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The Contribution of Negative and Positive Illness Schemas to Depression in Patients With End-Stage Renal Disease

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This research examined the role of negative and positive illness schemas as predictors of depression in 109 ESRD patients who were recruited from dialysis clinics throughout the San Diego area. Specifically, the model evaluated whether negative and positive illness schemas would mediate the relationship between disease severity and depression, and social support and depression, in a cross-sectional design. The model was tested with the Cognitive Depression Inventory (CDI), derived from the Beck Depression Inventory (BDI), and the full Beck as criterion variables. Hierarchical multiple regression analysis employing path-analytic procedures revealed that while disease severity was unrelated to depression, negative illness schema contributed to higher BDI and CDI scores, and positive illness schema contributed to lower BDI and CDI scores. Furthermore, positive illness schema mediated the relationship between social support and depression in both the BDI and CDI models. The results illustrate the important contribution of illness schemas to depression in this life-threatening disease.

KEY WORDS: illness schemas; depression; ESRD.

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INTRODUCTION

Psychiatric comorbidity is highly prevalent in patients with end-stage renal disease (ESRD), and has been found to be more common than in patients with other serious medical conditions such as heart disease, stroke, and diabetes (Kimmel *et al.*, 1998). Depressive disorders, in particular, are frequently found in patients with ESRD, with prevalence estimates reaching as high as 40% (Craven *et al.*, 1987). Rates of depression have varied markedly, however, owing to inconsistencies across studies in applying diagnostic criteria, differences in measures, and variability in sampling procedures (O'Donnell and Chung, 1997). Moreover, it has been difficult to establish definitive estimates of the prevalence of depression in ESRD due to inherent problems in distinguishing medical symptoms of ESRD (e.g., lethargy, sleep loss, poor concentration) from those associated with a depressive disorder.

Conceptualizing Depression in ESRD

Depression impairs the quality of life of ESRD patients and may contribute to a reduced life span (Kimmel *et al.*, 2000). Understanding the etiology of depression in ESRD thus becomes a critical question for both researchers and clinicians.

One important perspective to consider is that the severity of the illness and associated physical comorbidities that tax the adaptive capacities of patients may lead directly to depression. Patients with ESRD encounter numerous physical and medical limitations and, as a result, suffer significant loss and role impairment that may contribute to depressed mood (Christensen and Raichle, 2002). Thus, the extent to which illness-related stressors and loss account for variability in depression is important to determine.

In addition to disease severity, appraisals and beliefs about ESRD may play an important role in depression. Appraisals about illness are central to understanding the meaning of being ill, the process of coping, and psychosocial adjustment (Turk and Salovey, 1995). In ESRD, considerable research has focused on the role of perceived intrusiveness of the illness in depression and emotional well-being (Christensen and Ehlers, 2002). In general, the more the ESRD patients perceive that their medical condition interferes with their functioning, the more depressed they tend to be (Devins *et al.*, 1984, 1997). In addition, perceived helplessness has been found to contribute to ESRD depression (Devins *et al.*, 1981). Helplessness has been found to contribute to depression in patients with rheumatic disease (Nicassio *et al.*, 1985) and to mediate the relationship between indicators of the severity of

illness and depression in studies with patients with fibromyalgia, lupus erythematosus, and rheumatoid arthritis (RA) (Nicassio *et al.*, 1999; Smith *et al.*, 1990; Tayer *et al.*, 2001).

The present research examined the role of the illness schema construct in ESRD depression. Self-schemas refer to cognitive generalizations that organize and guide the processing of self-relevant information (Markus, 1977). Schemas affect information-processing functions such as enhanced recall and recognition memory for schema-consistent information (Alloy *et al.*, 1988). Applying the self-schema construct to chronic illness, Clemmey and Nicassio (1997) examined the role of illness schemas in depressed and nondepressed patients with RA. Using a multifaceted measure of illness schemas assessing the components of self-description, information processing, and illness behaviors, the authors found that depressed patients with RA scored significantly higher on indices of negative illness schema whereas nondepressed patients with RA had significantly higher scores on indices of positive illness schema. Moreover, depressed patients with RA scored significantly higher on negative illness schema measures than controls without RA or depression.

