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Depressive Symptoms Erode Self-Esteem in Severe Mental Illness: A Three-Wave, Cross-Lagged Study

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Vulnerability, scar, and reciprocal-relations models of depressive symptoms and self-esteem were compared among people with severe mental illness (SMI; $N = 260$) participating in a partnership-based intervention study. Assessments were conducted at baseline, midway through the intervention (after 4 months), and at termination (after 9 months). Cross-lagged, structural equation modeling analyses revealed that participants' baseline depressive symptoms predicted a decrease in self-esteem in the first 4 months but not in the subsequent 5 months of participation. Exploratory regression analyses indicated that improved social functioning buffered this deleterious effect of depressive symptoms. These findings, which are consistent with the scar model, highlight the fragile nature of the self and the importance of social functioning in recovery from SMI.

Of the numerous personality and self-concept dimensions that have been investigated in relation to depression, self-esteem appears to be the most extensively investigated dimension (see J. E. Roberts & Monroe, 1998, for a recent review). However, despite this extensive research effort, the exact nature of the relations between self-esteem and depression remains unclear. In particular, it is not clear whether self-esteem is a vulnerability factor that contributes to the development of depression or a consequence of individuals' experiences of depression. The purpose of the present study was to examine the relations between self-esteem and depression using a three-wave, cross-lagged, structural equation design.

The question concerning the relations between depressive symptoms and self-esteem can be located in a broader context of the comparison between vulnerability and scar models of personality and depression (Klein, Wonderlich, & Shea, 1997). Underlying vulnerability models is the assumption that personality and/or the self-concept are causative forces in depression. Namely, individuals' personality traits, or the structure of their self-concept, predispose them to experience depression, particularly in the face of life stress (e.g., Monroe & Simons, 1991; Robins, 1995). Conversely, the assumption underlying *scar models* is that the devastating consequences of depression include changes in personality and/or in the self-concept (Rhode, Lewinson, & Seeley, 1990).

In the context of research on self-esteem, both models are plausible. Individuals with low self-esteem are likely to be vulnerable in the face of stressors such as failures and/or rejections by significant others, and these stressors might precipitate depressive experiences in these individuals. Similarly, it makes sense that the experience of depression decreases individuals' self-esteem because depression is implicated in impaired functioning and negative attitudes toward the self and the world.

The empirical status of the relations between self-esteem and depressive symptoms is unclear. Some evidence exists in support of the vulnerability model. Thus, Lewinson, Hoberman, and Rosenbaum (1988) found that even after controlling for baseline depressive symptoms, low self-esteem predicted higher levels of depressive symptoms over a 9-month prospective interval. Similarly, G. W. Brown and his colleagues used an interview-based measure of self-esteem (G. W. Brown, Andrews, Bifulco, & Veiel, 1990; G. W. Brown, Bifulco, Andrews, & Bridge, 1986) and found that negative evaluation of the self predicted future onsets of depression even after controlling for its association with subclinical disorders, but this effect emerged only in the face of a major life event. In contrast, null findings as to the effect of self-esteem on depression also have been reported (Ingham, Kreitman, Miller, Sashidharan, & Hedeen, 1987; J. E. Roberts & Gotlib, 1997; J. E. Roberts & Kassel, 1997; for an extended review, see J. E. Roberts & Monroe, 1998).

Although not directly addressing the relationships between depressive symptoms and self-esteem, several studies conducted by Coyne and his colleagues (Coyne & Calarco, 1995; Coyne, Gallo, Klinkman, & Calarco, 1998) yielded results consistent with a scar model. Coyne and Calarco (1995) conducted focused group discussions with depressed psychiatric patients to learn the ways that depression had influenced their lives. These focused group discussions have led to the development of the Self-Appraisal Questionnaire (SAQ; Coyne & Calarco, 1995), which assesses the impact of depression on self-perception and coping. The content of some of the scales that make up the SAQ is highly consistent with the phenomenology of low self-esteem (i.e., fear of taking risks, concealment of symptoms, sense of being a burden on others, and sense of stigma). Coyne and Calarco (1995) administered the SAQ to 20 never-depressed women, 7 women who had recovered from a first episode of depression, and 10 women who had recovered from a recurrent episode. The never-depressed group scored significantly lower on almost all subscales of the SAQ, including those that are consistent with low self-esteem.

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In yet another investigation, Coyne et al. (1998) administered the SAQ to 48 depressed psychiatric patients, 60 depressed primary care patients, 38 primary care patients who were distressed (i.e., had elevated levels of depressive symptoms on the Center for Epidemiological Depression Scale [CES-D]; Radloff, 1997), but not clinically depressed, and 81 primary care patients who were neither distressed nor depressed. The nondistressed, nondepressed primary care patients scored lower than the other groups on almost all the of SAQ subscales. Importantly, scores of the distressed primary care patients in three subscales that are consistent with low self-esteem (i.e., Imposition of Limits, Management of Burden, and Sense of Stigma) were comparable to the clinically depressed primary care patients. This finding suggests that elevated levels of depressive symptoms might reduce self-esteem, even if they do not reach a level that meets criteria for major depressive disorder (MDD).

It is important to note that the vulnerability and scar models are not mutually exclusive, in that the relations between personality/self-concept and depression might be reciprocal. For instance, Shahar, Blatt, Zuroff, Kuperminc, and Leadbeater (in press) examined the relations between self-criticism and depressive symptoms during early adolescence. These investigators found that among young adolescent girls depressive symptoms and self-criticism predicted each other over time.

Methodological and statistical considerations are paramount in attempting to compare the vulnerability, scar, and reciprocal-relations models. Perhaps the most adequate design for this task is the cross-lagged design (Hays, Marshall, Wang, & Sherbourne, 1994; Marmor & Montemayor, 1977). The design comprises two or more variables assessed at two or more points in time. It yields three types of effects: *synchronous associations* (i.e., the association between the target variables at each point in time); *stability effects* (i.e., the prediction of a variable by its previous levels); and, most important, *cross-lagged effects*. These latter effects refer to the prediction of one or more variables by other variables that have been measured previously, controlling for the baseline level of the predicted variable (i.e., controlling for stability effects).

