Psychiatry Research 189 (2011) 43–48

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Negative expectancy appraisals and defeatist performance beliefs and negative symptoms of schizophrenia

Shannon M. Couture [a,*], Jack J. Blanchard [a], Melanie E. Bennett [b]

[a] Department of Psychology, University of Maryland College Park, Biology-Psychology Building, College Park, MD 20742, USA
[b] Department of Psychiatry, University of Maryland Baltimore School of Medicine, 737 W. Lombard Street, Baltimore MD 21201, USA

ARTICLE INFO

Article history:
Received 8 March 2011
Received in revised form 19 May 2011
Accepted 23 May 2011

Keywords:
Dysfunctional beliefs
Cognitive model of negative symptoms
Treatment

ABSTRACT

Negative symptoms have clear functional implications in schizophrenia and are typically unresponsive to current treatments. The cognitive model of negative symptoms suggests that dysfunctional beliefs are influential in the development and maintenance of negative symptoms and schizophrenia. The current study reports on a preliminary investigation of a new measure of Negative Expectancy Appraisals (specifically beliefs about limited probability of success and perception of limited cognitive resources), and also evaluates whether dysfunctional beliefs are more closely linked to particular subdomains of negative symptoms. Sixty two individuals with schizophrenia completed measures of dysfunctional beliefs and were rated on negative symptoms. Analyses indicated that the endorsement of beliefs regarding low expectations for success and perception of limited resources (Negative Expectancy Appraisals) are robustly associated with diminished experience negative symptoms (avolition, asociality, and anhedonia), but are not associated with negative symptoms reflecting diminished expressivity (blunted affect, alogia). Similarly, Defeatist Performance Beliefs are modestly related to diminished experience, but not diminished expression, negative symptoms. Negative Expectancy Appraisals were also robustly linked to depressive symptoms. Results from the current study provide evidence that dysfunctional beliefs are clearly relevant to consider in relation to negative symptoms, and may represent a fruitful treatment target.

1. Introduction

Researchers have consistently demonstrated that negative symptoms are moderately to strongly associated with community functioning and laboratory performance-based measures of functioning (Evans et al., 2003; Leifker et al., 2009). Moreover, negative symptoms represent a critical unmet treatment need (Kirkpatrick et al., 2006), as pharmaceutical and psychosocial interventions do not tend to impact negative symptoms, or do so only to a minimal degree (Buckley and Stahl, 2007). Importantly, negative symptoms do not seem to be merely an artifact of depressive or psychotic symptoms (Emsley et al., 2003), nor can they be explained by the pervasive neurocognitive impairment inherent in schizophrenia (despite being correlated; Harvey et al., 2006).

Despite the clear clinical and functional implications of negative symptoms, factors which contribute to their development, maintenance, and exacerbation are poorly understood, and there is little agreement about the likely causes of negative symptoms (Avery et al., 2009). Over 20 years ago, John Strauss proposed several factors that underlie negative symptoms including fear of stressful social situations, avoidance of stigmatization, loss of hope and self-esteem, and the belief that improvement is not possible due to being diagnosed with a mental disorder (Strauss, 1985; Strauss et al., 1989). There has been renewed interest in these constructs, exemplified by a recently proposed cognitive model of negative symptoms (Rector et al., 2005; Beck et al., 2009). The purpose of this paper is to provide an additional test of the cognitive model of negative symptoms by 1) considering whether dysfunctional beliefs are differentially related to previously identified facets of negative symptoms (e.g., Blanchard and Cohen, 2006), and 2) adding an additional belief dimension proposed by the model, but not previously explored in prior research.

1.1. Cognitive model of negative symptoms

The cognitive model of negative symptoms suggests that individuals with an inherited vulnerability to schizophrenia encounter significant difficulties (e.g., poor school performance, social problems) as they develop through adolescence and early adulthood due to the increasing complexity of life demands. These initial problems in social and occupational functioning are

* Corresponding author at: University of Maryland, 1123M Biology-Psychology Building, College Park, MD 20742, USA. Tel.: +1 301 405 7190; fax: +1 301 314 9566.
E-mail addresses: scouture@psyc.umd.edu (S.M. Couture), jblanchard@psyc.umd.edu (J.J. Blanchard), mbennett@psych.umaryland.edu (M.E. Bennett).

