Article

Training coping skills and coping with stress self-efficacy for successful daily functioning and improved clinical status in patients with psychosis: A randomized controlled study

Débora Godoy-Izquierdo (Ph.D.)¹*, **Mª Luisa Vázquez Pérez (Ph.D.)¹**, **Raquel Lara Moreno (Ph.D.) ¹ and Juan F. Godoy García (Ph.D.)¹**

¹ Centro de Investigación Mente, Cerebro y Conducta (Research Center Mind, Brain and Behaviour). Grupo de Investigación Medicina Conductual/Psicología de la Salud (CTS-267). Departamento de Personalidad, Evaluación y Tratamiento Psicológico. Facultad de Psicología. Universidad de Granada. Campus Universitario de Cartuja, 18071. Granada (Spain). Phone: (+34) 958 242331, Fax: (+34) 958 243749. rlaramoreno@ugr.es (R.L.M.); mlvazquez@fundacionsafa.es (M.L.V.P); jgodoy@ugr.es (J.G.G.)

* Correspondence: deborag@ugr.es

Abstract: There is growing evidence on the relevance of self-efficacy for well-being and functioning among individuals with psychotic disorders, but specific self-efficacy for coping with stress has rarely been investigated. This study explored the outcomes of an intervention for the improvement of coping resources based on a training in coping skills and coping with stress self-efficacy (CSSE). Fourteen adult volunteers who were diagnosed with schizophrenia (n=12) or schizoaffective disorder (n=2) were matched in clinical and sociodemographic characteristics and randomly assigned to the study groups. The intervention group received the training along with their pharmacological therapy; the control group received their prescribed drug therapy. Participants completed self-reports on CSSE, perceived successful daily functioning based on coping skills, and clinical status (BPRS-E). Trained patients showed a significant increase in CSSE and reported greater successful functioning status, and significant improvements in their clinical status were also observed. All these enhancements remained at 3-month and 6-month follow-ups. Control participants showed no significant changes. Moreover, the intervention condition interacted with CSSE and perceived coping functioning in explaining improvements in clinical status: in the treatment group, greater CSSE translated into enhanced daily functioning, and this improvement predicted better clinical status. These findings stress the relevance of promoting coping resources in psychotic disorders and provide preliminary evidence for the potential benefits of CSSE.

Keywords: schizophrenia; schizoaffective disorder; self-efficacy; coping; stress.

1. Introduction

The According to the World Health Organization [1], more than 20 million people worldwide suffer from schizophrenia. Due to the chronicity and severity of schizophrenia spectrum disorders (SSDs), their symptom diversity and pervasive function impairments (e.g., in perception, cognition, language, affect, behaviour, daily and social functioning and sense of self), recurrent relapses, elevated disability, high rates of (co)morbidity and heightened premature mortality, as well as high burden of care, antipsychotic drug therapy and psychosocial interventions such as cognitive-behavioural therapy (CBT) are combined for the management of the disease [2-4] CBT aims to improve a broad range of skills for facing symptoms and managing daily life challenges to enhance patient's mental health and overall well-being by achieving clinical improvement, enhanced daily functioning and higher quality of life. Psychosocial interventions have been shown to be clinically effective, and dropout rates are markedly lower compared to pharmacotherapy. It is necessary for clinicians and researchers to continue ex-

ploring theoretically grounded and evidence-based psychosocial therapeutic interventions and their efficacy.

The present study presents the outcomes of a CBT intervention for patients with chronic SSDs grounded in three widely accepted theoretical models: Zubin and Spring's vulnerability-stress model in psychotic disorders [5-8], Lazarus and Folkman's person-context transactional model of stress and coping [9] and Bandura's self-efficacy theory [10,11]. These theoretical proposals highlight stress as well as deficient or maladaptive coping and competence beliefs in the genesis, onset, course and treatment of psychosis. The relationship between stress and psychotic disorders has been widely discussed [12-15] emphasizing the role of poor perceptions of controllability and lower effectiveness in handling stressful events. Thus, both symptom-related coping and general coping are essential for functioning and well-being of patients with psychotic disorders [16-20] Psychotherapeutic interventions often focus on stress management attempting to improve adaptive coping abilities to promote well-being and recovery [16,18,21].

Specific self-efficacy beliefs for coping with stress are a powerful resource for coping [10] as they allow the individuals to manage taxing life situations. Coping with stress self-efficacy (CSSE) refers to the set of beliefs concerning self-confidence in one's own resources to successfully handle challenging and demanding, stressful events and tasks [22,23]. Efficacy expectations refer to the individual's perceived ability to carry out particular coping actions; outcome expectations refer to his or her confidence in obtaining the expected positive outcomes by implementing such coping actions. As such, CSSE beliefs are related to an individual's perceived success in preventing and reducing stress, obtaining positive outcomes and controlling undesired consequences.

Specific self-efficacy for coping with stress has not been examined among individuals with schizophrenia and related disorders to determine its influence on the patient's real-world behaviour in daily life. As research on general self-efficacy (i.e., the confidence in facing and successfully solving demanding tasks, which can or cannot be perceived as stressful) in patients with an SSD is extensive, and it has also been profusely investigated in relation to coping with symptoms for disease management and coping with other disease-related processes affecting well-being, functioning and quality of life, or as related with other psychosocial resources (e.g., perceptions of control, mastery, empowerment or agency), this research is not specifically regarded to coping with stress. To our knowledge, only one study addressed CSSE. MacDonald et al. [24] found that effective coping correlated with higher CSSE, greater use of problem-solving coping strategies and social support, and less severe negative symptoms; CSSE also predicted problem-focused coping and correlated inversely with negative symptoms. Nevertheless, this study is limited in terms of the sample composition (i.e., a mixed-diagnostic group of young patients with recent onset disorder), the measurement of CSSE (i.e., an ad hoc face-valid item) and its descriptive, cross-sectional design. In addition, the authors claimed that "future research needs to determine whether coping skills training increases participants' confidence about their ability to cope with stress" [24] (p. 126). Unfortunately, this line of inquiry was never continued.

Based on the abovementioned conceptual roots, we designed a training in coping with stress and CSSE [25,26] aimed at reducing psychotic symptoms and the impact of the disease on general functioning in daily life among chronic patients with SSDs. The intervention was expected to help patients acquire coping skills and simultaneously enhance their self-confidence in managing stress, which subsequently was expected to improve the patients' clinical status and overall well-being. As far as we know, no such dual-purpose intervention targeted for patients with psychotic disorders had been implemented. The present study aims at evaluating the influence of such an intervention focused on enhancing coping with stress resources and CSSE on patients' coping-based successful daily functioning as well as on clinical status. Our first hypothesis was that the implementation of this intervention would produce a significant increase on CSSE and perceived successful daily functioning –as derived from coping skills enhancement– in the trained patients compared to control patients; further, we expected that these out-

comes would remain at three- and six-month follow-ups. Our second hypothesis was that the effects of the intervention in the trained group would translate into enhanced clinical outcomes, as measured by a symptom-based report, through the mediational effect of improvements in daily functioning; that is, we expected an indirect mediation path between coping self-efficacy and clinical status through daily functioning moderated in turn by the factor study group (i.e., moderated mediation). Thus, trained patients, with stronger CSSE and better perceived psychosocial functioning as derived from the intervention, were expected to benefit more in terms of clinical symptoms compared to control patients.

