

Defeatist Beliefs as a Mediator of Cognitive Impairment, Negative Symptoms, and Functioning in Schizophrenia

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Poor social and vocational outcomes have long been observed in schizophrenia. Two of the most consistent predictors are negative symptoms and cognitive impairment. We investigate the hypothesis that cognitive content—defeatist beliefs regarding performance—provides a link between cognitive impairment, negative symptoms, and poor functioning in schizophrenia. A total of 77 individuals (55 patients diagnosed with schizophrenia or schizoaffective disorder and 22 healthy controls) participated in a cross-sectional study of psychopathology. Tests of memory, abstraction, attention, and processing speed, as well as current psychopathology, functioning, and endorsement of defeatist beliefs, were employed. Greater neurocognitive impairment was associated with elevated defeatist belief endorsement, higher negative symptom levels, and worse social and vocational functioning. Notably, statistical modeling indicated that defeatist belief endorsements were mediators in the relationship between cognitive impairment and both negative symptoms and functioning. These effects were independent of depression and positive symptom levels. The results add to the emerging biopsychosocial understanding of negative symptoms and introduce defeatist beliefs as a new psychotherapeutic target.

Key words: neurocognitive impairment/negative symptoms/functioning

Introduction

For a substantial proportion of patients diagnosed with schizophrenia, social and vocational disability diminishes their quality of life and significantly limits the extent of their recovery.^{1,2} Negative symptoms and neurocognitive impairment, in contrast to psychotic symptoms, predict poor social and vocational functioning in schizophre-

nia.^{3–6} A moderate cross-sectional association has been observed between negative symptoms and cognitive impairment,⁷ each showing minimal association with positive symptoms. Antipsychotic medications have not demonstrated significant efficacy relative to either negative symptoms or cognitive impairment, a fact that is underscored in the National Institute of Mental Health's recent initiatives (Measurement and Treatment Research Initiative to Improve Cognition in Schizophrenia—MATRICS) designed to improve treatment and measurement in both domains.^{8,9}

Models of negative symptoms, cognitive impairment, and functioning, whether emphasizing neurobiological pathology in the manner of Hughlings Jackson¹⁰ and Kraepelin¹¹ or cognitive dysfunction in the tradition of Bleuler,¹² have received mixed empirical support.¹³ Moreover, a direct connection between negative symptoms and cognitive impairment is not self-evident: neurocognitive problems such as mental inflexibility, memory, and attention difficulties are not isomorphic with the behavioral and affective symptoms such as anhedonia, asociality, and lack of motivation. Additionally, the process by which cognitive problems lead to negative symptoms remains unclear.

We propose that the lack of a clear fit between impairment and symptoms occurs because the connection is indirect. Put in terms of the conceptual scheme proposed by Harvey et al¹⁴ for understanding the “true” relationship between these constructs, we suggest that cognitive impairment and negative symptoms are linked through another construct. Recent research provides a clue to the identity of this common correlate: patients with higher negative symptom levels have been found to endorse defeatist beliefs regarding task performance (eg, “if I fail partly, it is as bad as being a complete failure”) to a greater extent than patients with lesser negative symptomatology—an association that holds when depression levels are controlled.¹⁵

Might defeatist beliefs also link cognitive impairment with negative symptoms and functioning in schizophrenia? Such a finding is predicted by the cognitive-behavioral model of psychopathology^{16,17} and suggests that specific performance-related cognitive content can serve as a bridge between compromised cognitive processing of

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attention, memory, and abstraction, on the one hand, and the emotional, motivational, and behavioral deficits of negative symptoms and poor functioning, on the other. Because neurocognitive performance, negative symptom levels, and functioning are all abnormal in schizophrenia, our hypothesis first requires, at minimum, that individuals with schizophrenia endorse defeatist beliefs to a greater extent than healthy individuals. While previous research suggests that defeatist beliefs correlate with negative symptoms,¹⁵ patients with schizophrenia have not, heretofore, been directly compared with healthy controls on the measure. A second requirement of our hypothesis is that the statistical relationship between defeatist beliefs, neurocognitive impairment, and negative symptoms is consistent with mediation. A similar relationship is predicted to hold between defeatist beliefs, neurocognitive impairment, and functioning. We, thus, conducted a cross-sectional investigation in which outpatients diagnosed with schizophrenia and healthy controls were administered measures of symptomatology, neurocognition, functioning, and defeatist beliefs.

