Improvement of communicative-pragmatic ability in adolescents with Autism Spectrum Disorder: The adapted version of the Cognitive Pragmatic Treatment

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1   **Abstract**

2   Autism spectrum disorder (ASD) is a complex pathology that includes impaired social

3   interaction abilities. Insufficient attention has been paid to programs specifically devoted to

4   improving communicative-pragmatic skills. Moreover, the majority of studies have focused

5   on children, while programs specifically developed for the adolescents are lacking.

6   The present study aims to test the feasibility and acceptability of the adapted version of the

7   Cognitive Pragmatic Treatment for adolescents (A-CPT), a 15-session group training, as well

8   as its ability to improve the communicative-pragmatic performance of adolescents with ASD.

9   Twenty-one verbally fluent adolescents with ASD took part in the training; they were

10   assessed in three phases, i.e., before, after and at 3months follow-up, using the equivalent

11   forms of the Assessment Battery for Communication (ABaCo), a tool for testing a wide range

12   of pragmatic phenomena, such as direct and indirect speech acts, irony, deceit and violation

13   of Grice's maxims, expressed through linguistic, non-verbal, i.e., gestures, or paralinguistic

14   expressive means. Furthermore, Theory of Mind (ToM) tasks and tests investigating the main

15   cognitive domains, e.g., Executive Functions (planning, shifting, working memory) and long-

16   term memory, were administered. The results showed an improvement in participants'

17   performance in all the four scales of the ABaCo, i.e., linguistic, extralinguistic, paralinguistic

18   and context scale; this improvement was maintained at follow-up assessment three months

19   after the end of the program. No improvement was observed in the cognitive and ToM

20   domains investigated, with the only exception of expressive vocabulary task. Despite the lack

21   of a control group, the high degree of feasibility of the CPT, highlight the importance of more

22   work needed in this research line.

23

24   **Keywords**: Autism Spectrum Disorder; verbally fluent – ASD; Asperger Syndrome;

25   Pragmatics; Rehabilitation; Improvement, Comprehension, Production.

1 **Introduction**

2 *Pragmatic impairment in individuals with Autism Spectrum Disorder*

3 Autism spectrum disorder (ASD) is a heterogeneous pathology that includes, among its core

4 deficits, impaired communicative and social interaction abilities (APA, 2013). The latest edition of

5 the Diagnostic and Statistical Manual of Mental Disorders (DSM5; APA, 2013) collapses what the

6 previous version (DSM-IV; APA, 1994) considered as separate domains of impairment (Fletcher-

7 Watson, McConnell, Manola, & McConachie, 2014), i.e., communicative and social interaction.

8 In their pioneering proposal, Baron-Cohen, Leslie and Frith (1985) identified the deficit in

9 Theory of Mind (ToM) - the ability to comprehend others' mental states (Premack & Woodruff,

10 1978) – as the primary difficulty for individuals with ASD. A large body of evidence in the

11 literature has confirmed the impairment of ToM in people with ASD (for a review see Baron-

12 Cohen, 2000; for a meta-analysis see Chung, Barch, & Strube, 2014). Several studies also showed

13 the special role that language has in influencing the performance on ToM tasks of children with

14 ASD (for a review see Tager-Flusberg & Joseph, 2005).

15 From a different theoretical perspective, some scholars have argued that an intact and fully

16 developed ToM is necessary in order to communicate efficiently (Bosco et al., 2009; Sperber &

17 Wilson, 2002; Tirassa, Bosco, & Colle, 2006, 2008). The difficulties that people with ASD have in

18 comprehending an interlocutor's communicative intention are well documented in the existing

19 literature: they are particularly evident when the meaning of a speaker's utterance does not

20 correspond to what s/he intends to communicate, and especially when the characteristics of the

21 context in which the utterance is proffered have to be considered (Loukusa & Moilanen, 2009).

22 Difficulties with communication in individuals with ASD might be more strongly characterized by

23 difficulties in specific aspects of language processes, i.e., lexical and syntactic, or by a deficit in

24 pragmatic ability (Volden & Phillips, 2010). In this last case they do not necessarily suffer from a

25 linguistic impairment, but they exhibit difficulties with more sophisticated aspects of language,

26 such as communicative-pragmatic ability (Loukusa & Moilanen, 2009).

27   Traditionally, pragmatics has been defined as the use of language in a given context

28   (Levinson, 1983) and refers to the inferential ability to fill the gap that often exists between the

29   speaker's literal utterance and the intended meaning as, for example, in the case of indirect speech

30   acts, irony and other forms of figurative language. Pragmatics has a fundamental role in daily

31   communicative interactions, since it enables individuals to convey effective meanings in everyday

32   life. Even when their linguistic abilities are intact, individuals with ASD often have problems to

33   manage communicative-pragmatic interactions (Baixauli-Fortea, Casas, Berenguer-Forner,

34   Colomer-Diago, & Roselló-Miranda, 2019) and in dealing with more sophisticated pragmatic

35   phenomena such as indirect speech acts, humor, sarcasm and other forms of figurative language

36   (Jolliffe & Baron-Cohen, 2000; Ozonoff & Miller, 1995), in which the literal meaning does not

37   correspond to the communicative intended one. Furthermore, people with ASD may have

38   difficulties with narrative and conversational discourse, since they often find it hard to make

39   appropriate comments, and to identify and maintain the topic during a conversation (Losh & Capps,

40   2003; Volden, 2002).