2. Materials and Methods

2.1. Participants

Fourteen adult individuals of age 21 to 60 years (M=42.71, SD=12.43; 6 women), suffering from schizophrenia (N=12) or schizoaffective disorder (N=2) diagnosed as a primary clinical disorder by their psychiatrist, voluntarily participated. Patients were recruited from a community psychiatric rehabilitation centre. After they were matched by diagnosis, sex, age, clinical symptoms and antipsychotic medication regimen, one individual in each pair was randomly assigned to the intervention group or the control group [26]. The experimental group (6 patients with schizophrenia, 1 with schizoaffective disorder; 4 men, 3 women) received the CSSE and coping skills training in addition to their prescribed drug therapy. The remaining patients (6 patients with schizophrenia, 1 with schizoaffective disorder; 4 men, 3 women) comprised a wait-list control group and adhered only to their prescribed drug regimen.

Table 1. Characteristics of the participants.

Condition	N
Educational level	
Primary school	6
Secondary school	6
University	2
Occupational status	
Work/Studying	0
Unemployed	14
Marital status	
In a stable relationship (married or partnered)	3
No partner	9
Children, yes	2
Living with	
Spouse/partner & children	3
Biological family	5
Supporting housing	3
Alone	3
Medication	
Risperidone	10
Clozapine	2
Chlorpromazine	1
Amisulpride	1
Antidepressant and/or anxiolytic drugs	8

All participants were in a stable or post-acute phase of their disorder receiving outpatient treatment with no hospitalizations or changes in housing or medication within the last month (non-acute exacerbation, non-prodromal, non-relapse period). No modifications were made to the patients' medications immediately before or during the study. None of the patients had a concurrent diagnosis of organic brain damage, intellectual

disability, substance abuse or any other major medical or psychiatric illness [27]. Table 1 shows their sociodemographic and clinical characteristics, including the antipsychotic drugs taken by the patients.

Eligibility criteria were intended to allow construction of a homogeneous sample in terms of clinical status. Inclusion criteria were suffering from schizophrenia or schizoaffective disorder, age 18 years old or older and being in a stable phase of the disease. Exclusion criteria included being in an active phase of the disease, refusing to participate, medication non-adherence, recent changes in medication and the abovementioned comorbidities. In addition to the final participants, two participants belonging to the training group dropped out at the beginning of the study (with lack of interest as reason for withdrawal); consequently, they and their matched controls were reassigned to a general wait-list and excluded from the analyses.

2.2. Measures

The Coping with Stress Self-efficacy Scale (CSSES) [22,23] was used to assess CSSE before and after the intervention, three months after the intervention (follow-up 1) and six months after the intervention (follow-up 2). Its eight items assess how confident the individuals are in successfully managing stressful events based on their ability to effectively deal with daily life problems or hassles (efficacy expectations -EE, 4 items-; out-come expectations -OE, 4 items-). Responses are given on a Likert-type 5-point scale from 1="completely disagree" to 5="completely agree". Partial and global scores are derived by adding the items scores, with higher scores corresponding to a greater perceived self-efficacy for managing stress. Appropriate reliability and factorial and construct validity have been found for the CSSES [22,23].

The Areas of Change Index (ACI) assessed patients' perceived changes in successful daily functioning at post-intervention and 3-month and 6-month follow-ups. This ad hoc self-report assessed perceived outcomes, derived from the intervention in the training group or time passing in the control group, in a broad range of areas related to health and functioning, including overall personal functioning; self-control; problem solving; coping with interpersonal problems; coping with marital, family and domestic problems; coping with problems in adherence to pharmacological/psychological treatment; coping with clinical symptoms, including negative thoughts and hallucinations; stress prevention; and coping with stress. The responses were given on a Likert-type 5-point scale from 1="no change" to 5="extreme change".

The Expanded Brief Psychiatric Rating Scale (BPRS-E 24-items) [28] was used to assess psychotic symptoms at all study phases. We used this rating scale as a semi-structured interview (all authors had received training in BPRS administration and rating following published suggestions). Symptoms were rated for their intensity during a one-week timeframe from 1=not present to 7=extremely severe. The following symptom dimensions were assessed: positive (psychotic) symptoms, negative symptoms, affective symptoms, symptoms of disorientation and symptoms of (cognitive) disorganization [26]. Subscale scores were obtained by adding responses in each dimension; a global score was then derived by adding the subscale scores, with higher scores indicating the presence of more severe and clinically significant symptoms. Psychometric properties of the BPRS and the expanded version have been demonstrated [29,30] and it is a widely used measure in psychiatric assessment. Because of its high sensitivity to change, it has been recommended as an outcome measurement to assess symptom change (e.g., after therapeutic interventions), rather than for diagnostic purposes [28,30,31].

An overall index of Satisfaction with Changes Index (SCI) (1="completely dissatisfied" to 5="extremely satisfied") assessed the patient's satisfaction with intervention outcomes and perceived improvements in daily life.

2.3. Procedure

Details on recruitment and procedure are described elsewhere [26]. After contacting the collaborating therapeutic centre, we provided the responsible parties with pertinent in-formation regarding the study. We then had an initial meeting with the patients and

their main carers to briefly explain the key characteristics and objectives of the intervention. Voluntary participation was requested, and each interested patient signed an informed consent before baseline assessment. Those who had consented were then scheduled for baseline assessment and an in-depth interview to confirm eligibility criteria, considering also the clinical reports that the centre had for each patient. The patients who met the inclusion criteria were then matched by diagnosis, sex, age, clinical symptoms and antipsychotic medication regimen. Then, the participants were randomly assigned to each of the study groups. Patients in the training group received an intervention for enhancing daily functioning based on the improvement of coping skills and CSSE, as described below, along with their habitual pharmacological treatment; patients in the control group only received their habitual drug regimen.

The pre-intervention assessment was conducted during the previous days at the start of the first session of training. The intervention was a training aimed at enhancing successful daily functioning through improving coping resources (including coping skills and CSSE beliefs) over the course of 15 group sessions, with two 150-minute sessions per week (with a break within session). An initial block was aimed at explaining and enhancing general self-efficacy and efficacy and outcome expectations, followed by a core-work block aimed at enhancing coping skills and simultaneously increasing beliefs of self-efficacy for coping with stress. Specifically, the following areas were approached: coping with interpersonal problems; coping with treatment adherence; coping with marital, family and domestic problems; coping with clinical symptoms; and coping with daily stress [25,26]. Personal beliefs in CSSE were enhanced by addressing the main sources of self-efficacy perceptions: enactive mastery experiences, vicarious mastery experiences, verbal persuasion of success and emotional arousal [10]. The methodology used throughout the programme was psycho-education, instruction-guided modeling and behavioural rehearsal in the framework of problem-solving strategies. As far as we know, no intervention with these characteristics targeted at patients with psychotic disorders had been implemented to date. Our intervention differs from previous published ones in that it includes CSSES as a key element. Post-intervention assessment was con-ducted immediately following the training and three and six months later. One of the authors (MLV, supervised by JFG) implemented the intervention; another blinded one (DGI) conducted the assessments. This study was approved by the authors' institutional ethics committee and followed the international guidelines for research with humans.