Methods

Participants

The sample included 55 stable outpatients, with a diagnosis of schizophrenia or schizoaffective disorder, and 22 healthy controls. Patients with negative symptoms were referred by the Schizophrenia Research Center at the University of Pennsylvania. All recruitment contacts were made blind to current patient symptomatology and level of functioning. Nonpatients were recruited so as to match the patient sample on demographic variables, including gender and socioeconomic status (see table 1). The patient group was, on average, older than controls ($F_{1,76} = 4.3, P < .05$); age was controlled in the group statistical comparison.

Procedure

All subjects participated in a single research session lasting between 2 and 4 hours. After the procedure was fully explained, written informed consent was obtained from all subjects. All participants were compensated for participation. This procedure was approved by the Institutional Review Board at the University of Pennsylvania.

Trained interviewers (MA and/or PhD) administered symptom, attitude, and functioning measures. These measures are a mix of interviewer-scored and self-report instruments. Collateral information from family members and treating psychiatrists was factored into clinician ratings of symptoms and functioning. Neurocognitive impairment was assessed via computerized tasks. All ratings of symptoms and functioning were made blind to neurocognitive performance and degree of defeatist belief endorsement.

Table 1. Sample Characteristics

| | Patient ($N = 55$) | | Control ($N = 22$) | |
|-----------------------------------|----------------------|--------------|----------------------|--------------|
| | Mean | SD | Mean | SD |
| Age (y) ^a | 36.9 | 9.9 | 31.8 | 7.8 |
| Gender (% male) | 65 | ($N = 36$) | 68 | ($N = 15$) |
| Parent education (y) ^b | 13.0 | 2.8 | 13.9 | 2.7 |
| Illness onset (age, y) | 22.0 | 5.8 | — | — |
| Length of Illness (y) | 14.4 | 9.8 | — | — |
| Diagnosis | N | % | | |
| Schizophrenia | | | | |
| Paranoid | 22 | 40 | | |
| Undifferentiated | 26 | 47 | | |
| Disorganized/ catatonic | 2 | 4 | | |
| Schizoaffective | | | | |
| Bipolar | 4 | 7 | | |
| Unipolar | 1 | 2 | | |

^a $P < .05$.

^bParent education is average of father's and mother's education level.

Materials

Clinical Measures. The total score, sans the attention subscale and inappropriate affect, of the Scale for the Assessment of Negative Symptoms¹⁸ was used as an index of negative symptoms. The total scores of the psychotic factor and the disorganized factor of the Scale for the Assessment of Positive Symptoms¹⁹ were employed to measure positive symptoms. Quality of Life Scale, Abbreviated²⁰ total score assessed current functioning. Finally, depression and anxiety were self-reported on the Beck Depression Inventory II²¹ and Beck Anxiety Inventory,²² respectively.

Belief Endorsement. Beliefs were assessed with the Dysfunctional Attitude Scale (DAS).²³ The defeatist performance belief subscale consists of 15 statements describing overgeneralized conclusions about one's ability to perform tasks (eg, "If you cannot do something well, there is little point in doing it at all"; see Appendix). The dysfunctional need for acceptance subscale consists of 10 statements that exaggerate the importance of being accepted by other people (eg, "I cannot be happy unless most people I know admire me").