The findings reflect an interesting association between illness schema and depression in patients with or without a chronic illness. The appraisal of oneself as ill, regardless of whether one was ill or not, was related to heightened depressive symptomatology. A limitation of this research, however, was that it did not incorporate an objective measure of health status. Thus, it was not possible to rule out the possibility that poor health status could have accounted for the relationship between illness schema and depression.

Overview of Present Research

In this research, we analyzed the contribution of negative and positive illness schemas to depression in ESRD. This research expanded on the Clemmey and Nicassio (1997) study in the following ways. First, an objective, physician-administered measure of the severity of ESRD was adopted. Second, a theoretical framework was proposed in which illness schema was investigated as a potential intervening variable in explaining the relationship between health status and depression, akin to the role of helplessness in patients with rheumatic disease.

Figure 1 depicts this proposed framework. Specifically, it was hypothesized that the effects of ESRD severity on depression would be mediated through both negative and positive illness schemas. It was predicted that high ESRD severity would be associated with high depression through high negative illness schema and low positive illness schema. The contribution of social support was also examined in this model. Because the illness schema construct may be influenced not only by patients' previous experience with

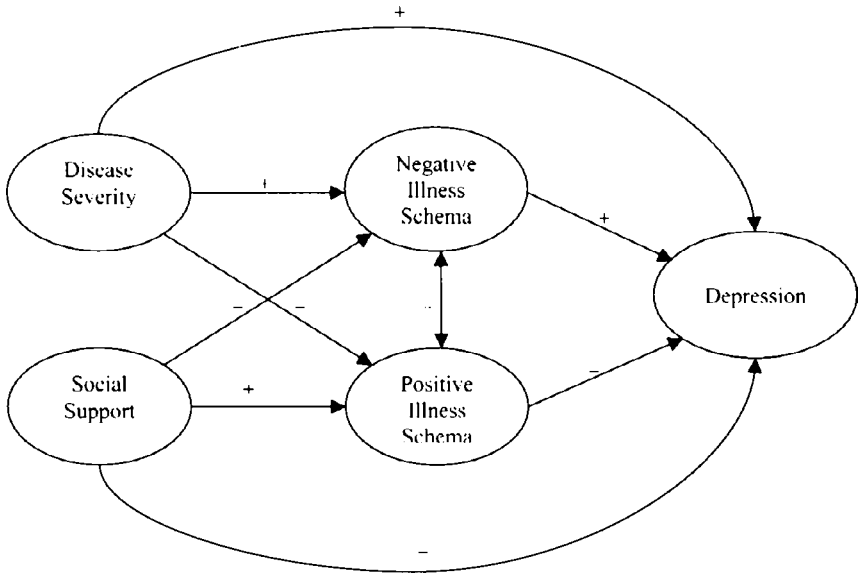

Fig. 1. Proposed theoretical model depicting hypothesized relationships between study variables.

their illness, but also by social and cultural factors (Landrine and Klonoff, 1992), we hypothesized that high social support availability would be related to lower negative and higher positive illness schema. The position that social support may lead to positive mental and physical health outcomes by enhancing identity and self-esteem has been advocated in the social support literature (e.g., Cohen, 1988). Thus, in addition to analyzing the mediational role of illness schema, a goal of this research was to examine the potential health-related and social precursors of negative and positive illness schema in patients with a serious, life-threatening chronic illness.

METHODS

Participants

Potential participants were recruited from nine hemodialysis clinics within the greater San Diego County area. The following inclusion criteria were established for determining ESRD patients' eligibility for the study: (1) participation in an ongoing hemodialysis program, (2) ability to read and comprehend English, and (3) ability to complete the self-assessment portion of the protocol without outside assistance. Patients with severe physical

infirmities or disabilities that prevented their participation in the assessment protocol, and patients with a known psychotic disorder, dementia or other organic brain syndrome, or mental retardation were excluded from participation. Social workers at each of the nine sites were trained in applying these screening criteria before approaching patients about their interest in participating in the research. The application of these criteria resulted in the identification of 376 potential participants. Eighty-two patients were eliminated because of severe physical disabilities (e.g., blindness, extreme weakness), and 38 patients were eliminated because of organic brain impairment, psychosis, or mental retardation, leaving a sample of 256 eligible patients.

