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Cognitive Characteristics in “Difficult-to-Discharge” Inpatients with Serious Mental Illness: Attribution Biases are Associated with Suspiciousness Only for Those with Lower Levels of Insight

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Despite advances in psychiatric rehabilitation (PR), a substantial number of individuals with serious mental illness (SMI) are institutionalized for extended periods. The cognitive characteristics of these individuals play a role in their institutionalized status. Consideration of individual cognitive characteristics, including “attribution biases” and insight into one’s illness, has benefited PR in improving case conceptualization and treatment planning. Insight, or understanding one’s illness, involves attributions about the causes of one’s own behavior and experience, including psychiatric symptoms. Further, attribution biases may have a negative impact on such understanding, and consequently on engagement in rehabilitation. This exploratory study analyzed quantitative individual differences in attribution bias, understanding of illness, and psychiatric symptoms, to determine how these functional domains interact in people with SMI who are “difficult to discharge.” The results reveal an interaction between active positive symptoms, exaggerated externalizing attribution bias (attributing the cause of positive events to others), and understanding of illness. Among individuals with more impaired understanding of illness, attribution biases are associated with high levels of

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suspiciousness. However, among individuals with better understanding of illness, attribution biases and suspiciousness are not related. The dynamic relationship between attribution bias, positive symptoms, and understanding of illness sheds light on the variable nature of insight in SMI and supports utilizing these cognitive characteristics in case conceptualization, individualized treatment plans, and developing cognitively focused PR treatment modalities.

Keywords: Attribution bias; Insight; Psychiatric rehabilitation; Schizophrenia; Serious mental illness

Despite advances in psychiatric rehabilitation (PR) in general and community-based services in particular, a substantial number of people with serious mental illness (SMI) find themselves in institutional settings for extended periods (more than a few weeks), either in traditional state hospital-type institutions (Fisher, Geller, & Pandiani, 2009) or penal institutions (Steadman, Osher, Robbins, Case, & Samuels, 2009). This is no longer attributable solely to obsolete mental health policy that allows such institutions to persist nor to policy that shifts populations from state hospitals to prisons (Prins, 2011). Instead, it at least partially reflects the remaining limitations of our treatment and rehabilitation methods and their implementation, the humanitarian need to protect people who cannot do so themselves, and the public interest in controlling safety risks. Today a relatively small but heterogeneous SMI subpopulation is chronically institutionalized. This subpopulation has in common that its members are especially “difficult to discharge” (Fisher et al.), in large part because they have histories of repeated failure to function outside a protected setting. It is distinct from other institutional subpopulations (i.e., those adjudicated as not guilty of a crime due to a psychiatric illness and sex offenders; Fisher et al., 2009). In the past, this subpopulation was characterized by long, continuous periods of institutionalization. In more recent years, the subpopulation includes a preponderance of people with multiple hospitalizations interspersed with brief, unstable periods in community settings, the proverbial “revolving door syndrome.”

Ironically, many of the modalities in the modern PR toolkit were piloted and developed in institutional settings. Although PR is rarely implemented in contemporary institutions, it remains clear

that PR still produces superior outcomes compared with traditional treatment models, often referred to as the *medical model*, and its benefits extend beyond the institution to the community service system (Tarasenko, Sullivan, Ritchie, & Spaulding, 2012). As PR science and technology continue to progress, attention to the particular needs of the remaining difficult-to-discharge subpopulation is well justified. In particular, one of the major goals of PR is tailoring treatment planning and goals according to the specific cognitive, symptomatic, and personal characteristics of each individual. Understanding key characteristics of the difficult-to-discharge population will improve the ability to create accurate case conceptualizations and tailor treatment appropriately for these individuals. The present study is an exploratory analysis of some key characteristics of that subpopulation, potentially relevant to addressing the problems that keep them institutionalized.