Traditionally, the above effects have been tested by means of various statistical procedures, including correlations and multiple regressions. However, the statistical procedure of choice for the examination of these effects appears to be structural equation modeling (SEM) with latent variables (Hoyle & Smith, 1994). In its most advanced form, SEM allows the examination of the relations between latent variables. The later variables are factors that denote hypothetical constructs (in our case, depressive symptoms and self-esteem). In SEM, these latent variables, or factors, are measured by means of multiple variables. The relations between the measured variables and their respective latent variables pertain to the measurement model component of SEM. The relations between the latent variables pertain to the structural model component of SEM (for an elaborated discussion, see Hoyle & Smith, 1994).

Hays et al. (1994) noted five advantages of using SEM in cross-lagged analyses (see also Bentler & Speckart, 1981; Kerwin, Howard, Maxwell, & Borowski, 1987). The first advantage is that, unlike multiple regression models, SEM allows simultaneous assessment of multiple dependent variables in a single model. The second advantage is that SEM enables the examination of both direct and indirect effects of one variable (e.g., depressive symptoms) on another (e.g., self-esteem). The third advantage is that SEM allows treatment of a given construct (e.g., depressive symptoms) as both an independent and a dependent variable. The forth advantage is that of examining relations between latent rather than manifest variables. Because latent variables, as factors, are measured without random error, the estimation of the relationships between them is "disattenuated" (Nunnally, 1978) and pertains to a more accurate description of the relations between the target theoretical constructs. Finally, the fifth advantage of SEM is that it yields indices of the overall fit hypothesized models to data. Applied to the present study, SEM enables the translation of the vulnerability, scar, and reciprocal relations theoretical models into statistical models. Each of these statistical models yields indices describing its fit to the empirical data. Models with better fit are considered theoretically superior.

In this study, we used SEM and the cross-lagged design to examine the relation between self-esteem and depression. Specifically, we tested the vulnerability, scar, and reciprocal relations models using data collected from a sample of people with severe mental illness (SMI, Bond & Resnick, 2000). SMI is a socially driven category that was born out of the community mental health movement and the field of psychiatric rehabilitation. The category encompasses a wide range of chronic and disabling psychiatric diagnoses (e.g., schizophrenia spectrum disorders; bipolar disorder; psychotic major depression; and severe, highly debilitating anxiety and personality disorders). People with SMI represent a particularly well-suited sample for the examination of the vulnerability, scar, and reciprocal relations models, because both depressive symptoms and self-esteem were found to play an important role in the recovery and daily adaptation of these individuals. For instance, reduced self-esteem was found to be a risk factor for the development of first-onset psychosis (Krabbendam et al., 2002), and elevated self-esteem was demonstrated to be a marker of good adaptation and quality of life among patients with SMI (Bradshaw & Brekke, 1999; Davidson & Strauss, 1992; Dongen, 1998; Hansson et al., 1999; Lecomte et al., 1999; Torrey, Mueser, McHugo, & Drake, 2000). Similarly, people with psychosis have been shown to report elevated levels of depressive symptoms (Birchwood, Iqbal, Chadwick, & Trower, 2000) or demoralization (Davidson, Stayner, Lambert, Smith, & Sledge, 1997), possibly because of the social and personal losses precipitated by their illness (Iqball, Birchwood, Chadwick, & Trower, 2000).

The larger study from which these data are drawn has been described in detail elsewhere, and readers interested in these details may refer to previous reports (Davidson et al., 2001; Davidson, Shahar, & Chinman, 2002). For present purposes, it is only important to describe the overall study design and to report three main findings. Participants were engaged in a randomized community trial comprising three active conditions. In the first condition, participants received a monthly stipend to be spent on social and recreational activities (i.e., a stipend condition). In the second condition, in addition to receiving the same stipend, participants were matched with a volunteer partner, a person who also had SMI, who would join with them in participating in social and recreational activities (i.e., a consumer-partner condition). In the third condition, participants were given the stipend and were matched with a volunteer partner who did not have SMI (i.e., a nonconsumer-partner condition) for the same purpose of joining with them in participating in social and recreational activities.

Each intervention lasted for 9 months. Participants were assessed at baseline, midway through the study (i.e., after 4 months), and at the end of the study period. Major findings included the following: (a) the three conditions were equally effective in improving participants' social functioning and self-esteem, (b) this improvement took place mainly in the last 5 months of participation (i.e., in the period between Time 2 and Time 3), and (c) no change was found over time with respect to depressive symptoms (Davidson et al., 2002).

In this investigation, we focused on two measures of depressive symptoms and self-esteem that were included in the study protocol: the CES-D and the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). We constructed several indicators based on data from each instrument so as to measure self-esteem and depressive symptoms as latent variables in the context of SEM analyses (Hoyle & Smith, 1994).

The conceptual model underlying the present investigation is presented in Figure 1. This figure includes three types of lines that represent the three types of effects embodied in the cross-lagged design. Dotted lines represent synchronous associations, solid/thin lines represent stability effects, and solid/thick lines represent cross-lagged effects. Note that stability and cross-lagged effects are estimated not only in the periods between Times 1 and 2 and Times 2 and 3 but also in the period encompassing Times 1 and 3. This practice, enabled by our use of a three-wave design, allowed us to examine changes in cross-lagged relations as a function of time (see G. K. Brown, 1990, for a similar practice). The following three hypotheses were tested:

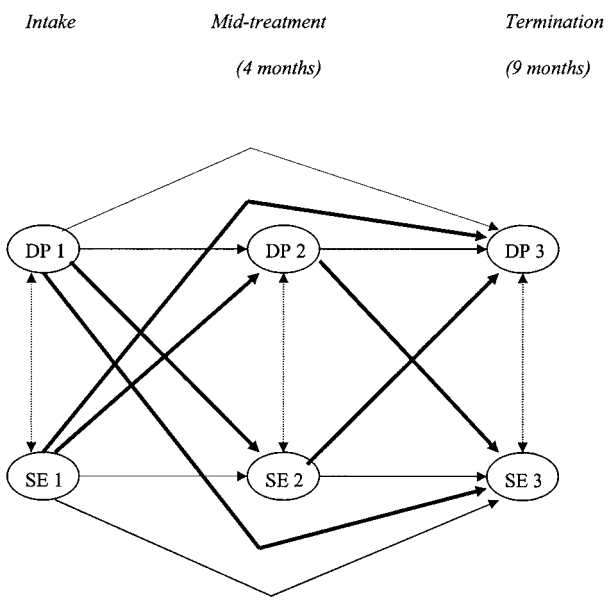

Figure 1. Conceptual model of the structural equation modeling analyses used to examine the vulnerability, scar, and reciprocal-relations theoretical models. Solid/thick lines represent cross-lagged effects, dotted lines represent synchronous associations, and solid/thin lines represent stability effects. Synchronous effects at Times 2 and 3 are estimated by correlations between the disturbances of depressive symptoms and self-esteem at Times 2 and 3. DP = Center for Epidemiological Depression Scale depressive symptoms; SE = Rosenberg Self-Esteem Scale self-esteem.