0165-1781/$ – see front matter © 2011 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.psychres.2011.05.032

influential in the formation of dysfunctional beliefs (e.g., expecting rejection when meeting a new person). These beliefs result in the selection of maladaptive behaviors such as social isolation and the diminished engagement in goal-directed behavior; consequently, there are limited opportunities to contradict negative or maladaptive beliefs. According to the model, negative symptoms arise from the interaction of the dysfunctional beliefs and subsequent behavioral choices.

The model proposes specific types of dysfunctional beliefs that may be associated with negative symptoms. Most frequently studied to date are Defeatist Performance Beliefs, or "overly generalized negative conclusions regarding their own task performance" (Beck et al., 2009, p. 152) (e.g., "If you cannot do something well, there is little point in doing it at all" or "People should have a reasonable likelihood of success before undertaking anything."). Defeatist Performance Beliefs are endorsed more strongly by individuals with schizophrenia compared to healthy controls, and correlate with negative, but not positive, symptom severity (Rector, 2004; Grant and Beck, 2009; Horan et al., 2010). Defeatist Performance Beliefs do evidence significant relationships with depression in some (small to medium effects; Rector, 2004; Grant and Beck, 2009; Horan et al., 2010), but not all (Perivoliotis et al., 2009), studies; however, these studies also suggest that the relationship between negative symptoms and Defeatist Performance Beliefs remains significant (and of a similar magnitude) after controlling for depressive symptoms.

Beck et al. (2009) also proposed that Negative Expectancy Appraisals are also important for negative symptoms. Negative Expectancy Appraisals involve perceptions of reduced future likelihood of pleasure (i.e., akin to conceptualizations of anticipatory pleasure c.f. Kring, 1999), acceptance (e.g., others would not want to engage with them due to having a mental illness, failure and difficulty are inevitable due to having a diagnosis), success (e.g., will fail to meet goals or will have substandard performance), and perception of limited cognitive resources necessary to perform tasks associated with daily living (e.g., beliefs about the cost of effort, beliefs about abilities to persist with difficult tasks, limited abilities due to neurocognitive impairment). No studies have directly evaluated the contribution of Negative Expectancy Appraisals to negative symptoms, probably due in part to a lack of an available assessment measure for this cognitive domain. However, related concepts, such as beliefs about self-efficacy (Pratt et al., 2005; Avery et al., 2009), evidence significant relationships with negative symptoms, thus providing limited evidence that Negative Expectancy Appraisals have promise.

1.2. What negative symptoms are being modeled?

One major limitation of the prior research is that prior studies have typically explored associations between beliefs and global indices of negative symptoms rather than different negative symptom domains. This is an important distinction given studies (see reviews by Blanchard and Cohen, 2006; Foussias and Remington, 2010) suggesting that the structure of negative symptoms may be best represented by a two-factor model involving a diminished experience factor (comprised of anhedonia, asociality, and avolition) and a diminished expression factor (comprised of blunted affect and alogia). Given that the dysfunctional beliefs described in the model primarily focus on expectations regarding performance of behaviors (Negative Expectancy Appraisals) and the consequences of failed performance (Defeatist Performance Beliefs), it seems reasonable to conclude that these dysfunctional beliefs would be more strongly related to negative symptoms that involve drive, motivation, interest, and engagement in behavior (i.e., avolition, anhedonia, asociality); rather than symptoms characterized by diminished outward expression (i.e., blunted affect and alogia).

1.3. Current study

This study is an extension of prior work investigating the cognitive model of negative symptoms. The primary question of interest is whether the relationship between dysfunctional beliefs and negative symptoms varies based on the negative symptom domain assessed. A secondary aim is to provide a preliminary report on the potential utility of including additional dysfunctional belief domains (Negative Expectancy Appraisals) for understanding the negative symptoms of schizophrenia. Based on the cognitive model and prior research, we hypothesized that Negative Expectancy Appraisals and Defeatist Performance Beliefs would be significantly correlated with diminished experience negative symptoms but not diminished expression symptoms.

Ancillary aims included investigating the relationship among dysfunctional belief domains based on prior evidence of significant relationships among belief measures (Grant and Beck, 2009; Horan et al., 2010), and hypothesizing that the relationship between negative symptoms and dysfunctional beliefs would remain significant after statistically controlling for psychotic and depressive symptoms (in line with prior work; Grant and Beck, 2009). Finally, prior studies of Defeatist Performance Beliefs investigated whether negative symptoms were associated with greater dysfunctional belief endorsement broadly or whether they are uniquely associated with belief domains proposed by the model. As these prior studies have reported conflicting results (Rector, 2004; Grant and Beck, 2009 versus Horan et al., 2010); we included an additional secondary aim of investigating whether Defeatist Performance Beliefs and Negative Expectancy Appraisals were associated with negative symptoms to a greater degree than Need for Approval (i.e., non-model) beliefs.

