

Expectations of Success as a Predictor of Negative Symptom Reduction over 18 months in
Individuals with Schizophrenia

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Running head: EXPECTANCIES OF SUCCESS AND NEGATIVE SYMPTOMS

- We examine expectancies of success—beliefs of future success and goal attainment.
- 118 individuals with schizophrenia-spectrum disorders completed an 18 month study.
- High and moderate expectancies of success predicted reduced negative symptoms.
- Findings support the cognitive model of negative symptoms.

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Abstract

Negative symptoms are often enduring and lead to poor functional outcomes in individuals with schizophrenia. The cognitive model of negative symptoms proposes that low expectancies of success contribute to the development and maintenance of negative symptoms; however, longitudinal investigations assessing these beliefs and negative symptoms are needed. The current study examined whether an individual's baseline expectancies of success—one's beliefs about future success and goal attainment—predicted negative symptom reduction over 18 months in individuals with schizophrenia-spectrum disorders ($n = 118$). Data were collected at baseline, 9 months, and 18 months as part of a randomized controlled trial of Illness Management and Recovery. A mixed effects regression analysis revealed a significant reduction in negative symptoms over time, with a significant interaction effect between time and baseline expectancies of success. After controlling for baseline negative symptoms, demographic variables, and treatment conditions, those with high and moderate baseline expectancies of success evidenced a significant reduction in negative symptoms at 18 months, while those with low baseline expectancies of success did not evidence reduced negative symptoms. Findings support the cognitive model of negative symptoms and suggest that expectancies of success may be a useful treatment target for interventions aimed at reducing negative symptoms.

Keywords: negative expectancy appraisals; success; schizophrenia; negative symptoms; dysfunctional beliefs

1. Introduction

Negative symptoms such as reduced initiation of goal directed behaviors, pursuit of pleasurable experiences, and social interest and engagement, are often linked to poor functional outcomes. Indeed, negative symptoms have been linked to poor quality of life in individuals with schizophrenia (Hunter and Barry, 2012; Foussias et al., 2014), decreased independent living, functional capacity, and social and role functioning (Pogue-Geile and Harrow, 1985; Bowie et al., 2006; Kring et al., 2013; Fervaha et al., 2014). Moreover, evidence shows that negative symptoms contribute to poor functioning more than positive symptoms of schizophrenia (Rabinowitz et al., 2012). Approximately 60% of individuals with schizophrenia-spectrum disorders experience one or more negative symptoms (Bobes et al., 2010) and 15-20% experience enduring negative symptoms that are primary to the disorder (Buchanan, 2007). Although recent psychosocial treatments have shown efficacy in improving a subset of negative symptoms (Grant et al., 2012; Granholm et al., 2014; Grant et al., 2014), negative symptoms can often persist despite psychosocial treatments and antipsychotic medication (Tandon et al., 2010).

The cognitive model of negative symptoms of schizophrenia suggests that one potential psychological mechanism that plays a role in the development and maintenance of negative symptoms is dysfunctional beliefs. Specifically, negative symptoms are thought to develop from dysfunctional beliefs about performance, acceptance, likelihood of success, and resources (Rector et al., 2005; Beck et al., 2009), which reduce motivation and effort for tasks of every-day living. Indeed, several cross-sectional studies have garnered support for the cognitive model of negative symptoms, with much of the evidence looking at a subtype of dysfunctional beliefs, defeatist performance beliefs (i.e., overgeneralized negative beliefs about one's ability to successfully perform tasks). Defeatist performance beliefs are reported more frequently by

individuals with schizophrenia than by people without schizophrenia (Grant and Beck, 2009; Horan et al., 2010). Also, increased defeatist performance beliefs are associated with increased negative symptoms in individuals with schizophrenia (Grant and Beck, 2009; Horan et al., 2010; Couture et al., 2011; Quinlan et al., 2014), even when depression is controlled (Rector, 2004). Moreover, defeatist performance beliefs have been found to mediate the relationship between cognitive performance and both negative symptoms and functioning (Grant and Beck, 2009), as well as mediate the relationship between the capacity to perform everyday functional behaviors and negative symptoms (Horan et al., 2010). Longitudinal investigations of defeatist performance beliefs in individuals with schizophrenia have largely been conducted in the context of cognitive therapy clinical trials, which have found some support for an association between a reduction in defeatist performance beliefs and improved negative symptoms and functioning over time (Granholm et al., 2013; Granholm et al., 2014). However, the longitudinal relationship between negative symptoms and other types of dysfunctional beliefs remains unclear.

