

The communicative impairment as a core feature of schizophrenia: Frequency of pragmatic deficit, cognitive substrates, and relation with quality of life

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Abstract

Background: Impairments in specific aspects of pragmatic competence, supporting the use of language in context, are largely documented in schizophrenia and might represent an indicator of poor outcome. Yet pragmatics is rarely included in clinical settings. This paper aims to promote a clinical consideration of pragmatics as a target of assessment and intervention. We investigated the frequency of the pragmatic deficit, its cognitive substrates, and the relation with quality of life.

Methods: Pragmatic abilities were compared in a sample of patients with schizophrenia and healthy controls based on a comprehensive pragmatic test (APACS). We assessed also for psychopathology, cognition, social cognition, and quality of life. We explored the co-occurrence of deficits in different domains, and we used multiple regressions to investigate the effect of cognition and social cognition on pragmatics, and of pragmatics on quality of life.

Results: Pragmatic abilities, especially comprehending discourse and non-literal meanings, were compromised in schizophrenia, with 77% of patients falling below cutoff. Pragmatic deficit co-occurred with cognitive or socio-cognitive deficits in approximately 30% of cases. Multiple regression analysis confirmed the interplay of cognition and social cognition in pragmatic behavior. Quality of life was predicted by symptoms and by pragmatic abilities.

Conclusions: The high frequency of impairment suggests that the pragmatic deficit is a core feature of schizophrenia, associated with quality of life. Cognitive and socio-cognitive abilities might represent necessary though not sufficient building blocks for the acquisition of pragmatic abilities throughout development. Therefore, a more precise incorporation of pragmatics in the description of the pathology is of high clinical and translational relevance.

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1. Introduction

Alterations of communication are largely documented in schizophrenia since the first descriptions of the illness [1,2]. In modern days, multidisciplinary approaches combining psychiatry, linguistics, and neuroscience of language have paved

the way to a more principled characterization of linguistic disruption in schizophrenia [3]. In this perspective, the deficit seems to encompass both comprehension and production [4,5], especially in the domains of syntax [6] and high-level semantics [7].

In this view, it has been claimed that the most obviously disordered language level in schizophrenia is pragmatics [3,8], i.e. the ability of processing the relationship between language and context [9]. Beyond the grammatical aspects of language, patients with schizophrenia suffer from a failure in the use of language in social interaction, in producing contextually appropriate speech, and in inferring context-dependent meanings. Evidence supporting the claim of a diffuse pragmatic impairment

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is abundant yet sparse. Deficits in the comprehension of non-literal language, for instance, have been reported since at least 100 years, traditionally attributed to the inability of abstract thinking, clinically defined as “concretism”, i.e. adherence to the physical aspects of stimuli and words [10]. Recently, the interest on this topic has grown remarkably, with a plethora of studies reporting breakdowns in patients with schizophrenia across a range of specific tasks involving the comprehension of pragmatic aspects of language [11–17]. For instance, in a story comprehension task, when required to judge the appropriateness of a statement, patients make more errors than controls when the speech is metaphorical or ironic [11]. Similarly, patients are impaired in the comprehension of idiomatic expressions, as tested both in sentence-to-picture matching task [13] and in online sentence continuation verification task [15]. Several studies also deal with discourse production in schizophrenia [18–21], reporting failures in maintaining thematic coherence and respecting the rules of conversation. For instance, Perlini et al. compared a sample of patients with schizophrenia with healthy controls and patients with bipolar disorder, evaluating several micro- and macro-linguistic aspects of discourse, including fine-grained analysis of pragmatic parameters such as informativeness and coherence [19]. Results showed diffuse deficits in the performance of patients with schizophrenia, compared to both the other groups. Linscott et al. showed that patients scored higher than controls in the Profile of Pragmatic Impairment in Communication (PPIC), being less compliant with Gricean conversational rules [18].