41   However, pragmatics does not only refer to the ability to use language, but also to the

42   capacity to handle extralinguistic/non-verbal expressive means - such as gestures, body movements,

43   facial expressions - and paralinguistic cues – such as rhythm, intonation and prosody (Bara, 2010).

44   Indeed, the communicative-pragmatic difficulties experienced by individuals with ASD also regard

45   the use, for communicative purposes, of the non-verbal/extralinguistic domain, i.e., gestures and

46   body movements, as well as the paralinguistic one (Angeleri, Gabbatore, Bosco, Sacco, & Colle,

47   2016; Colgan et al., 2006; Morett, O'Hearn, Luna, & Ghuman, 2015; Silverman, Bennetto,

48   Campana, & Tanenhaus, 2010).

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50   ***Treatments targeting pragmatics***

51   ToM and pragmatic skills are considered, in the current literature, as being part of a more

52   general social ability and they are usually regarded as two different facets of the same cognitive

ability. Specifically, Sperber & Wilson (2002) proposed that pragmatics is a subcomponent of a more general ToM ability. For this reason, reviews and meta-analyses (Parsons, Cordier, Munro, Joosten, & Speyer, 2017; Shukla-Mehta, Miller, & Callahan, 2010; Williams White et al., 2007) on this topic usually include programs that focus on mixed interventions, aimed at improving both communicative and ToM/social abilities. This is the case of social skills training (Barry et al., 2003; Cotugno, 2009; Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012; McConnell, 2002; Winner & Crooke, 2009, for a review see White et al., 2007), focused, for example, on non-verbal communication and emotion recognition (Soorya & Siper et al. 2015; Lopata, Thomeer et al. 2010), joint engagement and initiating communication (Kasari, Gulsrud, Wong, Kwon, & Locke, 2010), decoding facial expressions, and prosody (Thomeer et al., 2015).

However, Bosco, Tirassa, & Gabbatore (2018) recently argued that despite its contribution in explaining a person's communicative ability, ToM does not completely overlap with the communicative-pragmatic competence; the authors discussed the possible methodological and empirical problems that might arise when treating such cognitive constructs as if they were one and the same. In particular, the authors pointed out that pragmatic inferential ability does not necessarily overlap with ToM. In conversational implicatures, for instance, the hearer infers the speaker's intended meaning, which goes beyond the literal meaning of the utterance. For example, scalar implicatures rely on quantifiers, such as "all", "none", "some" etc.; the comprehension of "On Francesca's desk, some pens are black" usually implies that not all the pens on the desk are black. In comprehending scalar implicatures, a hearer doesn't need to make any assumptions about the speaker' mental states, but still she is able to comprehend the pragmatic communicative meaning of the utterance by simply using her inferential ability (for a similar discussion see also Parola, Berardinelli, & Bosco, 2018).

In line with such theoretical observation, a recent study showed that treatments specifically targeting the improvement of ToM do not affect communicative abilities in ASD (Marraffa & Araba, 2016). It is therefore important to bear in mind not only the similarities, but also the

79   differences between ToM and the pragmatic domain, since this has relevant implications in the

80   clinical practice (see also Bambini et al., 2016); as for people with ASD, more and specific attention

81   should be paid to treatments specifically focused on improving communicative-pragmatic ability,

82   rather than on ToM alone. For example, Adams et al. (2012) examined the effectiveness of a social

83   communication speech and language intervention in improving language skills, functional

84   pragmatic ability and social communication of a group of 99 participants with Pragmatic Language

85   Impairment (PLI), ranging in age from 5 to 11 years. Even if the authors found no significant

86   treatment effect on structural language and narrative ability, the treatment showed significant

87   effects on participants' conversational competence, on parent-reported measures of pragmatic

88   functioning and social communication, and on teacher-reported ratings of classroom learning skills.

89   The authors highlighted that the performance of their group of children with PLI was substantially

90   overlapping with that of children with verbally fluent ASD; therefore, the authors stated their

91   intervention may be relevant in addressing social communication skills also in the latter clinical

92   group.

93   Finally, the totality of the above-mentioned studies focused on pre-school or

94   elementary/primary school children, whereas as Parsons et al. (2017) underlined in their review of

95   the literature, no studies have been done on interventions for adolescencents specifically focused on

96   pragmatics.