Neurocognitive Performance. Cognitive impairment was assessed via 5 computerized tasks that have previously been applied to healthy participants²⁴ and individuals diagnosed with schizophrenia.²⁵ Tasks were selected to assess the following neurocognitive domains that meta-analysis²⁶ indicates are related to poor outcome in schizophrenia: abstraction/mental flexibility,^{27,28}

verbal memory,²⁹ and attention/vigilance.³⁰ Additionally, processing speed was also assessed. The tests, programmed in Flash Media, were presented in a window within a web browser (Mozilla Firefox) on either a laptop or desktop computer. Following previously established procedures,³¹ (a) accuracy and median response times were computed from raw scores of each test and converted to *z* scores using normative data; (b) abstraction, verbal memory, and attention/vigilance domain scores were computed by averaging the appropriate standardized accuracy values; (c) the standardized median response times for the 5 tests were averaged to compute the processing speed domain; and (d) the 3 accuracy domain scores were averaged along with the negative of the processing speed domain score to create a general index of neurocognitive performance.

Statistical Analysis

Statistical analyses were conducted to address 2 hypotheses: first, patients will differ from controls by evidencing greater defeatist belief endorsement; second, the patient data will be consistent with defeatist beliefs as a potential mediating variable between cognitive impairment and negative symptoms, on the one hand, and cognitive impairment and functioning, on the other. Because the present investigation was a partial replication of Rector’s¹⁵ earlier work, a comparable sample size (*N* = 55) was employed.

Hypothesis 1: Abnormal Defeatist Belief Endorsement. One-way analysis of covariance (ANCOVA) was employed: the covariate was age, group served as independent variable, and belief endorsement served as the dependent variable. ANCOVA models were tested for both defeatist belief and need for acceptance endorsements. Additionally, patient-control effect sizes (ie, Cohen’s *d*)³² were estimated to allow comparison across study measures. We followed Cohen’s scheme in categorizing effect sizes: small = 0.3, medium = 0.5, and large = 0.8.

Hypothesis 2: Mediation. Correlation Pearson product-moment correlations were calculated for all study variables. Only statistically reliable correlations were retained for subsequent statistical analysis. Partial correlations were also calculated to clarify interrelationships between variables.

Pathanalysis Three component models composed of independent (*X*), dependent (*Y*), and mediator (*M*) variables were estimated as (a) an unelaborated model consisting of the direct relationship between independent and dependent variables and (b) an elaborated model including the mediator.³³ We followed Shrout and Bolger’s³⁴ 5-step procedure for determining if a 3-variable model is consistent with mediation of a proximal effect. Two 3-

variable models were assessed: (a) neurocognitive performance (*X*), defeatist beliefs (*M*), and negative symptoms (*Y*); (b) neurocognitive performance (*X*), defeatist beliefs (*M*), and functioning (*Y*). Because it is generally advised to have a 20:1 ratio of subjects to parameters in path analysis,³⁵ models composed of more than 3 freely varying parameters were not estimated. Additionally, nonparametric bootstrapping, which has been found to be more sensitive in mediation analyses when sample sizes are less than 100,³⁴ was employed to estimate SEs of the direct and indirect effects for significance testing. For each model, SEs were SDs of a pseudopopulation based upon 5000 samples drawn with replacement from the patient data. A final index of mediation is the change in variance accounted for by the inclusion of the mediator in the model. This was determined by significance test of the change in the square of the multiple correlation coefficient (*R*² change) associated with the mediator being included in the model.

Results

Group Differences

Table 2 contains group comparison data across all study measures. Of note, and consistent with prediction, the patient group endorsed defeatist performance beliefs to a greater extent than the healthy controls (*F*_{1,74} = 15.48, *P* < .001). The effect size for this difference

Table 2. Group Differences^a

| | Patients (<i>N</i> = 55) | | Controls (<i>N</i> = 22) | | Effect Size |
|---------------------|------------------------------|------|------------------------------|-----|----------------|
| | Mean | SD | Mean | SD | |
| Negative | 23.7 | 12.1 | — | — | — |
| Psychotic | 14.3 | 13.4 | — | — | — |
| Disorganized | 5.4 | 7.6 | — | — | — |
| BDI | 13.0 | 11.5 | 4.9 | 4.6 | 0.74 |
| BAI | 12.0 | 11.3 | 1.4 | 2.1 | 0.97 |
| QOLA | 22.5 | 9.3 | 39.2 | 2.8 | −1.5 |
| NP | −0.84 | 0.98 | 0.11 | 0.4 | −0.99 |
| Defeatist beliefs | 43.2 | 14.1 | 30.1 | 9.9 | 0.92 |
| Need for acceptance | 35.3 | 10.4 | 27.4 | 9.6 | 0.73 |