After eligibility criteria were met, social workers approached patients about their interest in participating in the research while at the clinic. After reviewing the study, social workers presented patients with a written announcement informing them of study logistics and demands and that a physician would conduct a formal assessment of their health status as part of the protocol. Patients indicated their interest in participating in the research by checking a box on the announcement and returning it to their social worker at the next clinic visit. At that time, patients provided informed consent and were given the self-assessment battery to complete following the dialysis session. Of the 256 potential participants, 104 declined to participate, and 43 did not complete the first phase of the study. Within 3 weeks after the completion of the self-assessment phase of the research, a nephrologist conducted an evaluation of each patient's health status, traveling to each site, as required.

Of the final sample of 109 participants, 65 were men and 44 were women. The average age of the participants was 55.5 years, with age ranging from 21 to 85 years. Forty-nine percent of the participants were married, 20% were single, 12% were divorced, 10% were widowed, and 3% were in a long-term relationship but not married. Thirty-eight percent were Caucasian, 20% were Hispanic, 23% were African American, 11% were Asian/Pacific Islander, and 7.3% were members of other ethnic groups. The majority of the participants earned less than $30,000 a year. Fifty percent of the participants reported that they were receiving disability benefits. The average length of time since beginning dialysis treatment in this sample was 3.17 years.

Measures

Disease Severity

On the basis of a clinical interview and a review of medical records, the nephrologist completed the ESRD Severity Index (ESRD-SI) for each

participant. Developed by Craven *et al.* (1991), the ESRD-SI is a reliable and valid measure for evaluating disease activity and comorbidities in ESRD patients. The physician makes a rating ranging from 0 (absent) to 10 (severe) for each of the following 10 categories of medical complications: cardiovascular, peripheral vascular, peripheral neuropathy, bone disease, visual impairment, autonomic neuropathy, gastrointestinal disease, access and dialysis events, diabetes mellitus, and "other." Severity ratings are summed across the 10 illness categories to calculate the ESRD-SI score. The ESRD-SI has demonstrated good interrater reliability ($r = 0.92$) and high test–retest reliability ($r = 0.92$) over a 2-week interval (Craven *et al.*, 1991). Griffin *et al.* (1995) reported that ESRD-SI scores correlated with physiological measures of disease severity such as serum album ($r = -0.33$) and creatinine levels ($r = -0.26$).

At the same time the ESRD-SI rating was obtained, the patient's latest Kt/v value, indicative of the adequacy of dialysis, was recorded from the medical record. Thirty-five patients had values less than 1.5, indicating inadequate dialysis. Although such values may reflect uremic depression and therefore may pose a potential confound in the model tested, Kt/v scores were not related to either BDI ($r = 0.03$), CDI ($r = -0.02$), or disease severity ($r = -0.01$) scores in this sample. Thus, patients with Kt/v scores of less than 1.5 were included in tests of the model.

Illness Schemas

This construct was assessed on the basis of three tasks from the protocol developed by Clemmey and Nicassio (1997). The three tasks involved self-description, recall, and recognition.

Self-Description Task. In this task, participants selected adjectives that described themselves from a list of 136 words depicting health-related states and terms. Half of the words had been judged to be negative (e.g., defective, frail) and half positive (e.g., survivor, sturdy). Two scores were derived: the total number of negative items endorsed, and the total number of positive items endorsed. The self-description task is an index of self-schema content (Markus, 1977) and supposed to reflect a consistent pattern of self-referent judgments.

Recall Task. This measure consisted of adjectives that were recalled from those that were originally endorsed in the self-description task. Item recall is considered to be reflective of both self-schema content and biased information processing. Schema researchers have shown that individuals tend to recall information congruent with schema content more readily than incongruent information (Derry and Kuiper, 1981; Greenberg and Beck,

1989). Separate scores were derived from the number of negative and positive items recalled. To address the question that recall may be influenced by dialysis adequacy, the relationship between *Kt/v* and the number of negative and positive items recalled was examined. *Kt/v* was not correlated with either negative ($r = 0.02$) or positive ($r = 0.01$) items recalled. Thus, dialysis adequacy was not associated with these cognitive measures.