97

98   ***The present study***

99   In light of the above considerations, we decided to focus on three main aspects that have been

100   overlooked in the current literature: first, the importance of focusing on pragmatic ability in

101   individuals with ASD, given the scarcity of studies specifically addressing communicative-

102   pragmatic skills. Second, the shortage of empirical evidence showing that the improvement in the

103   target variables is maintained after the end of the training program (see Fletcher-Watson, et al.,

104   2014); third, the lack of empirical evidence in favor of the effectiveness of pragmatic language

interventions in adolescents with ASD (Parsons et al., 2017). Therefore, the present study aims to contribute to filling the gap in the current literature. Specifically, we adapted the Cognitive Pragmatic Treatment (CPT; Bosco, Gabbatore, Gastaldo, & Sacco, 2016; Gabbatore et al., 2015; Gabbatore, Bosco et al., 2017; Sacco et al., 2016) in order to make it suitable for this age range (A-CPT) and administered the adapted training program to a group of verbally fluent adolescents with ASD (APA, 1994).

The CPT is a manualized treatment, retrievable at [blinded for review] focused on communicative-pragmatic abilities, specifically on inferential ability. It has the advantage of being more systematic than other treatments available in the current literature (see Parsons et al., 2017), in addressing all the expressive means that enable a communicative interaction to take place. The CPT includes, within the same program, (a) placing the focus on different pragmatic abilities, such as conversational and narrative skills, social and contextual appropriateness; (b) promoting the ability to communicate by using different expressive means (linguistic, non-verbal/extralinguistic, i.e. gestures, facial expressions, and prosodic, i.e., tone of voice, rhythm, etc.) and (c) developing the participants' capacity to use inferential abilities, rather than focusing primarily on teaching them appropriate forms of behavior in given contexts.

The CPT has previously shown a good level of efficacy in improving communicative-pragmatic performance in patients with schizophrenia (Bosco et al., 2016; Gabbatore, Bosco et al., 2017). Even if schizophrenia and autism are different pathologies, a meta-analysis showed that patients with ASD and schizophrenia share, at least to some extent, a deficit in mentalizing ability (Chung et al., 2014); besides, the above-mentioned clinical groups display, at least partially, impairments in the same aspects of pragmatic ability (see Saban-Bezalel, Hess, Dolfin, Hermesh, & Vishne, 2017; Solomon et al., 2011). Furthermore, CPT showed to be effective in the improvement of the pragmatic ability of patients with traumatic brain injury (Gabbatore et al., 2015; Sacco et al., 2016), a clinical condition characterized, among other motor and cognitive impairments, by a

number of communicative difficulties in particular with respect to the inferential ability (Angeleri et al., 2008).

Finally, a recent meta-analysis (Matthews, Biney, & Abbot-Smith, 2018) examined, in typical and atypical development, the interplay, among pragmatics, mentalizing ability and executive functioning (EF), which is not yet fully clear in the current literature. EF is a theoretical construct referring to a set of cognitive abilities - such as planning, shifting, and working memory - enabling a person to perform goal-directed behaviors in a flexible and effective way, and adapting her own actions to the specific request of the context (Miyake et al., 2000). The results of the meta-analysis showed that mentalizing was able to explain only some variance in the pragmatic skills, namely discourse contingency and comprehension of irony. As for the EF, there were few studies covering a wide range of skills, and indicating an association between inhibition and communicative perspective taking, as well as a role of working memory and verbal fluency on some of the pragmatic abilities examined, e.g., answering contingently in a conversation and using appropriate language in social contexts.
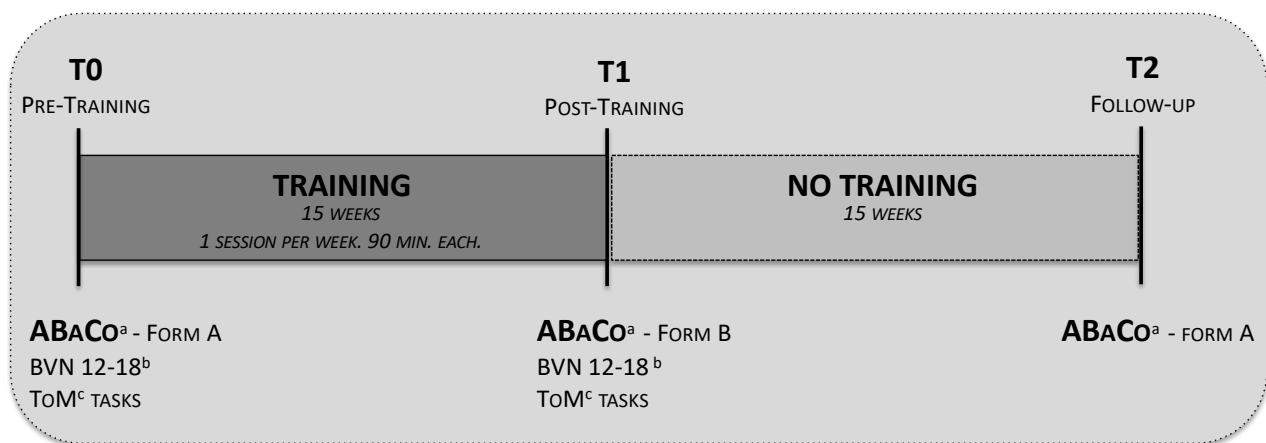
In sum, the scarce evidence available in the current literature seems to suggest that EF and ToM correlate with (some aspects of) pragmatic ability; however, at the same time, pragmatics appears to address specific aspects and not to merely represent the sum of mentalizing and executive functioning (see also Bambini et al., 2016; Bosco et al., 2018; 2019; Bosco & Gabbatore, 2017a; 2017b).

