

Attributional style and symptoms as predictors of social function in schizophrenia

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Abstract—While the attributions of people with schizophrenia have been hypothesized to play a role in determining social behavior, contradictory predictions can be made about exactly what type of attributions contribute to social dysfunction. One possibility is that attributing undesirable events to internal, stable, and global factors might lead to poorer social function. An alternate possibility is that attributing events in general to internal, stable, and global factors might lead to better social function. As a test of these hypotheses, 40 participants in a post-acute phase of schizophrenia were administered the Attributional Style Questionnaire, the Positive and Negative Syndrome Scale, and the Quality of Life Scale. Stepwise multiple regressions controlling for age and education indicated that a lack of negative symptoms and the tendency to make stable attributions for life events in general predicted more frequent social contacts, a higher quality of social interaction, and better community participation on the Quality of Life Scale. Results suggest that the tendency to see life events as the result of unstable or unpredictable causes is associated with social dysfunction independent of symptom level.

Key words: schizophrenia, attributional style, social function, quality of life.

INTRODUCTION

Social isolation in schizophrenia has been hypothesized to result from a combination of neurobiological forces [1–3], dilatory social forces including stigma [4,5], and the attributions persons with schizophrenia make about themselves and their condition [6–8]. The effects

of attributional style in determining social outcomes are of particular importance, given that they may be intuitively conceptualized as phenomena that are semi-independent from and may even predate illness [9], and because they are potentially open to change through psychotherapeutic interventions [10–12].

To date, however, despite a large body of literature on the relationship between attributional errors and specific symptoms such as paranoid delusions [13,14], little to no empirical attention has been paid to the broader functional correlates of attributional style in schizophrenia. We suggest that this may be due in part to two contradictory and competing predictions that can be made about how attributional style is related to function. First,

Abbreviations: ASQ = Attributional Style Questionnaire; DSM-IV = Diagnostic and Statistical Manual for Mental Disorders, 4th edition; PANSS = Positive and Negative Syndrome Scale; QOL = Quality of Life Scale; SCID = Structured Clinical Interview for DSM-IV; VA = Department of Veterans Affairs; WAIS-III = Wechsler Adult Intelligence Scale III; WCST = Wisconsin Card Sorting Test.

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from the tradition of the reformulated learned helplessness model, it might be hypothesized that the tendency to make internal, stable, and global attributions about negative life events may negatively impact social function much as it does in depression [15]. In other words, perhaps social function is negatively affected when persons with schizophrenia see undesirable life events as the result of temporally stable and far-reaching factors for which they are to blame. Evidence supporting this hypothesis includes studies suggesting that people with schizophrenia are more likely than community controls to make such attributions [16] and that this attributional style tends to be linked to greater levels of depressed mood [17].

From the broader traditions of rehabilitation and the study of the phenomenology of schizophrenia, however, an alternative hypothesis can be made. In particular, we suggest that multidisciplinary literature has pointed to the possibility that with the onset of schizophrenia, the causes of all life events become harder to discern, and as a consequence the person withdraws socially [18–21]. Thus it seems intuitively plausible that external, unstable, or specific attributions for all life events may broadly hinder interpersonal relationships, ultimately leading to a state of resignation and/or the evolution of a preference for greater social distance. Indirect evidence in favor of this view comes from research indicating that, as persons with schizophrenia recover, they increasingly report perceiving that they can influence life events (i.e., increases in internal attributions) and that life events are the result of predictable forces (i.e., increasingly stable ones) [22,23].

Given this literature, it appears that two alternative hypotheses can be readily made: that attributing undesirable events to internal, stable, and global factors leads to poorer social function or that this same pattern of attributions about events in general may lead to better social function. Accordingly, our study sought to test whether and in what manner attributional style is related to level of social function. In particular, we examined whether symptoms and attributional style were related to (a) the frequency of social interaction, (b) the qualities of social interactions, and (c) general community participation. To measure methods of attribution, we used the Attributional Style Questionnaire (ASQ), a self-report instrument that assesses three of the most commonly recognized dimensions of attributional style: internal, stable, and global attributions [24]. By internal attributions, we refer to the

tendency to see causes of events as due to the individual rather than forces beyond the individual's control. By stable attributions, we refer to the tendency to see causes of events as temporally stable. By global attributions, we refer to the tendency to see causes of events as due to factors that affect multiple events and that are not specific to a single event. To measure symptoms, we used the Positive and Negative Syndrome Scale (PANSS) [25], and to measure the three aspects of social function of interest, we used the Quality of Life Scale (QOL) [26].