Recognition Task. In the recognition task, a list of 40 adjectives was presented to participants, half of which were novel. Words that participants endorsed as self-descriptive and accurately recognized were scored to reflect biased recognition of self-referent information. Recognition scores were calculated separately for negative and positive items. While Clemmey and Nicassio (1997) used false recognition scores that were based on items endorsed but not previously seen, this measure was not adopted in this study since participants tended not to exhibit this bias.

Scores from each of the three tasks were converted into *z* scores and then summed into composite Negative Illness Schema (ISN) and Positive Illness Schema (ISP) indexes. For ISN, the self-description task correlated 0.49 ($p < 0.001$) with the recall task and 0.79 ($p < 0.001$) with the recognition task. The correlation between the recall and recognition tasks was 0.47 ($p < 0.001$). Cronbach's alpha of the ISN based on the composite of the three measures was 0.81. ISP had a parallel structure. The self-description task correlated 0.46 ($p < 0.001$) with the recall task and 0.74 ($p < 0.001$) with the recognition task. The correlation between the recall and recognition tasks was 0.56 ($p < 0.001$). Cronbach's alpha of ISP was also 0.81. Thus, ISN and ISP were highly internally consistent. As anticipated, ISN and ISP were slightly negatively correlated ($r = -0.37$, $p < 0.001$).

Perceived Social Support

Perceived social support was measured by the Interpersonal Support Evaluation List (ISEL), developed by Cohen *et al.* (1985). The ISEL consists of 40 statements rated on a 4-point Likert scale (1 = *definitely true* to 4 = *definitely false*), measuring the perceived availability of social support. The ISEL is composed of four subscales, addressing self-esteem support, belonging support, appraisal support, and tangible support. A total ISEL score, derived by summing across subscales, was used in this research.

Depression

The Cognitive Depression Inventory (CDI) (Sacks *et al.*, 1990), a 15-item version of the Beck Depression Inventory (BDI) (Beck *et al.*, 1961),

constituted the principal measure of depressive symptomatology in this research. The 15-item CDI has been adopted in previous ESRD research (Sacks *et al.*, 1990) because the BDI contains six somatic items that may be confounded with symptoms of the disease. The CDI assesses cognitive and affective symptoms of depression, including sadness, pessimism, sense of failure, suicidal thoughts, and feelings of guilt, and omits somatic symptoms such as fatigue, appetite disturbance, sleep disturbance, and sexual problems that may reflect underlying disease activity. The internal consistency of the CDI has been shown to be comparable to that of the BDI (Sacks *et al.*, 1990). We also examined the model with the full 21-item BDI to determine whether adding the somatic items would alter the hypothesized direct paths from disease severity, social support, ISN, and ISP to depression.

Data Transformation

As a result of significant skewness, square-root transformations were performed on scores for the CDI, BDI, ESRD-SI, and ISEL. Transformations corrected the skewness of the BDI and ESRD-SI, but not that of the ISEL or the CDI. Therefore, raw scores were used in analyses of the ISEL and CDI. All other variables met the assumption of univariate normality for the regression analyses.

RESULTS

Table I presents descriptive information on variables included in the model. The mean CDI score of 6.32 and mean BDI score of 11.56 reflect slight to moderate levels of depression for the sample as a whole, and are very similar to levels of depression reported by other researchers with ESRD populations (Craven *et al.*, 1991). The mean ESRD-SI score of 13.18

Table I. Descriptive Statistics

Variable	Mean	SD	Range
Cognitive depression (CDI)	6.32	6.26	0–26
Depression (BDI)	11.56	8.32	0–33
Disease severity	13.18	7.45	2–35
Social support	121.70	16.22	81–150
ISN[a]	0.06	2.47	−5.36 to 6.21
ISP[a]	−0.13	2.58	−5.24 to 9.15

[a] Scale represents a sum of standardized scores.

Table II. Correlations Between Study Variables

	CDI	BDI[a]	Disease severity[a]	Social support	ISN	ISP
Cognitive Depression (CDI)	—-					
Depression (BDI)[a]	0.88***	—				
Disease severity[a]	0.13	0.20*	—			
Social support	−0.47***	−0.48***	−0.25**	—		
ISN	0.48***	0.53***	0.29**	−0.28**	—	
ISP	−0.43***	−0.52***	−0.08	0.35***	−0.37***	—

Note. ISN, Negative Illness Schema; ISP, Positive Illness Schema.
[a]Square-root transformation performed on this variable because of positive skewness.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

(SD = 7.45) is slightly higher than the value (Mean = 10.2) found by Craven *et al.* (1991) in the ESRD sample from which the ESRD-SI was derived.