Given the complex, and not yet completely clear relationship among all the above-mentioned variables, in the present study we also assessed ToM skills and a pool of cognitive functions such as EF (planning, shifting, working memory) and long term memory, before and after the training, so to use them as control measures and in order to exclude these might play a significant role in explaining the expected pragmatic improvement.

Hypotheses

156   We hypothesize to detect, after the administration of the CPT, an improvement in the

157 participants' communicative-pragmatic ability, the variable targeted by the training program.

158 Furthermore, since they are not the target variables of our treatment, we do not expect any specific

159 improvement after-training in ToM and in the other cognitive functions investigated, i.e., EF and

160 long term memory. See Figure 1 for a schematic representation of the design of the study.

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T0 PRE-TRAINING	**T1** POST-TRAINING	**T2** FOLLOW-UP
TRAINING *15 WEEKS* *1 SESSION PER WEEK. 90 MIN. EACH.*	**NO TRAINING** *15 WEEKS*	
ABaCo[a] - FORM A BVN 12-18[b] ToM[c] TASKS	**ABaCo**[a] - FORM B BVN 12-18[b] ToM[c] TASKS	**ABaCo**[a] - FORM A

163 *Figure 1. Graphical representation of the study design.*

164 *a. Assessment Battery for Communication, equivalent forms (Bosco et al., 2012);*

165 *b. Neuropsychological Evaluation Battery (Gugliotta et al., 2009);*

166 *c. Theory of Mind tasks (Baron-Cohen et al., 2001; Happé, 1994; Wimmer & Perner, 1983)*

167

168 **Material and Methods**

169 *Participants:*

170 Twenty-one adolescents (20 males and 1 female) with a diagnosis of verbally fluent Autism

171 Spectrum Disorder (DSM IV, APA 1994) were enrolled with the collaboration of two different

172 rehabilitation centers in Piedmont (Italy) area, namely Gruppo Asperger Onlus (Turin) and Centro

173 di Riabilitazione Ferrero (Alba). A diagnosis of ASD had been previously assigned by qualified

174 clinicians working at the public mental health clinical units, using DSM-IV criteria. The

175 participants ranged between 12 and 19 years of age (M = 14.41; SD = 2.13) and had between 6 and

176 14 years of schooling (M = 9.05; SD = 2.25). All participants were native Italian speakers. The

participants had a mean IQ of 93.52 (SD = 13.48) as obtained from their clinical records and measured using the Italian version of the Raven's Standard Progressive Matrices (Raven, 1938) with reference to the standardized norms for adolescents (Picone, Orsini, & Pezzuti, 2017). Individuals who were attending an Applied Behavior Analysis (ABA) rehabilitation program or other programs targeting communicative abilities were excluded from our sample. All the participants displayed adequate linguistic abilities, as certified by the achievement of standard scores within the normative range for their specific age on the subtest for linguistic comprehension i.e., *Token test,* (see *Cognitive assessment* section for a detailed description) of the Neuropsychological Evaluation Battery (BVN 12-18; Gugliotta, Bisiacchi, Cendron, Tressoldi, & Vio, 2009). The participants' average attendance rate was 94.41 %.

Prior to data collection, the participants agreed to take part into the research project by signing a written consent, and written parental consent was obtained for both the participation into the training and for the video recording of the sessions. Participants and their families were informed that data confidentiality would be assured, participation in the study was voluntary, and that they could refuse to participate and withdraw from the study at any time. Participants and their families were also informed about the nature and objective of the study, in compliance with the ethical code of the Italian Association for Psychology (AIP) and in accordance with the tenets of the Helsinki Declaration. The project was approved by Bio-Ethical Committee, University of Turin, protocol n. 144890.

The Cognitive Pragmatic Treatment - adapted version for adolescents

The Cognitive Pragmatic Treatment (CPT) is theoretically grounded on Cognitive Pragmatics (Bara, 2010), a theory on the cognitive and inferential processes underlying human communication. The CPT is a group training program that focuses on all the aspects that allow a person to communicate effectively, namely linguistic, extralinguistic and paralinguistic abilities, social appropriateness, awareness, conversational and narrative skills, in addition to ToM and planning

abilities. The final aim of the activities included in the CPT is an improvement of the participants'

inferential abilities, i.e., to fill the gap that often exists between what is literally said and what is

communicatively meant, as in case of indirect speech acts, irony, figurative language, etc. In

addition, particular emphasis is given to the ability to accurately match linguistic statements with

adequate extralinguistic cues, such as facial expressions and body movements, as well as with

paralinguistic ones, such as tone of voice, that characterize specific pragmatic phenomena, as in the

case of irony. The ability to recognize such features, together with the context in which an utterance

is proffered, is crucial in distinguishing a sincere from an ironic or deceitful communicative act,

since a person could use the same identical literal utterance to convey all these different meanings

(see Bosco, Parola, Valentini, & Morese, 2017). Furthermore, the CPT includes activities aimed to

improve participants' ability to manage their communicative acts.