2.4. Study design and data analyses

This is a longitudinal, randomized controlled study with between-group (training and control groups) and within-group (baseline, post-intervention, 3- and 6-month follow-ups) factors.

Preliminary analyses were conducted to ensure the quality of the database and to determine the analytical tests to be performed. Non-parametric tests were conducted because parametric criteria of normality and homoscedasticity were not reached and due to sample size. Thus, besides descriptive analysis (mean±standard deviation for continuous variables and n and percentage for categorical variables), Friedman's and Wilcoxon's within-group comparisons and Mann-Whitney's between-groups comparisons were conducted. For effect size, Cohen's d was calculated, with values of .2, .5 and .8 indicating a small, medium and large effect size [32].

In addition, moderated mediation effects were analyzed with the PROCESS Macro for SPSS [33], to test whether the influence of post-intervention levels of coping self-efficacy on clinical status after the intervention was mediated by perceived successful functioning and, simultaneously, moderated by the experimental condition (intervention vs. time passing). Preacher et al.'s approach emphasizes the estimation of conditional indirect effects by bootstrapping those conditional effects [33]. Consequently, for each analysis, 5000 bootstrap random resamples were obtained from the data for parameter estimation, ensuring the stability of the analyses. Bias-corrected 95% confidence intervals (95% CI) were then derived from the obtained distribution of coefficients over the sam-

ples, which requires no assumption regarding the underlying distributions because the statistical significance level is determined non-parametrically.

Analyses were carried out without missing data, with a significance level at *p<.05*.

3. Results

In the training group, Friedman's within-group comparisons showed significant changes between the four assessment phases for the global score in the CSSES ($\chi2$=16.818, *p<*.01) and EE ($\chi2$=15.950, *p<*.01) and OE subscales ($\chi2$=14.803, *p<*.01). A posteriori Wilcoxon's *Z* comparisons revealed a significant increase in CSSE among trained participants from baseline to post-intervention (change of 154.2%, *d*=5.7) (see Table 2 and Figure 1A). At the three-month and six-month follow-ups, no significant changes were observed, demonstrating that the improvements were maintained over time. A significant increase was also observed for EE (change of 171.8%, *d*=5.3) and OE (change of 137.5%, *d*=3.6) from baseline to post-intervention. Improvements were also maintained at the three- and six-month follow-up assessment for EE and OE components. In contrast, no significant changes were found for the control group for either CSSES global score or EE and OE subscales ($\chi2$=6.328, $\chi2$=2.534, $\chi2$=6.321, respectively, all *p>*.05). For this group (see Table 2 and Figure 1A), no significant increases or decreases were observed from each assessment phase to the next one. Noteworthy, effect sizes in the control group indicated mild to moderate deleterious changes.

Table 2. CSSE, ACI and SCI within-group and between-groups comparisons for each assessment phase.

		Pre M±SD	Post M±SD	3mFU M±SD	6mFU M±SD	Z pre-post (*p*) *d*	Z post-3mFU (*p*) *d*	Z 3mFU-6mFU (*p*) *d*
EE	Training group	6.57±2.44	17.86±1.86	16.00±3.21	16.71±2.50	-2.371 (.02*) 5.25	1.753 (.08) .73	-1.134 (.26) .25
	Control group	10.57±3.36	10.57±3.15	9.71±2.98	9.71±2.93	.000 (1.00) .00	-1.604 (.11) .28	.000 (1.00) .00
	U (p) *d*	8.500 (.04*) 1.38	.000 (<.01**) 2.91	3.000 (<.01**) 2.03	.000 (<.01**) 2.58			
OE	Training group	6.86±2.19	16.29±3.09	16.29±2.63	15.71±3.45	-2.388 (.02*) 3.57	.000 (1.00) .00	-1.342 (.18) .19
	Control group	8.29±1.38	8.14±1.35	7.57±2.07	6.86±1.07	-.333 (.74) .11	-.687 (.49) .33	-1.063 (.29) .45
	U (p) *d*	16.500 (.29) .80	.000 (<.01**) 3.67	.000 (<.01**) 3.71	.000 (<.01**) 3.92			
CS	Training group	13.43±2.44	34.14±4.81	32.29±5.28	32.43±5.19	-2.371 (.02*) 5.71	-1.784 (.07) .37	-.577 (.56) .03
	Control group	18.86±4.34	18.71±2.87	17.29±2.87	16.57±2.88	-.322 (.75) .04	-1.276 (.20) .49	-1.131 (.26) .25
	U (p) *d*	4.000 (<.01**) 1.60	.000 (<.01**) 4.02	.000 (<.01**) 3.68	.000 (<.01**) 3.93			
ACI	Training group		36.57±5.32	37.57±4.20	37.14±4.88			
	Control group		11.14±3.19	11.00±3.21	11.57±2.94			
	U (p)		.000 (<.01**)	.000 (<.01**)	.000 (<.01**)			
	d		5.98	7.17	6.54			
SCI	Training group		4.57±.54	4.57±.53	4.29±.76			
	Control group		1.14±.38	1.00±.00	1.14±.38			
	U (p)		.000 (<.01**)	.000 (<.01**)	.000 (<.01**)			
	d		7.46	13.47	5.53			