Consistent with the cognitive model of negative symptoms, one's expectancies of success may also be linked to the development and maintenance of negative symptoms (Rector et al., 2005; Beck et al., 2009). Expectancies of success involve one's beliefs about the likelihood of being successful and attaining goals in the future. Indeed, believing that one can meet their own goals or can succeed at a task would likely affect negative symptoms, as it would impact one's motivation to initiate and sustain goal-directed behavior. Moreover, cross-sectional research has identified a link between low expectancies of success and increased negative symptoms (Couture et al., 2011); however, no studies to our knowledge have conducted longitudinal examinations of these beliefs and their relationships with negative symptoms. Previous research has also focused more on beliefs about general or task-related abilities (i.e., defeatist

performance beliefs) and less on an individual's beliefs about the future and goals or expectancies of success, which is of increased importance given the prominence placed on setting and achieving goals in psychosocial treatments that promote recovery and target negative symptoms (e.g. Mueser and Gingerich, 2002; Grant et al., 2012). In fact, setting and making progress towards goals has been viewed as the "catalyst" for recovery and a means to promote negative symptom improvement (Clarke et al., 2009; Grant et al., 2014). Therefore, additional research elucidating the role of beliefs about goals on negative symptoms and goal setting is needed.

Moreover, an individual's expectancies of success may impact the course of goal-setting and psychosocial treatment. Given that individuals engaged in treatment may be at various stages of change (Prochaska and DiClemente, 1994), they may be more or less engaged in initial treatment goal-setting. That is, individuals who are still contemplating change may not have or be aware of clear goals, while those who are more determined or motivated to change may have a greater sense of the types of goals that are meaningful goals that they want to pursue. However, if an individual is not ready or motivated to change or does not believe that they can achieve their goals, clinician led goal-setting is more likely to fail (Miller and Rollnick, 1991). Similarly, if the goal is not personally set and identified by the consumer, goal-setting and ultimately treatment based on those goals is likely to be less effective unless adequate justification is provided and described by the clinician (Locke and Latham, 2002). Therefore, one's pre-treatment expectancies of success may be an indicator of one's readiness to identify and pursue meaningful goals, and it may be a driving force for future actions. Consequently, identifying the impact of an individual's expectancies of success on treatment outcomes is critical.

Based on the cognitive model of negative symptoms (Rector et al., 2005; Beck et al., 2009), the current study aimed to clarify the longitudinal relationship between expectancies of success and negative symptoms. Specifically, we conducted a secondary data analysis examining the predictive relationship of consumer expectancies of success for negative symptom reduction over an 18 month period. Given identified links between expectancies of success and concurrent negative symptoms (Couture et al., 2011), we first hypothesized that baseline consumer expectancies of success would predict negative symptom reduction over time (main effect). Next, we hypothesized that the level of negative symptom reduction would vary based on baseline expectancies of success, with higher baseline expectancies of success leading to a greater reduction in negative symptoms over time (interaction effect).

2. Methods

2.1. Participants

We conducted a secondary data analysis of data from a randomized controlled trial comparing Illness Management and Recovery (IMR) to a problem solving group, which served as an active control condition. The IMR curriculum (Gingerich and Mueser, 2006) was used to guide the IMR condition and included goal setting for personal recovery goals. No formal curriculum or goal setting was used in the problem solving condition; participants were encouraged to discuss current concerns and obtained support for solving problems. Additional information about study conditions is available in Salyers et al. (2014). Participants consisted of 118 individuals; sixty participants were randomized to the IMR condition, while 58 were randomized to the active control condition. Each condition met weekly for 9 months. Assessments were completed at baseline (pre-intervention) and 9 and 18 months later. Eligibility criteria included a diagnosis of schizophrenia or schizoaffective disorder based on the Structured Clinical Interview for DSM-IV (First et al., 1996), being at least 18 years old, no evidence of

severe cognitive dysfunction based on a cognitive screener (Callahan et al., 2002), current participation in mental health services at a VA medical center or a community mental health center, and no health condition(s) that would prohibit participation in an 18 month study. The sample had a mean age of 47.7 (SD = 8.9) and predominantly consisted of African American ($n = 72$, 61%) males ($n = 94$, 80%). Participants had diagnoses of schizophrenia ($n = 54$, 46%) or schizoaffective ($n = 64$, 54%) disorders and were receiving services at either an urban community mental health center ($n = 66$, 56%) or VA hospital ($n = 52$, 44%). Most participants were unemployed ($n = 101$, 86%), not currently married or living with a partner ($n = 99$, 84%), completed high school/GED or less ($n = 79$, 67%), and had an annual income below \$20,000 ($n = 99$, 84%). Results from the original study found that there were no experimental differences between groups on outcomes over time, though both groups evidenced a significant reduction in negative symptoms over time; results and additional participant characteristics are described in more detail elsewhere (Salyers et al., 2014). The original study was approved by the local Institutional Review Boards.