^aNegative = total score, Scale for the Assessment of Negative Symptoms¹⁸; psychotic = sum of hallucinations and delusions items, Scale for the Assessment of Positive Symptoms¹⁹; disorganized = sum of bizarre behavior and formal thought disorder items, Scale for the Assessment of Positive Symptoms¹⁹; BDI = Beck Depression Inventory²¹; QOLA = Quality of Life Inventory, Abridged²⁰; NP = neurocognitive performance, average standardized score; defeatist beliefs = subscale, Dysfunctional Attitude Scale²³; need for acceptance = subscale, Dysfunctional Attitude Scale.²³

Table 3. Correlations: Patient Data ($N = 55$)^a

| | Neurocognitive Performance | Negative Symptoms | Functioning | Defeatist Beliefs | Psychotic | Disorganized | Depression | Anxiety |
|---------------------|----------------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|---------|
| Negative symptoms | −0.37 ^b | — | — | — | — | — | — | — |
| Functioning | 0.47 ^b | −0.81 ^b | — | — | — | — | — | — |
| Defeatist beliefs | −0.32 ^c | 0.49 ^b | −0.45 ^b | — | — | — | — | — |
| Psychotic | 0.01 | 0.22 | −0.30 ^c | 0.20 | — | — | — | — |
| Disorganized | −0.32 ^c | 0.24 | −0.32 ^c | 0.34 ^c | 0.36 ^b | — | — | — |
| Depression | −0.03 | 0.20 | −0.24 | 0.41 ^b | 0.27 ^c | −0.10 | — | — |
| Anxiety | −0.17 | 0.25 | −0.25 | 0.34 ^c | 0.31 ^c | 0.00 | 0.66 ^b | — |
| Need for acceptance | −0.15 | 0.12 | −0.22 | 0.64 ^b | 0.18 | 0.35 ^b | 0.26 | 0.14 |

^aNeurocognitive performance = average standardized score; negative symptoms = total score, Scale for the Assessment of Negative Symptoms¹⁸; functioning = Quality of Life Inventory, Abridged²⁰; defeatist beliefs = subscale, Dysfunctional Attitude Scale²³; psychotic = sum of hallucinations and delusions items, Scale for the Assessment of Positive Symptoms¹⁹; disorganized = sum of bizarre behavior and formal thought disorder items, Scale for the Assessment of Positive Symptoms¹⁹; depression = Beck Depression Inventory²¹; anxiety = Beck Anxiety Inventory.²²

^b $P < .01$.

^c $P < .05$.

is large and comparable to patient-control differences for the other study measures. Patients, additionally, endorsed more need for acceptance attitudes than healthy controls ($F_{1,74} = 9.5$, $P < .01$). As compared with the healthy controls, the patient sample evidenced greater symptomatology, worse functioning, poorer cognitive performance, and elevated dysfunctional belief endorsement.

Correlations

Table 3 presents Pearson correlations between all the primary study measures in the patient sample.

Defeatist Beliefs. Consistent with the literature, neurocognitive performance correlates significantly both with functioning and negative symptoms and does not correlate with psychotic symptoms ($P > .90$). Defeatist beliefs also correlate with negative symptoms and functioning but not with psychotic symptoms ($P > .10$). The direction of this pattern of correlation suggests that patients who endorse defeatist beliefs tend to have elevated negative symptoms and poorer functioning and perform poorly on the neurocognitive tests. These variables will be subject to the mediation analysis.