Correlations among variables in the model are presented in Table II. Disease severity was not correlated significantly with the CDI ($r = 0.13$), whereas social support was moderately negatively correlated with depression ($r = -0.47$). Illness schema measures were significantly related to depression and, as expected, correlated in opposite directions with CDI scores. ISN was positively correlated with depression ($r = 0.48$), whereas ISP was negatively correlated with depression ($r = -0.43$). Further, higher disease severity was associated with higher ISN ($r = 0.29$) but was unrelated to ISP ($r = -0.08$). In contrast, social support was related to lower ISN ($r = -0.28$) and higher ISP ($r = 0.35$). These data substantiate the import of illness schemas as correlates of depression but also demonstrate, contrary to the model, that disease severity did not have a significant bivariate relationship with CDI scores. Because the sample was ethnically heterogeneous, the relationship between ethnic background and model variables was analyzed.

It was found that being of Caucasian, Hispanic, African/American, or Asian/Pacific Islander descent was not correlated with disease severity, social support, positive illness schema, negative illness schema, or depression scores (all rs < 0.17, ps > 0.05).

Recall that it was hypothesized that illness severity and social support would be related to depression through the intermediate influence of positive and negative illness schema. To identify the independent predictors of depression and to provide a definitive test of the model, hierarchical multiple regression analysis employing path-analytic procedures was conducted. These analyses were carried out in the following order. First, the independent effects of disease severity and social support on positive and negative illness schema were evaluated. Second, the direct paths from disease severity and

social support to depression were examined. Finally, the paths from positive and negative illness schema to depression were evaluated after controlling for the direct effects of disease severity and social support. When applicable, significant covariates were removed on the first step of all analyses.

Prediction of Negative and Positive Illness Schema

In the first regression analysis, the paths from disease severity and social support to ISN were examined. On the first step, employment status made a significant contribution to ISN scores, $F(1, 107) = 10.13$, $p < 0.01$. Being unemployed was associated with higher negative illness schema scores. The joint contribution of disease severity and social support was significant on the next step, accounting for 9% of the variance in ISN scores, $F(3, 105) = 5.61$, $p < 0.01$. Higher disease severity was independently associated with higher ISN scores ($\beta = 0.21$, $p < 0.05$), whereas the relationship between social support and ISN ($\beta = -0.18$, $p = 0.06$) fell short of significance.

Because no significant covariates of ISP were found, the contribution of disease severity and social support was examined on the first step of the analysis predicting to ISP. Together, these variables accounted for 12% of the variance in ISP scores, $F(2, 106) = 7.22$, $p < 0.001$. However, only social support was independently related to ISP ($\beta = 0.35$, $p < 0.001$). Disease severity bore no relationship with ISP scores ($\beta = 0.01$).

In sum, the above analyses demonstrate that disease severity and social support had different relationships with illness schema measures. Disease severity was associated with negative illness schema but not with positive illness schema, whereas social support contributed significantly to positive illness schema, but only marginally to negative illness schema.

Direct Effects of Disease Severity and Social Support on CDI Depression

The next analysis evaluated the direct relationships between disease severity and depression, and social support and CDI depression. On the first step, the contribution of age, gender, years of education, and employment status was significant, $F(4, 104) = 11.97$, $p < 0.001$. Lower age ($\beta = -0.21$, $p < 0.05$) and employment status (being unemployed) individually predicted depression ($\beta = 0.39$, $p < 0.001$). On the next step, disease severity and social support were significant, $F(6, 102) = 13.63$, $p < 0.001$, accounting for an additional 13% of the variance in depression. However, only lower social support contributed to higher depression ($\beta = -0.36$, $p < 0.001$), whereas the contribution of disease severity was not significant ($\beta = 0.03$).