Hypothesis 1: Consistent with the vulnerability model, we expected earlier levels of self-esteem to predict subsequent levels of depressive symptoms, controlling for earlier levels of depressive symptoms.

Hypothesis 2: Consistent with the scar model, we expected earlier levels of depressive symptoms to predict subsequent levels of self-esteem, controlling for earlier levels of self-esteem.

Hypothesis 3: Consistent with the reciprocal-relations model, we expected both depressive symptoms and self-esteem to predict each other over time.

Method

Participants and Procedure

Participants were 260 low-income adults (57% men and 43% women) with SMI. Patients were assessed prior to the study in order to determine current diagnosis using the Structured Clinical Interview for *DSM–III–R* (SCID; Spitzer, Williams, Gibbons, & First, 1989). Fifty percent of the participants had a diagnosis of schizophrenia spectrum disorder (schizophrenia, schizoaffective disorder), 34% had a diagnosis of severe mood disorder (bipolar disorder or psychotic unipolar depression), and 16% had another Axis I diagnosis (e.g., anxiety disorder, eating disorder). Forty-four percent of the patients also had a co-occurring substance use disorder. Nineteen percent of the patients had been previously hospitalized in an inpatient psychiatric unit.

All participants were receiving outpatient services from local community mental health centers and were judged by their clinicians to have a moderate to severe level of social and vocational impairment. This judgment was consistent with the sample's average of 47.54 on the Global Assessment of Functioning scale of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994). Eighty-two percent of the participants were Caucasian, 11% were of African origin, and 2% were of Hispanic origin. Participants' ages ranged from 20 years to 78 years (M = 42.24, Mdn = 40.00, SD = 10.85).

Potentially eligible clients of community mental health centers across Connecticut were informed about the study by their primary clinician/case manager and were invited to meet with study staff to learn more about the study. Interested clients then met with staff to learn about the study, its risks and potential benefits, the design feature of randomization, and the requirements of participation. They were screened for eligibility, had any questions answered, and were invited to provide informed consent. Following consent and administration of the baseline assessment, participants were randomly assigned to one of the three conditions described previously. Follow-up assessments were conducted after 4 months of participation and again at 9 months, the end of the treatment period. Participants received $20 on completion of each of the three assessments.

Of the 260 clients who began the study, 59 dropped out. This represents 23% attrition (see attrition analysis below). We handled missing data using full information maximum likelihood (FIML) estimates (T. W. Anderson, 1957) that were enabled by the AMOS 4.01 program (Arbuckle, 1999). In comparison with other methods such as listwise deletion, pairwise deletion, and means imputation, the FIML method was found to produce the least bias estimates of missing values (cf. Arbuckle & Wothke, 1999; Muthén, Kaplan, & Hollis, 1987).

Instruments

Our two principal instruments were the RSES and the CES-D. The RSES is perhaps the most commonly used self-report measure of self-esteem. It is a 10-item, 4-point Likert-scale instrument yielding a global self-esteem

score. Five items are negatively worded (e.g., "All in all, I am inclined to feel that I am a failure"), whereas the remaining 5 items are positively worded (e.g., "On the whole, I am satisfied with myself"). Adequate reliability and validity of the RSES have been demonstrated in previous studies (Rosenberg, 1965; Corwyn, 2000), including studies conducted on samples similar to the present study (cf. Unger, Anthony, Sciarappa, & Rogers, 1991). In the present study, the internal consistency of the RSES, as measured by the alpha coefficient, was .85, .87, and .86 for Times 1, 2, and 3, respectively.

To construct manifest indicators of a latent self-esteem factor, we followed recommendations stipulated by Little, Russell, Widaman, and their colleagues (Kishton & Widaman, 1994; Little, Cunnigham, Shahar, & Widaman, 2002; Russell, Kahn, Spoth, & Altmaier, 1998). Namely, we randomly selected items and averaged them into three parcels of 3, 3, and 4 items, respectively. We also examined a host of other combinations of parcels, all of which yielded identical results.

The CES-D is a commonly used measure of depressive symptoms. Respondents are requested to rate the extent to which they experienced 20 symptoms over the past 2 weeks (e.g., "I am sad"). Items are scored on a 4-point scale, ranging from 0 (*rarely or none of the time, less than a day*) to 3 (*most or all the time, 5–7 days*). Participants' scores are computed as the sum of their responses to the items. The reliability and validity of the CES-D are well researched and have been repeatedly demonstrated (e.g., Radloff, 1977). In the present study, the internal consistency of this scale was .88, .89, and .88 for Times 1, 2, and 3, respectively.

Because several clinical cutoffs were reported with respect to the CES-D (Radloff, 1997; Turk & Okifuji, 1994), we were interested in examining how our sample fared with respect to these norms. The mean levels of CES-D scores in our sample exceeded all these norms (*M*s = 24.77, 24.33, and 25.31; for Times 1, 2, and 3, respectively). Moreover, a large proportion of the sample (62%, 65%, and 71%; for Times 1, 2, and 3, respectively) scored higher than 19, which to the best of our knowledge is the most conservative cutoff score used thus far (Turk & Okifuji, 1994). These findings strongly suggest that our sample exhibited elevated and clinically significant levels of depressive symptoms.

Extensive psychometric investigation of the CES-D revealed that this instrument comprises four factors representing depressed mood (DPRS), lack of positive mood (POS), vegetative-somatic complaints (VEG), and depression-related interpersonal problems (INT; see G. K. Brown, 1990; Radloff, 1977; Sheehan, Fifield, Reisine, & Tennen, 1995). In the present study, we averaged items comprising these factors and used these averages as manifest indicators of a latent factor of depressive symptoms. Because item 4 ("I felt that I was just as good as other people") and item 9 ("I thought my life had been a failure") overlapped in content with the RSES, we did not use these items in constructing the above-mentioned indicators.