In recent years, PR research has been increasingly concerned with the cognitive dimensions of SMI. New treatment modalities are informed by advances in the psychopathology of social perception, emotion recognition, theory of mind, and related separate but overlapping processes currently under the heuristic rubric of *social cognition*. The relevance of these constructs to treatment outcome is empirically supported (Brune, 2005; Corrigan & Toomey, 1995; Green, Olivier, Crawley, Penn, & Silverstein, 2005; Mueser et al., 1996; Penn, Corrigan, Bentall, Racenstein, & Newman, 1997; Wykes, Steel, Everitt, & Tarrier, 2008) and separable from the relevance of neuropsychological constructs (Couture, Penn, & Roberts, 2006; Penn, Spaulding, Reed, & Sullivan, 1996; Vauth, Rusch, Wirtz, & Corrigan, 2004). Tailoring PR treatment approaches to the needs of the difficult-to-discharge subpopulation should be informed by attention to their social cognitive and other higher-level cognitive characteristics.

The purpose of this study is to explore interrelationships between selected cognitive and clinical characteristics in a contemporary difficult-to-discharge SMI sample. The characteristics of interest, selected for probable relevance to being difficult to discharge, are (1) beliefs about personal agency, associated with the familiar psychological construct "attribution bias;" (2) understandings about the nature of one's psychiatric condition, traditionally but imprecisely termed "insight into illness"; and (3) severity of positive symptoms.

The first characteristic, attribution bias, is of interest because people's beliefs about their own agency are often barriers to

engaging in the rehabilitation enterprise, and a heightened sense of personal agency is widely recognized as an important recovery goal. *Locus of control* is one type of attribution bias, reflecting the degree to which causes of events are attributed to internal (e.g., self-efficacy, personal choice) versus external (e.g., chance, powerful others) sources. When a measure of locus of control or related attribution dimensions shows a skewed or disproportionate attribution tendency across events, there is an attribution bias. These have been linked to various dimensions of psychopathology (Bentall, Kaney, & Dewey, 1991; Kinderman & Bentall, 1997; Kinderman, Kaney, Morley, & Bentall, 1992; McKay, Langdon, & Coltheart, 2005). For example, biases in attributing positive events to internal factors and negative events to external factors (i.e., good outcomes occur because of my actions whereas bad outcomes occur because of the actions of others, the situation, or chance), called self-serving biases, have been linked to paranoia and delusions (Bentall, Kinderman, & Kaney, 1994; Kinderman & Bentall, 1997; Kinderman et al., 1992; Mizrahi, Addington, Remington, & Kapur, 2008). Further, biased attributions causing external locus of control and low personal agency are logically related to institutionalization. Being involuntarily confined is expected to induce such attributions in most anybody, and lack of agency in seeking release is logically expected to protract confinement.

Another social cognitive characteristic that could both lead to and result from institutionalization is the understanding individuals have of their illness, or insight into it. Insight is a collection of beliefs, the result of attribution processes, about the role of psychiatric illness in a person's experience and behavior (Arango & Amador, 2011). Deficient insight has long been associated with SMI, although collectively people with SMI show the entire range of severity from no impairment to complete denial of any problem whatsoever, with many intermediate levels. Similarly, individuals may have insight about some aspects of their condition (e.g., the utility of medication) but not others (e.g., whether they have a mental illness) (Lysaker, Yanos, & Roe, 2009). Arguably, a complete understanding of one's illness requires integration of the illness into the full extent of the person's autobiographical narrative (Lysaker et al., 2012). However, even simple operational measures of key features of insight provide targets for educational and cognitive-behavioral treatments, known to be effective in improving the understanding and managing of one's illness (e.g., Kemp, David,

& Hayward, 1996; Rathod & Turkington, 2005; Wykes et al., 2008). Deficient insight is often a barrier to recovery despite availability of treatment and PR. Better understanding of the mechanisms of deficient insight, including its relationship to beliefs about personal agency (i.e., attributions) and symptoms, should lead to improved treatment outcome.

Indeed, connections between insight and attributional style have been reported in the literature. In particular, external locus of control is associated with increased self-stigmatization in SMI populations with intact awareness of illness, specifically awareness of public reaction and stigma regarding mental illness (Watson, Corrigan, Larson, & Sells, 2007). Insight and efficacy are also particularly relevant to engagement in treatment programs that encourage participants to take an active role in their own treatment planning, such as "treatment malls" (Davidson & Strauss, 1992; Ballard, 2008). The research on connections between insight and attributional style is not complete but does appear to illustrate that there are important relationships between these constructs. However, these relationships are neither simple nor linear, and neither specificity nor generalization to the difficult-to-discharge subpopulation is known.