The adolescents' version of the Cognitive Pragmatic Treatment (A-CPT), adopted within the

present study, consists of a total of 15 sessions: one session a week, each lasting approximately 90

minutes, including a 10-minute break. See Table 1.

Table 1. Outline of the short version of the A-CPT.

SESSION		CONTENT AND ACTIVITIES
1	INTRODUCTION AND OVERALL COMMUNICATIVE ABILITY	Introduction to the aims and structure of the CPT program; setting-up of the working group by a self-introduction of each participant, including the description of any perceived difficulty in daily living communication. Overview of the communicative-pragmatic ability, via video clips and role-playing tasks, based on daily living situations and depicting all the communicative expressing means.
2	LINGUISTIC	Video-clips and role-playing based on the linguistic expressive modality.
3	EXTRALINGUISTIC	Video-clips and role-playing based on the gestural modality.
4-5	PARALINGUISTIC	Video-clips, facial expressions recognition, tone of voice tasks, role-playing;
6-7	SOCIAL APPROPRIATENESS	Video-clips and role-playing focused on social appropriateness and communicative adequacy in different contexts.
8	CONVERSATIONAL	Video-clips, role-playing and exercises focused on the use of conversational rules (i.e., turn-taking, topic management).
9	PHONE CONVERSATION	Audio-clips and role-playing focused on telephone conversational rules (i.e., voice only, no paralinguistic and

		gestural clues, available in live interactions).
10-11	SOCIAL ABILITY	Video-clips and role-playing focused on the ability to formulate meta-representations with respect to one's own and others' mental states.
12	NARRATIVE AND PLANNING	Picture-description task, aimed at eliciting story-telling by providing an adequate amount and type of information.
13-14	OVERALL COMMUNICATIVE ABILITY	Video-clips and role-playing focused on the overall pragmatic effectiveness, expressed through all the modalities constituting communicative competence.
15	CONCLUSION, AWARENESS AND FEEDBACK	Conclusions and feedback about the progresses observed along the CTP, i.e., video recording of the salient moments along the sessions where the improvements could be detected were shown to each participant during the group session

Each session provides the participants with an ecological setting in which to practice their pragmatic abilities, which they can relate to communicative situations they are likely to have to cope with during their daily life. In each session, the training activities converge on a specific communicative modality and both comprehension and production skills are taken into account. First, the focus is on increasing the participants' inferential abilities and helping them to practice filling the gap that often occurs between the literal and intended meanings (e.g., in indirect speech acts, irony, communicative implicatures and so forth). Secondly, the treatment aims to improve the participants' ability to maintain attention and efficiently utilize all the available expressive modalities, i.e., language, gestures, facial expressions, prosody, tone and rhythm of the voice, and so on. Self-monitoring and feedback provided by the therapist and the other group members are aimed at guiding the participants throughout the processes described above. The structure of each session remains constant throughout the whole training program (see Table 2), regardless of the specific topic of the session.

The training material used is organized as follows:

Introduction and overview

Explanation of the content of the current session, paying particular attention to relating the topic to the episodes in the participants' daily lives; summary of the content covered in the previous sessions.

239 *Comprehension activities*

240 The training material consists of short video clips created specifically for the CPT program.

241 Participants are asked to observe two actors interacting by using a specific communication

242 modality, depending on the session (i.e., the linguistic modality in linguistic sessions or the gestural

243 modality in extralinguistic sessions, and so on). At the end of each video clip, the participants are

244 invited, one at a time, to comment on the interactions they have observed: for example, they are

245 asked to suggest what the actor could say to recover the communicative failure, given the observed

246 situation. The purpose of this activity is to stimulate the participants' comprehension of the

247 communicative situations portrayed and discuss their opinion with other group members.

248 Discussing and commenting on the communicative situations observed during the training sessions

249 also helps to improve discourse coherence and enhance compensatory communication strategies.

250 *Production activities*

251 The majority of these training activities are based on role-playing exercises (i.e., interactive

252 scenarios reproducing everyday situations): participants are asked to conduct in-group

253 conversations designed to improve and strengthen their ability to use contextual elements.

254 Participants work in pairs and act out the communicative situation out in front of the other group

255 members; therefore, role-playing activities provide the participants with specific communication

256 strategies and feedback from the therapist and other group members, within the safe setting of

257 group training. Other activities that specifically target communicative production skills rely on the

258 ability to improve a variety of communicative components, such as the ability to select and

259 appropriately use facial expressions as well as prosodic elements to effectively connote one's

260 speech.