Depression and Need for Acceptance. Endorsement of need for acceptance beliefs, according to prediction, is not reliably correlated with key study variables of neurocognitive performance ($P > .25$), negative symptoms ($P > .40$), and functioning ($P > .10$). The association between depression and neurocognitive performance is also not reliably different from zero ($P > .80$); negative symptoms, moreover, do not correlate significantly with levels of depressive symptoms ($P > .15$). The correlation between depression and functioning is a nonsignificant trend ($.10 >$

$P > .05$). Both depression and need for acceptance correlate moderately with defeatist beliefs. However, the partial correlation between defeatist beliefs and negative symptoms, while controlling both for depression levels and need for acceptance endorsements, is statistically significant ($r_{51} = .53$, $P < .001$), as is the partial correlation between defeatist beliefs and neurocognitive impairment when depression and need for acceptance are statistically controlled ($r_{50} = -.33$, $P < .05$). Accordingly, need for acceptance beliefs and depression will not be included in the mediation analysis.

Disorganized Symptoms. Neurocognitive performance correlates significantly with disorganized symptoms. However, the partial correlation is significant between neurocognitive performance and negative symptoms while statistically controlling disorganized symptoms ($r_{51} = -.32$, $P < .05$). Disorganized symptoms will not be included in the mediation analysis.

Functioning and Negative Symptoms. The measures of functioning and negative symptoms are highly intercorrelated in this sample ($r_{53} = .80$, $P < .001$). Such a high level of colinearity precludes modeling the 2 variables together because very little variance will be left for other variables.^{36,37}

Mediation: Neurocognitive Performance, Negative Symptoms, and Defeatist Beliefs. Figure 1 contains the results of the path analysis that forms the basis of the test of mediation: the independent variable is neurocognitive performance, the dependent variable is negative symptoms, and defeatist beliefs are the putative mediating variable.

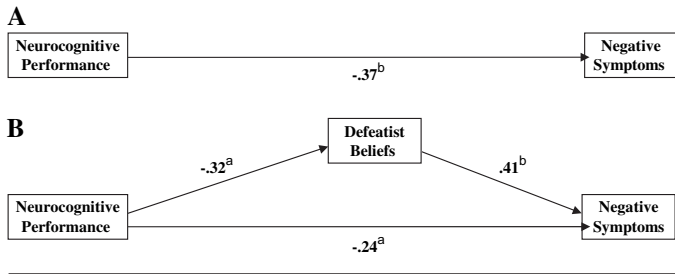


Fig. 1. Path Analysis ($N = 54$). Figure 1A depicts the simple model of neurocognitive performance and negative symptoms. Figure 1B depicts the full model that also includes defeatist beliefs. Neurocognitive performance = average standardized score; negative symptoms = total score, Scale for the Assessment of Negative Symptoms¹⁸; defeatist beliefs = subscale, Dysfunctional Attitude Scale.²³ ^a $P < .05$. ^b $P < .01$.

Step 1 Figure 1A depicts the simple path model representing the relationship between neurocognitive performance and negative symptom levels. This path is statistically significant ($z = -3.22, P < .01$), satisfying step 1 of Shrout and Bolger’s³⁴ revised version of Baron and Kenny’s³³ method.

Step 2 The path on the left side of figure 1B depicts the association between neurocognitive performance and defeatist beliefs. This path is also statistically significant ($z = -2.49, P < .05$) satisfying step 2: participants who perform more poorly on the tasks tend to endorse defeatist attitudes to a greater extent.

Step 3 On the right side of figure 1B appears the path representing the association between defeatist beliefs and negative symptoms. In accord with step 3 of mediation, this path is statistically reliable ($z = 3.38, P < .001$). Patients with more severe negative symptoms tend to endorse more defeatist beliefs. This relationship is independent of the association of neurocognitive performance upon negative symptoms.

Step 4 The path at the bottom of figure 1B represents the relationship between neurocognitive performance and negative symptoms, controlling for the effects of defeatist beliefs. This path is reduced in magnitude, relative to the comparable path in figure 1A, which suggests mediation according to Baron and Kenny’s method.³³ Table 4 contains the effect decomposition based on the bootstrap analysis. The indirect effect of neurocognitive performance on negative symptoms through defeatist beliefs is statistically reliable (90% confidence interval [CI] = -0.28 to $-0.04, P < .05$), confirming that the data are consistent with mediation.