With regard to symptoms and social function, we predicted—consistent with most operative definitions of negative symptoms [27]—that negative symptoms would be most strongly related to social function. The two competing hypotheses regarding attributional style that were examined were (1) independent of negative symptoms, more internal, stable, and global attributions for negative events predict poorer social function; and (2) independent of negative symptoms, less internal, stable, and global attributions for events in general predict poorer social function.

A final issue addressed by our study concerns the potential confounding effects of deficits in verbal ability or flexibility in abstract thinking. In particular, we were concerned that any findings linking attributional style with social function could potentially result from the effects of these cognitive factors on responses to the ASQ. In particular, we were concerned about two possible confounds: (1) that cognitive impairments could affect how persons responded to the ASQ, and (2) that cognitive factors could affect both how persons form attributions and function. To control for this possibility, we planned to conduct additional analyses using measures of verbal intelligence and flexibility in abstract thought as covariates.

METHODS

Participants

Participants were 40 persons with DSM-IV (Diagnostic and Statistical Manual for Mental Disorders, 4th edition) diagnoses of schizophrenia ($n = 26$) or schizoaffective disorder ($n = 14$). All were initially recruited from the outpatient psychiatry service of a Department of Veterans Affairs (VA) Medical Center. All participants were in a post-acute phase of illness, as defined by having no hospitalizations or changes in medication or housing in

the month before the study began. Excluded from the study were participants with active substance abuse or a history of mental retardation. The mean age of the sample was 46.6 (SD \pm 7.9) years of age, and the mean educational level was 12.5 (SD \pm 1.5) years. The average participant had a lifetime history of 10.9 (SD \pm 12.2) psychiatric hospitalizations, with the first occurring at a mean age of 25.2 (SD \pm 7.7) years. All but one of the participants were male; 27 were Caucasian, 12 were African American, and 1 was Latino. *T*-tests comparing background and clinical variables between participants with schizophrenia and schizoaffective disorder revealed no significant differences.

Instruments

The Wisconsin Card Sorting Test (WCST) is a neuropsychological test in which participants sort cards that vary according to shape, color, and number of objects depicted [28]. Participants are told to match cards to “key” cards but are not told the matching principle, which changes after 10 correct responses. Our study used one score, the total number of categories correct, as a measure of executive function. This score is easily interpretable and provides a simple index of how well a participant was able to perform the task. This test was chosen because of its wide use in schizophrenia and links with outcome in multiple studies [29].

The vocabulary subtest of the Wechsler Adult Intelligence Scale III (WAIS-III) assesses a participant’s knowledge of vocabulary [30]. This subtest has been widely used as a brief assessment of general verbal intellectual function and is believed to represent an aspect of cognitive function less impacted by schizophrenia [31].

The Attributional Style Questionnaire (ASQ) asks participants to indicate, on a 7-point Likert scale, the extent to which they would attribute 6 different hypothetical positive and 6 different hypothetical negative life events to internal, stable, and global causes [24,32]. The ASQ has been used with many different groups of persons, including those with schizophrenia [16], and its reliability and validity have been reported elsewhere [24]. In our study, correlational analyses indicated that internal attributions for positive events were positively correlated with internal attributions for negative events ($r = 0.46$, $p < 0.01$). Stable and global attributions for positive events were similarly significantly correlated with stable and global attributions for negative events ($r = 0.48$, $p < 0.01$ and $r = 0.49$, $p < 0.01$, respectively).

To determine whether participant responses to the ASQ could be validly summed to provide general internal, stable, and global scale scores, we calculated the coefficient alphas separately for the sum of all internal items, all stable items, and then all global items. These revealed that each general score achieved a significant level of internal consistency, with coefficient alphas ranging from 0.80 to 0.87. For all three scales, the removal of no single item significantly increased the internal consistency.

The Quality of Life Scale (QOL) is a 21-item scale completed by clinically trained research staff following a semi-structured interview and chart review [26]. For the purposes of this study, we were interested in three of the four factor scores of the QOL. The first, interpersonal relations, measures the frequency of recent social contacts and includes separate assessments—for example, of frequency of contacts with friends and acquaintances. The second, intrapsychic foundations, measures qualitative aspects of interpersonal relationships and includes assessments—for example, of empathy for others. The third, common objects and activities, assesses community involvement in terms of participation in common activities and possession of common objects that denote such participation. The fourth, instrumental role, was not of interest, as this scale taps vocational function. Limited variation in vocational function was expected in this sample because all participants were unemployed and were consequently entering vocational rehabilitation. Good to excellent interrater reliability was found for the three QOL factor scores for this study, with intraclass correlations ranging from 0.85 to 0.93.