261

262 In addition, for both comprehension and production skills, specific activities are offered in

263 different sessions such as, for example, those focusing on paralinguistic skills (e.g., recognition and

264 production of facial expressions, exercises to modulate the tone of voice), narrative skills

265 (description of pictures and plot of famous movies), and planning skills (planning activities and

266 errands to be done in a given time frame).

267

268 *Conclusion and homework*

269 At the end of each session, a brief recap of what has been done during the session is provided.

270 Moreover, participants are asked, between sessions, to pay attention and practice what they

271 discussed and learned during the training session.

272

273

274 The original version of the CPT was successfully adopted in treating the pragmatic abilities of

275 people with traumatic brain injury and schizophrenia (Bosco, Gabbatore, Gastaldo, & Sacco, 2016;

276 Bosco et al., 2018; Gabbatore et al., 2015), also determining cerebral changes in resting-state

277 activity of the participants (Gabbatore, Bosco et al., 2017; Sacco et al., 2016). The original version

278 of the CPT consisted of two sessions per week (12 weeks) for a total of 24 sessions; each session

279 lasted approximately 90 minutes and included a 10-minute break. The length and the frequency of

280 the original CPT, together with the content of some of the tasks in the original version of the CPT

281 were not considered totally suitable for adolescent participants and have been revised and adapted

282 for this age range. Namely, only a set of video clips was selected for the shorter version (A-CPT),

283 by choosing those video clips picturing daily-living situations familiar to a group of adolescents.

284 The same applied to the role-playing tasks: a selection of role-playing from the original CPT was

285 included and some of them have been modified in order to focus on situations that are closer to

286 adolescents' daily activities. An example of such revision process is explained below. No

287 modifications were needed for the other above-mentioned activities included in the original version

288 of the CPT (e.g., recognition and production of facial expressions or pictures description).

289

290 ***Role-playing, CPT - original version.***

13

291   **Character 1.** You are a customer, calling the local branch of your bank. You want to

292   talk to the branch manager about an issue with your bank account. You have been

293   coping with this issue for a while now, and none of the employees has been able to

294   help, despite your numerous phone calls. This time you really want to talk with the

295   branch manager, as you don't want to waste any more time and want your issue to be

296   solved as soon as possible.

297   **Character 2.** You are a bank clerk at that branch. The manager has asked all

298   employees not to transfer any of the phone calls regarding complaints to his office; he

299   has asked the employees to say he is out of the office. Indeed, the manager doesn't

300   want to be bothered and he wants his employees to handle and solve customers' issues

301   themselves.

302 **Role-playing, CPT - adapted version for adolescents**

303   **Character 1**: You are the younger brother/sister. You really would like it was not

304   always implicitly your turn to clear the table and/or wash the dishes. In fact, your

305   older brother/sister is a slacker and s/he always find an excuse to get away with it and

306   you are definitely annoyed by such behavior.

307   **Character 2**: you are the older brother/sister. You don't like washing dishes and you

308   always try not to do it; but also, you think you always take care of everything else. In

309   fact, it is you taking the trash out, it is you collecting the dry clothes and it is you

310   helping dad washing the car. Therefore, you would like your little brother/sister to

311   take care of the table and the dishes at least.

312

313 **Assessment measures**

314 *Communicative-pragmatic assessment*

315 The participants' communicative-pragmatic skills were assessed pre- and post-training with the

316 equivalent forms of the Assessment Battery for Communication (ABaCo; Angeleri, Bosco,

317   Gabbatore, Bara, & Sacco, 2012; Bosco, Angeleri, Zuffranieri, Bara, & Sacco, 2012; Angeleri et al.

318   2015). ABaCo is a validated clinical tool, belonging to the category of published tests of language

319   pragmatics (for a review see Adams, 2002), having good statistical properties, and allowing to focus

320   at the same time on various aspects of the pragmatic assessment, such as comprehension and

321   production abilities expressed by different expressive means, i.e. linguistic, extralinguistic and

322   paralinguistic. The equivalent forms of the ABaCo are composed of 4 assessment scales - linguistic,

323   non-verbal/extralinguistic, paralinguistic, contextual - that evaluate the comprehension and

324   production of several communicative phenomena such as direct and indirect communicative acts,

325   irony and deceit. The benefit of the equivalent forms is that they are composed of items with the

326   same structure and the same level of difficulty, but with different content: therefore, using the

327   equivalent forms of the same tool means that test and re-test procedures can be used, avoiding any

328   learning effect. The two equivalent forms showed excellent internal consistency (total score: α =

329   0.92 Form A and α = 0.95 Form B) as well as between-form correlation (Pearson's correlation

330   between the global scores of Form A and form B: r = 0.92). Please see Bosco et al. (2012) for a

331   more detailed description of the psychometric properties of the equivalent forms of the ABaCo.