Step 5 The path coefficient at the bottom of figure 1B is statistically reliable ($z = -1.97, P \leq .05$), suggesting that the data are consistent with partial mediation. The bootstrapping estimate (table 4) of the direct path between neurocognitive impairment and negative symptom is also statistically reliable (90% CI = -0.41

Table 4. Bootstrapping Mediation Effect Decomposition: Neurocognitive Performance, Defeatist Beliefs, and Negative Symptoms (Patient Data, $N = 54$)^a

| Neurocognitive Performance | Negative Symptoms | | |
|----------------------------|-------------------------|----------------|-----------------------|
| | Unstandardized Estimate | Standard Error | Standardized Estimate |
| Direct effect | -3.00^b | 1.48 | -0.24 |
| Indirect effect | -1.66^b | 0.88 | -0.13 |
| Total effect | -4.66^c | 1.45 | -0.37 |

^aNeurocognitive performance = average standardized score; negative symptoms = total score, Scale for the Assessment of Negative Symptoms¹⁸; direct effect = neurocognitive performance \rightarrow negative symptoms; indirect effect = neurocognitive performance \rightarrow defeatist beliefs \rightarrow negative symptoms.

^b $P < .05$.

^c $P < .01$.

to $-0.05, P < .05$). The data are consistent with partial mediation. The ratio of the indirect effect to total effect is 0.35, indicating that defeatist beliefs account for about one-third of the effect of neurocognition on negative symptoms.

R² change The squared Pearson correlation between neurocognitive performance and negative symptoms is .14. The squared multiple correlation for the 3-variable model that also includes defeatist beliefs is .29. Thus, the change in R^2 associated with adding defeatist beliefs to the model is .15, which is statistically different from zero ($F\text{-change}_{1,51} = 11.0, P < .01$), evidence that inclusion of defeatist beliefs in the model accounts for an additional 15% of the variance.

Mediation: Neurocognitive Performance, Functioning, and Defeatist Beliefs. Figure 2 depicts the path analysis testing whether the relationship between neurocognitive performance and functioning is mediated by defeatist belief endorsements.

Step 1 The path between neurocognitive performance and functioning (top of figure 2) is statistically significant ($z = 4.69, P < .001$); step 1 is satisfied.

Step 2 The statistically significant path between neurocognitive performance and defeatist beliefs (left side of figure 2; $z = -2.49, P < .05$) meets the stipulation of this step.

Step 3 The path between defeatist beliefs and functioning (right side of figure 2) is statistically reliable ($z = -2.78, P < .01$). Patients with poorer functioning tend to endorse more defeatist beliefs, a relationship that is independent of the effect of neurocognitive performance upon functioning.

Step 4 The path between neurocognitive performance and functioning, while the effect for defeatist

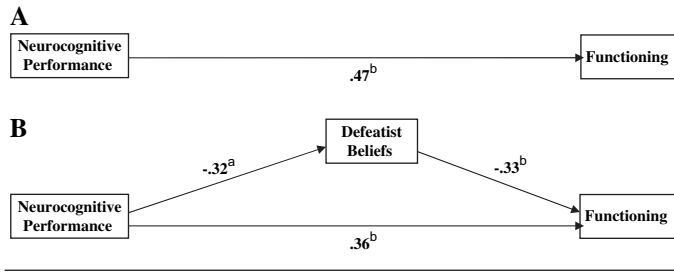


Fig. 2. Path Analysis ($N = 54$). Figure 2A depicts the simple model of neurocognitive performance and functioning. Figure 2B depicts the full model that also includes defeatist beliefs. Neurocognitive performance = average standardized score; functioning = Quality of Life Scale, Abridged²⁰; defeatist beliefs = subscale, Dysfunctional Attitude Scale.²³ ^a $P < .05$. ^b $P < .01$.

beliefs is controlled (bottom of figure 2B), is reduced in magnitude, consistent with mediation. The effect decomposition resulting from the bootstrapping procedure appears in table 5. The indirect effect of neurocognitive performance on functioning through defeatist beliefs is statistically reliable (90% CI = -0.28 to -0.04 , $P < .05$), confirming that the data are consistent with mediation.