In addition to these two measures, we also report exploratory analyses involving the Social Functioning Scale (SFS; Birchwood, Smith, Cochrane, Wetton, & Copestake, 1990). The SFS is a 51-item, 5-point Likert scale self-report questionnaire that assesses participants' engagement in social activities in the past 3 months (e.g., "I visited relatives in their homes"). Later, we describe the context under which scores of these scales were used.

Results

Analytic Approach

Our SEM analyses were conducted using the AMOS 4.01 program, on the basis of the maximum likelihood estimation procedure. The following indices were selected to evaluate model fit: Bentler–Bonett's nonnormed fit index (Bentler & Bonett, 1980; values higher than .90 represent acceptable model fit), comparative fit index (Bentler, 1990; values higher than .90 represent acceptable model fit), and root-mean-square error of approximation (Steiger, 1980; values of .08 and lower represent acceptable model fit). The commonly used chi-square index was not consulted because of its extreme sensitivity to sample sizes. However, in comparing competing models, we conducted a nested-model comparison based on the chi-square difference test (CSDT; G. K. Brown, 1990). Namely, the chi-square values of two competing and nested models were estimated, and the model with the statistically significant lower chi-square values was deemed superior. When a nonsignificant chi-square difference was found, the model with more degrees of freedom (i.e., the more parsimonious model) was deemed superior (Bentler & Mooijaart, 1989).

As described earlier, we measured depressive symptoms and self-esteem as multi-indicator latent factors. The DPRS, POS, VEG, and INT subscales of the CES-D served as manifest indicators of the depressive symptoms latent factors, whereas the three parcels derived from the RSES served as manifest indicators of the self-esteem latent factors. Latent factors of depressive symptoms and self-esteem were constructed for Times 1, 2, and 3.

The SEM analyses were conducted in four stages. First, in adherence to the two-step approach (J. C. Anderson & Gerbing, 1988), we examined the measurement model of the variables. The model is tested with a confirmatory factor analysis (CFA) that estimates the loadings of the manifest indicators on their respective latent variables. Statistically significant loadings, as well as an acceptable model fit, are required to establish the measurement model. In turn, the establishment of the measurement model serves as prerequisite for testing the structural relations between the latent variables (J. C. Anderson & Gerbing, 1988; Hays et al., 1994).

In the course of establishing the measurement model, three CFA models were compared. The first was labeled a *null model* and specifies no relations between the variables (i.e., these relations were fixed at zero). This model is used as a baseline model to estimate the progress obtained in terms of model fit when other models are tested. The second model was labeled a *time-invariant model*, in which the loading of the manifest indicators on their respective latent variables were constrained to equality across time. For instance, Time 1 loadings of DPRS, POS, VEG, and INT on the depressive symptoms factor at Time 1 were constrained to be equal to the equivalent loadings at Times 2 and 3. This time-invariant model ensures that the measurement of the latent factors is comparable over time, which facilitates interpretability of the results obtained (Hays et al., 1994; Hoyle & Smith, 1994). The third model was labeled a *saturated model*, in which the equality constraints placed on loadings were relaxed.

Estimating the fit of these three models, we expected that (a) both the time-invariant and saturated models would fit the data better than the null model and (b) the fit of the time-invariant and saturated models would be comparable, which would justify the equality constraints placed on the loadings of the indicators on their respective latent factors over time.

We then proceeded with SEM analyses to estimate the relations between depressive symptoms and self-esteem. The SEM models included synchronous, stability, and cross-lagged effects. Five SEMs were compared. The first was a null model, in which the cross-lagged effects were fixed at zero. Although this model is to be distinguished from the null model estimated in the previous stage, it served a similar function of a baseline model. The second model was a saturated model, in which the cross-lagged effects were freely estimated. The third model was labeled *vulnerability*,

because in this model, the cross-lagged effects of depressive symptoms on self-esteem were fixed at zero, whereas the cross-lagged effects of self-esteem on depressive symptoms were freely estimated. The forth model was labeled *scar*. In this model the cross-lagged effects of self-esteem on depressive symptoms were fixed at zero, whereas the cross-lagged effects of depressive symptoms on self-esteem were freely estimated. The fifth and last model was a *most parsimonious model* that included only the statistically significant relations between the latent variable (Bentler & Mooijaart, 1989).

We expected the saturated, vulnerability, and scar models to fit the data better than the null model. A pattern consistent with the theoretical vulnerability model (see Hypothesis 1) is one in which the fit of the SEM vulnerability model is better than the null model (because the cross-lagged effects of self-esteem on depressive symptoms are statistically significant and hence improve model fit). At the same time, the fit of the vulnerability model should be comparable to that of the saturated model (because the cross-lagged effects of depressive symptoms and self-esteem should be nonsignificant and, hence, should not improve model fit). A pattern consistent with the scar model (see Hypothesis 2) is that in which the fit of the SEM scar model is better than the fit of the null model but is comparable to the fit of the saturated model. Finally, a pattern consistent with the reciprocal-relations model (see Hypothesis 3) is that in which the fit of the saturated model is better than the fit of both the vulnerability and scar models.

Results of the CFA

In Table 1 we present the loadings of the manifest indicators on their respective latent factors, and in Table 2 we present the correlations between the latent factors. These loadings and correlations were highly statistically significant ($p < .001$).

In Table 3 we present summary statistics for the three CFA models. As expected, the fit of both the time-invariant and saturated models was significantly better than the fit of the null model, CSDT (null vs. time-invariant model) = 12,241.28, $df = 66$, $p < .001$; CSDT (null vs. saturated model) = 12,250.36, $df = 76$, $p < .001$. Also as expected, the fit of the time-invariant model was comparable to that of the saturated model (CSDT = 9.08, $df = 10$, $p = .52$). Accordingly, we selected the more parsimonious time-invariant model as the final measurement model.