The third characteristic of interest is severity of psychiatric symptoms, particularly positive psychotic symptoms or symptoms of thought disturbance. There is substantial heterogeneity in presentation of these symptoms in the difficult-to-discharge population in both range of specific symptoms displayed and severity of each symptom. In fact, there are multiple, relatively independent dimensions of severity, including responsiveness to medication, severity of residual symptoms when optimally medicated, degree to which these symptoms interfere with personal and social functioning, and symptom frequency and intensity.

Symptom severity is a major continuing topic of conversation between patients and practitioners. Better understanding and control of symptoms is often a recovery goal, and success or failure in achieving that goal is logically expected to have an impact on personal agency and engagement in treatment. For those reasons, the relationships between symptom severity and dimensions of social cognition are of pointed interest in the difficult-to-discharge subpopulation.

This study explored three general hypotheses: (1) externalizing attribution biases are positively related to positive symptoms generally and to specific positive symptoms; (2) understanding of

illness is negatively related to positive symptoms generally and to specific positive symptoms; and (3) the relationship between attribution bias and insight interacts with severity of positive symptoms, consistent with the related theory that these are overlapping processes with a common underlying mechanism (e.g., impaired neuropsychological and social cognitive abilities). Initial hypothesis testing of overall positive symptoms was followed by parallel analyses of the specific symptoms constituting the overall positive symptoms factor to elucidate whether specific positive symptoms better account for the relationships found in the initial analysis. It was hypothesized that, of the six symptom types that constitute the positive symptom cluster, suspiciousness and unusual thought content would be most highly related to insight and external attribution biases.

METHOD

Participants

This study used archival data from 59 participants hospitalized for at least 3 consecutive months in a Midwestern suburban state psychiatric hospital while receiving PR and psychopharmacological treatment. The treatment program was a 40-bed inpatient PR program serving people with severe and disabling mental illnesses under civil commitment (Choi, 2010; Rothmann, 2006). On average, participants were 42.0 years old at the most recent admission ($SD = 12.7$) and had completed 12.3 years of education ($SD = 2.26$). Most (91.5%) had primary Axis I diagnoses in the schizophrenia spectrum (schizophrenia, schizoaffective disorder, bipolar disorder, or psychotic disorder not otherwise specified) and had an average of 8.28 previous hospitalizations ($SD = 6.07$). At data collection, participants had spent an average of 617 days in the program ($SD = 449$) since their most recent hospitalization. Additional participant characteristics are summarized in Table 1. The sample is representative of the difficult-to-discharge subpopulation that continues to inhabit public psychiatric institutions.

Measures

This study evaluated data generated by the Brief Psychiatric Rating Scale (BPRS; Lukoff, Nuechterlein, & Ventura, 1986); the Internal,

TABLE 1. Demographic and clinical characteristics (N = 59)

Variable	<i>n</i>	%
Sex		
Male	29	49.2
Ethnicity		
White	53	89.8
Black	3	5.1
Asian American	2	3.4
Hispanic	1	1.7
Marital status (at admission)		
Single	34	57.6
Married	5	8.5
Divorced/widowed/separated	20	33.9
Axis I diagnosis		
Paranoid schizophrenia	19	32.2
Schizophrenia, chronic/undiff type	18	30.5
Schizoaffective	10	16.9
Bipolar disorder	6	10.2
Psychotic disorder, NOS	1	1.7
Other	3	8.5
Second axis I diagnosis		
Substance abuse/dependence	10	16.9
Obsessive-compulsive disorder	6	10.2
Post traumatic stress disorder	1	1.7
Other	5	8.5
No diagnosis/missing	37	62.7
Axis II Diagnosis		
Personality disorder, NOS	11	18.6
Paranoid	6	10.2
Borderline	4	6.8
Antisocial	3	5.1
Borderline intellectual functioning/mild mental retardation	2	3.4
Other	6	10.2
No diagnosis/missing	27	45.8

Personal, and Situational Attribution Questionnaire (IPSAQ; Kinderman & Bentall, 1996); and the Insight Scale (Birchwood et al., 1994).