Step 5 The path linking neurocognitive performance and functioning, while controlling defeatist belief endorsement (bottom of figure 2B), is statistically reliable ($z = 3.02$; $P < .01$), suggesting that the data are consistent with partial mediation. The bootstrapping analysis of the direct path between neurocognitive impairment and negative symptom (table 5) is statistically reliable (90% CI = 0.18 to 0.52 , $P < .01$). The data are consistent with partial mediation. The ratio of the indirect effect to total effect is 0.23 ; defeatist beliefs account for nearly a quarter of the effect of neurocognition on functioning.

R² change The relationship between neurocognitive performance and functioning has an R^2 of $.22$. Adding defeatist beliefs to the model increase the value of R^2 to $.32$. The change of $.09$ in R^2 is statistically different from zero (F -change_{1,51} = 7.44 , $P < .01$), evidence that inclusion of defeatist beliefs in the model accounts for an additional tenth of the variance.

Discussion

Our findings are consistent with the hypothesis that defeatist beliefs are a mediating variable between cognitive impairment, negative symptomatology, and poor functioning in schizophrenia. Patients showed more defeatist belief endorsement than healthy controls; furthermore, the inclusion of defeatist beliefs in the statistical modeling resulted in an attenuation of the association between cognitive impairment and both negative symptom levels and functioning in the patient sample. Bootstrapping procedures, moreover, confirm the statistical significance of

Table 5. Bootstrapping Mediation Effect Decomposition: Neurocognitive Performance, Defeatist Beliefs, and Functioning (Patient Data, $N = 54$)^a

| Neurocognitive Performance | Functioning | | |
|----------------------------|-------------------------|----------------|-----------------------|
| | Unstandardized Estimate | Standard Error | Standardized Estimate |
| Direct effect | 3.44 ^c | 1.05 | 0.36 |
| Indirect effect | 1.02 ^b | 0.67 | 0.11 |
| Total effect | 4.46 ^c | 0.95 | 0.47 |

^aNeurocognitive performance = average standardized score; functioning = Quality of Life Scale, Abridged²⁰; direct effect = neurocognitive performance → functioning; indirect effect = neurocognitive performance → defeatist beliefs → functioning. ^b $P < .05$. ^c $P < .01$.

the mediation effect. Defeatist beliefs appear to explain a significant proportion of the variance in both models. The present study, consequently, replicates and expands upon Rector’s¹⁵ original finding of an association between defeatist beliefs and negative symptoms.

Alternative Explanations

Several important competing explanations of the present result can be addressed by the pattern of the data.

Depression

Patient participants manifested mild to moderate levels of depression. However, depression levels are not reliably correlated with neurocognitive performance, negative symptoms, or functioning, and the association between defeatist beliefs and all 3 variables is still significant when depression levels are statistically controlled.

Positive Symptoms

Many of the patient participants had moderate to marked hallucinations and delusions. However, 2 observations are as follows: (a) defeatist beliefs are not associated with psychotic symptoms and (b) defeatist beliefs, and not psychotic symptoms, are associated with neurocognitive impairment and negative symptoms.

Artifact/Halo

The defeatist belief and need for acceptance measures were administered as a part of the same questionnaire (ie, the DAS). Yet, despite both sharing the same response scale and the items appearing interleaved with one another, the defeatist beliefs measure was associated with neurocognitive impairment, negative symptoms, and functioning, while need for acceptance was not associated

with any of these variables. Additionally, the measures that have been shown to be related do not all occur in the same measurement modality: symptoms are interviewer scored, defeatist beliefs are self-reported, and cognitive impairment is determined by an objective computerized scoring algorithm.