2. Methods

2.1. Participants

Seventy four individuals with schizophrenia or schizoaffective disorder were recruited from outpatient clinics affiliated with the University of Maryland Baltimore or the Baltimore Veteran's Affairs Medical Center as part of a larger study investigating the psychometric properties of a newly developed negative symptom instrument (The Collaboration to Advance Negative Symptom Assessment in Schizophrenia; Blanchard et al., 2011). Of these 74 individuals, only 62 were able to complete dysfunctional belief measures due to time constraints. Thus all data reported in the results are from this subset of the full sample. Participants were identified via chart review or recommendation from their mental health clinician. Inclusion criteria were: 1) diagnosis of schizophrenia or schizoaffective disorder; 2) age between 18–60 years; 3) currently being seen by a psychiatrist at one of the participating clinics. Exclusion criteria were: 1) other DSM-IV diagnosis (except substance use disorders); 2) substance dependence within the past 6 months; 3) substance abuse within the past month; 4) history of significant head injury or mental retardation; 5) significant neurological disease; 6) not proficient in English; 7) unable to participate at time of assessment due to intoxication or severe psychotic symptoms. Study procedures were approved by local Institutional Review Board (IRBs) and all participants provided informed consent. The sample was comprised of individuals with a chronic schizophrenia (diagnosed for approximately 20 years), primarily African–American, with a high school education. Approximately two-thirds of the sample was diagnosed with schizophrenia, one-third with schizoaffective disorder. Demographic characteristics for the sample are displayed in Table 1 and clinical characteristics (including Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) diagnosis) are displayed in Table 2.

2.2. Materials

2.2.1. The Structured Clinical Interview for DSM-IV (SCID-I; First et al., 2001)

The SCID-I was used to establish clinical diagnoses. Clinical interviewers had a minimum of Master's-level training and extensive diagnostic experience including completion of the SCID-101 training course. To ensure ongoing diagnostic agreement, all clinical interviews were videotaped for regular weekly supervision by a doctoral-level psychologist.

2.2.2. The Clinical Assessment Interview for Negative Symptoms (CAINS; Forbes et al., 2010; Blanchard et al., 2011)

The CAINS is a new negative symptom measure that is intended to be responsive to recommendations from the National Institute of Mental Health (NIMH) consensus group advocating for a new instrument which addresses methodological shortcomings

Table 1
Demographic characteristics ($N = 62$).

	Mean	S.D.
Age	46.7	8.4
Years education	12.1	2.5
	%	*N*
Sex		
Female	33.9	21
Male	62.9	39
Race		
Caucasian	11.3	7
African–American	72.6	45
Multi-racial	6.5	4
Other	3.2	2
Marital status		
Married	3.2	2
Widowed	3.2	2
Divorced	21.0	13
Never married	67.7	42
Children		
None	58.1	36
1 or more	38.7	24
Living arrangement		
Unsupervised, house/apartment	67.7	42
Group home	4.8	3
Supervised housing	24.2	15
Employed		
Yes	19.4	12
No	77.4	48
Veteran		
Yes	27.4	17
No	69.4	43

Note. S.D. = Standard Deviation.

of existing scales (e.g., relying almost exclusively on functional behaviors rather than internal states to evaluate symptoms; Kirkpatrick et al., 2006; Blanchard et al., 2011). The reader is referred to several new publications on this instrument for more detail (Forbes et al., 2010; Blanchard et al., 2011; Horan et al., under review). The version of the CAINS used in this study is a 23-item clinical interview scale and has adequate reliability and discriminant and convergent validity (Horan et al., under review).

Items measure: Asociality (3 items); Avolition (4 items); Anhedonia (9 items); Blunted Affect (5 items); and Alogia (2 items). Items are rated on a 5-point scale from 0 (no impairment) to 4 (severe deficit). Consistent with prior factor analytic studies of negative symptoms (Blanchard and Cohen, 2006), initial exploratory factor analyses of the refined CAINS within the Collaboration to Advance Negative Symptom Assessment in Schizophrenia (CANSAS) multisite study, in over 270 patients with schizophrenia, supported two major factors of negative symptoms: a diminished experience component (asociality, avolition, and anhedonia scales; possible range = 0–64; α for current study = 0.89) and a diminished expression component (alogia and blunted affect scales; possible range = 0–28; α for current study = 0.81). For purposes of the current study, symptom scores for these two factors were created by merely summing the constituent items. The correlation between these factors in the current study was modest ($r = 0.29$, $p < 0.05$), and the lack of relationship with positive and depressive symptoms in the current study provides additional evidence discriminant validity in this sample (see Table 3).