Note. A positive d value indicates that the score of the first comparison group is higher than that of the second one. PRE: preintervention; POST: postintervention; 3mFU: 3-month follow-up; 6mFU: 6-month follow-up; CSSE: coping with stress self-efficacy; EE: efficacy expectations; OE: outcome expectations; CS: Self-efficacy for coping with stress (global score). ACI: Areas of Change Index; SCI: Satisfaction with Changes Index. * *p<*.05, ** *p<*.01.
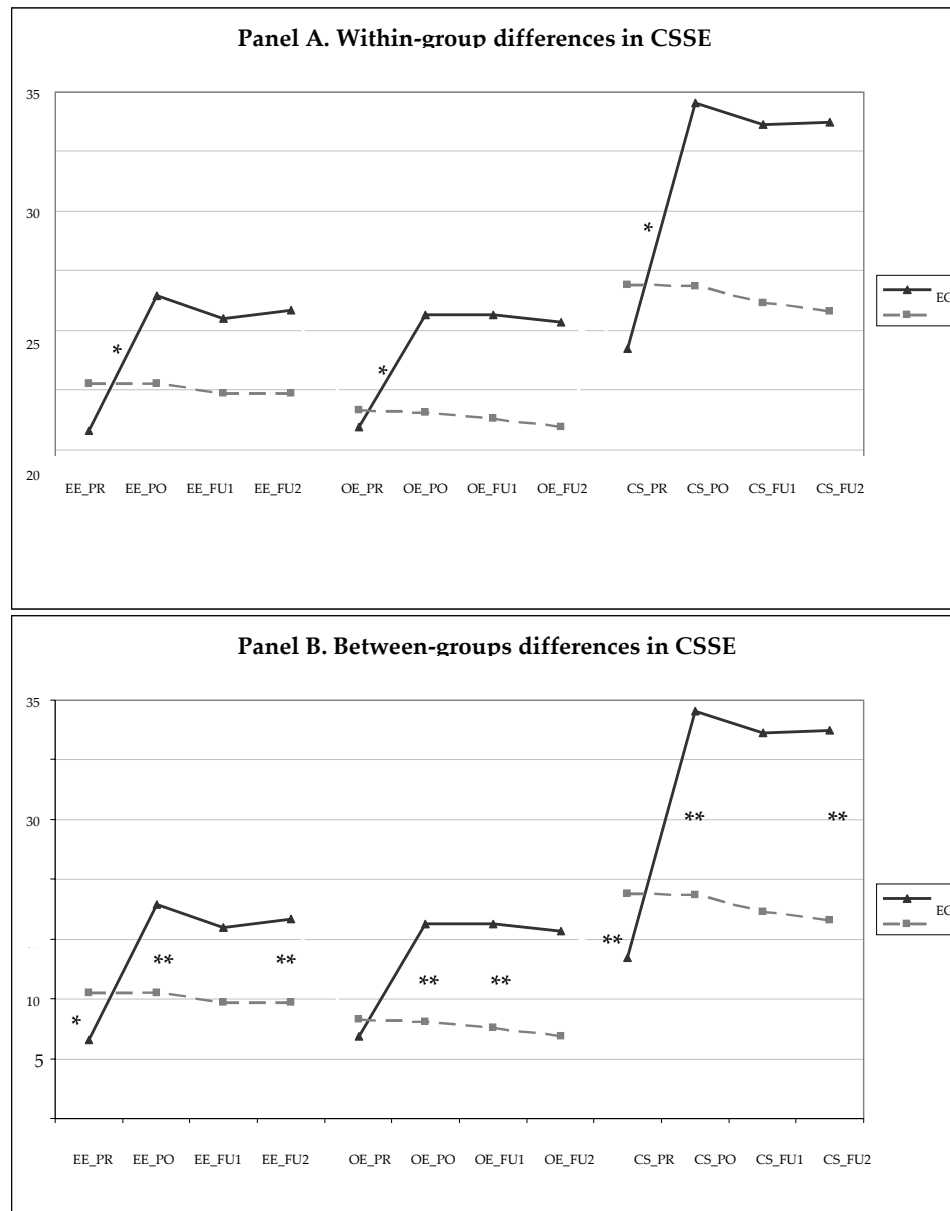
Figure 1. Panel A. Repeated measures for the study groups for CSSES. Panel B. Differences between the study groups for the CSSES. PR: preintervention; PO: postintervention; FU1: 3-month follow-up; FU2: 6-month follow-up; EE: efficacy expectations; OE: outcome expectations; CS: Self-efficacy for coping with stress (global score). *$p<.05$,**$p<.01$.

Mann-Whitney's *U* between-groups comparisons for the CSSES global score at baseline indicated higher levels of self-efficacy for coping in the control group (d=1.6), even when a random assignment to the study group of matched participants was con-ducted (see Table 2 and Figure 1B). The same occurred for the EE (d=1.4) scores, with no significant differences for OE scores (d=.8). At post-intervention, significant differences were found favoring the training group for the global (d=4.0), EE (d=2.9) and OE scores (d=3.7). At 3-month follow-up, significant differences were found favoring the training group for the global (d=3.7), EE (d=2.0) and OE scores (d=3.7). Last, at 6-month follow-up, significant differences were found also favoring the training group for the global (d=3.9), EE (d=2.6) and OE scores (d=3.9).

Patients in the intervention group also reported significantly higher perceived positive functioning in daily life as well as higher satisfaction with these changes compared to patients in the control group at post-intervention assessment (see Table 2). These significant differences continued at the 3-month and 6-month follow-ups.

Detailed findings obtained for the BPRS-E are published elsewhere [26]. Attending to the global score, Friedman's ($\chi 2$=19.925, p<.01) and a posteriori Wilcoxon's within-group comparisons revealed a significant reduction in psychotic symptoms among trained participants, represented by a decrease in the BPRS-E total score. These improvements were maintained over time, with an additional short-term decrease in symptoms. Improvements corresponded to a reduction of 56% from baseline to post-intervention (d=4.1), an additional reduction of 6.6% (d=2.1) from post-intervention to 3-month follow-up and an additional 7.2% (d=.2) from 3-month follow-up to 6-month follow-up (Table 3). In contrast, no significant changes were found for the control group ($\chi 2$=2.194, p>.05; p>.05 for all pair-wise tests) (Table 3). Mann-Whitney's between-groups comparisons of the BPRS-E global score showed significant differences at each assessment point favoring the training group, even when it started the intervention with a non-significantly higher clinical impairment (post-intervention, d=4.5, 3-month follow-up, d=5.0, 6-month follow-up, d=6.3).

Table 3. BPRS-E within-group and between-groups comparisons for each assessment phase.

		Pre M±SD	Post M±SD	3mFU M±SD	6mFU M±SD	Z pre-post (*p*) *d*	Z post-3mFU (*p*) *d*	Z 3mFU-6mFU (*p*) *d*
POSIT	Training group	21.29±11.09	8.14±2.12	7.14±1.07	7.29±1.11	-2.207 (.03*) 1.99	-1.289 (.20) .63	-.577 (.56) .14
	Control group	15.14±5.84	15.71±6.40	15.71±6.97	15.29±6.26	-1.069 (.29) .09	.000 (1.00) .00	-.966 (.33) .06
	U (p) *d*	18.500 (.44) .73	3.000 (<.01**) 1.78	2.000 (<.01**) 2.13	2.000 (<.01**) 2.17			
NEGAT	Training group	10.57±4.24	5.43±1.27	5.00±.82	5.00±.82	-2.201 (.03*) 1.87	-1.732 (.08) .41	.000 (1.00) .00
	Control group	6.86±2.54	7.71±3.45	8.00±3.56	8.29±3.77	-1.300 (.19) .28	-1.000 (.32) .08	-.816 (.41) .08
	U (p) *d*	11.000 (.08) 1.09	14.000 (.17) .97	8.000 (.03*) 1.37	7.000 (.02*) 1.43			
AFFECT	Training group	35.86±5.64	16.86±2.27	13.29±.95	13.00±.82	-2.371 (.02*) 4.80	-2.207 (.03*) 2.22	-.707 (.48) .33
	Control group	37.14±4.56	37.00±3.74	35.14±4.70	36.14±5.43	.000 (1.00) .03	-2.156 (.03*) .44	-1.473 (.14) .20
	U (p) *d*	20.500 (.61) .25	.000 (<.01**) 6.70	.000 (<.01**) 7.72	.000 (<.01**) 7.40			
DISOR	Training group	5.00±3.00	2.43±.53	2.57±.79	2.29±.49	-1.841 (.07) 1.46	-.577 (.56) .21	-1.414 (.16) .44
	Control group	3.86±3.18	3.86±2.54	3.71±2.63	3.57±2.15	.000 (1.00) .00	-1.000 (.32) .06	-.272 (.79) .06
	U (p) *d*	20.000 (.52) .37	18.000 (.36) .93	22.000 (.72) .67	18.000 (.33) .97			
DISORG	Training group	4.86±2.67	1.29±.49	1.00±.00	1.00±.00	-2.049 (.04*) 2.26	-1.414 (.16) 1.18	.000 (1.00) ‡
	Control group	2.43±1.90	1.57±.79	1.14±.38	1.29±.49	-1.342 (.18) .64	-1.342 (.18) .74	-1.000 (.32) .34
	U (p) *d*	12.500 (.11) 1.06	20.000 (.50) .44	21.000 (.32) .74	17.500 (.14) 1.18			
TOT	Training group	77.57±18.30	34.14±3.13	29.00±1.83	28.57±1.81	-2.366 (.02*) 4.05	-2.375 (.02*) 2.07	-1.134 (.26) .24
	Control group	65.43±10.85	65.86±11.13	63.71±11.97	64.57±9.68	-.211 (.83) .04	-2.003 (.04*) .19	-.736 (.46) .08
	U (p) *d*	14.000 (.18) .83	.000 (<.01**) 4.45	.000 (<.01**) 5.03	.000 (<.01**) 6.27			