332   With the only exception of four items, the equivalent forms are made of semi-structured open

333   questions requiring the comprehension and production, respectively, of specific pragmatic

334   phenomena. The participants' answers on the ABaCo are coded offline based on the video clips

335   administered and scores are recorded on specific score sheets. The administration of the ABaCo and

336   the scoring procedure is performed in accordance with the instructions set out in the administration

337   manual (Angeleri, Bara, Bosco, Colle, & Sacco, 2015) in order to guarantee an objective and

338   standardized measurement. Each task can be assigned a score of 0 or 1.

339   (a) In *comprehension tasks* 1 point is given when the participant correctly comprehends the

340   proposed task and 0 when no comprehension is shown. In the ABaCo tasks, each participant is

341   required to understand the communicative-pragmatic meaning expressed, that could be an utterance

342 on the linguistic scale, a gesture on the extralinguistic scale, a paralinguistic cue on the

343 paralinguistic scale, and the adequacy of the communicative act in relation to the social

344 context/situation on the context scale.

345 (b) In *production tasks* 1 point is given when the participant produces a communicative act that is

346 congruent with respect to the requested task. On the linguistic scale, the act produced must be an

347 utterance, on the extralinguistic scale a gesture, on the paralinguistic scale a paralinguistic cue (i.e.,

348 producing an utterance with a specific intonation, for example an order, or expressing a particular

349 emotion). On the context scale, 1 point is given when the participant produces a communicative act

350 that is appropriate to the given situation and with respect to the level of formality or informality

351 required. In all the tasks, no points are given if the participant is not able to produce the requested

352 communication act in the requested modality.

353 *Cognitive assessment*

354 The cognitive assessment was performed using the Neuropsychological Evaluation Battery,

355 standardized in Italian for pre-adolescents and adolescents (BVN 12-18; Gugliotta et al., 2009),

356 including tasks focused on a variety of cognitive functions. Specifically, a selection of items was

357 administered to the participants pre- and post-training:

358 - *Token test* (De Renzi & Faglioni, 1978), to assess language comprehension, and specifically

359 receptive language comprehension. The score ranges from 0 to 36.

360 - *Expressive vocabulary task* (Brizzolara, Chilosi, & Cipriani, 1993), to assess the ability to name

361 items. The score ranges from 0 to 88.

362 - *Digit Span and Corsi block-tapping test* (Bisiacchi, Cendron, Gugliotta, Tressoldi, & Vio, 2005)

363 to assess verbal (the score ranges from 0 to 9) and spatial working memory, respectively (the score

364 ranges from 0 to 7).

365 - *Immediate and Deferred Recall test for long-term verbal memory task* (Rapaport, Gill, Schafer, &

366 Holt, 1968; Spinnler & Tognoni, 1987), to assess the ability to extract and memorize information

367 and recall it, immediately after its presentation and after a short time has elapsed. The total score is

368 separate for immediate and deferred task and ranges from 0 to 8.

369 - *Selective attention* (Bisiacchi et al., 2005), to assess the ability to focus on a single or a few items

370 in a given perceptual field, for a certain amount of time. The score ranges from 0 to 21.

371 - *Tower of London* (Shallice, 1982), to assess planning ability, the score ranges from 0 to12.

372 - *Modified card sorting test* (Nelson, 1976) for the assessment of shifting and inhibitory control.

373 The score ranges from 0 to 8.

374

375 *Theory of Mind tasks*

376 Theory of Mind was evaluated using the following tasks:

377 - *Sally & Ann task* (Wimmer & Perner, 1983) for the assessment of first-order ToM. A score of 1 is

378 given for correct interpretation, a score of 0 otherwise.

379 - a selection of six scenarios from the *Strange Stories task* (Happé, 1994), for the assessment of

380 advanced aspects of ToM. A set of mentalistic stories constitutes the task. The six stories selected

381 regard double bluff, mistakes, white lies, pretense, misunderstanding, and were read aloud by the

382 examiner; they were chosen in order to exclude tasks investigating typical pragmatic phenomena

383 (i.e., metaphors) as well as tasks assessing phenomena already included in our pragmatic

384 assessment (e.g. irony). The score ranges from 0 to 6.

385 - *Reading the Mind in the Eyes test* (Baron-Cohen et al., 2001), for the assessment of ToM non

386 mediated by language. The task is composed by 28 pictures where only the eye region of the face is

387 available. The total score ranges from 0 to 28.

388

389 **Procedures**

390 Communicative-pragmatic abilities were assessed in three stages (see Figure 1):

391 *T0 (pre-training).* The ABaCo (equivalent form A), the cognitive battery and the ToM tasks were

392   administered to the participants immediately before the beginning of the rehabilitative training, in

393   order to have a measure of their communicative-pragmatic, cognitive and ToM profiles. Each

394   participant was assessed in two sessions (one for the ABaCo and one for the cognitive tests), each

395   lasting about 50 minutes. The assessment of each participant was completed within a week before

396   the beginning of the training.