The Positive and Negative Syndrome Scale (PANSS) is a 30-item rating scale completed by clinically trained research staff at the conclusion of a chart review and semi-structured interview [25]. Our study used the five PANSS components identified by Bell et al.: positive, negative, cognitive, excitement, and emotional discomfort [33]. Items representing each component are listed in **Table 1**. Good to excellent interrater reliability was found for the PANSS components for this study, with intraclass correlations ranging from 0.80 to 0.94.

Procedures

Following informed consent, participant diagnoses were determined by a clinical psychologist using the Structured Clinical Interview for DSM IV (SCID) [34]. Following the SCID, participants were administered the WCST, PANSS interview, QOL interview, and ASQ as

Table 1.
PANSS Component Items.

Component	Items Included
Positive	Delusions, Hallucinations, Unusual Thought Content, Somatic Concern, Suspicious/Persecutory Thinking, Grandiosity
Negative	Passive Social Withdrawal, Emotional Withdrawal, Blunted Affect, Reduced Conversational Spontaneity/Flow, Poor Rapport, Disturbance of Volition, Preoccupation, Motor Retardation
Cognitive	Abstract Thinking, Stereotyped Thinking, Conceptual Disorganization, Lack of Insight, Poor Attention, Tension, Abnormal Mannerisms/Posture
Excitement	Excitement, Hostility, Poor Impulse Control, Uncooperativeness
Emotional Discomfort	Depression, Anxiety, Guilt Feelings, Active Social Avoidance

part of a battery of baseline assessments for one of two larger studies of work outcomes for persons enrolled in vocational rehabilitation. The PANSS and QOL interviews were conducted blind to responses to the ASQ and neurocognitive testing. Participant scores on the vocabulary subtest were available from a database for 38 of the 40 participants from an earlier study of the correlates of hopelessness in schizophrenia [5]. While the vocabulary subtest was administered, on average, 6 months prior to the collection of the baseline data for this study, data suggest that this is a relatively stable score, even in the presence of organic impairment [30,31].

Data Analyses

Our planned data analyses were divided into three phases. In the first, we planned to examine interrelationships and the distributions of key data. Second, regressions were to be conducted that examined the relationship of the general ASQ and PANSS scores with QOL scores, entering age and education as covariates. Third, we were to conduct regressions that examined only attributions for negative events and PANSS scores. Of note, in cases of regression in which ASQ variables made significant contributions in the predicted direction, we planned to repeat the regression using cognitive variables as covariates and examine univariate correlations.

RESULTS

Mean ASQ, PANSS, and QOL scores are reported in **Table 2**. Intercorrelations among the three QOL factor scores revealed that the variables were significantly related to one another and accounted for 11, 14, and 29 percent of

Table 2.
Mean Test Scores.

Test	Score*
Attributional Style Questionnaire	
Internal Positive	5.02 ± 1.36
Internal Negative	4.58 ± 1.22
Stable Positive	5.08 ± 1.27
Stable Negative	4.52 ± 1.24
Global Positive	4.80 ± 1.28
Global Negative	4.41 ± 1.45
Positive and Negative Syndrome Scale Component Scores	
Positive	16.1 ± 5.2
Negative	20.7 ± 6.1
Cognitive	18.6 ± 5.6
Excitement	08.4 ± 3.3
Emotional Discomfort	13.5 ± 4.7
Quality of Life Scale	
Interpersonal Function	20.2 ± 9.5
Intrapsychic Foundations	23.5 ± 5.9
Common Objects/Activities	6.7 ± 2.1
Wisconsin Card Sorting Test	
Categories Correct	3.5 ± 2.5
Vocabulary Subtest	
Age Corrected Scale Score	9.1 ± 3.0