The BPRS is a 24-item scale for rating observed psychiatric symptom severity on a Likert-type scale from 1 (not present) to 7 (extremely severe). Ratings are based on a structured 25-minute interview as well as available clinical records and collateral contacts. Interviewers receive structured training on conducting the interview and rating the individual items. Research suggests

excellent interrater reliability (Ventura, Green, Shaner, & Liberman, 1993). The overall interrater reliability was .87, ranging from .52 to .92 on individual items. Cronbach's alpha was .69 for positive symptoms and .68 for negative symptoms. A factor analysis of BPRS data collected at this facility revealed four factors (cf. Long & Brekke, 1999; Ventura, Nuechterlein, Subotnik, Gutkind, & Gilbert, 2000) that have been shown in this same treatment setting to be the only time-invariant solution (Choi, 2010). The focus of the present study is the thought disturbance factor (the sum of BPRS grandiosity, suspiciousness, hallucinations, unusual thought content, conceptual disorganization, and mannerisms and posturing items using the factor weights from Choi).

The IPSAQ contains 32 items that describe 16 positive and 16 negative social situations involving the actions of a hypothetical friend or neighbor toward the respondent. Respondents are asked to determine a major cause for each event and categorize the cause as internal (related to the respondent), personal (related to another person), or situational (related to circumstances or chance). Three positive and three negative subscale scores are generated: internal positive, personal positive, situational positive, internal negative, personal negative, and situational negative. For example, in response to the prompt, "A friend said that he or she finds you boring," a respondent might say the cause is that the friend "was in a bad mood," and indicate the cause is attributed to "something about the other person or other people" (personal negative) or "something about the situation (circumstances or chance)" (situational negative). The respondent might also say that the cause is "I am a bad talker," and indicate that the cause is attributed to "something about you" (internal negative). The rating format is parallel for positive prompts, but the second word of the scale name is "positive." Comparing free response to keyed response in this way allows the psychometrist to assess understanding and avoid invalid response sets. None were noted in this dataset. Subscale scores are computed as the sum of items answered with that particular type of attribution; higher scores reflect more attributions of the kind represented by each subscale. The IPSAQ has shown adequate reliability and validity in a nonpsychiatric population. Cronbach's alpha for the subscales ranged from .61 to .76 and was .68 on average. IPSAQ scores significantly correlated with other measures of attribution bias, supporting the validity of the measure. Furthermore, high scores on the internal negative

subscale were associated with low mood, and high scores on the personal negative subscale were associated with paranoia (Kinderman & Bentall, 1996).

The Insight Scale is an eight-item, self-report measure with three subscales: perceived need for treatment, awareness of illness, and relabeling of symptoms as pathological. The prompts include both forward and reverse-scored items with response options: "Agree," "Unsure," or "Disagree." Higher scores reflect better understanding of illness. The Insight Scale has shown good reliability and validity in SMI populations. The overall test-retest reliability was .90, ranging from .65 to .96 on subscales. Cronbach's alpha was .75. Insight ratings made by clinicians correlated with those obtained by self-report with the Insight Scale, supporting the measure's validity (Birchwood et al., 1994).

Procedures

The measures used in this study were routinely administered as part of the PR program's assessment, treatment planning, and progress evaluation system. Neither clinical nor laboratory staff nor participants knew the hypotheses of the study. The measures reported in this study were administered as part of ongoing treatment, and this secondary analysis was approved by the institutional review boards of both the university and the state hospital.

Analyses

First, Pearson's correlations and stepwise multiple regression analyses were conducted to determine relationships between the BPRS thought disturbance factor and the subscales of the IPSAQ and Insight scales. Separate stepwise regressions (Aiken, West, & Reno, 1991) were performed to find the best unique predictors of the BPRS thought disturbance factor and for its constituent items. For each stepwise regression model, the six subscales of the IPSAQ and three subscales of the Insight Scale were entered as predictors.

To identify interactions between predictors, the centered multiplicative products of each pair of predictors in the final stepwise regression model were entered. This two-step method was chosen over simultaneously adding the individual predictors and interaction terms into a stepwise model to prevent a resulting model that

included interaction terms without their respective individual predictors. The latter model would have limited interpretive meaning. Interactions are reported only when significant.

RESULTS

Table 2 shows the univariate statistics for the study variables; Table 3 shows the correlations of each subscale with the BPRS thought disturbance factor and its constituent items; Table 4 shows the regression weights for the various models.

