

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

**PRAGMATIC IMPAIRMENT IN SCHIZOPHRENIA: ASSESSMENT AND TREATMENT APPROACHES.**

**This is the author's manuscript**

*Original Citation:*

*Availability:*

This version is available <http://hdl.handle.net/2318/1963033> since 2024-03-19T17:20:18Z

*Terms of use:*

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

## **COMMUNICATIVE-PRAGMATIC IMPAIRMENT IN SCHIZOPHRENIA: ASSESSMENT AND TREATMENT APPROACHES**

**Ilaria Gabbatore**

University of Oulu

Research Unit of Logopedics

Child Language Research Center

### **Communicative impairment in Schizophrenia**

Schizophrenia involves a range of cognitive and emotional dysfunctions including perception, inferential thinking, language and communication, behavior monitoring, fluency, productivity of thought and speech and attention (DSM-5; American Psychiatric Association, 2013). Impaired communicative competence is a typical feature of schizophrenia, and it has long been thought to contribute to the severe functional disability of this disorder (Cummings, 2014). Aim of the paper is to provide an overview of the available data in the literature concerning the assessment and the treatment of pragmatic impairments in these individuals.

Among linguistic abilities, both comprehension and production have been found to be abnormal in patients with schizophrenia (Condray, 2005). They tend to use simpler syntactic structures and to repeat words, providing scarcely informative speech samples (DeLisi, 2001). The impairments become more pervasive when patients need to organize what they want to communicate at the pragmatic-communicative level and generate appropriate mental models (Marini et al., 2008).

Schizophrenic individuals find it difficult to convey a message or an intention (Frith & Corcoran, 1996) resulting in low performance in those communicative behaviors requiring the ability to go beyond the literal meaning and take into consideration the contextual information and the speaker's intention. Schizophrenic individuals may have difficulties in managing a conversation in everyday life (Bazin, Sarfati, Lefrère, Passerieux, & Hardy-Baylé, 2005) and having troubles in appropriately using the conversational rules, providing inappropriate quantity of information and failing in being clear and concise. Schizophrenia often implies also difficulties in using non-verbal cues to facilitate communication partner's engagement (Linscott, 2005), so that the ability to handle prosody and facial expressions to connote their statements is impaired (Edwards, Jackson, & Pattison, 2002). Studies in the pragmatic field, moreover, highlight these patients to have impairments in being sensitive to Grice's maxims (Mazza, Di Michele, Pollice, Casacchia, & Roncone, 2008), in managing communicative failures of communication (Bosco, Bono, & Bara, 2012b), in

comprehending indirect speech acts (Corcoran, 2003) and in figurative expressions, such as metaphors and idioms (Langdon, Coltheart, Ward, & Catts, 2002; Tavano et al., 2008).

Beside their communicative-pragmatic difficulties, patients with schizophrenia exhibit impairments in Theory of Mind (ToM) (Bosco et al., 2009; Brüne, Dimaggio, & Lysaker, 2011), i.e. the capacity to attribute mental states to oneself and to others, and to use such knowledge to interpret one's own and other people's behaviors (Premack & Woodruff, 1978; see also Brizio, Gabbatore, Tirassa, & Bosco, 2015). According to some authors (Frith, 2004) the pragmatic impairment of these patients might be partially explained by their main deficit in ToM. Nevertheless, the relationship between ToM and pragmatic abilities in schizophrenia is still controversial. On the one hand the capacity to mind-read needs to be intact in order to understand communicative intentions (Happé & Loth, 2002; Salvatore, Dimaggio, Popolo, & Lysaker, 2008), on the other hand several authors agree in the view that communicative-pragmatic competence cannot be entirely identified with the ability to mind-read (Sperber & Wilson, 2002; Tirassa, Bosco, & Colle, 2006a; Tirassa, Bosco, & Colle, 2006b; Tirassa & Bosco, 2008). For instance, ToM seems to be only partially able to explain the difficulties experienced by schizophrenic individuals in recognizing and repairing communicative failures (Bosco, Bono & Bara, 2012b).