*Mean ± 1 standard deviation

the variance amongst one another, respectively: intrapsychic foundations and common objects ($r = 0.33, p < 0.05$), interpersonal foundations and common objects ($r = 0.37, p < 0.05$), and interpersonal foundations and intrapsychic foundations ($r = 0.54, p < 0.001$). Lastly, intercorrelations among PANSS component scores revealed positive symptoms were positively related to emotional discomfort ($r = 0.39, p < 0.05$), and that negative symptoms were positively related to cognitive ($r = 0.32, p < 0.05$) and excitement scores ($r = 0.39, p < 0.05$). Tests of normality with the Kolmogorov-Smirnov statistic failed to reject the hypotheses that the three general ASQ scores, three ASQ scores for negative events only, three QOL scales, and the PANSS positive, negative, and cognitive scores were normally distributed at the $p > 0.20$ level. On the PANSS emotional discomfort item, the Kolmogorov-Smirnov statistic failed to reject the hypotheses of normalcy at the $p > 0.10$ level. Normalcy was rejected for the PANSS excitement score (0.162; $p = 0.01$) with visual inspection of the histogram revealing a strongly bimodal distribution.

Next, to determine the association between symptoms and general attributional style, we performed three stepwise multiple regression equations in which PANSS component and ASQ scores were allowed to enter to predict each of the QOL scores. In all equations, age and education were forced to enter first as covariates, and the PANSS and ASQ scores accounting for the most variance were allowed to enter thereafter. As summarized in **Table 3**, these regressions produced a statistically significant predictor equation for all three QOL variables. As predicted, lesser levels of negative symptoms and higher

degrees of stable attributions predicted better social function on each QOL factor. Lower levels of emotional discomfort predicted better QOL interpersonal function scores. ASQ internal and global scores and PANSS positive, cognitive, and excitement scores were not significant predictors in any equation.

Of note, to determine whether there were other links between symptoms, attributions, and social function that were not detected in the multiple regression analysis as a result of shared variance, we determined univariate correlations for the QOL scores with each PANSS and ASQ variable. Our analyses revealed that, in addition to the relationships found in the regressions, cognitive symptoms were correlated significantly with intrapsychic foundations ($r = -0.47, p < 0.01$) and common objects and activities ($r = -0.43, p < 0.01$). No other significant relationships were observed.

To determine whether the links between attributional style and social function were the result of neurocognitive factors, we repeated the regressions, this time forcing the vocabulary subtest score and the WCST categories correct score to enter first into the equation as covariates. In these analyses, the combined covariates were significant predictors of the QOL scores each time, with better cognitive function predicting better social function. In the case of interpersonal function, the covariates accounted for 20 percent of the variance, with the result that negative symptoms were no longer a significant contributor, and emotional discomfort captured only 27 percent of the variance. The size of the contribution of the ASQ stable score to the prediction of interpersonal function remained the same. In the

Table 3.
Multiple Regressions Predicting QOL Scores from PANSS and ASQ Components Controlling for Age and Education.

QOL Measure of Social Function	Contributing PANSS and ASQ Components	F	Partial R ²	Model R ^{2*}
Interpersonal Function	PANSS Emotional Discomfort	5.2 [‡]	0.26 [§]	0.27 [‡]
	PANSS Negative		0.09 [†]	0.36 [‡]
	ASQ Stable		0.08 [†]	0.44 [‡]
Intrapsychic Foundations	PANSS Negative	10.3 [§]	0.32 [‡]	0.34 [‡]
	ASQ Stable		0.20 [‡]	0.54 [‡]
Common Objects and Activities	ASQ Stable	4.0 [‡]	0.16 [‡]	0.17 [‡]
	PANSS Negative		0.14 [‡]	0.31 [‡]

QOL = Quality of Life Scale

PANSS = Positive and Negative Syndrome Scale

ASQ = Attributional Style Questionnaire

*Total model includes contributions of the covariates

[†] = $p < 0.05$

[‡] = $p < 0.01$

[§] = $p < 0.001$

case of intrapsychic foundations, the neurocognitive covariates accounted for 13 percent of the variance, resulting in negative symptoms capturing only 24 percent of the variance, while the contribution of the size of the contribution made by the stable score again remained the same. In the case of common objects and activities, the neurocognitive covariates captured 10 percent of the variance, and none of the original predictor variables, including the ASQ, captured significant portions of the variance.

In the final set of analyses, we again performed regressions predicting the QOL scores, this time using PANSS scores and ASQ internal, stable, and global scores for negative events (with age and education as covariates as above). These analyses found that higher scores on intrapsychic foundations were predicted by lesser levels of negative symptoms and, contrary to predictions made by the learned helplessness model, by more stable attributions for negative events ($R^2 = 0.09$). Attributional style for negative events was unrelated to QOL interpersonal relations or common objects and activities scales.