Results of the SEM Analyses

In Table 4 we present summary statistics for the SEM models. Although all the SEM models demonstrated an acceptable fit to the data, the pattern of results was mainly consistent with the scar model. Specifically, the fit of the scar model was comparable to the fit of the saturated model (CSDT = .33, $df = 3$, $p = .95$). This suggests that our fixing to zero the cross-lagged effects of self-esteem on depressive symptoms was a plausible practice, because it did not reduce model fit. Moreover, the fit of the scar model tended to be better than the fit of the null model (CSDT = 7.89, $df = 3$, $p = .06$). This suggests that our fixing to zero the cross-lagged effects of depressive symptoms on self-esteem was an implausible practice, because it tended to reduce model fit. In contrast, the fit of the vulnerability model tended to be worse than the fit of the saturated model (CSDT = 6.81, $df = 3$, $p = .08$), suggesting that fixing to zero only the cross-lagged effects of depressive symptoms on self-esteem was implausible, because it tended to reduce model fit. Similarly, the fit of the vulnerability model was comparable to the fit of the null model (CSDT = .91, $df = 3$, $p = .82$), suggesting that fixing to zero only the cross-lagged effects of self-esteem on depressive symptoms was plausible, because it did not reduce model fit.

The saturated model allowed us to directly examine the statistically significant parameters that were obtained. We found that the only statistically significant cross-lagged effect that was obtained led Time 1 depressive symptoms to Time 2 self-esteem ($\beta = -.20$, $p < .05$; elevated levels of depressive symptoms at Time 1 predicted a decrease in self-esteem in the period between Time 1 and Time 2). Indeed, fixing to zero only this parameter significantly reduced the fit of the saturated model (CSDT = 5.39, $df = 1$, $p = .02$).

Of secondary importance, but nonetheless interesting, were the synchronous and stability effects. A strong synchronous association between depressive symptoms and self-esteem was found at Time 1 ($r = -.69$, $p < .001$; see also Table 1). The synchronous association in subsequent waves, which were estimated by the correlation between the "disturbances" depressive symptoms and self-esteem, were modest, statistically significant ($r = -.36$, $p < .001$; $r = -.22$, $p < .05$; for Times 1 and 2, respectively), and comparable in magnitude (CSDT = 0.10, $df = 1$, $p = .75$). This pattern implies that even after partialling out previous levels of depressive symptoms and self-esteem, the two variables still co-

Table 1
Loadings of the Manifest Indicators on Their Respective Latent Factors

Factor	DP 1	DP 2	DP 3	SE 1	SE 2	SE 3
DPRS 1	.87					
POS 1	.51					
VEG 1	.77					
INT 1	.89					
DPRS 2		.90				
POS 2		.43				
VEG 2		.80				
INT 2		.73				
DPRS 3			.97			
POS 3			.46			
VEG 3			.86			
INT 3			.84			
RSES 1 Time 1				.77		
RSES 2 Time 1				.89		
RSES 3 Time 1				.88		
RSES 1 Time 2					.76	
RSES 2 Time 2					.87	
RSES 3 Time 2					.89	
RSES 1 Time 3						.80
RSES 2 Time 3						.86
RSES 3 Time 3						.83

Note. DP = Center for Epidemiological Depression Scale depressive symptoms; SE = Rosenberg Self-Esteem Scale self esteem. Depressed mood (DPRS), lack of positive mood (POS), vegetative–somatic complaints (VEG), and depression-related interpersonal problems (INT) are the four Center for Epidemiological Depression Scale indicators. Rosenberg Self-Esteem Scale (RSES) 1, 2, and 3 are the three RSES parcels. All loadings are statistically significant at $p < .001$.

Table 2
Correlations Between the Latent Variables

Variable	DP 1	DP 2	DP 3	SE 1	SE 2	SE 3
DP 1	—					
DP 2	.70	—				
DP 3	.36	.48	—			
SE 1	−.69	−.48	−.26	—		
SE 2	−.63	−.61	−.29	.76	—	
SE 3	−.63	−.48	−.36	.77	.77	—

Note. DP = Center for Epidemiological Depression Scale depressive symptoms; SE = Rosenberg Self-Esteem Scale self-esteem. All correlations are statistically significant at $p < .001$.

vary, although the reasons for this covariation could not be determined using the present data.

The stability effects were all highly significant ($p < .001$), with the exception of the stability effect leading from Time 1 depressive symptoms to Time 3 depressive symptoms ($\beta = .00$, *ns*). Although the Time 1–Time 2 stability effect of depressive symptoms was stronger than the Time 2–Time 3 stability effect ($r = .68$ vs. $r = .48$), this difference was nonsignificant (CSDT = 0.14, $df = 1$, $p = .70$). For self-esteem, the Time 1–Time 2 stability effect ($r = .63$) tended to be stronger than the Time 2–Time 3 stability effect ($r = .44$, CSDT = 3.07, $df = 1$, $p = .08$), and was significantly stronger than the Time 1–Time 3 stability effect ($r = .37$, CSDT = 4.43, $df = 1$, $p < .05$). This pattern suggests that, in general, self-esteem evinced greater individual-differences stability over time than depressive symptoms. This would be expected given the conceptualization of self-esteem as a trait and of depressive symptoms as a clinical state.

Following Bentler and Mooijaart (1989), we arrived at the most parsimonious model by systematically omitting nonsignificant parameters (see also Hays et al., 1994). Such omission did not reduce model fit (CSDT = 1.99, $df = 6$, $p = .92$; see Table 3). Standardized path coefficients of this final, most parsimonious model are presented in Figure 2.

Exploratory Regression Analyses

We were intrigued by the pattern presented in Figure 2, whereby the deleterious effect of depressive symptoms on self-esteem emerged during the first 4 months but disappeared during the subsequent 5 months. In attempting to understand this pattern, we were reminded that in previous analyses (Davidson et al., 2002), we found that participants' improvement took place primarily in the period between 4 and 9 months, the very same period in which the deleterious effect of depressive symptoms on self-esteem disappeared. We surmised that the disappearance of this deleterious effect represents yet further evidence of participants' improvement.

If this was indeed the case, then individual differences in improvement should moderate the relations between depressive symptoms and self-esteem. Specifically, the deleterious effect of depressive symptoms on self-esteem should be manifested predominantly in those people who did not improve. We tested this prediction using two regression analyses, as described later.

First, we operationalized improvement in terms of increase in social functioning as assessed by the SFS. We selected this variable because of the nature of the three interventions, which were

Table 3
Summary Statistics of the Confirmatory Factor Analysis Models

Model	$\chi^2(260)$	*df*	NNFI	CFI	RMSEA
Null	12573.87***	231	.00	.00	.45
Time-invariant	332.59***	165	.98	.99	.06
Saturated	323.51***	155	.98	.99	.07

Note. NNFI = nonnormed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.
*** $p < .001$.