Analyses began with the BPRS thought disturbance factor, an indicator of positive symptom severity. Thought disturbance positively correlated with IPSAQ personal negative, as shown in Table 3. The final stepwise multiple regression model included a positive weight for IPSAQ personal negative, which was the best unique predictor of thought disturbance, $R^2 = .068$, $F(1, 57) = 4.182$, $p = .045$ (see Table 4). Thus, the initial analysis found that a tendency to attribute the causes of negative events to other people significantly predicted positive symptoms, and this was the strongest unique predictor of positive symptoms. To explore this relationship further, follow-up analyses were conducted to evaluate possible multivariate relationships between attribution bias, insight, and the individual items that comprise the thought disturbance factor.

TABLE 2. Descriptive statistics (N = 59)

Variable	<i>M</i>	<i>SD</i>
BPRS Factor scores		
Factor 1: Thought disturbance	6.73	4.00
IPSAQ subscale scores		
Internal positive	8.07	3.34
Personal positive	3.39	2.12
Situational positive	3.85	2.82
Internal negative	5.95	3.60
Personal negative	4.97	3.07
Situational negative	4.34	2.79
Insight scale subscale scores		
Relabeling symptoms	2.37	1.36
Awareness of illness	2.75	1.39
Need for treatment	2.87	1.31

TABLE 3. Correlations with BPRS thought disturbance factor and constituent items (N = 59)

	IPSAQ						Insight Scale		
	IP	PP	SP	IN	PN	SN	RS	AI	NT
BPRS factor:									
Thought disturbance	-.110	.117	.091	-.224	.261*	.079	-.230	-.085	-.015
BPRS items:									
Grandiosity	.010	.150	-.016	-.193	.401**	-.058	-.021	.009	.055
Suspiciousness	-.057	.239	.036	-.143	.232	.085	-.257*	-.136	-.033
Hallucinations	-.095	-.135	.013	-.110	.019	-.054	-.174	.012	.065
Unusual thought content	-.132	.094	.156	-.271*	.279*	.157	-.233	-.037	-.018
Conceptual disorganization	-.126	.037	.086	-.080	-.048	.111	-.164	-.111	-.025
Mannerisms and posturing	.072	.049	-.050	.020	.033	.009	-.502**	-.315*	-.265*

Note. IP = Internal positive; PP = Personal positive; SP = Situational positive; IN = Internal negative; PN = Personal negative; SN = Situational negative; RS = relabeling Symptoms; AI = Awareness of illness; NT = Need for treatment.

* $p < .05$; ** $p < .01$.

TABLE 4. Final stepwise regression models of thought disturbance and BPRS items

Variable	β						
	Thought Disturbance Factor	Grandiosity	Suspiciousness	Model 1	Model 2	Unusual Thought Content	Mannerisms & Posturing
SN						.354**	
PN	.261*	.401**				.262*	
PP			.307*	.403**			
RS			-.322*	-.339**		-.284*	-.502**
PP* RS				-.344**			
Constant	6.728	1.950	2.645	2.764	2.350	1.249	
ΔR^2				.110			

Note. SN = Situational negative; PN = Personal negative; PP = Personal positive; RS = Relabeling symptoms.

* $p < .05$. ** $p < .01$.

Blank cells indicate the predictor did not predict the criterion better than chance.

Model 1 is the stepwise regression model predicting suspiciousness; Model 2 is the regression model predicting suspiciousness that includes the interaction term.

Grandiosity positively correlated with IPSAQ personal negative, as shown in Table 3. The final stepwise multiple regression model with all IPSAQ and insight predictors included a positive weight for IPSAQ personal negative, which was the best unique predictor of grandiosity, $R^2 = .106$, $F(1, 57) = 1.895$, $p = .002$ (see Table 4). This model indicated that the tendency to attribute the cause of negative events to other people significantly predicted symptoms of grandiosity.