Mediational Roles of Negative and Positive Illness Schema

The final step in testing the model was to determine if ISN and ISP mediated the relationship between social support and depression. Because disease severity did not predict depression, schema measures, by definition, could not serve in a mediational role. If ISN and ISP mediated the relationship between social support and depression, the direct path from social support to depression that was established above would be eliminated or significantly reduced after schema measures entered the regression. The joint contribution of ISN and ISP after removing the effects of disease severity and social support was highly significant, $F(8, 100) = 14.72$, $p < 0.001$. Higher ISN scores ($\beta = 0.20$, $p < 0.05$) and lower ISP scores ($\beta = -0.21$, $p < 0.01$) each contributed to higher depression (see Table III for results of the CDI regression model). The direct path from ISEL to depression, although reduced, remained significant ($\beta = -0.25$, $p < 0.01$), indicating that positive illness schema partially mediated the relationship between social support and depression (see Fig. 2).

Testing the Model With BDI Scores

To address the concern that the inclusion of somatic items would overestimate the contribution of disease severity to depression and therefore bias the interpretation of the model, we reexamined the model with the BDI as the criterion variable. A parallel set of analyses was then conducted.

Table III. Hierarchical Regression Analysis Predicting Cognitive Depression (CDI)

Step	Predictor	R^2	R^2 change	F change	df	ß	sr^2
1	Employment	0.32	0.00	11.97***	4,104	0.36***	0.10
	Education					−0.16	0.02
	Gender					0.07	0.00
	Age					−0.21*	0.04
2	Disease severity[a]	0.45	0.13	13.63***	6,102	0.03	0.00
	Social support					−0.36***	0.12
3	ISN	0.54	0.09	14.72***	8,100	0.20*	0.03
	ISP					−0.21**	0.04

Note. ISN, Negative Illness Schema; ISP, Positive Illness Schema; ß, Standardized beta coefficient at that step of the regression equation; sr^2, Unique variance accounted for by each predictor variable at that step of the regression equation.

[a] Square-root transformation performed on this variable because of positive skewness.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

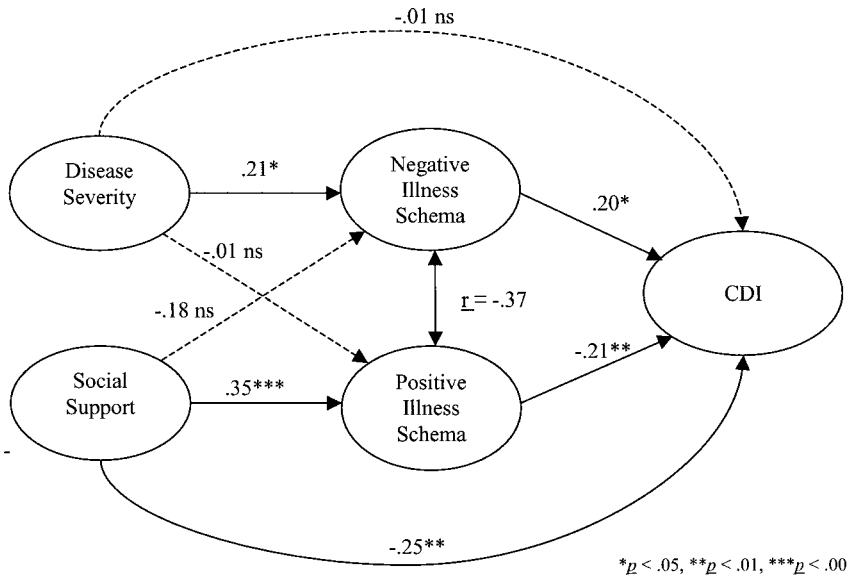

Fig. 2. Empirical model illustrating derived relationships between study variables and with the CDI.

On the first step of the analysis in which the direct relationships between disease severity and depression, and social support and depression were tested, the contribution of age, gender, years of education, and employment status was again significant, $F(4, 104) = 7.70$, $p < 0.001$; however, only employment status (being unemployed) predicted depression ($\beta = 0.39$, $p < 0.001$). On the next step, disease severity and social support jointly contributed to BDI scores, $F(6, 102) = 13.05$, $p < 0.001$, accounting for 16% of the variance in depression. Lower social support contributed to higher depression ($\beta = -0.39$, $p < 0.001$), whereas the relationship between disease severity and depression was not significant ($\beta = 0.06$). On the next step, the contribution of ISN and ISP was significant, $F(8, 100) = 17.40$, $p < 0.001$, with higher ISN scores ($\beta = 0.26$, $p < 0.01$) and lower ISP scores ($\beta = -0.28$, $p < 0.001$) each contributing to higher BDI scores (see Table IV). As in the analysis with the CDI, the direct path from social support to depression remained significant ($\beta = -0.25$, $p < 0.01$) after schema measures entered the regression equation.