2.2. Measures

2.2.1. Negative symptoms were measured using the eight-item negative symptoms subscale (Bell et al., 1994) of the interview-based Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987). Items on the subscale include passive/apathetic social withdrawal, emotional withdrawal, blunted affect, lack of spontaneity and flow of conversation, poor rapport, disturbance of volition, preoccupation, and motor retardation. Ratings were completed by trained research personnel who achieved inter-rater reliability of .80 prior to completing study interviews. The PANSS has demonstrated satisfactory test-retest reliability, internal consistency, and validity in individuals with schizophrenia (Kay et al., 1987), and the negative symptom subscale showed adequate internal consistency in the current sample ($\alpha = .73$).

2.2.2. Expectancies of Success were assessed using the 5-item goal and success orientation subscale from the self-report Recovery Assessment Scale (RAS; Corrigan et al., 1999; Corrigan et al., 2004). This subscale taps important beliefs about the likelihood of being successful and attaining goals in the future that likely play an important role in prospective negative symptoms. Sample items include, “I have goals in life that I want to reach,” “I have a desire to succeed,” and “I believe I can meet my current personal goals.” This subscale assesses beliefs akin to low expectancies of success, which are predicted by the cognitive model to have an important role in maintenance and development of negative symptoms (Rector et al., 2005; Beck et al., 2009), with the main difference being that expectancies of success are positively phrased. Thus, for conceptual clarity, we will refer to this subscale as expectancies of success throughout the manuscript. Although the primary predictor variable was the subscale reflecting expectancies of success, we also examined the other subscales of the RAS to explore whether the relationship was specific to expectancies of success or also applicable to other subscales of the RAS. The RAS has shown good test-retest reliability and internal consistency in individuals with severe mental disorders (Corrigan et al., 1999). In the current sample, the internal consistency for each of the RAS subscales was adequate: expectancies of success subscale ($\alpha = .75$), personal confidence and hope ($\alpha = .88$), willingness to ask for help ($\alpha = .83$), reliance on others ($\alpha = .72$), and no domination by symptoms ($\alpha = .54$).

2.3. Data analysis

We first confirmed changes in negative symptoms and expectancies of success over time and across treatment groups. Then, we tested our hypotheses that expectancies of success predict a reduction in negative symptoms over 18 months (main effect) and the level of change depends upon the baseline expectancies of success status (interaction effect). We conducted a mixed

effects regression analysis (random intercept model), controlling for baseline negative symptoms, demographic variables, and randomized treatment conditions. An interaction between time and baseline expectancies of success was included in the model. To aid in interpreting the results, we graphed the change in negative symptoms over time at three levels of baseline expectancies of success (low = 1SD below the mean, moderate = mean, and high = 1SD above the mean) for participants with average baseline negative symptoms. For the interpretability, the predictors were mean centered. After confirming changes in negative symptoms and expectancies of success across groups, all analyses were conducted with the entire sample. To examine the specificity of expectancies of success to negative symptoms, we also conducted four additional mixed effects regression analyses controlling for the aforementioned variables with each of the other four subscales from the RAS. Full Information Maximum Likelihood Estimation method was used to accommodate missing data. SAS ver. 9.3 was used for analyses.

3. Results

Consistent with the parent study, negative symptoms significantly decreased over 18 months ($p < .05$, baseline $M = 19.11$, $SD = 5.54$; 9 months $M = 18.20$, $SD = 5.98$; and 18 months $M = 17.54$, $SD = 6.77$) but overall expectancies of success did not significantly change over 18 months ($p > .05$; baseline 3.26 , $SD = .45$; 9 months: 3.33 , $SD = .52$; 18 months: 3.31 , $SD = .55$). Notably, neither negative symptoms ($p > .05$) nor expectancies of success ($p > .05$) differed over time across treatment conditions. As shown in Table 1, negative symptoms decreased over time ($\beta = -.80$, $p = .02$) for participants with average baseline expectancies of success. Further, a two-way interaction was found between time and baseline expectancies of success ($\beta = -1.95$, $p = .01$). Thus, the time effect varied as a function of baseline expectancies of success (see Table 1 & Figure 1). More specifically, after controlling for baseline negative symptoms, demographic variables, and treatment condition, higher levels of baseline expectancies of success were