## **Assessment tools**

In light of communicative impairment in schizophrenia, an accurate assessment is important to better understand inefficient behavioral strategies of these individuals. In the last decades, some clinical tools for the assessment of the communicative competence in schizophrenia and its relation with other cognitive features have been developed.

*Pragmatic Protocol* (Prutting & Kittchner, 1987) focuses on the management of speech acts, maintenance of the topic of the conversation, respect of the turn-taking rules, lexical and nonverbal aspects of the conversation. Meilijson, Kasher, & Elizur (2004) administered it to a sample of schizophrenic patients, detecting that when compared with healthy individuals and individuals with other psychiatric and neurological disorders, schizophrenic persons showed higher degrees of inadequacy in the investigated components. *Profile of Pragmatic Impairment in Communication* (PPIC; Linscott, Knight, & Godfrey, 1996) is based on Grice's (1975) theoretical analysis of pragmatic competence and focuses on the conversational behavior underlying the generation of implied meanings. Linscott (2005) used the PPCI to investigate the existing interrelation among thought disorder, pragmatic deficits and cognitive impairment. Results highlighted patients' pragmatic linguistic impairment to be more ascribable to a generalized cognitive decline than to a thought disorder.

The *Montréal Evaluation de la Communication* (MEC; Joannette, Ska, & Côté, 2004) and its Italian adaptation *Protocollo Montréal per la valutazione delle Abilità Comunicative* (MAC; Tavano, Côté, Ferré, Ska, & Joannette, 2013) are based on the evaluation of several communicative components: awareness of the communicative

deficit, emotional prosody, verbal fluency, semantic judgment, conversational and narrative abilities, understanding of indirect speech acts and metaphors interpretation. Champagne-Lavau and Stip (2010) applied the tool in a study with schizophrenic individuals to explore the relationship between pragmatic understanding (as assessed by the comprehension of metaphors and indirect requests), executive functions and ToM ability. The results confirmed ToM deficit and a lack of flexibility in schizophrenic individuals. Moreover, evidences showed that schizophrenic patients exhibit specific difficulties in understanding non-idiomatic and idiomatic metaphors and indirect requests, while their performance was comparable to healthy controls in tasks focused on the comprehension of literal interpretation.

These batteries often differ greatly from one another in terms of content and procedures, limiting the possibility to make comparable conclusions. An attempt to cover a wider range of expressive modalities with the same technique, thus overcoming the limitation in this field, is represented by the *Assessment Battery for Communication* (ABaCo; Angeleri, Bosco, Gabbatore, Bara, & Sacco, 2012; Bosco, Angeleri, Zuffranieri, Bara, & Sacco, 2012a; Gabbatore et al., 2014; Sacco et al., 2008). This is a clinical tool able to assess, both in comprehension and in production, a wide range of pragmatic phenomena of different level of complexity. It is composed of five evaluation scales, each focusing on a particular expressive modality, i.e., linguistic, extra-linguistic, paralinguistic, taking also into consideration social appropriateness and conversational abilities. Thus, the battery provides in a unified tool a precise assessment of schizophrenic patients' communicative abilities, way beyond language itself. Colle et al. (2013) evaluated patients' performance at ABaCo, highlighting a pattern of increasing difficulty both in comprehension and production of direct and indirect communication acts, the easiest tasks, followed by deceptions and ironies, the most difficult tasks to solve, both in the linguistic and gestural modality. Results also highlighted impairment in handling affective prosody, facial affect, and in the ability to use paralinguistic cues. Moreover, patients exhibited scarce sensitivity to the violation of Grice's maxims and social norms. Finally, the authors detected difficulties in taking into account contextual information, such as the nature of the relationship with the interlocutor and the interlocutor's background knowledge about the surrounding context. At the conversational scale, patients' performance was less accurate than healthy controls' in both topic management and turn-taking.