The results with the BDI mirrored the findings with the CDI (see Fig. 3). With both criterion measures, illness schema measures were individually predictive of depression, and positive illness schema partially mediated the relationship between social support and depression. In neither instance was disease severity related to depression in the model. Thus, the

Table IV. Hierarchical Regression Analysis Predicting Depression (BDI)[a]

Step	Predictor	R^2	R^2 change	F change	df	ß	sr^2
1	Employment	0.23	0.00	7.70***	4,104	0.40***	0.01
	Education					−0.14	0.02
	Gender					0.09	0.00
	Age					−0.10	0.13
2	Disease severity[a]	0.39	0.16	13.05***	6,102	0.06	0.00
	Social support					0.39***	0.18
3	ISN	0.51	0.16	17.40***	8,100	0.26**	0.12
	ISP					−0.28***	0.10

Note. ISN, Negative Illness Schema; ISP, Positive Illness Schema; ß, Standardized beta coefficient at that step of the regression equation; sr^2, Unique variance accounted for by each predictor variable at that step of the regression equation.
[a]Square-root transformation performed on this variable because of positive skewness.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

inclusion of somatic symptoms by using the full BDI did not artificially inflate the relationship between disease severity and depression nor did it attenuate the significance of schema measures in predicting depression in the model.

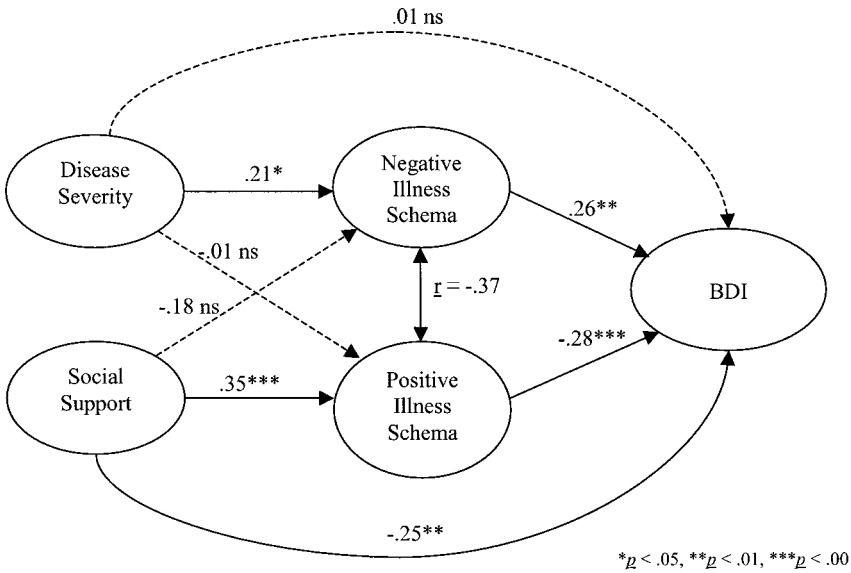

Fig. 3. Empirical model illustrating derived relationships between study variables and with the BDI.

DISCUSSION

This study has added to a growing literature that beliefs about health and illness are key to understanding mood disturbance in persons with serious chronic disease. The results indicated that negative and positive illness schema were significant predictors of depression in ESRD showing divergent relationships with CDI and BDI scores. As anticipated, high negative illness schema was associated with greater depression, whereas high positive schema was correlated with lower depression. The data are in substantial agreement with the findings of Clemmey and Nicassio (1997), who found that depressed RA patients had higher negative and lower positive illness schema scores than RA patients without depression.