Note. ‡ In this case it is not possible to calculate the coefficient d as the standard deviation of both groups equals 0. PRE: preintervention; POST: postintervention; 3mFU: 3-month follow-up; 6mFU: 6-month follow-up; POSIT: positive symptoms; NEGAT: negative symptoms; AFFECT: affective symptoms; DISOR: disorientation symptoms; DISORG: disorganization symptoms; TOT: total score. * p<.05, ** p<.01.

According to our second hypothesis, changes in clinical status from baseline to post-intervention would be mediated by post-intervention perceived successful functioning (i.e., coping skills use in daily life) as derived from self-efficacy for coping with stress beliefs, and moderated in turn by study group. To test this hypothesis, a moderated mediation analysis was conducted, with differences in scores on the BPRS-E from pre- to post-intervention as the outcome, the CSSES total score at post-intervention entered as the predictor, the ACI score at post-intervention entered as the mediator and the experimental condition entered as a moderator of such a relationship. The results are displayed in Table 4 and Figure 2. The moderated mediation was confirmed. Perceived successful functioning in daily life as predicted by stronger coping self-efficacy resulted in higher improvements in clinical status (i.e., higher change) at post-intervention for the trained group, but not for the control group. Moreover, coping self-efficacy could not predict clinical status directly but only indirectly by this moderated mediation effect. Overall, 48% of the variance in BPRS-E changes was accounted for by the entire model.

Table 4. Changes in clinical status as predicted by coping self-efficacy mediated by perceived successful functioning based on coping skills and moderated by study group.

Predictor	Coeff.	SE	*t*	*p*	LLCI	ULCI
Predicted: ACI_Post						
CSSE_Post	.55	.876	.629	.54	-1.401	2.502
Group	7.83	11.711	.669	.52	-18.268	33.936
CSSE_Post x Group	.18	.489	.376	.72	-.905	1.272
Predicted: BPRS-E change						
ACI_Post	-3.23	1.174	-2.752	.02*	-5.815	-.647
CSSE_Post	2.82	1.834	1.535	.15	-1.222	6.854
Values of mediator at group						
Intervention group	**-2.96**	**2.18**			**-8.203**	**-.903**
Control group	-2.37	2.40			-7.823	.259

R^2=.69; *F(2, 11)*=12.338, *p*<.01.

Note. Non-standardized parameters. PROCESS Model #4. Bootstrapped samples for bias corrected 95% confidence intervals: 5000. ACI: Areas of Change Index; CSSE: Self-efficacy for coping with stress (global score); LLCI: Lower limit of the 95% CI; ULCI: Upper limit of the 95% CI. *p<.05.
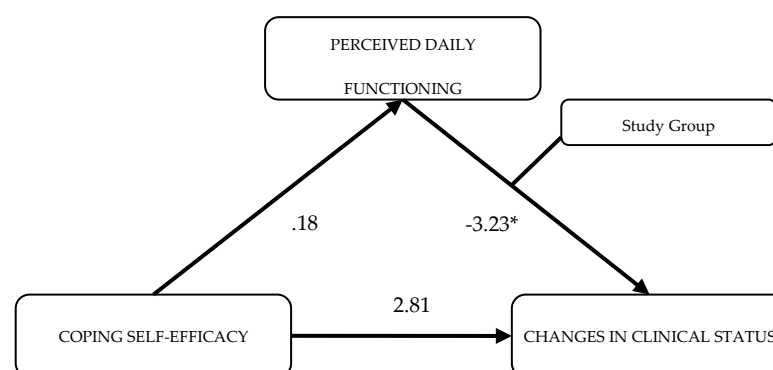

Figure 2. Moderated mediation: Study group moderates the indirect relationship of coping self-efficacy and change in clinical status through perceived daily functioning based on coping skills.

4. Discussion

Treatment of SSDs currently involves antipsychotic medication and psychosocial therapies, the combination of which is often helpful for people suffering from psychotic disorders to gain better clinical outcomes and recovery, decrease functional impairment

and reduce the number of relapses and hospitalizations. By focusing on modifiable protective psychosocial resources, rather than only on risk and disease factors, it is expected that patients will experience improved clinical outcomes, lower relapse rates, and enhanced well-being, quality of life and daily functioning (i.e., personal, familial, social and work roles) [25]. Following this rationale, we implemented a pioneering training programme aimed at enhancing coping skills and CSSES in a group of patients primarily diagnosed with schizophrenia.

Our first aim was to explore whether the intervention increased personal resources for coping with stress, including CSSES, and improved daily functioning by using successful coping skills and by trusting in an enhanced perception of capability of managing stress. Findings revealed that CSSES, as well as EE and OE components, significantly increased in the training group after the intervention (effect sizes up to 5.7), and these improvements remained at follow-ups. Percentage of changes and effect sizes are remarkable. In addition, significant differences were found between the intervention and the control groups at all of the assessment phases, which demonstrated that trained patients gained more global CSSES, EE and OE, even when they started with comparatively worse perceptions. Moreover, the divergences slightly but progressively increased over time. Patients in the intervention group also reported significantly higher perceived positive functioning in daily life as well as higher satisfaction with these changes compared to their counterparts at post-intervention and follow-ups. Further-more, these improvements were accompanied by a significant reduction in BPRS-E psychotic positive, negative, affective and disorganization symptoms among trained participants, compared to control patients (effect sizes up to d=4.80). This improvement in clinical status was also maintained over time, with further enhancements in several domains. Percentages of change and between-groups differences and effect sizes for all these differences are also noteworthy.

This study revealed unique improvements following this theoretically driven intervention. As far as we know, no other intervention aimed at increasing CSSES along with coping skills among individuals with SSDs has been implemented to date, thus it is impossible to compare findings. Self-efficacy perceptions have been found to have an influence on coping efforts and functional or clinical outcomes (see below). Moreover, when self-efficacy trainings have been implemented, or self-efficacy has been addressed by interventions, positive outcomes have been obtained [34-36]. These interventions could be effective in increasing patients' self-efficacy to manage their illness and empowering them. The present study contributes to research on self-efficacy and coping with stress among patients with SSDs, complementing the findings obtained by Mac-Donald et al. [24], as well as on the efficacy of psychosocial therapy, particularly CBT, in the therapy of psychotic disorders. Our findings suggest that it is possible to enhance a sense of agency among individuals with schizophrenia. The sense of being an active agent in managing the disease as well as daily demanding situations may decrease patients' vulnerability to stress and increase their ability to influence the environment, empowering individuals for enhanced independent living, employment, social relationships and overall well-being. Thus, interventions targeting coping self-efficacy may be beneficial for increasing inner resources in order to manage not only the disease stressful symptoms and the hardships imposed by the illness but also the varied stressful events that SSDs patients encounter in daily life.