associated with a steeper decrease in negative symptoms over 18 months. For participants with high and moderate expectancies of success, negative symptoms decreased significantly over time ($p < .001$ and $p < .05$ and, respectively), but for those with low expectancies of success, a significant negative symptom reduction was not observed ($p = .95$). None of the demographic variables or treatment conditions were significant in the model. We also explored whether these effects on 18 month negative symptoms were specific to the expectancies of success subscale or were more broadly applicable to the other RAS subscales; mixed effects regression analyses also controlling for baseline negative symptoms, demographic variables, and treatment conditions revealed that no other baseline subscales of the RAS were significant predictors of negative symptoms at 18 months (personal confidence and hope ($p = .23$); willingness to ask for help ($p = .14$); reliance on others ($p = .27$); no domination by symptoms ($p = .95$)).

4. Discussion

Our findings indicate that an individual's beliefs about the likelihood of being successful and meeting personal goals in the future (i.e., one's expectancies of success) can yield important information about future negative symptoms. Although the mean level of negative symptoms reduced overtime, as hypothesized, higher baseline expectancies of success predicted greater reductions in negative symptoms over time. Holding baseline negative symptoms, demographic variables, and treatment condition constant, participants with high or moderate levels of baseline expectancies of success had significantly less negative symptoms over time, while participants with low levels of baseline expectancies of success did not improve in negative symptoms over time. Therefore, greater levels of baseline expectancies of success appeared to facilitate greater reductions in negative symptoms 18 months later. Further, beliefs about recovery did not predict a reduction in negative symptoms over time. Overall, the findings are consistent with a previous

cross-sectional study that found that low expectancies for success were positively correlated with diminished experience negative symptoms or anhedonia, asociality, and avolition (Couture et al., 2011). Our study builds upon those findings by examining the prospective relationship between expectancies of success and negative symptoms.

An additional key finding was that the level of expectancies of success did not significantly change over time even though participants were engaged in psychosocial treatment. Further, there were no differences in expectancies of success over time by treatment condition. Though these findings are consistent with a previous study that found significant symptom reduction despite no changes in a measure of recovery for participants with severe mental disorders who engaged in a self-management program (Fukui et al., 2011), these findings are particularly surprising given that a critical element of IMR is goal-setting with frequent follow-up, while the control group did not address goals (Mueser and Gingerich, 2002; McGuire et al., in press). Thus, we would have expected to see changes in expectancies of success in the IMR condition but not the active control condition. One possible explanation is that although cognitive behavioral and motivational enhancement techniques are components of IMR that may facilitate change in expectancies of success over time, it is possible that the dose of each of these techniques was inadequate. Alternatively, it may be that deficits in metacognitive capacity (Lysaker et al., 2005), autobiographical memory (Berna et al., 2011), or poor self-integration (McGuire and Lysaker, in press) were important but unmeasured components. Indeed, deficits in metacognitive capacities can produce difficulties in one's abilities to form complex ideas about themselves and about the future. Thus, it may be that no change was seen in expectancies of success, as these deficits can complicate the formation of goals and engagement in goal-directed behavior.

Our findings also suggest that those with different levels of expectancies of success might differentially benefit from interventions. Indeed, despite the effectiveness of the interventions (IMR and the active control condition) in reducing negative symptoms, those with lower baseline expectancies of success did not appear to benefit from the interventions to the same extent of those with higher baseline expectancies of success. Therefore, those with lower levels of expectancies of success might need particular attention early on in order to obtain full benefits from interventions. Specifically, given that the interventions used in this study did not directly target negative beliefs about success, those with low levels of expectancies of success may benefit from techniques or interventions that focus on modifying beliefs to reduce negative symptoms (e.g. Grant et al., 2012; Granholm et al., 2013). Alternatively, given the identified links between low metacognitive capacity and both reduced intrinsic motivation (Vohs and Lysaker, 2014) and concurrent and prospective negative symptoms (Tas et al., 2012; McLeod et al., 2014) it may be that those with lower baseline expectancies of success would benefit from an integrated psychotherapy that aims to develop the degree to which persons form complex and integrated ideas about themselves, their future, and their goals (Lysaker et al., 2010). Future studies should seek to examine how more targeted interventions impact an individual's expectancies of success over time and if similar patterns across individuals with different levels of negative symptoms are observed.