Table 4
Summary Statistics of the Structural Equation Modeling Models

Model	$\chi^2(260)$	*df*	NNFI	CFI	RMSEA
Saturated	332.48***	164	.98	.99	.06
Vulnerability	339.29***	167	.98	.99	.06
Scar	332.81***	167	.98	.99	.06
Null	340.20***	170	.98	.99	.06
Parsimonious	334.47***	170	.98	.99	.06

Note. NNFI = nonnormed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation.
*** $p < .001$.

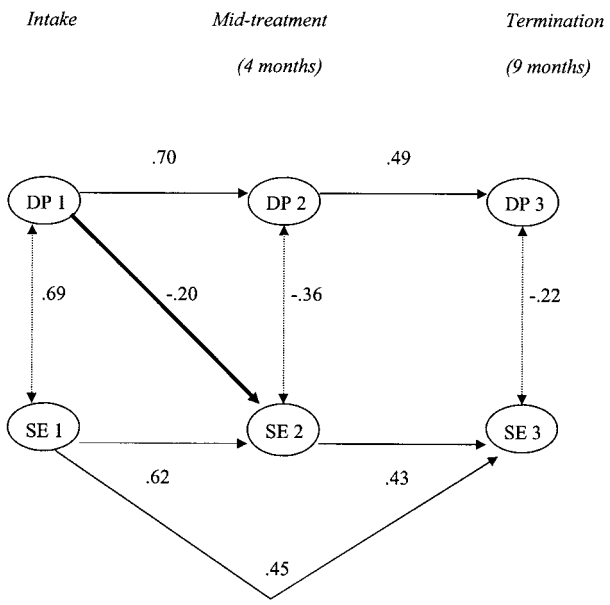

Figure 2. Statistically significant ($p < .05$) standardized parameters of the relations between the latent variables in the final and most parsimonious structural model are presented. Solid/thick lines represent cross-lagged effects, dotted lines represent synchronous associations, and solid/thin lines represent stability effects. Synchronious effects at Times 2 and 3 are estimated by correlations between the disturbances of depressive symptoms and self-esteem at Times 2 and 3. The cross-lagged effect of depressive symptoms at intake on midtreatment self-esteem is highlighted. DP = Center for Epidemiological Depression Scale depressive symptoms; SE = Rosenberg Self-Esteem Scale self-esteem.

aimed primarily at improving social functioning. We measured improvement in social functioning from baseline to midstudy and from midstudy to the end of the study period using residual change scores. Thus, midstudy SFS scores were regressed onto baseline SFS scores, with residual scores (i.e., scores of midstudy SFS that are unrelated to baseline SFS) representing change or improvement. Positive scores represented an increase in social functioning, whereas negative scores represented a decrease in social functioning. A similar procedure was performed with midstudy and end of study levels of SFS.

Next, we used these two residual change scores in two regression analyses that conformed to the following equation:

$$Y\ (RSES_3) = \beta 1\ (RSES_2) + \beta 2\ (CESD_2) + \beta 3\ (IMPSFS) + \beta 4\ (CESD_2 \times IMPSFS) + Error$$

Where $RSES_3$ is end of study self-esteem, $RSES_2$ is midstudy self-esteem, $CESD_2$ is midstudy depressive symptoms, IMPSFS is the residual change scores of SFS (either to the change from baseline to midway or to the change from midway to end of study period), and $CESD_2 \times$ IMPSFS is a multiplicative interaction term representing the interaction between midstudy depressive symptoms and improvement in social functioning. If improvement moderated the relation between depressive symptoms and self-esteem, then the coefficient of this multiplicative term should be statistically significant.

Results of the regression analyses largely conformed to our expectations. Improvement in social functioning during the first 4 months interacted with midstudy depressive symptoms to predict self-esteem changes in last 5 months of the study period ($\beta = .12$, $p < .01$). Similarly, improvement in social functioning during the last 5 months of the study period tended to interact with midstudy depressive symptoms in predicting self-esteem changes in the last 5 months of participation ($\beta = .09$, $p = .08$).

We plotted these interactions using the recommendations of Aiken and West (1991), and we present them in Figures 3 and 4. The interaction presented in Figure 3 pertains to improvement occurring during the first 4 months of the intervention, whereas the interaction presented in Figure 4 pertains to improvement occurring during the subsequent 5 months. As shown in these figures, the pattern of these interactions was consistent with our expectations. Under high level of improvement (i.e., 1 *SD* above the mean of the two residual change scores), we found no relation between midstudy depressive symptoms and self-esteem at the end of the study period. Conversely, under low level of improvement (i.e., 1 *SD* below the mean), the relationship between midstudy depressive symptoms and end of study self-esteem was negative: Elevated depressive symptoms predicted a decrease in self-esteem over time.

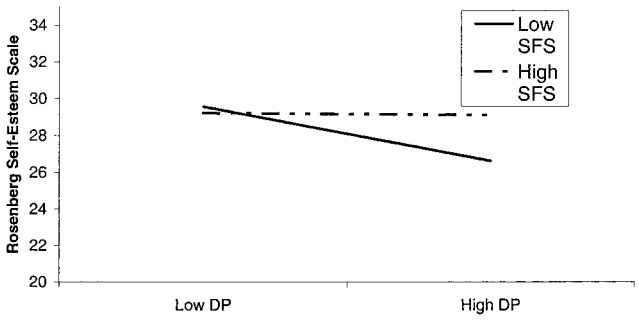

Figure 3. Termination level of self-esteem as a function of the interaction between midtreatment depressive symptoms and improvement of social functioning during the period encompassing intake and midtreatment. SFS = improvement in the Social Functioning Scale; DP = depressive symptoms.

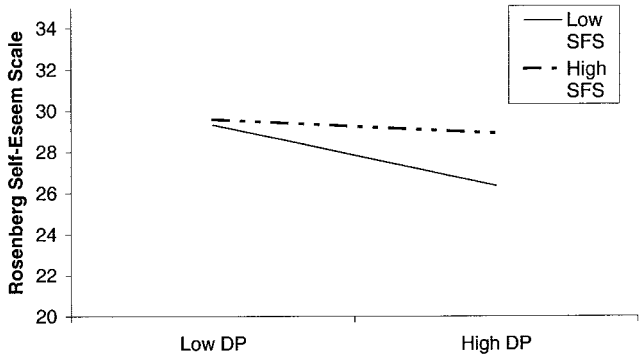

Figure 4. Termination level of self-esteem as a function of the interaction between midtreatment depressive symptoms and improvement of social functioning during the period encompassing midtreatment and termination. SFS = improvement in the Social Functioning Scale; DP = depressive symptoms.