## **Rehabilitative approaches**

Cognitive and communicative remediation in schizophrenia have received little attention, even though deficits at this level considerably restrict the possibilities for functional recovery and persist even after the psychosis subsides (Green, 1996). Data from meta-analysis (Krabbendam & Aleman, 2003) highlight that cognitive rehabilitation is able to improve task performance in patients with schizophrenia, providing evidence for a generalization of training effects to the everyday life. The participation in cognitive remediation programs implies improvements in the quality

of interpersonal relationships (Hogarty et al., 2004) and in the ability to solve interpersonal problems (Spaulding, Reed, Sullivan, Richardson, & Weiler, 1999). Kurtz and Richardson (2012) indicate moderate-large effects of social cognitive training procedures on facial expression recognition and small-moderate effects of these trainings on theory of mind abilities.

Some programs were developed to improve cognitive functioning, and cognition training has become a regular component of treatment programs for people suffering from schizophrenia (Silverstein & Wilkniss, 2004).

*Cognitive Remediation Therapy* (Wykes & van der Gaag, 2001) focuses on increasing the capacity and efficiency of cognitive functions, on teaching global and transferable cognitive schemes to guide response behavior, on improving metacognition and increasing motivation, on generalization of skills and use of social support. The *Cognitive Enhancement Therapy* (Hogarty & Flesher, 1999) is a therapeutic procedure combining activities aimed at enhancing perceptive and cognitive resources critical for social functioning and general adjustment in people with schizophrenia (Hogarty et al., 2004). This training is designed for individuals with stable mental illness and aims at improving neurocognitive skills, focusing on enhancing perspective taking, social context appraisal, and other components of social cognition. Bell, Bryson, Greig, Corcoran, and Wexler (2001) evaluated the effects of the *Neurocognitive Enhancement Therapy*, a comprehensive program of computer-assisted cognitive remediation, consisting of drill-and-practice exercises in attention, memory, language and problem solving in a sample of schizophrenic individuals. Results revealed improvements in executive functions, working memory and affect recognition concerning the cognitive remediation condition that revealed to be stable in time (Bell, Lysaker, & Bryson, 2003).

Some treatments, then, have been developed to improve social functioning. *Social Cognition and Interaction Training* (Penn, Roberts, Combs, & Sterne, 2007) is a group-based intervention aimed at training the ability to manage emotions, improving cognitive flexibility in social situation and identifying mental states. In addition, the *Training of Affect Recognition* (Frommann, Streit, & Wölwer, 2003; Wölwer et al., 2005) was developed to specifically improve patients' abilities to recognize facial expressions, to identify and verbalize emotions and to integrate these abilities into the social, behavioral and situational context.

Focusing on the ToM impairments, Roncone et al. (2004) applied the *Instrumental Enrichment Program* (IEP; Feuerstein and Jensen, 1980) in a study with schizophrenic individuals aimed at improving social cognition deficits. This method is based on mediated learning and is focused on the enhancement of the patients' ability to modify wrong beliefs and their thinking strategies by exposure to new experiences. The training focuses on being aware of the cognitive impairment, exercising emotion recognition and forming new habits in social competencies. Moreover, the program helps individuals to understand the nature of the main cognitive processes involved in social interactions and to modify self and other people's perception. Kayser, Sarfati, Besche, and Hardy-Baylé (2006) proposed a therapeutic intervention for schizophrenic patients aimed at improving the ability to correctly attribute mental states. The program is realized through video scenes

showing the interactions between two or more persons whose mental states need to be identified and analyzed. Participants are encouraged to think of the characters' intentions and mental states, make hypotheses and give arguments for their interpretations. The role of the therapist is to guide patients in their analysis through comments and suggestions. The results showed an improvement in patients' abilities to attribute intentions to others and their capacity to infer mental states, with a consequent reduction of disorganization signs; improvements in the participants' communication disorders were also detected.

The rehabilitative approaches described above cover a wide range of skills, treated with different techniques. Nevertheless, at the best of my knowledge, no treatment has been proposed for the recovery of the communicative-pragmatic impairment: as discussed in the introduction, communicative competence comprises several components and can be differently impaired in schizophrenic individuals.