Table 2
Clinical characteristics.

	Mean	S.D.
Age of first psychiatric treatment	21.8	7.6
Age of first hospitalization	23.3	7.3
Number of previous hospitalizations	6.4	6.7
CDSS total	2.85	3.3
BPRS positive symptoms	12.1	6.5
CAINS diminished experience factor	23.8	12.9
CAINS diminished expression factor	5.6	5.0
	%	*N*
Diagnosis		
Schizophrenia	59.7	37
Schizoaffective-bipolar type	17.7	11
Schizoaffective-depressed type	21.8	13
Medication		
Atypical only	53.2	33
Typical only	24.2	15
Both typical and atypical	21.0	13

Note. S.D. = Standard Deviation; CDSS = Calgary Depression Scale for Schizophrenia; BPRS = Brief Psychiatric Rating Scale; CAINS = Clinical Assessment Interview for Negative Symptoms.

2.2.3. The Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1990)

The CDSS was developed to provide an assessment of depressive symptoms separate from positive, negative and extrapyramidal symptoms in schizophrenia patients. The CDSS is a nine item structured interview scale, and has been extensively evaluated in both inpatient and outpatients, with good inter-rater agreement and good convergent and discriminant validity (Addington et al., 1990; Kim et al., 2006). The total score was used in all analyses. In the current study, we found good internal consistency for the CDSS (α = 0.70).

2.2.4. Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993)

The 24-item expanded version of the BPRS was used to measure clinical symptomatology. Items were rated on a seven point scale, ranging from "not reported" to "very severe". We used the positive symptom subscale (suspiciousness, grandiosity, conceptual disorganization, hallucinatory behavior, unusual thought content, bizarre behavior, disorientation) based on the factor structure supported by Kopelowicz et al. (2008). The internal consistency of the BPRS positive symptoms subscale for the current study was good (α = 0.75). As we were primarily interested in depressive symptoms, we used the CDSS rather than the BPRS affect factor.

2.2.5. Defeatist Performance Beliefs from the Dysfunctional Attitudes Scale (DAS; Weissman, 1978)

The Defeatist Performance Beliefs subscale of the DAS includes 15 statements concerning one's ability to perform tasks and the likelihood of success. Example items include, "If you cannot do something well, there is little point in doing it at all" or "People should have a reasonable likelihood of success before undertaking anything." Participants rate how strongly they agree with each item on a scale of 1 (agree totally) to 7 (disagree totally). In the current study, Defeatist Performance Beliefs had excellent internal consistency (α = 0.85).

2.2.6. Need for Approval Beliefs from the DAS (Weissman, 1978)

The need for approval subscale of the DAS consists of 10 items concerning extreme statements about the need of other's acceptance and approval to be happy. As with Defeatist Performance Beliefs, participants rate how strongly they agree with each item on a scale of 1 (agree totally) to 7 (disagree totally). Example items include, "My value as a person depends greatly on what others think of me" and "If others dislike you, you cannot be happy." In the current study, Need for Approval Beliefs had adequate internal consistency (α = 0.62).

2.2.7. Success and Resource Appraisals Questionnaire (SARA-Q; Couture et al., 2007)

As there was no previously existing measure of Negative Expectancy Appraisals, a new measure assessing beliefs regarding low expectations for success and perception of limited cognitive resources was developed. These two belief domains were selected for incorporation into the new measure as they share similar content (i.e., both involve beliefs about performing tasks and activities). Items were generated by scale authors and consensus was used to select items to incorporate in the measure. Participants rate their level of agreement with 25 statements using a 7-point Likert scale ranging from agree totally to disagree totally (consistent with scaling on the DAS). Example items include, "I can't think as well as other people", "It doesn't usually seem worth the effort to try new things", "I'm not very good at following through with what I set out to achieve", and "I am capable of achieving my goals" (reverse scored). In this sample, the SARA-Q demonstrated excellent internal consistency (α = 0.88).

Table 3
Correlations of dysfunctional beliefs and symptoms.