The present study further examined whether the indirect effect of coping self-efficacy on clinical status through perceived successful daily functioning by applying coping skills varied as a function of receiving an intervention focused on enhancing coping resources (i.e., whether this mediated relationship occurs at each level of the moderator, study group). Supporting a conditioned effect, findings revealed that only in the intervention group, greater perceptions of personal efficacy for coping with stress contributed to enhanced daily functioning and thus to better clinical status. Boot-strapped CIs used for inferring the conditional indirect effect given the values of moderator (intervention vs. control group) revealed that this indirect effect is different

from zero except among those patients not receiving the intervention, for whom there is no indirect effect of coping self-efficacy on clinical symptoms through daily functioning. As previously noted [37], indirect analyses are specially interesting in prevention and treatment studies, where interventions are designed to change the outcome of interest by targeting process variables that are hypothesized to be causally related to the outcome.

Self-efficacy theory postulates that "self-efficacy is not simply a correlate of functioning, but actually contributes to it by mediating the relationships between other variables and functioning" (p. 194) [38]. Following the self-efficacy theory [10,11], it is possible that self-efficacy, as a protective factor, mediates the effects of coping styles and efforts for coping with psychiatric illnesses on daily functioning and successful adjustment [38,39]. It is also possible that it mediates the influences of stressors and disease-related distress on functional and well-being outcomes [40]. However, when mediational indirect effects have been tested for self-efficacy on functional outcomes and illness-related behaviours, generally no support has been obtained [38,41-48], with a few favorable findings [44,49-51]. More robust findings have been reported when self-efficacy was considered as a predictor of patient's functioning when other mediators were considered, such as negative symptoms and illness-related emotional distress [38,45,46,48,52,53]. These studies, particularly those supporting the influences of self-efficacy on functioning-related mediators, are in line with our results, which point out that self-efficacy predicts illness-related patient functioning, which in turn predicts clinical outcomes and adaptation. As self-efficacy is domain-dependent, the use of indicators of general self-efficacy instead of domain-specific self-efficacy might have contributed to the mixed results in the schizophrenia research literature [48]. Further exploration of the specific relationships between stress, coping, self-efficacy for coping and health- or functioning-related outcomes is warranted. The present study, using a domain-specific self-efficacy and an experimental, intervention-based design, helps provide a deeper understanding of the predictors and paths of functioning and well-being in SSDs.

Understanding the relationship between self-efficacy and psychosocial functioning has implications for the treatment of SSDs. Clinical research has highlighted the importance of evidence-based psychological interventions to enhance everyday functioning and quality of life by enabling patients to achieve productive, sustained, independent living, vocational or educational activities, satisfying interpersonal relationships and meaningful lives, not merely the reduction of symptoms and relapses. Strength-based interventions, aimed at enhancing self-agency, coping capacities, personal potential and self-worth are crucial for recovery. If individuals with schizophrenia have the capability to perform daily behaviours but fail to do so because they perceive that they lack the ability, direct attempts at increasing self-efficacy should be included as part of the treatment [38,54]. Our findings point out the importance of not only offering the patients effective coping skills but also of improving patients' confidence in their use and efficacy to enhance their clinical status and adjustment to their disease. Further, specific CSSE may influence patients' psychosocial functioning, overall well-being and quality of life, which would in turn impact their coping efforts [55] and thus their CSSE beliefs. Interventions such as the one presented in this study are aimed at increasing resources for living as independently and successfully as possible, whether patients are "reinstitutionalized" (e.g., supported housing, community hostels), non-institutionalized or institutionalized patients. Increasing self-efficacy beliefs might be essential for outpatients, as it has been demonstrated that these self-beliefs decrease with chronification of the disorder, probably due to the continued failure to cope successfully with the challenges of the illness and daily living [45].

Despite the strengths (e.g., domain-specific constructs, clinical randomized study, prospective design) and pioneering and inspiring findings presented herein, this study has several limitations to note. First, the small sample size of voluntary patients and the reduced number of individuals suffering from psychotic disorders other than schizophrenia raise cautions on the generalizability of the findings. Nonetheless, to individualize treatment as much as possible and maximize its possible benefits, we decided to

offer it to a limited number of patients. Second, further research is needed aimed at establishing long-term outcomes (i.e., over 6 months) after the training. Third, our findings rely on self-reported data, and their validity would be enhanced with other sources of information, such as external informant reports, behavioural observations or experience-based sampling. Moreover, we have not considered clinical indicators (e.g., adjustment in medication, relapse rates, information from relatives) other than self-report questionnaires and clinicians' judgments. Finally, indirect effects analysis is notably less powerful than outcome analysis [56], which means that only very strong effects would likely be detected in the present study due to sample size. Although the postulated moderated mediation was demonstrated, the path from coping self-efficacy to perceived successful functioning was not significant. Although it has been indicated that there must be a significant association between all of the variables in the model to assert that there is a mediation, recent positions note that this is not necessary [57], or that the causal effects might not even be expected [58] a non-significant effect could be found for instance when there are other possible intervening factors in the relationship between the variables. The sole requirement to demonstrate a moderated mediation is a significant conditioned indirect effect on either the total or the direct effect [57].

5. Conclusions

In conclusion, this longitudinal, experimental-design study with manipulation of coping resources, including self-efficacy for coping with stress, found that significant improvements in the clinical status of patients suffering from SSDs were associated with changes in coping resources. CSSE is revealed as a powerful contributor to clinical status. The indirect effect of coping self-efficacy on clinical status after the intervention through daily functioning by using trained coping resources is conditioned by the values of the moderator group study, and this is only true for the patients who received the intervention aimed at increasing coping resources. This study elucidates the mechanisms by which CSSE and coping work together in accounting for patients' functioning in the real world and well-being and thus contributes to the cumulative knowledge on the psychosocial resources for enhanced quality of life in psychosis. Establishing the relationships among psychosocial resources such as coping and self-efficacy with indicators of well-being and clinical status allow us to understand the underlying processes of such relationship and to use this information to design effective evidence-based interventions [59] for promoting fulfilling and optimal living and positive clinical status in schizophrenia and related disorders.

Author Contributions: Conceptualization, D.G.I., M.L.P.V. and J.F.G.G.; methodology, D.G.I. and J.F.G.G.; validation, D.G.I., M.L.P.V. and J.F.G.G.; formal analysis, D.G.I. and J.F.G.G.; investigation, D.G.I., M.L.P.V. and J.F.G.G.; resources, D.G.I., M.L.P.V., R.L.M. and J.F.G.G.; data curation, D.G.I., M.L.P.V., R.L.M. and J.F.G.G.; writing—original draft preparation, D.G.I. and M.L.P.V.; writing—review and editing, D.G.I., M.L.P.V., R.L.M. and J.F.G.G.; supervision, D.G.I. and J.F.G.G.; project administration, D.G.I. and J.F.G.G.; funding acquisition, D.G.I., M.L.P.V. and J.F.G.G. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Universidad de Granada.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflict of interest: The authors declare that they have no conflict of interest.