Recently, the *Cognitive Pragmatic Treatment* (CPT) has been developed with the purpose to overcome the limitation of the intervention in this field and provide a comprehensive rehabilitation program able to produce improvement in the communicative pragmatic abilities of these patients, taking also into consideration cognitive aspects such as awareness, theory of mind and executive functions.

The CPT has already been successfully used and validated with traumatic brain injured patients (Gabbatore et al., 2015). It consists of 20 sessions, each dealing with a particular aspect of communication. Patients attend two sessions (each 90 min.) per week, for 10 weeks. Sessions are conducted in small groups of five/six. The therapy mainly focuses on the different expressive modalities of communication, i.e. linguistic, gestural, paralinguistic, social appropriateness and conversational abilities. Some rehabilitation sessions also address aspects closely related to the communicative ability such as awareness, theory of mind, and planning. The sessions provide an ecological setting where patients are encouraged to put their communicative abilities into practice and taught how to deal with common problems of the everyday communication, through self-monitoring strategies and feedback provided by the therapist. The various training activities focus on the idea that the ability to create new meanings and share them with other people, using different expressive modalities, is the very essence of human communication (Bara, 2010). Often in everyday communicative interactions the intended meaning does not simply correspond to the literal one; the goal of a pragmatic training such as CPT is to help patients to interpret the intended meaning and to look beyond the literal one, passing through all the different stages of elaboration involved in the communicative process. The training program involves activities designed to improve patients' inferential abilities so as to fill the existing gap between what is said and what is meant. Discussions with the participants and specific exercises focus on the communicative intentions observed rather than on the mere linguistic aspects of the utterances, the understanding of which is fairly well preserved in these patients. More specifically, patients are encouraged to go beyond the literal meaning and focus on the speaker's communicative intentions and the possible alternative meanings and implications, depending on the circumstances.

The training program also focuses on the ability to take contextual information into consideration, and modulate speech according to a particular context: schizophrenia often implies difficulties in decoding the violations of conversational implicatures and these patients often exhibit low levels of adherence to the context, so that their discourse is characterized by derailments and digressions. The communicative inappropriateness shown by subjects with schizophrenia is indeed a severe obstacle to their social reintegration. During the Cognitive Pragmatic Treatment program, particular emphasis is given to the ability to identify the other person's intentions, without over interpreting their mental states and thus jumping to wrong conclusions. Video recording of the sessions are used to provide feedback to the patients, during and at the end of the program: thanks to this practice, the conductor is able to give a better analytical, critical and objective contribution to the contents of the sessions, thereby helping patients to be more aware of their impairment and of the progresses they make.

In a recent study (Bosco, Gabbatore, Gastaldo, Bara, & Sacco, 2016) the CPT's efficacy in improving communicative-pragmatic abilities in people with schizophrenia was tested. The effects of the remediation program was measured through the use of the equivalent forms of the Assessment Battery for Communication (Bosco et al., 2012a), whose use reduces the possibility of the results being attributable to factors such as practice and memory. Post-treatment evaluation revealed a significant improvement in patients' performance on comprehension and production tasks for all the scales of the ABaCo, with the sole exception of the context scale, which was only close to the statistical significance. In particular, authors observed a significant improvement in linguistic abilities, i.e. the use of language for communicative purposes, and extralinguistic competence, i.e., gestures and body movements. Moreover, at the end of the training program, the patients showed improved paralinguistic abilities, i.e. a more fluent and appropriate use of tone of voice, gaze and facial expressions. As regards the context scale, authors attributed the absence of significant difference in pre- and post-treatment performance to the fact that this scale has fewer items than the others, thus probably proving to be less reliable and effective in detecting improvements in performance (see Bosco et al., 2012a). The observed improvement in communicative-pragmatic abilities remained stable over time: the effect of the treatment was still apparent at the follow-up assessment, three months after the end of the treatment.