The observed link between expectancies of success and future negative symptoms and lack of relationship between other types of beliefs and negative symptoms highlights the importance of assessing one's expectancies of success in individuals with schizophrenia. Given that these beliefs can be assessed with a five-item self-report questionnaire, this measure may provide clinicians and researchers with an efficient way to measure consumers' perceptions

about achievable goals. For example, if participants do not endorse these beliefs, clinicians may then provide more targeted interventions that aim to develop mastery and success (Beck et al., 2009) to enhance an individual's belief that they can set and achieve goals. In addition, this measure is also shorter than many other measures that assess for dysfunctional beliefs such as the Dysfunctional Attitudes Questionnaire (Weissman and Beck, 1978) or the Success and Resource Appraisals Questionnaire (Couture et al., 2007), perhaps enhancing its clinical utility. In addition, the expectancies of success subscale uses positively phrased items instead of negatively phrased items, which can reduce confusion (Colosi, 2005). This is especially pertinent for individuals with schizophrenia, who may experience cognitive deficits that interfere with the ability to accurately interpret complicated questions. However, future work is needed to directly compare the relationship and psychometric properties, including predictive validity, of these measures.

Findings from this study should also be interpreted in light of several limitations. First, this is a secondary analysis of existing data and therefore was not designed to rigorously examine factors that predict negative symptom reduction. While the PANSS is a widely used measure of negative symptoms, it focuses largely on behavioral deficits and does not adequately capture an individual's internal experience to fully evaluate negative symptoms (Blanchard et al., 2010). Future studies should aim to replicate these findings using more novel instruments of negative symptoms, such as the Clinical Assessment Interview for Negative Symptoms (CAINS; Horan et al., 2011; Kring et al., 2013) that include assessments of internal experiences. Second, our predictor variable, expectancies of success from the RAS, has face validity, but its relationship to other measures of expectancies and dysfunctional beliefs is unknown. Additional work is needed to verify the validity of this measure as an indicator of expectancies. In addition, other variables

or outcomes may be important to consider in future studies. For example, illness-related factors such as co-morbid depression, length of time diagnosed, and medication use may be predictive of negative symptoms.

The current study provides additional support for the cognitive model of negative symptoms, demonstrating that one's beliefs about the likelihood of being successful and meeting personal goals in the future was prospectively related to reduced negative symptoms. This study builds on prior studies by examining the longitudinal relationship between negative symptoms and expectancies of success. Indeed, this is one of the only studies we know of to examine expectancies of success and negative symptoms over time. We found that expectancies of success can predict an individual's level of negative symptoms over an 18 month period. Further, we found that expectancies of success have specificity to prospective negative symptoms. These findings suggest that targeting an individual's beliefs about the likelihood of future success and goal attainment might be a means of reducing negative symptoms in individuals with schizophrenia.

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Table 1. *Mixed Effect Regression Results (n = 118)*

	<i>Main Effects Only</i>				<i>Main Effects + Interactions</i>			
	β	<i>SE</i>	<i>t</i>	<i>p</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	20.96	2.08	10.08	<.0001	20.63	2.00	10.30	<.0001
Time	-.80	.35	-2.27	.02	-.85	.33	-2.59	.01
Treatment Condition	-.49	.65	-.75	.46	-.46	.63	-.72	.47
Site	.67	.75	.89	.37	.98	.73	1.35	.18
Age	-.04	.04	-.90	.37	-.03	.04	-.80	.43
Gender	.46	.83	.55	.58	.42	.80	.52	.60
Race	-.14	.71	-.20	.84	-.02	.69	-.03	.97
Education	-.80	.77	-1.04	.30	-.92	.74	-1.24	.22
Baseline Negative Symptoms	.61	.06	9.58	<.0001	.88	.08	11.46	<.0001
Baseline Expectancies of Success	-1.52	.75	-2.02	.05	.11	.93	.12	.91
Time*Baseline Negative Symptoms					-.35	.06	-5.77	<.0001
Time*Baseline Expectancies of Success					-1.95	.71	-2.74	.01

Note: Baseline variables were used unless otherwise noted; Variables are coded as follows: Time – 0 = baseline, 1 = 9 months, and 2 = 18 months; Treatment Condition – 0 = Active Control Group, 1 = Illness Management and Recovery; Site - 0 = Veterans Administration Medical Center, 1 = Community Mental Health Clinic; Gender – 0 = Female, 1 = Male; Race – 0 = Non-Caucasian, 1 = Caucasian; Education – 0 = Less than high school, 1 = More than high school; Negative symptoms = Negative symptoms subscale of Positive and Negative Syndrome Scale; Expectancies of Success = Goal and success orientation subscale of Recovery Assessment Scale.

Figure 1. *Negative Symptoms Over 18 months Across Levels of Expectancies of Success (n = 118)*