Suspiciousness negatively correlated with insight relabeling symptoms, as shown in Table 3. The final stepwise multiple regression model included both a positive weight for IPSAQ personal positive and a negative weight for insight relabeling symptoms, which were the best unique predictors of suspiciousness, $R^2 = .156$, $F(2, 56) = 5.179$, $p = .009$ (see Table 4). Including the interaction between IPSAQ personal positive and insight relabeling symptoms (computed as the product of these terms) in a separate multiple regression model improved the fit of the final model, $R^2 = .266$, $\Delta R^2 = .110$, $\Delta F(1, 55) = 8.202$, $p = .006$. For participants with lower scores on insight relabeling symptoms, the IPSAQ personal positive subscale was positively associated with suspiciousness. However, for participants with higher scores on insight relabeling symptoms, the IPSAQ personal positive and suspiciousness were not associated (see Figure 1). This model indicated that among people with impaired ability to relabel symptoms as pathological, the tendency to attribute the cause of positive events to others predicted increased suspiciousness, but among people without this impairment in insight, there was no association between attributional style and suspiciousness.

Unusual thought content negatively correlated with IPSAQ internal negative and positively correlated with IPSAQ personal negative as shown in Table 3. The final stepwise multiple regression model included positive weights for IPSAQ personal negative and situational negative and a negative weight for insight relabeling symptoms, which were the best unique predictors of unusual thought content, $R^2 = .206$, $F(3, 54) = 4.679$, $p = .006$ (see Table 4). This model indicated that a greater tendency to attribute the cause of negative events to others or the situation, as well as lower ability to relabel symptoms as pathological, significantly predicted symptoms of unusual thought content. Of note, although attributing the cause of negative events to oneself was associated with less unusual thought content in a bivariate relationship, this attributional style did not contribute to the multiple regression

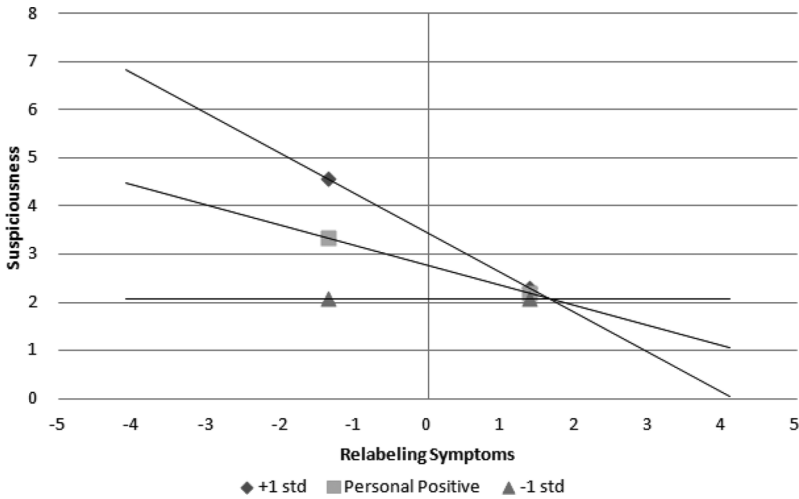


Figure 1. Interaction between suspiciousness, relabeling symptoms, and personal positive attributions ($N = 59$). The line with the square indicators represents the negative relationship between suspiciousness and relabeling symptoms for individuals with an average amount of personal positive attributions; the line with the diamond indicators represents the more negative relationship between these variables for individuals with one standard deviation more personal positive attributions than average; the line with the triangle indicators represents the noncorrelation between these variables for individuals with one standard deviation less personal positive attributions than average.

model, indicating that it does not uniquely predict unusual thought content after accounting for the ability to relabel symptoms as pathological and the tendency to attribute negative events to others or situations. Also of note, interactions among these predictors did not significantly improve the fit of the model.

Mannerisms and posturing negatively correlated with all three subscales of the Insight Scale but none of the IPSAQ subscales, as shown in Table 3. The final stepwise multiple regression model included a negative weight for insight relabeling symptoms, which was the best unique predictor of mannerisms and posturing, $R^2 = .252$, $F(1, 55) = 18.576$, $p = .000$ (see Table 4). This model indicated that impaired ability to relabel symptoms as pathological significantly predicts symptoms of atypical mannerisms.

No Insight or IPSAQ subscale significantly correlated with hallucinations or with conceptual disorganization.

DISCUSSION

This study evaluated multivariate relationships between attribution bias, insight, and symptom severity in difficult-to-discharge patients having SMI in an extended-term state hospital PR program.