## **Conclusion**

Communicative-pragmatic abilities are essential for the management of our everyday lives. Despite the evidences of deficit at this level, not so many studies have investigated these abilities in individuals with schizophrenia. The assessment and treatment tools described above contribute to shed light on important evidences concerning several components of the communicative competence. Nevertheless, a lack of uniformity in procedures and stimuli used is detectable, and comparing results is difficult. An accurate and complete assessment of communicative abilities appears

to be crucial not only for assessing patients' impairments, but also to plan and develop adequate and specific rehabilitation programs.

## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)* American Psychiatric Pub.
- Angeleri, R., Bosco, F.M., Gabbatore, I., Bara, B.G., & Sacco, K. (2012). Assessment battery for communication (ABaCo): Normative data. *J Behavior Research Methods, 44*, 845-861.
- Bara, B. G. (2010). *Cognitive pragmatics: The mental processes of communication* MIT Press.
- Bazin, N., Sarfati, Y., Lefrère, F., Passerieux, C., & Hardy-Baylé, M. (2005). Scale for the evaluation of communication disorders in patients with schizophrenia: A validation study. *Schizophrenia Research, 77*, 75-84.
- Bell, M., Bryson, G., Greig, T., Corcoran, C., & Wexler, B.E. (2001). Neurocognitive enhancement therapy with work therapy: Effects on neuropsychological test performance. *Archives of General Psychiatry, 58*, 763-768.
- Bell, M., Lysaker, P., & Bryson, G. (2003). A behavioral intervention to improve work performance in schizophrenia: Work behavior inventory feedback. *Journal of Vocational Rehabilitation, 18*, 43-50.
- Bosco, F.M., Gabbatore, I., Gastaldo, L., & Sacco, K. (2016). Communicative-Pragmatic Treatment in Schizophrenia: A Pilot Study. *Front. Psychol. 7*:166.
- Bosco, F.M., Angeleri, R., Zuffranieri, M., Bara, B.G., & Sacco, K. (2012a). Assessment battery for communication: Development of two equivalent forms. *Journal of Communication Disorders, 45*, 290-303.
- Bosco, F.M., Bono, A., & Bara, B.G. (2012b). Recognition and repair of communicative failures: The interaction between theory of mind and cognitive complexity in schizophrenic patients. *Journal of Communication Disorders, 45*, 181-197.
- Bosco, F.M., Colle, L., Fazio, S.D., Bono, A., Ruberti, S., & Tirassa, M. (2009). Th.o.m.a.s.: An exploratory assessment of theory of mind in schizophrenic subjects. *Consciousness and Cognition, 18*, 306-319.
- Brizio, A., Gabbatore, I., Tirassa, M., & Bosco, F.M. (2015). "No more a child, not yet an adult": Studying social cognition in adolescence. *Frontiers in Psychology, 6*(01011)
- Brüne, M., Dimaggio, G., & H Lysaker, P. (2011). Metacognition and social functioning in schizophrenia: Evidence, mechanisms of influence and treatment implications. *Current Psychiatry Reviews, 7*, 239-247.
- Champagne-Lavau, M., & Stip, E. (2010). Pragmatic and executive dysfunction in schizophrenia. *Journal of Neurolinguistics, 23*, 285-296.
- Colle, L., Angeleri, R., Vallana, M., Sacco, K., Bara, B.G., & Bosco, F.M. (2013). Understanding the communicative impairments in schizophrenia: A preliminary study. *Journal of Communication Disorders, 46*, 294-308.