	1	2	3	4	5	6
1. Defeatist Performance Beliefs	–					
2. Need for Approval	0.61**	–				
3. SARA-Q	0.50**	0.46**	–			
4. CAINS diminished experience	0.27*	0.15	0.42**	–		
5. CAINS diminished expression	−0.11	−0.21	0.09	0.29*	–	
6. CDSS total	0.07	0.24	0.51**	0.11	−0.08	–
7. BPRS positive symptoms	−0.01	0.04	0.30*	0.03	−0.13	0.51**

Note. CAINS = Clinical Assessment Interview for Negative Symptoms; SARA-Q = Success and Resources Appraisals Questionnaire; CDSS = Calgary Depression Scale for Schizophrenia; BPRS = Brief Psychiatric Rating Scale.
** $p < 0.01$.
* $p < 0.05$.

2.3. Procedure

Participants attended a single session approximately 3–4 h in length. They were given ample opportunity for breaks. All participants received study measures in the same order. The study interviewer administered the SCID, CAINS, BPRS, CDSS, and dysfunctional belief measures.

2.4. Data analysis

Given the primary aim of evaluating the relationship between the two facets of negative symptoms and dysfunctional beliefs proposed by the model, we first computed Pearson's correlations and tested the statistical difference between these correlations using Fisher's transformation (two-tailed significance tests were used for all comparisons). Similarly, we expected Defeatist Performance Beliefs and Negative Expectancy Appraisals but not Need for Approval (i.e., non-model) beliefs would be associated with negative symptoms, so we also tested the statistical difference between these correlations. Next, we evaluated the relationship among psychotic symptoms, depression, and dysfunctional beliefs. Finally, we conducted partial correlations to determine whether the relationship between negative symptoms and dysfunctional beliefs remained statistically significant after controlling for depressive symptoms.

3. Results

3.1. Correlations of dysfunctional beliefs and negative symptoms

First, the relationship between dysfunctional beliefs and symptoms was evaluated (see Table 3). With regard to negative symptoms, Defeatist Performance Beliefs ($r=0.27$, $p<0.05$) and the SARA-Q ($r=0.42$, $p<0.01$) were significantly correlated with the diminished experience negative symptoms factor, but Need for Approval beliefs were not ($r=0.15$, n.s.). In contrast, none of the dysfunctional belief measures were associated with the diminished expression negative symptom factor. Consistent with hypotheses, Defeatist Performance Beliefs ($Z=2.58$, d.f.$=58$, $p<0.05$) and the SARA-Q ($Z=2.29$, d.f.$=56$, $p<0.05$) were more strongly associated with the CAINS diminished experience factor of negative symptoms than the diminished expression factor.

Second, differential relationships with negative symptoms for model versus non-model dysfunctional beliefs were evaluated. The SARA-Q was more strongly associated with diminished experience negative symptoms than Need for Approval beliefs ($Z=2.14$, d.f.$=56$, $p<0.05$), but the correlations between diminished experience negative symptoms and Defeatist Performance Beliefs versus Need for Approval beliefs were not statistically different from one another ($Z=1.08$, d.f.$=58$, n.s.).

Third, the intercorrelations among dysfunctional belief measures were examined (see Table 3). The three dysfunctional belief measures were strongly intercorrelated. Although these correlations indicated substantial shared variance among the measures (ranging from 21% to 37%), this indicates that 63 to 79% of the variance in each measure is unaccounted for by other belief measures.

Fourth, we considered whether adding the SARA-Q to the current study added any useful information above the influence of Defeatist Performance Beliefs. The correlation between the SARA-Q and the CAINS diminished experience factor ($r=0.42$) was not statistically different than the relationship between Defeatist Performance Beliefs and the CAINS diminished experience factor ($r=0.27$; $Z=1.24$, d.f.$=56$, $p>0.05$). After controlling for the SARA-Q, Defeatist Performance Beliefs were not significantly correlated with diminished experience negative symptoms ($r=0.06$, n.s.), but the SARA-Q remained significantly correlated with diminished experience negative symptoms after controlling for the Defeatist Performance Beliefs scale ($r=0.35$, $p<0.01$).

3.2. Correlations of dysfunctional beliefs and other symptoms

Defeatist Performance Beliefs were not associated with psychotic or depressive symptoms. In contrast, the SARA-Q was correlated with psychotic symptoms ($r=0.30$, $p<0.05$) and depressive symptoms ($r=0.51$, $p<0.01$). After controlling for depression severity, the partial correlation between CAINS diminished experience negative symptoms remained statistically significant for Defeatist Performance Beliefs ($r=0.26$, $p<0.05$) and for the SARA-Q ($r=0.42$, $p<0.01$) and of a similar magnitude as the zero-order correlations. The partial correlation between the SARA-Q and diminished experience negative symptoms, controlling for positive symptoms, was $r=0.43$ ($p<0.01$); again, statistically significant and similar in magnitude to the zero-order correlation.