Globally, these findings strongly indicate a widespread pragmatic impairment in schizophrenia, yet this bulk of evidence is rarely described under the unifying umbrella of pragmatic competence. Only a few studies included a broad assessment of pragmatic abilities [22]. Among these, Colle et al. presented a preliminary assessment of verbal and non-verbal communicative abilities in patients with schizophrenia based on the Assessment Battery of Communication (ABaCo), with a special focus on the interplay between pragmatics and mind-reading in understanding speech acts of different complexity. Results evidenced a wide dysfunction, with 80% of patients' scores below the 20th percentile of the normative data [22]. Apart from a few investigations, most studies focus on specific aspects of pragmatic capacity in schizophrenia, preventing from a comprehensive evaluation of the communicative disruption in this clinical population.

This “fragmentation” of the literature also hampers a clearer understanding of the relationship between pragmatics and both the cognitive and socio-cognitive abilities that are typically impaired in schizophrenia, as well as between pragmatics, psychopathology, and intellectual level. Indeed, performance in specific pragmatic tasks has been related either to executive functions or theory of mind (ToM) [11,23–25]. For instance, cognitive abilities, especially executive functions and working memory, were found to predict the comprehension of idiomatic expressions [13] and proverbs [12]. Other authors, however, argued that the role of social cognition abilities is stronger than that of executive functions in comprehending proverbs [23] as

well as indirect request [24]. Also, there is evidence that the role of ToM might vary across pragmatic tasks, being associated for instance with the understanding of irony, but unrelated to the understanding of metaphors [11]. Conflicting results are reported also for symptoms [15,17,18,26]. Some studies found a relation between pragmatic performance and symptoms [14,17], while others reported no association between though disorders and high-level language aspects such as idioms comprehension [13] or conversational abilities [18]. In sum, the relationship between the global domain of pragmatic abilities, cognition, and psychopathology appears still unclear.

Interestingly, several authors suggested that communicative and pragmatic impairment could impact on social interaction and daily living [27]. However, up to date, only a few studies explicitly explored the effect of communication abnormalities on functioning in schizophrenia [28–30]. According to these studies, disconnected speech and verbal underproductivity compromise the patients' social skills, including the ability to engage in social relationships [29], and the inability to comprehend sarcasm affects recreational functioning [30].

Further research shows that the pragmatic deficit is present in prodromal samples [31,32] and in first-degree relatives [33,34], and even that specific discourse coherence features in youths' speech might help predicting future development of psychosis [35], suggesting that communication [36] and more specifically pragmatic disruption may represent a biomarker of schizophrenia, fitting into the neurodevelopmental hypothesis [37], as rooted in early brain development.

In sum, so far pragmatics has been mainly confined to the research setting, and a complete and reliable assessment of pragmatic abilities is not included in the clinical practice. This undermines our comprehension of the frequency of the deficit, its possible role as a core feature of schizophrenia, its impact on daily living, and its cognitive substrates, as well as its possible consideration as a target of intervention.

In this study we sought to promote a clinical turn in the consideration of the pragmatic deficit in schizophrenia. Specifically, we aimed at: (i) providing a first estimation of the frequency of pragmatic impairment in schizophrenia; (ii) exploring the interplay of cognitive domains in determining the pragmatic deficit; and (iii) assessing the relation of pragmatics with quality of life. Our hypotheses were as follows: (i) we expected to observe a high frequency of pragmatic impairment, comparable to the frequency of core features of schizophrenia, such as the neurocognitive deficit [38]; (ii) the pragmatic deficit was expected to be intertwined with both cognition and social cognition; (iii) we predicted that pragmatic abilities would significantly contribute to quality of life, even when other variables are taken into account. To address these issues, we employed a comprehensive and reliable assessment tool for pragmatic abilities (the APACS test), recently validated and normed on the Italian population [39] and previously shown to be capable of detecting a pragmatic deficit in psychiatric illness [40]. Here the APACS test was administered to a wider sample of patients with schizophrenia and accompanied with a

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