- Condray, R. (2005). Language disorder in schizophrenia as a developmental learning disorder. *Schizophrenia Research*, 73, 5-20.
- Corcoran, R. (2003). Inductive reasoning and the understanding of intention in schizophrenia. *Cognitive Neuropsychiatry*, 8, 223-235.
- Cummings, L. (2014). Pragmatic disorders and theory of mind. *Cambridge Handbook of Communication Disorders*, 559-577.
- DeLisi, L.E. (2001). Speech disorder in schizophrenia: Review of the literature and exploration of its relation to the uniquely human capacity for language. *Schizophrenia Bulletin*, 27, 481.
- Edwards, J., Jackson, H.J., & Pattison, P.E. (2002). Emotion recognition via facial expression and affective prosody in schizophrenia: A methodological review. *Clinical Psychology Review*, 22, 789-832.
- Feurstein, R., & Jensen, M. R. (1980). Instrumental enrichment: Theoretical basis, goals, and instruments. *The Educational Forum*, 44, 401-423.
- Frith, C.D. (2004). Schizophrenia and theory of mind. *Psychological Medicine*, 34, 385-389.
- Frith, C.D., & Corcoran, R. (1996). Exploring 'theory of mind' in people with schizophrenia. *Psychological Medicine*, 26, 521-530.
- Frommann, N., Streit, M., & Wölwer, W. (2003). Remediation of facial affect recognition impairments in patients with schizophrenia: A new training program. *Psychiatry Research*, 117, 281-284.
- Gabbatore, I., Sacco, K., Angeleri, R., Zettin, M., Bara, B. G., & Bosco, F. M. (2015). Cognitive pragmatic treatment: A rehabilitative program for traumatic brain injury individuals. *Journal of Head Trauma Rehabilitation*, 30, E14-E28.
- Gabbatore, I., Angeleri, R., Bosco, F.M., Cossa, F.M., Bara, B.G., & Sacco, K. (2014). Assessment of communicative abilities in aphasic patients. *Minerva Psichiatrica*, 55, 45-55.
- Green, M.F. (1996). What are the functional consequences of neurocognitive deficits in schizophrenia? *The American Journal of Psychiatry*, 153, 321-30.
- Grice, H. P. (1975). Logic and conversation. The William James lectures, II. In P. Cole & J. L. Morgan (Eds.), *Syntax and semantics 3: Speech acts*. New York: Academic Press.
- Happé, F., & Loth, E. (2002). 'Theory of mind' and tracking speakers' intentions. *Mind & Language*, 17, 24-36.
- Hogarty, G.E., Flesher, S., Ulrich, R., Carter, M., Greenwald, D., Pogue-Geile, M., ... Garrett, A. (2004). Cognitive enhancement therapy for schizophrenia: Effects of a 2-year randomized trial on cognition and behavior. *Archives of General Psychiatry*, 61, 866-876.
- Hogarty, G.E., & Flesher, S. (1999). Practice principles of cognitive enhancement therapy for schizophrenia. *Schizophrenia Bulletin*, 25, 693-708.
- Joanette, Y., Ska, B., & Côté, H. (2004). *Protocole MEC, protocole montréal d'évaluation de la communication* Ortho éd.
- Kayser, N., Sarfati, Y., Besche, C., & Hardy-Baylé, M. (2006). Elaboration of a rehabilitation method based on a pathogenetic hypothesis of "theory of mind" impairment in schizophrenia. *Neuropsychological Rehabilitation*, 16, 83-95.