Multigroup Analyses

We explored the possibility that the findings reported earlier change as a function of participants' gender, primary diagnosis (i.e., schizophrenia-spectrum disorder vs. other Axis I diagnoses), employment (i.e., employed vs. unemployed), or condition (stipend vs. nonpatient partner vs. patient partner). To that effect, we conducted three multigroup analyses, in which the model presented in Figure 2 was tested simultaneously across the various groups, and nested-model comparisons were conducted. In all of these analyses, the CSDT yielded nonsignificant values, suggesting that the results do not change as a function of participants' gender, primary diagnosis, employment, or study condition.

Attrition Analysis

The 59 participants who had data at the first wave but who dropped out afterward were compared with the 201 participants who had complete data. Independent *t* tests were conducted on a host of variables, including participants' age, depressive symptoms (as measured by the CES-D), self-esteem (RSES), interview-based psychiatric symptoms (as measured by the Brief Psychiatric Rating Scale; Overall & Graham, 1962), subjective well being (Ryff, 1989), social functioning (as measured by the SFS), and the *DSM–IV* based Global Assessment of Functioning (American Psychiatric Association, 1994). In all of these comparisons, the differences between the two groups were highly nonsignificant ($p > .50$). We then conducted cross-tabulation analyses to examine the relations between attrition status and a host of demographic variables (gender, ethnicity, marital status, employment, education,

having children, and primary diagnosis). No statistically significant relations were found.

We did, however, find a statistically significant relation between attrition status and study condition, $\chi^2(2, N = 260) = 12.35$, $p < .01$. Of the 59 participants who dropped out, only 6 were assigned to the stipend condition (10.17%), whereas 23 were assigned to the nonconsumer partner condition (39.98%), and 30 were assigned to the consumer partner condition (50.85%). Nevertheless, because study condition did not moderate the earlier described findings, this relation between attrition status and study condition appears negligible in the context of the present study.

Discussion

In a sample of people with SMI with moderate to severe social impairment who participated in a psychosocial rehabilitative intervention, we obtained findings consistent with the theoretical scar model, but not with the theoretical vulnerability or reciprocal-relations models. Namely, we found that participants' elevated levels of depressive symptoms at baseline predicted a decrease in their self-esteem over time. This effect was present during the first 4 months of study participation, but disappeared during the 5-month period from midway to end of the study period. Exploratory regression analyses suggested that improvement in social functioning moderated, or buffered, the deleterious effect of depressive symptoms on self-esteem. Namely, this deleterious effect was manifested predominantly among participants who showed little improvement in social functioning. These findings have relevance for the conceptual relations between depression and self-esteem as well as for understanding of adaptation in SMI and the evaluation of improvement in the course of psychotherapeutic and psychosocial interventions. We discuss these issues in turn and conclude with noting the study's limitations.

Implications for the Relations Between Depression and Self-Esteem

Several features of our study design facilitated an accurate estimation of the relations between depressive symptoms and self-esteem. The measurement of both variables at several assessment points enabled us to pit several theoretical models against each other (i.e., the vulnerability, scar, and reciprocal-relations models). The use of latent variables and SEM limited the possibility that null effects stemmed from a reduced reliability (Hays et al., 1994). Finally, the use of three waves of measurements instead of the commonly used two-wave cross-lagged design enabled the identification of changes in the longitudinal relations between the variables as a function of time. This, in turn, paved the way to exploratory regression analyses that suggested that improvement during the intervention moderated, or buffered, the effect of depressive symptoms on self-esteem.

Our findings are consistent with the relatively few studies showing that either clinical depression or elevated levels of depressive symptoms increase individuals' negative evaluation of self (Coyne & Calarco, 1995; Coyne et al., 1998) as well as individuals' negative appraisal of their of personal goals (Salmela-Aro & Nurmi, 1996). On a broader level, these findings are consistent with the call issued by Wachtel and colleagues (Wachtel, 1994; Wachtel & Gold, 1993) to begin treating individuals' self-concept as a dependent variable. Such practice is relatively rare in personality and psychopathology research, perhaps because of the common perception that personality is a stable psychological phenomenon. The complex and controversial issue of personality stability (cf. Mischel & Shoda, 1995) lies outside the scope of this article. However, a distinction made by Santor, Bagby, and Joffe (1997) between relative and absolute stability should accommodate the various perspectives on this issue. Of particular relevance to the present study is the notion of relative stability, which reflects the stability of individual differences on a certain personality trait. As shown by Santor et al. (1997), even when relative stability is high and relative change (i.e., instability) is low, small relative changes can still be predicted by depressive symptoms (see also Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1998).

Another implication of our findings pertains to the synchronous associations obtained between self-esteem and depressive symptoms. The two variables correlated significantly at all waves of measurement, although the correlation at Time 1 ($r = .69$) was considerably higher than the correlations at Times 2 and 3 ($rs = .36$ and $-.22$). Moreover, even the relatively strong correlation at Time 1 indicated that more than 50% of the variance of both variables is unshared. This pattern suggests that at least among people with SMI, self-esteem and depression function as distinct psychological constructs. At the same time, the relatively strong correlation at Time 1 and the consistent correlations at Times 1 and 2 also suggest that these two distinct constructs belong to a single, overarching psychological phenomenon, such as negative affect (Clark & Watson, 1991), fatalism (R. Roberts, Roberts, & Chen, 2000), or demoralization (Davidson et al., 1997).