CONCLUSIONS

Results suggest that symptoms and attributional style are independently related to social function in schizophrenia. Greater levels of emotional discomfort and negative symptoms, coupled with the tendency to see life events in general as the result of temporally unstable factors, predicted just over 40 percent of the variance in a measure of the frequency of social contacts, controlling for age and education. Greater levels of negative symptoms, coupled with the tendency to attribute life events to unstable causes, predicted over 50 percent of the variance of a measure of the quality of interpersonal relationships and 30 percent of the variance in a measure of community participation. Associations between attributional style and frequency and quality of social function were found to persist even when controlling for verbal and abstracting abilities. When verbal and abstracting abilities were controlled for, however, the link between attributional style and community participation did not persist. Additionally, when cognition was controlled for, the association between symptoms and function was reduced, though still significant.

Overall, this pattern of findings suggests that the belief that life events in general do not result from predictable or temporally stable causes may hinder efforts of persons with schizophrenia to connect with others and to

navigate in the social world. For instance, it may be that seeing events as resulting from transitory and inconsistent forces makes persons with schizophrenia hesitant to reach out to others and impairs the ability to appreciate the changing and complex dynamics of interpersonal relationships. It seems a matter of intuition that the tendency to see the rules that govern social interactions as vulnerable to change without warning might make such endeavors impossible to prepare for. It may also be intuited that the effects of unstable attributions on social function might be well exacerbated by the lack of social interest and deficits in cognitive flexibility, as well as negative and depressive symptoms. Regarding community function, however, it may be that links with attributions are mediated by impairments in cognition that may be a causal factor in attributional style.

Thus, taken together, these results are partially consistent with phenomenological models of schizophrenia, which stress that impairments in schizophrenia are closely linked with the sense that the world is an unpredictable and unstable place [21]. Results were not consistent with the predictions from a reformulated learned helplessness model that attributing negative events to internal, stable, and global causes would be linked with social impairment. Attributions for positive and negative events in general were positively correlated with one another, suggesting that they captured a global cognitive style. Furthermore, when attributions for negative events only were considered, the findings remained that making more stable attributions was linked to better social function on one of the three indices (i.e., the measure of quality of interpersonal relationships).

Of note, while stability was closely linked to function, internal and global attributions were not. This seems surprising. Why might stability be related to function when attributions about having a personal influence or the connection between the causes of life events are not? One hypothesis we would offer as fodder for future research is that perhaps persons with schizophrenia come to perceive their lives as controlled by a number of unrelated and external forces that are the causes of events; but this perception is not always maladaptive. For example, they may believe that events will be influenced evenly by medication and the decisions of a sibling or mental health or social security worker. In other words, it may not matter what is causing events to happen or whether those causes are related, but only whether they can be anticipated to remain constant.

Importantly, the correlational nature of this study precludes drawing any firm causal inferences. For instance, just as attributional style may have contributed to the tendency to withdraw from others, the reverse may also be true. It cannot be ruled out that social rejection may lead to an attributional style in which life events are seen as the result of unstable causes. Similarly, it is also possible that the unstable attributions of the more disenfranchised participants are accurate appraisals of what has happened in their lives and again a result of social circumstances. It is also possible that the relationship between these variables is the result of a third set of variables not measured here.

Lastly, there are methodological limitations to this study. First, most participants were males in their 40s, in a stable phase of illness, and enrolled in rehabilitation. It is possible that these findings may not generalize to female patients, those who refuse rehabilitation, or persons in other stages of illness. For instance, it is plausible that attributions made in acute phases of illness have a different relationship to function. Second, the sample size was relatively small and the observed correlations modest in scope. Third, attributions were measured at one point in time only and, given that attributional style is known to fluctuate, their temporal relationship to function is unknown. Replication is necessary, therefore, with more diverse samples and the use of longitudinal designs as well. Future research that assesses symptoms, attributional style, and social function over time may help us to better understand any causal relationships that exist amongst these variables. For example, do changes in attributional style precede or follow changes in social function or are they the product of other processes? Are changes in one attributional dimension linked to changes in other dimensions? With replication, this research may have important implications for the development of rehabilitative interventions. In particular, if attributional style is related to social function, might not cognitive behavioral interventions that target such attributions help facilitate better outcomes? Perhaps participants have a greater chance of success in forming and maintaining social relationships if exposed to a rehabilitation program that helped them to see life events as related to stable causes.

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