- Krabbendam, L., & Aleman, A. (2003). Cognitive rehabilitation in schizophrenia: A quantitative analysis of controlled studies. *Psychopharmacology*, *169*, 376-382.
- Kurtz, M.M., & Richardson, C.L. (2012). Social cognitive training for schizophrenia: A meta-analytic investigation of controlled research. *Schizophrenia Bulletin*, *38*, 1092-1104.
- Langdon, R., Coltheart, M., Ward, P.B., & Catts, S.V. (2002). Disturbed communication in schizophrenia: The role of poor pragmatics and poor mind-reading. *Psychological Medicine*, *32*, 1273-1284.
- Linscott, R.J. (2005). Thought disorder, pragmatic language impairment, and generalized cognitive decline in schizophrenia. *Schizophrenia Research*, *75*, 225-232.
- Linscott, R., Knight, R., & Godfrey, H. (1996). The profile of functional impairment in communication (PFIC): A measure of communication impairment for clinical use. *Brain Injury*, *10*, 397-412.
- Marini, A., Spoletini, I., Rubino, I.A., Ciuffa, M., Bria, P., Martinotti, G., . . . Spalletta, G. (2008). The language of schizophrenia: An analysis of micro and macrolinguistic abilities and their neuropsychological correlates. *Schizophrenia Research*, *105*, 144-155.
- Mazza, M., Di Michele, V., Pollice, R., Casacchia, M., & Roncone, R. (2008). Pragmatic language and theory of mind deficits in people with schizophrenia and their relatives. *Psychopathology*, *41*, 254-263.
- Meilijson, S.R., Kasher, A., & Elizur, A. (2004). Language performance in chronic Schizophrenia A pragmatic approach. *Journal of Speech, Language, and Hearing Research*, *47*, 695-713.
- Penn, D.L., Roberts, D.L., Combs, D., & Sterne, A. (2007). Best practices: The development of the social cognition and interaction training program for schizophrenia spectrum disorders. *PS*, *58*, 449-451.
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, *1*, 515-526.
- Prutting, C.A., & Kittchner, D.M. (1987). A clinical appraisal of the pragmatic aspects of language. *Journal of Speech and Hearing Disorders*, *52*, 105-119.
- Roncone, R., Mazza, M., Frangou, I., De Risio, A., Ussorio, D., Tozzini, C., & Casacchia, M. (2004). Rehabilitation of theory of mind deficit in schizophrenia: A pilot study of metacognitive strategies in group treatment. *Neuropsychological Rehabilitation*, *14*, 421-435.
- Sacco, K., Angeleri, R., Bosco, F.M., Colle, L., Mate, D., & Bara, B.G. (2008). Assessment battery for Communication—ABaCo: A new instrument for the evaluation of pragmatic abilities. *Journal of Cognitive Science*, *9*, 111-157.
- Salvatore, G., Dimaggio, G., Popolo, R., & Lysaker, P.H. (2008). Deficits in mindreading in stressful contexts and their relationships to social withdrawal in schizophrenia. *Bulletin of the Menninger Clinic*, *72*, 191-209.
- Silverstein, S.M., & Wilkniss, S.M. (2004). At issue: The future of cognitive rehabilitation of schizophrenia. *Schizophrenia Bulletin*, *30*, 679-692.

- Spaulding, W.D., Reed, D., Sullivan, M., Richardson, C., & Weiler, M. (1999). Effects of cognitive treatment in psychiatric rehabilitation. *Schizophrenia Bulletin*, 25, 657.
- Sperber, D., & Wilson, D. (2002). Pragmatics, modularity and mind-reading. *Mind & Language*, 17, 3-23.
- Tavano, A., Côté, H., Ferré, P., Ska, B., & Joannette, Y. (2013). Somministrazione e codifica del protocollo MEC. *Protocollo MEC* (pp. 31-64) Springer.
- Tavano, A., Sponda, S., Fabbro, F., Perlini, C., Rambaldelli, G., Ferro, A., . . . Brambilla, P. (2008). Specific linguistic and pragmatic deficits in italian patients with schizophrenia. *Schizophrenia Research*, 102, 53-62.
- Tirassa, M., & Bosco, F.M. (2008). On the nature and role of intersubjectivity in communication. *Enacting Intersubjectivity: A Cognitive and Social Perspective to the Study of Interactions*, 81-95.
- Tirassa, M., Bosco, F.M., & Colle, L. (2006a). Rethinking the ontogeny of mindreading. *Consciousness and Cognition*, 15, 197-217.
- Tirassa, M., Bosco, F.M., & Colle, L. (2006b). Sharedness and privateness in human early social life. *Cognitive Systems Research*, 7, 128-139.
- Wölwer, W., Frommann, N., Halfmann, S., Piaszek, A., Streit, M., & Gaebel, W. (2005). *Schizophrenia Research*, 80, 295.
- Wykes, T., & van der Gaag, M. (2001). Is it time to develop a new cognitive therapy for psychosis—cognitive remediation therapy (CRT)? *Clinical Psychology Review*, 21, 1227-1256.

Gabbatore Iliaria  
ilaria.gabbatore@oulu.fi  
University of Oulu  
Faculty of Humanities  
Research Unit of Logopedics  
Child Language Research Center  
PO Box 1000  
90014 University of Oulu, Finland