Implications

In theoretical terms, our findings help to articulate key psychological features of an emerging biopsychosocial model of schizophrenia. While previous research has suggested a link between low self-esteem, cognitive impairment, and poor functioning,^{38,39} our finding identifies a proximal mechanism, defeatist beliefs regarding performance, that correlates with negative symptoms in addition to neurocognitive impairment and poor functioning. We propose that the intellectual rigidity of the emerging cognitive impairment imposes discouraging life experiences upon the patients leading them to develop negative expectancies and defeatist beliefs. Preliminary data support part of this model because defeatist performance beliefs are associated with negative symptom levels in individuals at high risk for developing psychosis (D. Perivoliotis, A. P. Morrison, P.M.G., P. French, A.T.B., unpublished manuscript, 2008). Ultimately, defeatist beliefs become a critical intermediary process between neurobiological factors and dysfunctional behavior seen in individuals with chronic schizophrenia. In this regard, our finding joins a number of recent reports of the impact of cognitive factors in negative symptoms and functioning.^{40,41}

This emerging literature suggests that defeatist, negativistic beliefs and negative expectancies may contribute to the avoidance of constructive and pleasurable activity seen in individuals with schizophrenia.⁴² This formulation is consistent with general models of human motivation, in which belief and expectation play important roles,⁴³ and efficacy beliefs, in particular, have been shown to be important mediators between task resources and task engagement.⁴⁴ Because negative symptoms, cognitive impairment, and functional outcome are all aspects of schizophrenia that do not respond well to traditional pharmacotherapy, and defeatist performance attitudes are connected to all 3, the present results suggest the possibility of improving functional outcome in schizophrenia. Specifically, we propose that eliciting and changing the defeatist performance beliefs could lead to increased engagement in constructive activity in individuals with prominent cognitive impairment and negative symptoms. Defeatist beliefs are, furthermore, measurable targets that can be added to traditional rehabilitation efforts,⁴⁵ cognitive remediation programs,⁴⁶ social skills training,⁴⁷ as well as cognitive behavioral therapy for schizophrenia.⁴⁸

Limitations

The principal limitations of our study are related to the size and nature (ie, stable outpatients) of our sample, as well as to the cross-sectional methodology. Our data are consistent with other causal hypotheses: thus, negative symptoms could cause defeatist beliefs, defeatist beliefs could cause neurocognitive impairment, etc. A longitudinal study or clinical trial is required to more effectively test between these hypotheses. Two additional limitations of the study merit mention.

Measurement

The present research relied, to a great extent, upon self-report and clinician-rated measures. Behavioral demonstration of the impact of defeatist beliefs, perhaps in the manner analogous to that suggested by Horan et al⁴⁹ for anhedonia, would buttress the present findings, as would more objective functioning indicators and use of a performance-based measure of functional capacity, such as the University of California Performance Skills Assessment.⁵⁰

Primary Vs Secondary Negative Symptoms

A priori, negative symptoms can be primary expressions of illness or secondary to another factor.⁵¹ Because we cannot attribute the negative symptoms we have measured to psychosis, anxiety, or depression, we propose that neurocognitive deficits appear to be the principal causal factor in the negative symptoms we have observed.

Conclusion

Our findings suggest that further investigation of patient psychological reaction to their cognitive impairments may further clarify the nature of negative symptoms and poor psychosocial adjustment and facilitate treatment that improves functional outcome.

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Appendix

Defeatist Performance Beliefs

1. It is difficult to be happy unless one is good looking, intelligent, rich, and creative.
2. People will probably think less of me if I make a mistake.

3. If I do not do well all the time, people will not respect me.
4. Taking even a small risk is foolish because the loss is likely to be a disaster.
5. If a person asks for help, it is a sign of weakness.
6. If I do not do as well as other people, it means I am an inferior human being.
7. If I fail at my work, then I am a failure as a person.
8. If you cannot do something well, there is little point in doing it at all.
9. Making mistakes is fine because I can learn from them.
10. If I fail partly, it is as bad as being a complete failure.
11. People should have a reasonable likelihood of success before undertaking anything.
12. If I don't set the highest standards for myself, I am likely to end up a second-rate person.
13. If I am to be a worthwhile person, I must be truly outstanding in one major respect.
14. People who have good ideas are more worthy than those who do not.
15. If I ask a question, it makes me look inferior.

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