In a disease as life-threatening as ESRD, it is particularly noteworthy that self-schemas about health may play a more crucial role in explaining depression than objective indicators of medical impairment and comorbidities. Yet, the results of this research showed that the objective measure of disease severity had no independent relationship with depression either before or after taking into account negative illness schema scores. Thus, contrary to our hypothesized model, negative illness schema did not mediate the relationship between disease severity and depression. Instead, negative illness schema contributed to depression totally independently of disease severity. The same pattern held up with the full BDI, thus diminishing the argument raised by previous researchers (see Christensen and Ehlers, 2002) that the inclusion of somatic symptoms of depression would be confounded with the assessment of ESRD disease severity.

The findings for positive illness schema elucidate the relative independence of this construct from negative illness schema and illustrate a different mechanism for influencing depression. It is important to note that positive illness schema contributed additively to the prediction of depression over and above the role of negative illness schema. Thus, the extent to which patients are high in negative illness schema and low in positive illness schema increases the probability that they will be depressed. It is possible that negative and positive illness schema measures may prove to be analogous to the constructs of negative and positive affect that have been shown to be negatively related to each other, and yet, to be largely independent dimensions of affective experience (Watson *et al.*, 1988). Accordingly, it would be interesting in future research to determine if negative illness schema and positive illness schema would be more closely associated with their respective negative and positive affect counterparts.

In the model, it was hypothesized that disease severity and social support would be related to both schema measures but in opposite directions. However, disease severity had no relationship with positive illness schema,

and social support was not significantly related to negative illness schema. Instead, the results demonstrated that disease severity contributed to higher negative illness schema scores whereas social support contributed to higher positive illness schema scores. With both the BDI and CDI, social support also contributed to depression independently of positive illness schema, a finding that is consistent with prior research showing that perceived social support was related to less psychological distress in ESRD patients (Christensen *et al.*, 1989; Siegal *et al.*, 1987).

The positive relationship between social support and positive illness schema is particularly noteworthy. A previous study with renal transplant patients (Moran *et al.*, 1999) found a relationship between family support and illness-related cognitions. Specifically, this research showed that social support was related to less illness-related intrusive ideation that in turn, was associated with less emotional distress. However, the present study has provided unique evidence that social support is associated with adaptive perceptions of health that may decrease the likelihood of depression. Systems theorists have stressed the potentially important role that family members and significant others may play in contributing to patients' appraisals of their health and the meaning of being ill (Kerns, 1995). Moreover, social support researchers of various disciplines have argued that social support and social engagement may play critical roles in the enhancement of identity and self-concept (Cohen, 1988; Thoits, 1983). The findings of the present study illustrate the need for future research to examine how social conditions may be related to appraisals of illness, the self, and other aspects of the adjustment process in ESRD.

Above all, this study has highlighted the value of conceptualizing depression in ESRD in multidimensional terms, taking into account the roles of physical, social, and psychological processes and their independent and conjoint effects (Engel, 1980). As such, disease severity and poor social support may be viewed as risk factors for depression to the extent that they may contribute to dysfunctional appraisals of health that may have more proximal effects on mood and adjustment. The adoption of relevant theoretical models for conceptualizing the causal mechanisms among physical, social, and psychological risk factors for depression in ESRD is a heuristic strategy for future researchers.

In sum, this research has furthered our understanding of the factors associated with depression in ESRD. However, because of some methodological limitations of the study, we urge caution in interpreting the results and the need for adopting some specific improvements in future research. For example, because the study was cross-sectional, the directionality and potential causal mechanisms among constructs could not be determined. Thus, a significant need exists for longitudinal research to determine whether changes

in disease severity, social support, and illness schemas predict changes in depressive symptomatology. In addition, because a rather large number of patients who were non-English literate or were severely ill were not included in the study, the results may not generalize to these dialysis populations. Further, because of limitations in relying solely on self-report measures of depression, we recommend that researchers consider the use of objective, interview-based measures of psychopathology such as the SCID (Spitzer *et al.*, 1987). The adoption of objectives measures would reduce the likelihood of conceptual overlap between the assessment of health schemas and mood disturbance. Finally, the incorporation of positive and negative indices of affective disturbance would expand our understanding of the nature of mood disturbance in ESRD and make possible an analysis of how schema measures may differentially contribute to these two dimensions of affective experience.

In conclusion, this study has illustrated the multifaceted nature of the adjustment process in ESRD. Specifically, the findings support the importance of addressing the linkage between social and psychological variables, and their joint contribution to depression in patients with this serious condition.

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