3.3. Exploratory analysis: can the relationship between CAINS diminished experience and the SARA-Q be explained by overlapping item content?

It is possible that because the CAINS diminished experience factor and the SARA-Q both assess future expectancies to some degree, this overlapping item content could explain the robust correlation. We removed future expectancy anhedonia items, and found that the correlation remained statistically significant ($r=0.45$, $p<0.01$).

4. Discussion

The current study sought to provide an additional test of the cognitive model of negative symptoms (Rector et al., 2005; Beck et al., 2009). This was the first study to examine the possible differential relationship between dysfunctional beliefs and the two major facets of negative symptoms (diminished experience and diminished expression). We also conducted a preliminary investigation of a newly developed scale of Negative Expectancy Appraisals.

Consistent with the cognitive model, we found that a measure of low expectations for success and perception of limited cognitive resources (the SARA-Q) and Defeatist Performance Beliefs were associated with the diminished experience factor of negative symptoms but was not correlated with negative symptoms factor of diminished expressivity. Comparing the differences between correlations of dysfunctional beliefs and the diminished experience factor with dysfunctional beliefs and the diminished expression factor revealed that these correlations were indeed significantly different from one another. It should be noted that content overlap between the CAINS diminished experience items and items from dysfunctional belief measures is unlikely to account for the observed relationships. Specifically, as an exploratory analyses, we removed anhedonia items questioning expectations about future pleasure and found this does not impact the magnitude of the correlations. In addition, observation of item content of the CAINS is very different on the surface (e.g., asking for intensity ratings for events the individual anticipates participating in during the coming week) from questions asked in the SARA-Q (e.g., “I'm not very good at following through with what I set out to achieve”).

We also investigated whether dysfunctional beliefs proposed in the model (Defeatist Performance Beliefs, Negative Expectancy Appraisals) would be more strongly associated with negative symptoms than non-model beliefs (Need for Approval). Our correlational analyses replicated the results of Grant and Beck (2009) and Rector (2004) suggesting that negative symptoms are related to Defeatist Performance Beliefs (and Negative Expectancy Appraisals), but not Need for Approval (but see Horan et al., 2010). Moreover, we confirmed these findings using a new measure of negative symptoms designed to address the methodological weaknesses of noted in existing negative symptom instruments (Blanchard et al., 2011).

As a measure of Negative Expectancy Appraisals, the SARA-Q was also found to be strongly associated with depressive symptoms and modestly correlated with psychotic symptoms as assessed by the BPRS. Depressed and psychotic symptoms were unrelated to negative symptom severity (correlations<0.12). Importantly, the robust association between diminished experience negative symptoms and

the SARA-Q remained after controlling for depressive symptoms, psychotic symptoms, and Defeatist Performance Beliefs. However, these findings do raise issues about how to interpret the fact that Negative Expectancy Appraisals were linked with negative symptoms, depression, and psychotic symptoms. One interpretation appeals toward cognitive models of other symptoms in schizophrenia; that is, these findings make sense in light of proposed active mechanisms in psychotic and depressive symptoms in psychosis. For example, cognitive conceptualization of voices suggest that voice content is related to the dysfunctional beliefs of the individual (Beck et al., 2009), and cognitive models of depression also assume poor future expectations (c.f. Beck et al., 1979). It is possible that the significant association we found between the SARA-Q and positive symptoms may be explained by the strong relationship between depression and psychotic symptoms ($r = 0.49$, a finding replicated in other samples; e.g., Lancon et al., 2001). Alternatively, given prior work suggesting that positive symptoms are associated with self-efficacy and self-esteem (e.g., Bentall et al., 2009), the significant association between the SARA-Q and positive symptoms may be accounted for by similar content between measures of self-efficacy and esteem and the SARA-Q. These findings clearly raise important measurement questions concerning dysfunctional beliefs and their association with symptom domains other than negative symptoms (e.g., can we identify beliefs with content specificity?). Future studies, particularly those that investigate the temporal stability of dysfunctional beliefs over time and changing affective symptom state, can explore these ideas further. Alternatively, the interpretation that this preliminary measure of a new belief domain is inadequate in some way cannot be ruled out given the current limited data on the SARA-Q. Additional research with this instrument, including more comprehensive data on its validity than has been presented here, is needed.