References

1.   World Health Organization. Retrieved from www.who.int, October 2020.

2.   Barbieri A, Visco-Comandini F. Efficacy of cognitive behavioural therapy in the treatment of psychosis: A meta-review. *Riv Psichiatr*. 2019; 54(5):183-195. DOI: 10.1708/3249.32182.

3.   Turner D, Reijnders M, van del Gaag M, et al. Efficacy and moderators of cognitive behavioural therapy for psychosis versus other psychological interventions: An individual-participant data meta-analysis. *Front Psychiatr*. 2020; 11:402. DOI: 10.3389/fpsyt.2020.00402.

4.   Ventriglio A, Ricci F, Magnifico G, et al. Psychosocial interventions in schizophrenia: Focus on guidelines. *Int J Soc Psychiatr*. 2020; 66(8):735-747. DOI: 10.1177/0020764020934827.

5.   Nuechterlein KH. *Vulnerability models for schizophrenia: State of the art*. In H Häfner, W Gattaz, W Janzanik (Eds.), Search for the causes of schizophrenia. Berlin: Springer-Verlag; 1987. p. 297-316.

6.   Nuechterlein KH, Dawson ME. A heuristic vulnerability/stress model of schizophrenic episodes. *Schizophrenia Bull*. 1984; 10(2):300-312. DOI: 10.1093/schbul/10.2.300.

7.   Zubin J, Spring BJ. Vulnerability: A new view of schizophrenia. *J Abnorm Psychol*. 1977; 86(2):103-126. DOI: 10.1037/0021-843x.86.2.103.

8.   Zubin J, Steinhauer SR. How to break the logjam in schizophrenia: A look beyond genetics. *J Nerv Ment Dis*. 1981; 169(8):477-492. DOI: 10.1037/0021-843x.86.2.103.

9.   Lazarus RS, Folkman S. *Stress, appraisal, and coping*. New York: Springer; 1984.

10.   Bandura A. *Self-efficacy: The exercise of control.* New York: Freeman; 1997.

11.   Bandura A. Self-efficacy: Toward a unifying theory of behaviour change. *Psychol Rev.* 1977; 84(1):191-215. DOI: 10.1016/0146-6402(78)90002-4.

12.   Belbasis L, Köhler CA, Stefanis N, et al. Risk factors and peripheral biomarkers for schizophrenia spectrum disorders: An umbrella review of meta-analyses. *Acta Psychiat Scand*. 2018; 137(2):88-97. DOI: 10.1111/acps.12847.

13.   Rossini Gajsak L, Gelemanovic A, Rojnic Kuzman M, Puljak L. Impact of stress response in development of first-episode psychosis in schizophrenia: An overview of systematic reviews. *Psychiat Danub*. 2017; 29(1):14-23. DOI: 10.24869/psyd.2017.14.

14.   Lange C, Deutschenbaur L, Borgwardt S, Lang UE, Walter M, Huber CG. Experimentally induced psychosocial stress in schizophrenia spectrum disorders: A systematic review. *Schizophr Res*. 2017; 182:4-12. DOI: 10.1016/j.schres.2016.10.008.

15.   Mayo D, Corey S, Kelly LH, et al. The role of trauma and stressful life events among individuals at clinical high risk for psychosis: A review. *Front Psychiatr*. 2017; 55:8. DOI: 10.3389/fpsyt.2017.00055.

16.   Phillips LJ, Francey SM, Edwards J, McMurray N. Strategies used by psychotic individuals to cope with life stress and symptoms of illness: A systematic review. *Anxiety Stress Coping*. 2009; 22(4):371-410. DOI: 10.1080/10615800902811065.

17.   Mian L, Lattanzi GM, Tognin S. Coping strategies in individuals at ultra-high risk of psychosis: A systematic review. Early Interv Psychia. 2018; 12(4):525-534. DOI: 10.1111/eip.12492.

18.   Riera-López de Aguileta I, Vila-Badia R, Usall J, Butjosa A, Ochoa S. Coping strategies in first-episode psychosis: A systematic review. *Early Interv Psychia*. 2020; 14(3):252-262. DOI: 10.1111/eip.12847.

19.   Tarrier N. *The use of coping strategies and self-regulation in the treatment of psychosis*. In AP Morrisonm, A casebook of cognitive therapy for psychosis. New York: Routledge; 2014. p. 95-123.

20.   Van Dijk FA, Schirmbeck F, Bovette LL, de Haan L. Coping styles mediate the association between negative life events and subjective well-being in patients with non-affective psychotic disorders and their siblings. *Psychiat Res*. 2019; 272:296-303. DOI: 10.1016/j.psychres.2018.12.020.

21.   Kommescher M, Gross S, Pützfeld V, Klosterkötter J, Bechdolf A. Coping and the stages of psychosis: An investigation into the coping styles in people at risk of psychosis, in people with first-episode and multiple-episode psychoses. *Early Interv Psychia*. 2017; 11(2):147-155. DOI: 10.1111/eip.12223.

22.   Godoy-Izquierdo D, Godoy J, López I, Martínez A, Gutiérrez S, Vázquez L. Autoeficacia para el afrontamiento del estrés en una muestra adulta española. *Ansiedad y Estrés*. 2008a; 1(14):13-29.

23.   Godoy-Izquierdo D, Godoy J, López I, Martínez A, Gutierrez S, Vázquez L. Propiedades psicométricas de la Escala de Autoeficacia para el Afrontamiento del Estrés. *Psicothema*. 2008b; 20(1):155-165.

24.   MacDonald EM, Pica S, McDonald S, Hayes RL, Baglioni AJ. Stress and coping in early psychosis: Role of symptoms, self-efficacy and social support in coping with stress. *Brit J Psychiat*. 1998; 172(33):122-127. DOI: 10.1192/S0007125000297778.

25.   Omitted

26.   Omitted

27.   American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994.

28.   Overall JE, Gorham DR. The Brief Psychiatric Rating Scale (BPRS): Recent developments in ascertainment and scaling. *Psychopharmacol Bull*. 1988; 24(1):97-99.

29.   Burlingame GM, Seaman S, Johnson JE, et al. Sensitivity to change of the Brief Psychiatric Rating Scale-Extended (BPRS-E): An item and subscale analysis. *Psychol Serv*. 2006; 3(2):77-87. DOI: 10.1037/1541-1559.3.2.77.

30.   Ventura J, Nuechterlein KH, Subotnik KL, Gutkind D, Gilbert EA. Symptom dimensions in recent-onset schizophrenia and mania: A principal components analysis of the 24-item Brief Psychiatric Rating Scale. *Psychiat Res*. 2000; 97(2-3):129-135. DOI: 10.1016/S0165-1781(00)00228-6.

31.   Leucht S, Kane JM, Kissling W, Hamann J, Etschel E, Engel R. Clinical implications of Brief Psychiatric Rating Scale scores. *Brit J Psychiat*. 2005; 187(14):366-371. DOI: 10.1192/bjp.187.4.366.