As postulated in our first hypothesis, the tendency to blame others for negative events was associated with more severe positive symptoms of psychosis overall and, more specifically, with more severe unusual thought content, suspiciousness, and grandiosity. Further, this externalizing attributional style predicted the severity of positive symptoms above insight and other attributional styles. These relationships provide further support for theories relating exaggerated, self-serving bias to symptoms in SMI.

Regarding our second hypothesis, insight, and in particular the ability to relabel psychiatric symptoms as pathological, predicted less unusual thought content, suspiciousness, and mannerisms and posturing.

On the insight measure, the relabeling symptoms subscale indicates acknowledgment that one has had symptoms of mental illness that have accounted for unusual experiences. Notably, on the BPRS, unusual thought content is not only an indicator of overall delusional thought content but also of one's conviction about these beliefs. Delusions are broadly defined, and unusual thought contents ratings may also represent somatic concern, guilt, suspiciousness, or grandiosity if these symptoms are severe. Suspiciousness is differentiated by a focus on persecutory beliefs regarding other humans or supernatural forces. In this case, attributional externalization and a lack of insight are definitive aspects of symptom severity. Mannerisms and posturing are objective clinician ratings of observed overt atypical behavior (e.g., rocking, maintaining an uncomfortable posture, or stereotyped behavior) that exclude obvious medication side effects. Increased ratings on these scales (unusual thought content and mannerisms and posturing) are each strong indicators of acute and functionally debilitating symptoms. An individual's inability to recognize these behaviors as being unusual or symptoms of an illness may preclude his or her ability to engage in recovery in these areas. The dimension of insight captured by relabeling symptoms can be a barrier to engaging in treatment and can perpetuate severe symptoms of delusions and mannerisms. Overall, these results support the idea that efforts

toward increased insight and personal agency may support individuals' recovery from positive symptoms and vice-versa. However, treatment planning must be informed by a person's unique context, as individual recovery is idiosyncratic: These relationships often are nonlinear and may not conform to the modal trajectories identified in aggregate research (e.g., Choi, Davidson, & Spaulding, 2011).

As anticipated in our third hypothesis, the analysis revealed an interaction between all three types of clinical characteristics: insight, attribution bias, and symptom severity, suspiciousness in particular. As illustrated in Figure 1, among individuals who were less prone to label their symptoms as part of their illness, the increased tendency to attribute the cause of positive events to other people was associated with increased suspiciousness; among individuals who were more prone to label their symptoms as part of their illness, the tendency to attribute the cause of positive events to other people was not associated with suspiciousness.

This particular interaction is not what would be hypothesized, given the connection between suspiciousness and attributing negative events to others. However, this finding may be explained by an overall tendency in this subgroup of the sample to make external attributions, about both negative and positive events. In a sense, the problem could also be one of restricted range: Few members of the sample endorse an externalizing bias toward positive events, so members that do endorse an externalizing bias appear to have a comparatively exaggerated sense of externality. The externalizing effect on suspiciousness may be present in individuals with deficient insight because these individuals experience suspiciousness to a degree sufficient for it to impact other factors, including insight. In this difficult-to-discharge population, chronic institutionalization may significantly limit feelings of control about a range of positive and negative events, resulting in a generally externalized attribution tendency.

Internalizing attributional style, specifically toward negative events, was negatively associated with unusual thought content at the bivariate level, the opposite direction from what might be expected (i.e., a more internalizing attributional style was associated with less unusual thought content). This correlation was also the opposite of the positive relationship between externalizing negative events and unusual thought content. Although insight and externalizing attributions were stronger predictors of psychotic symptom severity than personal agency regarding negative events,

the bivariate correlation between internalizing attribution of negative events and decreased delusional symptoms warrants discussion. It is possible that for some people in institutional settings, attributing negative events to oneself may be part of a natural “grieving” stage during recovery from severe thought disturbance symptoms. Personal agency likely plays an important role in functional outcome, institutionalization, and PR more generally, which depend on a multitude of factors in addition to psychotic symptom severity, but the potential roles for personal agency in recovery appear to be complex and may be idiosyncratic.

Understanding how these constructs relate to each other for particular individuals in the difficult-to-discharge population is likely to inform case conceptualization and treatment planning. For instance, for people who demonstrate an interrelationship between constructs, it is likely necessary to understand and target the loss of personal agency in addition to targeting positive symptoms and decreased functionality, as this loss of personal agency is part of the constellation of problems prolonging these deficits.