Although the current study has provided an important extension of prior work on the relationship between dysfunctional beliefs and negative symptoms in schizophrenia, it has a variety of limitations. First, previous research has linked dysfunctional beliefs to neurocognitive ability and capacity to engage in functional behaviors (Grant and Beck, 2009; Horan et al., 2010), but we did not include a neurocognitive battery in our assessment. In addition, although the inclusion of the SARA-Q allowed us to evaluate a wider variety of beliefs described in the cognitive model of negative symptoms, the factor structure of the SARA-Q is unknown and more work on its psychometric properties is needed. Finally, the current study would have been strengthened by including a control group, which will be addressed in future studies.

In sum, the current study has provided additional evidence to support the cognitive model of negative symptoms. Results clearly suggest that the dysfunctional beliefs included in the current study are only related to diminished experience negative symptoms, and not to diminished expressivity negative symptoms. This study also indicates that Negative Expectancy Appraisals are important for understanding negative symptoms in addition to Defeatist Performance Beliefs. Although it is currently unknown which beliefs are most important for negative symptoms, these findings suggest that it is important to consider assessing dysfunctional beliefs in schizophrenia to gain a more complete picture of factors that may contribute to negative symptoms and poor functioning. It is possible that targeting these domains of dysfunctional beliefs in treatment may result in improved outcomes and reduced negative symptoms in schizophrenia.

Acknowledgements

This work was supported by National Institute of Mental Health (K02-MH079231 and R01-MH082839) to J.J.B. The NIMH had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. The authors wish to acknowledge Dr. Paul Grant and anonymous reviewers for helpful comments on an earlier version of this manuscript. The authors also wish to recognize the PI's (Drs. Ann Kring, William Horan, and Raquel Gur) on the Collaboration to Advance Negative Symptom Assessment in Schizophrenia (CANSAS) who had a role in the larger study.