32. Cohen J. *Statistical power analysis for the behavioural sciences*. New York: Routledge; 1988.

33. Preacher KJ, Rucker DD, Hayes AF. Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivar Behav Res*. 2007; 42(1):185-227. DOI: 10.1080/00273170701341316.

34. Tse S, Tsoi EWS, Hamilton B, et al. Uses of strength-based interventions for people with serious mental illness: A critical review. *Int J Soc Psychiatr*. 2016; 62(3):281-291. DOI: 10.1177/0020764015623970.

35. Shon KH, Park SS. Medication and symptom management education program for the rehabilitation of psychiatric patients in Korea: The effects of promoting schedule on self-efficacy theory. *Yonsei Med J.* 2002; 43(5):579-589. DOI: ymj.2002.43.5.579.

36. Lee JW, Ha JH. The effects of an acceptance-commitment therapy based stress management program on hospitalization stress, self-efficacy and psychological well-being of inpatients with schizophrenia. *J Korean Acad Nurs*. 2018; 48(4):443-453. DOI: 10.4040/jkan.2018.48.4.443.

37. MacKinnon DP, Fairchild AJ, Fritz MS. Mediation analysis. *Annu Rev Psychol*. 2007; 58:593-614. DOI: 10.1146/annurev.psych.58.110405.085542.

38. Pratt SI, Mueser KT, Smith TE, Lu W. Self-efficacy and psychosocial functioning in schizophrenia: A mediational analysis. *Schizophr Res*. 2005; 78(2-3):187-197. DOI: 10.1016/j.schres.2005.02.014.

39. McDermott BE. Development of an instrument for assessing self-efficacy in schizophrenic spectrum disorders. *J Clin Psychol*. 1995; 51(3):320-331. DOI: 10.1016/j.psychres.2018.08.093.

40. Ritsner M, Gibel A, Ponizovsky A, Shinkarenko ,E, Ratner Y, Kurs R. Coping patterns as a valid presentation of the diversity of coping responses in schizophrenia patients. *Psychiat Res*. 2006; 144(2-3):139-152. DOI: 10.1016/j.psychres.2005.09.017.

41. Fung KM, Tsang HW, Corrigan PW. Self-stigma of people with schizophrenia as predictor of their adherence to psychosocial treatment. *Psychiatr Rehabil J*. 2008; 32(2):95-104. DOI: 10.2975/32.2.2008.95.104.

42. Hill K, Startup M. The relationship between internalized stigma, negative symptoms and social functioning in schizophrenia: The mediating role of self-efficacy. *Psychiat Res*. 2013; 206(2-3):151-157. DOI: 10.1016/j.psychres.2012.09.056.

43. Kurtz MM, Olfson RH, Rose J. Self-efficacy and functional status in schizophrenia: Relationship to insight, cognition and negative symptoms. *Schizophr Res.* 2013; 145(1-3):69-74. DOI: 10.1016/j.schres.2012.12.030.

44. Morgades-Bamba CI, Fuster-Ruizdeapodaca MJ, Molero F. The impact of internalized stigma on the well-being of people with schizophrenia. *Psychiat Res*. 2019a; 271:621-627. DOI: 10.1016/j.psychres.2018.12.060.

45. Ventura J, Subotnik KL, Ered A, et al. The relationship of attitudinal beliefs to negative symptoms, neurocognition, and daily functioning in recent-onset schizophrenia. *Schizophrenia Bull*. 2014; 40(6):1308-1318. DOI: 10.1093/schbul/sbu002.

46. Wright AC, Browne J, Cather C, Pratt SI, Bartels SJ, Mueser KT. Does self-efficacy predict functioning in older adults with schizophrenia? A cross-sectional and longitudinal mediation analysis. *Cognitive Ther Res*. 2020; 1-13. DOI: 10.1007/s10608-020-10171-8.

47. Morgades-Bamba CI, Fuster-Ruizdeapodaca MJ, Molero F. Internalized stigma and its impact on schizophrenia quality of life. *Psychol Health Med*. 2019b; 24(8):992-1004. DOI: 10.1080/13548506.2019.1612076.

48. Vaskinn A, Ventura J, Andreassen OA, Melle I, Sundet K. A social path to functioning in schizophrenia: From social self-efficacy through negative symptoms to social functional capacity. *Psychiat Res*. 2015; 228(3):803-807. DOI: 10.1016/j.psychres.2015.05.019.

49. Mazor Y, Gelkopf M, Mueser KT, Roe D. Posttraumatic growth in psychosis. *Front Psychiatr*. 2016; 7:202. DOI: 10.3389/fpsyt.2016.00202.

50. Vauth R, Kleim B, Wirtz M, Corrigan PW. Self-efficacy and empowerment as outcomes of self-stigmatizing and coping in schizophrenia. *Psychiat Res.* 2007; 150(1):71-80. DOI: 10.1016/j.psychres.2006.07.005.

51. Zhou C, Li Z. Modelling of self-management in schizophrenia: The role of neurocognition, self-efficacy and motivation. *J Clin Nurs*. 2020; 29(21-22):3966-3976. DOI: 10.1111/jocn.15407.

52. Chang WC, Kwong VWY, Hui CLM, Chan SKW, Lee EHM, Chen EYH. Relationship of amotivation to neurocognition, self-efficacy and functioning in first-episode psychosis: A structural equation modeling approach. *Psychol Med.* 2017; 47(4):755-765. DOI: 10.1017/S0033291716003044.

53. Lee SJ, Lawrence R, Bryce S, Ponsford J, Tan EJ, Rossel SL. Emotional discomfort mediates the relationship between self-efficacy and subjective quality of life in people with schizophrenia. *J Ment Health*. 2019; 1-7. DOI: 10.1080/09638237.2019.1581355.

54. Chino B, Nemoto T, Fujii C, Mizuno M. Subjective assessments of the quality of life, well-being and self-efficacy in patients with schizophrenia. *Psychiat Clin Neuros*. 2009; 63(4): p. 521-528. DOI: 10.1111/j.1440-1819.2009.01995.x.

55. Strous RD, Ratner Y, Gibel A, Ponizovsky A, Ritsner M. Longitudinal assessment of coping abilities at exacerbation and stabilization in schizophrenia. *Compr Psychiat*. 2005; 46(3):167-175. DOI: 10.1016/j.comppsych.2004.07.035.

56. Fairchild AJ, MacKinnon DP. A general model for testing mediation and moderation effects. *Prev Sci*. 2009; 10(2): p. 87-99. DOI: 10.1007/s11121-008-0109-6.

57. Zhao X, Lynch Jr JG, Chen Q. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *J Consum Res*. 2010; 37(2): p. 197-206. DOI: 10.1086/651257.

58. MacKinnon DP, Pirlott AG. Statistical approaches for enhancing causal interpretation of the M to Y relation in mediation analysis. *Pers Soc Psychol Rev*. 2015; 19(1): p. 30-43. DOI: 10.1177/1088868314542878.

59. Lecomte T, Corbière M, Simard S, Leclerc C. Merging evidence-based psychosocial interventions in schizophrenia. *Behav Sci.* 2014; 4(4): p. 437-447. DOI: 10.3390/bs4040437.