92)	155	22.66 (4.73)	159
Hope Agency				
Baseline	11.14 (2.58)	212	11.43 (2.74)	215
Postintervention 1	11.49 (2.18)	170	11.25 (2.77)	171
Postintervention 2	11.71 (2.47)	157	11.21 (2.83)	160
Hope Pathways				
Baseline	11.49 (2.33)	212	11.23 (2.58)	212
Postintervention 1	11.63 (2.00)	171	11.51 (2.47)	169
Postintervention 2	11.55 (1.96)	155	11.41 (2.34)	160

Hope = State Hope Scale

Recovery = Recovery Assessment Scale

Table 3

Effects of Study Condition (Intervention vs. Control) on Participant Outcomes, Mixed Effects Random Regression (MIXREG) Controlling for Study Site (N=428)

Outcome Variable	MIXREG Estimate[a]	Standard Error	*P* Value
Recovery Total			
Intercept	88.70	1.57	.000
Intervention condition	-0.25	1.63	.878
Time	0.74	0.44	.095
Intervention x Time	1.55	0.62	.013
Recovery Personal Confidence			
Intercept	32.45	0.70	.000
Intervention condition	-0.16	0.73	.829
Time	0.33	0.20	.092
Intervention x Time	0.73	0.28	.008
Recovery Goal Orientation			
Intercept	20.06	0.43	.000
Intervention condition	-0.16	0.45	.730
Time	-0.07	0.13	.577
Intervention x Time	0.35	0.18	.050
Recovery No Symptom Domination			
Intercept	9.68	0.32	.000
Intervention condition	-0.33	0.37	.375
Time	0.06	0.12	.615
Intervention x Time	0.34	0.17	.045
Recovery Willingness to ask for Help			
Intercept	11.78	0.24	.000
Intervention condition	0.20	0.27	.457
Time	0.15	0.08	.070
Intervention x Time	0.09	0.12	.454
Recovery Reliance on Others			
Intercept	14.88	0.35	.000
Intervention condition	0.10	0.38	.782
Time	0.22	0.11	.044
Intervention x Time	0.11	0.15	.470
Hope Total			
Intercept	22.73	0.51	.000
Intervention condition	-0.27	0.54	.612
Time	0.08	0.15	.586
Intervention x Time	0.20	0.21	.347
Hope – Agency			
Intercept	11.57	0.30	.000
Intervention condition	-0.63	0.31	.046
Time	-0.08	0.09	.368
Intervention x Time	0.33	0.12	.006
Hope – Pathway			
Intercept	11.16	0.27	.000
Intervention condition	0.37	0.30	.216
Time	0.16	0.09	.079
Intervention x Time	-0.12	0.12	.343

[a] Estimates are unstandardized MIXREG coefficients and do not represent effect sizes; sign of coefficient indicates direction of effect.

Figure 1
Study flow chart