References

Addington, D., Addington, J., Schissel, B., 1990. A depression rating scale for schizophrenia. Schizophrenia Research 3, 247–251.
Avery, R., Startup, M., Calabria, K., 2009. The role of effort, cognitive expectancy appraisals and coping style in the maintenance of negative symptoms of schizophrenia. Psychiatry Research 167, 36–46.
Beck, A.T., Rush, A.J., Shaw, B.F., Emery, G., 1979. Cognitive Therapy of Depression. Guilford, New York.
Beck, A.T., Rector, N.A., Stolar, N.M., Grant, P.M., 2009. Schizophrenia: Cognitive Theory, Research, and Therapy. Guilford, New York, NY.
Bentall, R.P., Rowse, G., Shryane, N., Kinderman, P., Howard, R., Blackwood, N., Moore, R., Corcoran, R., 2009. The cognitive and affective structure of paranoid delusions: a transdiagnostic investigation of patients with schizophrenia spectrum disorders and depression. Archives of general psychiatry 66, 236–247.
Blanchard, J.J., Cohen, A.S., 2006. The structure of negative symptoms within schizophrenia: implications for assessment. Schizophrenia Bulletin 32, 238–245.
Blanchard, J.J., Kring, A.M., Horan, W.P., Gur, R., 2011. Toward the next generation of negative symptom assessments: the collaboration for the advancement of negative symptom assessment in schizophrenia. Schizophrenia Bulletin 37, 291–299.
Buckley, P.F., Stahl, S.M., 2007. Pharmacological treatment of negative symptoms in schizophrenia: therapeutic opportunity or cul-de-sac? Acta Psychiatrica Scandinavica 115, 93–100.
Couture, S.M., Grant, P.M., Beck, A.T., Morrison, A.P., 2007. Success and resource appraisals questionnaire (SARA-Q), unpublished instrument.
Emsley, R., Rabinowitz, J., Torreman, M., 2003. The factor structure for the Positive and Negative Syndrome Scale (PANSS) in recent-onset psychosis. Schizophrenia Research 61, 47–57.
Evans, J.D., Heaton, R.K., Paulsen, J.S., Palmer, B.W., Patterson, T., Jeste, D.V., 2003. The relationship of neuropsychological abilities to specific domains of functional capacity in older schizophrenia patients. Biological psychiatry 5, 422–430.
First, M., Spitzer, R., Gibbon, M., Williams, J., 2001. Structured Clinical Interview for DSM-IV Axis I Disorders — patient edition (SCID-I). Biometrics Research Department, New York. State Psychiatric Institute, New York, NY.
Forbes, C., Blanchard, J.J., Bennett, M., Horan, W.P., Kring, A., Gur, R., 2010. Initial development and preliminary validation of a new negative symptom measure: the clinical assessment interview for negative symptoms (CAINS). Schizophrenia Research 124, 36–42.
Foussias, G., Remington, G., 2010. Negative symptoms in schizophrenia: avolition and Occam's razor. Schizophrenia Bulletin 36 (2), 359–369.
Grant, P.M., Beck, A.T., 2009. Defeatist beliefs as a mediator of cognitive impairment, negative symptoms, and functioning in schizophrenia. Schizophrenia Bulletin 35, 798–806.
Harvey, P.D., Koren, D., Reichenberg, A., Bowie, C.R., 2006. Negative symptoms and cognitive deficits: what is the nature of their relationship? Schizophrenia Bulletin 32, 250–258.
Horan, W.P., Rassovsky, Y., Kern, R.S., Lee, J., Wynn, J.K., Green, M.F., 2010. Further support for the role of dysfunctional attitudes in models of real-world functioning in schizophrenia. Journal of Psychiatric Research 44, 499–505.
Horan, W.P., Kring, A.M., Gur, R.E., Reise, S.P., Blanchard, J.J., under review. Psychometric evaluation of the Clinical Assessment Interview for Negative Symptoms (CAINS) in a large outpatient schizophrenia sample.
Kim, S.W., Kim, S.J., Yoon, B.H., Kim, J.M., Shin, I.S., Hwang, M.Y., Yoon, J.S., 2006. Diagnostic validity of assessment scales for depression in patients with schizophrenia. Psychiatry Research 144, 57–63.
Kirkpatrick, B., Fenton, W., Carpenter, W.T., Marder, S.R., 2006. The NIMH-MATRICS consensus statement on negative symptoms. Schizophrenia Bulletin 32, 296–303.
Kopelowicz, A., Ventura, J., Liberman, R.P., Mintz, J., 2008. Consistency of Brief Psychiatric Rating Scale factor structure across a broad spectrum of schizophrenia patients. Psychopathology 41, 77–84.
Kring, A.M., 1999. Emotion in schizophrenia: old mystery, new understanding. Current Directions in Psychological Science 8, 160–163.
Lancon, C., Auquier, P., Reine, G., Bernard, D., Addington, D., 2001. Relationships between depression and psychotic symptoms of schizophrenia during an acute episode and stable period. Schizophrenia Research 47, 135–140.
Leifker, F.R., Bowie, C.R., Harvey, P.D., 2009. Determinants of everyday outcomes in schizophrenia: the influences of cognitive impairment, functional capacity, and symptoms. Schizophrenia Research 115, 82–87.
Perivoliotis, D., Morrison, A.P., Grant, P.M., French, P., Beck, A.T., 2009. Negative performance beliefs and negative symptoms in individuals at ultra-high risk for psychosis: a preliminary study. Psychopathology 42, 375–379.
Pratt, S.I., Mueser, K.T., Smith, T.E., Lu, W., 2005. Self-efficacy and psychosocial functioning in schizophrenia: a mediational analysis. Schizophrenia Research 78, 187–197.
Rector, N.A., 2004. Dysfunctional attitudes and symptom expression in schizophrenia: differential associations with paranoid delusions and negative symptoms. Journal of Cognitive Psychotherapy 18, 163–173.

Rector, N.A., Beck, A.T., Stolar, N., 2005. The negative symptoms of schizophrenia: a cognitive perspective. Canadian Journal of Psychiatry 50, 247–257.
Strauss, J.S., 1985. Negative symptoms: future developments of the concept. Schizophrenia Bulletin 11, 457–460.
Strauss, J.S., Rakfeldt, J., Harding, C.M., Lieberman, P., 1989. Psychological and social aspects of negative symptoms. British Journal of Psychiatry 155, 128–132.
Ventura, J.L., Nuechterlein, K.H., Liberman, R.P., Green, M.F., Shaner, A., 1993. Brief psychiatric ratings scale (BPRS) expanded version: scales, anchor points, and administration manual. International journal of methods in psychiatric research 3, 227–243.
Weissman, A., 1978. The Dysfunctional Attitudes Scale: a Validation Study. University of Pennsylvania, Philadelphia, PA.