



Thought disorder, pragmatic language impairment, and generalized cognitive decline in schizophrenia

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Abstract

Background: Schizophrenia is associated with pragmatic language impairment (PLI), a reduced ability to communicate intention in a rule-governed fashion. Two explanations for PLI include that PLI is equivalent to thought disorder and that PLI is secondary to generalized cognitive decline.

Objectives: The aims of this study were to demonstrate PLI in schizophrenia and to test which of these explanations best accounts for the relationships among thought disorder, PLI, and generalized cognitive decline.

Method: Schizophrenia ($n=20$) and control ($n=26$) participants provided speech samples that were scored for thought disorder (type–token ratio and Cloze procedure) and PLI [Profile of Pragmatic Impairment in Communication (PPIC)]. Generalized cognitive decline was determined from discrepancies between current and premorbid verbal IQ.

Results: Patients with schizophrenia exhibited significant PLI and generalized cognitive decline. There was no evidence of an association between thought disorder and PLI. Moreover, generalized cognitive decline predicted PLI ($r^2=0.33$ to 0.59) but not thought disorder ($r^2=0.02$ to 0.06).

Conclusions: The results conformed to a predicted pattern of associations based on the notion that PLI in schizophrenia is secondary to generalized cognitive decline.

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Keywords: Cloze procedure; Generalized cognitive decline; Pragmatic language impairment; Schizophrenia; Thought disorder; Type–token ratio

1. Introduction

Everyday conversations often contain utterances that have disparate literal and intended meanings. Such

disparities do not hinder the communication of intention provided listeners and speakers utilise shared conventions that govern conversational interactions (Grice, 1975, 1978). The ability to communicate and comprehend intention in a rule-governed fashion, called pragmatic language ability (Manochiopinig et al., 1992), is impaired in schizophrenia (Corcoran and Frith, 2003; Tényi et al., 2002).

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There are two explanations for pragmatic language impairment (PLI) in schizophrenia. Firstly, expressive PLI may be equivalent to formal thought disorder (Langdon et al., 2002). *Formal thought disorder* refers to a set of interrelated language phenomena (Holzman et al., 1985) that are construed as indicating that the form of underlying information processing is disorganized. In historical and contemporary accounts, thought disorder is presumed to reflect a core pathological process in schizophrenia (Andreasen, 1999; Bleuler, 1911/1950; Meehl, 1990). The argument that PLI and thought disorder are equivalent is based on the resemblance of aspects of language behaviour referenced by each of the terms. For example, pragmatic rules, such as *be relevant* and *be sufficient* (Grice, 1975), may be inappropriately violated by tangential or incoherent speech and poverty of speech, respectively. Secondly, PLI may be secondary to generalized cognitive decline in schizophrenia. This argument builds on Grice's (1975) analysis of the prerequisites for successful communication of intention and is supported by evidence that pragmatic language ability is not localized in the cortex (Zaidel et al., 2000), that PLI occurs in other neuropsychiatric groups (Godfrey et al., 2000; Hays et al., 2004; Linscott et al., 1996), and that in Alzheimer's disease, cognitive impairment accounts for much of the variance in PLI (Hays et al., 2004).

These explanations yield distinct predictions about the relationships among thought disorder, PLI, and generalized cognitive decline. If PLI and thought disorder are equivalent, PLI will be correlated with thought disorder, but neither will be correlated with generalized cognitive decline (Kerns and Berenbaum, 2002). However, if PLI is secondary to cognitive decline in schizophrenia, thought disorder and PLI should be uncorrelated and generalized cognitive decline will predict PLI (Hays et al., 2004) but not thought disorder.

In this study, the objectives were to demonstrate PLI in schizophrenia and to test three hypotheses: (1) objective indices of thought disorder are correlated with observer ratings of PLI; (2) greater cognitive decline is associated with greater PLI; and (3) greater cognitive decline is associated with more severe thought disorder. If PLI and thought disorder are equivalent, Hypothesis 1 should be supported, but Hypotheses 2 and 3 should not be supported. If PLI is secondary to cognitive decline, Hypothesis 2

should be supported but Hypotheses 1 and 3 should not be supported. A multitrait mixed-method language assessment protocol was used to avoid confounding method with trait variance. Specifically, thought disorder was quantified with two objective performance indices and PLI was quantified using observer ratings.

2. Method

2.1. Participants

Participants with schizophrenia were recruited from inpatient and outpatient psychiatry units, were at least 18 years old, had working diagnoses of schizophrenia and, in the opinion of referring clinicians, were capable of providing informed consent. Twenty-nine patients provided written informed consent. Six were later excluded because of evidence of neurological disorder, traumatic brain injury, possible substance dependence disorder, or illiteracy. Another participant was excluded prior to analysis because he was a demographic outlier and 2 withdrew from the study before assessment was completed, leaving 20 (16 males) who completed participation. DSM-IV diagnoses, which were confirmed using the Schedule for Affective Disorders and Schizophrenia (SADS; Spitzer and Endicott, 1979) and psychiatric records, were schizophrenia, paranoid type (6 participants), disorganised type (2), or undifferentiated type (10); and schizoaffective disorder, bipolar type (2). All patients were being treated with antipsychotics.

Control group participants were recruited through public advertisement or personal contact and were at least 18 years old. Of 33 volunteers who provided written informed consent, 7 were excluded because of evidence of neurological disorder, traumatic brain injury, substance-use disorder, personal history of psychiatric illness, family history of psychosis, or illiteracy, leaving 26 (14 males) who completed participation. Table 1 shows the demographic and clinical characteristics of the two groups.

2.2. Procedure and speech sample elicitation

Participants completed an initial screening interview, provided speech samples, completed the

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