The results of this study are particularly relevant for the subpopulation of people with SMI for whom acute care and community treatment as usual have proved insufficient. Although the treatment settings for people in this particularly disabled subpopulation of SMI seem to be in constant flux, treatment needs are similar across settings, and treatment for such individuals remains a major challenge for all mental health organizations. People who have been repeatedly hospitalized and are under civil commitment reasonably attribute much control over their life situation to others, but this bias can generalize to situations outside of treatment and commitment.

These generalized cognitive biases are a direct target of PR and cognitive interventions for psychotic disorders, which is an efficacious treatment for people in this population (Sensky et al., 2000). Additionally, specific individual and group psychotherapy interventions typically used within the PR contexts that target insight and attributional bias are likely to be important for this population, given the relationships between insight, attributional bias, and symptoms. Such group interventions include illness management and recovery (Gingerich & Mueser, 2005), metacognitive skill training (Moritz, Woodward, & Burlon, 2005), and social cognition and interaction training (Roberts, Penn, & Combs, 2013). Additionally, metacognition-oriented therapy for psychosis

(Lysaker & Buck, 2010) is a relatively new individual psychotherapy targeting insight in schizophrenia that has been supported by case studies (e.g., Salvatore et al., 2012) but not yet undergone clinical trial to our knowledge. More generally, psychotherapeutic approaches focusing on improving insight and understanding the role of illness identity and related attributions are an important aspect of PR (Yanos, Roe, & Lysaker, 2010). Our findings emphasize the utility of these types of approaches for the difficult-to-discharge population, as it is likely that successful treatment requires equal emphasis on symptoms, social cognitive deficits, and general functioning, given the systemic nature of the disorder.

This study has several limitations. The follow-up analyses were exploratory in nature. They were designed to narrow down and specify the specific symptoms that account for relationships between general positive symptoms, insight, and attributions. These results should be interpreted with caution due to risk of type I error inherent in low-powered exploratory analyses. It is recommended that this exploratory study be replicated with a larger sample size to determine the stability of the results. Additionally, the present analyses optimized sample size to achieve sufficient power while sacrificing specificity in stage of treatment. It has previously been shown that some relationships between psychological constructs change over the course of rehabilitation (Peer, Kupper, Long, Brekke, & Spaulding, 2007). It is unknown whether time in a rehabilitation program affects the present results. Inclusion of measures such as the IPSAQ and the Insight Scale in individualization of treatment for consumers with SMI is becoming more important as psychologists begin to understand the breadth of how these types of psychological constructs affect presenting problems. If attribution bias and insight are independently and interactively associated with current symptoms, they might also be associated with prognosis and future presentation of symptoms. Concurrent and longitudinal assessments are needed to determine treatment needs over the long-term trajectory of their illnesses as well as aggregate patterns in recovery. Future studies should increase sample size as well as include repeated observations at relevant time points during rehabilitation to identify prognostic aspects of these measures in rehabilitation and recovery.

Overall, the results indicate that relationships between attribution bias, insight, and symptom severity are complex in this difficult-to-discharge SMI population. Elements of exaggerated

self-serving bias are related to symptom severity, as well as other elements of attribution bias and insight, but these relationships differ across people with different attribution biases and insight. The strength of these relationships is not small, compared with those generally found between cognitive and symptom measures in SMI, accounting for a quarter of the shared variance in some cases. The presence of the interactions may explain why such strong relationships have gone undetected in previous studies that did not explicitly analyze interactions. Further, analysis specifically of interactions between multiple convergent or overlapping cognitive constructs, as in the present study, is a key step to treatment personalization. Whereas basic multiple regression provides information about characteristics of a single dimension, allowing constructs to interact allows considering the interrelationships among multiple characteristics simultaneously, affording multidimensional assessment and thereby more individualized treatment.

Given their conceptual overlap and statistical covariance, it is likely that some constructs measured by the BPRS and other psychiatric symptom scales are in fact innately tied to social cognitive symptoms in SMI. Researchers and clinicians may be observing the dynamic between changes in social cognitive characteristics and socio-environmental behavior systems. The nuanced but substantial contributions of insight and attribution bias to symptom severity suggest these could be useful evaluative markers in treatment and should be integrated into treatment planning, development, and assessment in PR.

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