Adaptation in SMI

Recently, there has been a growing interest in self-esteem among patients with SMI (Blankertz, 2001; Bradshaw & Brekke, 1999; Dongen, 1998; Torrey et al., 2000). Consistent with early models of self-esteem (Rosenberg, 1965), various authors have construed self-esteem in people with SMI as traitlike (cf. Hansson et al., 1999; Torrey et al., 2000). However, other authors have noted that among patients with SMI, particularly those with psychotic conditions, the self-experience is fragile. Indeed, attainment of an articulated, differentiated, stable, and essentially positive sense of self is one of the major challenges facing patients with SMI (Auerbach & Blatt, 1997; Blatt & Auerbach, 2001; Blatt, Stayner, Auerbach, & Behrends, 1995; Lysaker & Lysaker, 2001). Accordingly, other studies have demonstrated that in SMI, self-esteem changes as a function of hospitalization (Townsend & Rakfeldt, 1985) and perceived stigma (Blankertz, 2001). The present study provides additional support for the depiction of the self as fragile and unstable in SMI by elucidating yet an additional factor that precipitates changes in self-esteem: the presence of elevated levels of depressive symptoms.

Our findings encourage further studies of the role of elevated levels of depressive symptoms or psychological distress in SMI. As demonstrated in previous research, patients with SMI report high frequency of clinical depression (Birchwood et al., 2000), as well as elevated distress (Davidson et al., 2001). Both conditions impede these patients' recovery (Davidson et al., 2001) and increase their risk for suicidal behavior (Siris, 2001). Possibly, patients' low self-esteem serves as the mediator or mechanism for

this deleterious effect of depression in SMI. Namely, depressive symptoms act as demoralizing forces, diminishing patients' belief in their ability to overcome their debilitating condition, even when offered the appropriate pharmacological and psychosocial treatment. It therefore follows that any treatment regime of SMI should address this demoralizing effect of depressive symptoms.

The moderating or buffering role of social functioning in the effect of depressive symptoms on self-esteem is highly consistent with the suggestion that improvement in social functioning plays a key role in successful adaptation to SMI (Birchwood et al., 1990). Interestingly, the SFS, which was used here to assess improvement in social functioning, comprises items that emphasize the active role of individuals in their social exchanges. That active involvement in social exchanges that was found here to serve as a protective factor is consistent with emerging action theory conceptualizations that depict individuals as actively shaping the very contextual conditions that influence their well-being (Shahar, 2001).

Qualitative accounts of people with SMI attest to the importance of actively engaging in social exchanges and provide some clues as to the protective mechanisms of such engagement (Davidson et al., 1997, 2001; Davidson & Strauss, 1992). As one participant stated simply: "The more you get out the better you feel" (Davidson et al., 2001, p. 284). As evident by another participant, the effort of engaging in social relations is worthwhile because it short-circuits depressive vicious cycles and facilitates a positive sense of self:

> Sometimes all you need is a little help and a little encouragement to get you through. Another person could do that, but when you're by yourself it's very hard to say 'I'm an okay person' . . . It's easier to say 'I'm no good, I'm not important, I'm evil, I'm bad, I don't deserve anything.' And that's not good, because then that breaks down your self-esteem and all the good things inside you. (Davidson et al., 2001, p. 280)

Identification of Improvement in the Course of Psychosocial Interventions

A methodological implication of our findings is that the evaluation of the efficacy of psychosocial randomized clinical trials should not focus only on mean-level changes of target variables but also on changes in relations between variables (see Blatt and Ford, 1994, for an illustration of this type of change). Thus, it seems that the psychosocial intervention examined in the present study was helpful not only in improving patients' mean-level psychiatric symptoms or social functioning but also in severing the deleterious effect of depression on self-esteem. Nevertheless, because they were not predicted on an a priori basis, replication of these intriguing findings is in order.

Limitations

In the present study, the pertinent variables were measures with self-report questionnaires, which because of shared method variance, might have contributed to the inflation of the relations obtained between depressive symptoms and self-esteem. However, these relations were not exceedingly strong and are consistent with findings of previous research on the relations between these constructs. Furthermore, because depressive symptoms and low self-esteem were found to be central to the conscious experience of patients with severe mental illness (Davidson et al., 1997), reliance on self-report measures appears to be justified from the point of view of external and clinical validity.

Two caveats should be noted with respect to the implications of these findings to the vulnerability model. The first caveat is that the present study did not provide the most ideal test for this model, in that it might be the case that low self-esteem, as a vulnerability marker, exerts its deleterious effect in the context of high stress, a variable that was not measured here. It is our belief, however, that the absence of measuring stress had a limited influence on the results obtained. The reason for this is twofold. First, recent studied have consistently shown that negative self-evaluation exerts a main effect on depression rather than an interaction effect with life stress (Blatt, Quinlan, Pilkonis, & Shea, 1995). Indeed, other studies demonstrated that, rather than activating the vulnerability implicated in negative self-evaluation, life stress is generated by this evaluation and in turn predicts depression (Priel & Shahar, 2000; Shahar & Priel, 2003). Second, it should be recalled that ours is a high-stress sample, characterized by chronic and acute stress (e.g., poverty, social isolation, stigmatization, and exposure to community violence). Consequently, effects of self-esteem on depression in this high-stress sample correspond, at least partly, to the aforementioned stress by self-esteem interaction. Nevertheless, it is incumbent on future research to replicate our results while measuring life stress and taking the stress by self-esteem interaction into account.

The second caveat pertains to the meaning and prevalence of depression in our sample. Notably, because the majority of our participants are already exhibiting high levels of depressive symptoms and many would likely have met in the past or currently would meet criteria for MDD, this study does not represent a test of whether low self-esteem predicts first-onset MDD. Hence, generalization of our findings to the relations between self-esteem and MDD, particularly in a previously well population, should be made with caution. Indeed, in adherence to Coyne's (1994) call to distinguish between depressive symptoms and MDD, we were careful throughout the article to note that the focus of this study is on the former rather than the latter. Interestingly, our findings are consistent with previous studies showing that depressive symptoms exert considerable psychosocial impairment, even if they do not meet criteria for MDD. Thus, among adolescents, depressive symptoms were found to be associated with a social impairment that is comparable to that associated with MDD (Gotlib, Lewinsohn, & Seeley, 1995). Adolescent depressive symptoms were also found to predict MDD, as well as substance abuse, in young adulthood (Lewinson, Solomon, Seeley, & Zeiss, 2000). Similarly, as mentioned earlier, among primary care patients the association between distress and negative self-perception was comparable to the association between clinical depression and negative self-perception (Coyne et al., 1998). Our findings on the deleterious effect of depressive symptoms on self-esteem among people with SMI extend these studies, suggesting that the population of people with SMI might serve as a target population for researchers who are interested in assessing the clinical significance of elevated levels of depressive symptoms.

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