397   *T1 (post-training).* Within a week after completing the training, the participants underwent two

398   assessment sessions, one for the ABaCo (equivalent form B) and one for the same cognitive and

399   ToM tasks administered in T0. The aim of this second assessment was to verify whether there were

400   any improvements in participants' pragmatic performance after taking part in the training program,

401   and also to ascertain whether the expected improvement included other cognitive abilities or was

402   specific to their communicative-pragmatic skills.

403   *T2 (Follow-Up).* The participants' communicative-pragmatic abilities were evaluated again three

404   months after the end of the rehabilitative treatment, in order to check whether the improvements

405   detected at T1 (post-training) were stable and preserved over time.

406

407   The training was performed in small groups of 4 to 5 participants. Each group went through

408   the same number of sessions, and through exactly the same rehabilitative activities. Each session

409   lasted around 90 minutes with a 15-minute break; the sessions were performed once a week for a

410   total of 15 weeks. All the instructors were master students in psychology, and they all attended –

411   before the beginning of the present research study - the same training course, regarding the

412   administration of the assessment tools for the pragmatic, cognitive and ToM abilities. The

413   administration and coding procedures were organized so that each assessment protocol was coded

414   by a different person with respect to the one who had administered it, so to reduce any possible bias

415   in the scores' attribution. During the same course, instructors were trained about the structure and

the procedures of the CPT program by a psychologist and post doc-researcher, the latter being also

a member of the team who developed the original version of the CPT. Moreover, they were

supervised along all the stages of the training by an expert psychologist and psychotherapist, with a

good expertise in the field of pragmatic and cognitive impairment.

Results

Communicative-pragmatic assessment

The mean performance scores obtained by the participants at ABaCo at the three assessment phases,

i.e., pre-training, post-training and follow-up assessment, are displayed in Figure 2.
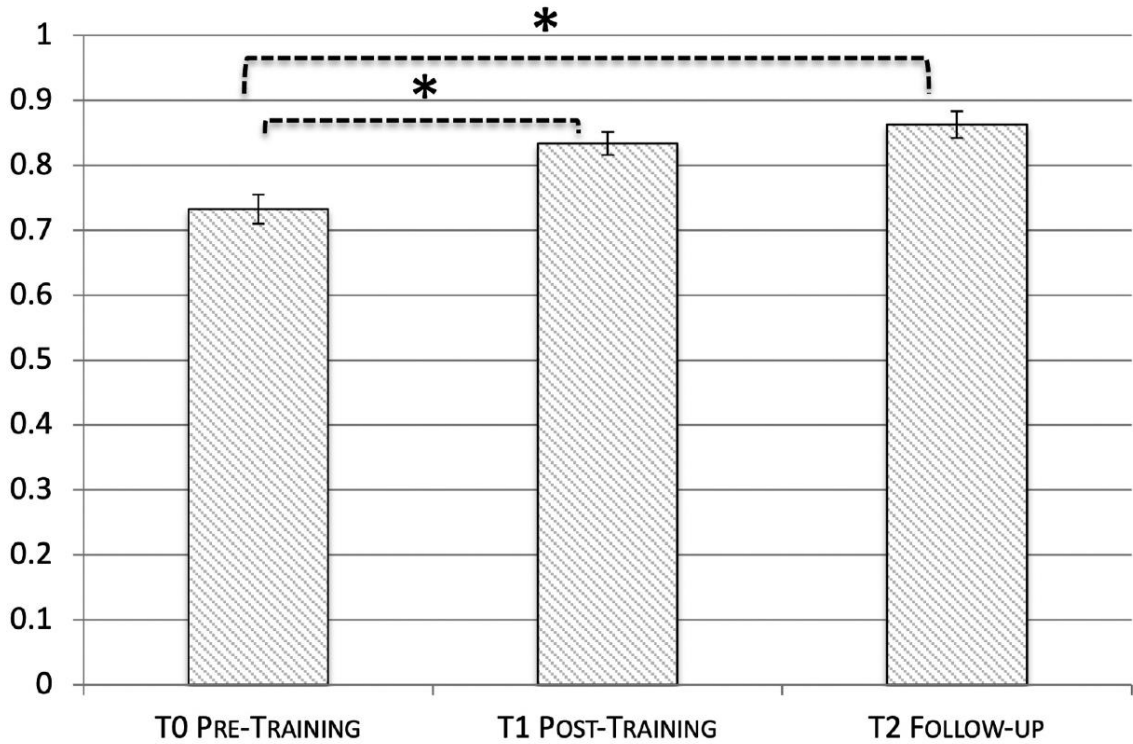

Figure 2. Mean performance total scores obtained at the ABaCo, at T0 (pre-training), T1 (post-training) and T2 (follow-up).

A repeated measure ANOVA analysis was run on the performance scores obtained at the total score

of the ABaCo at the different assessment times (i.e., T0 – pre-training, T1 – post-training and T2 –

follow-up), in order to assess whether any significant improvement could be detected as a

432   consequence of taking part in the training program and whether any detected improvement was

433   stable over time.

434   First of all, considering overall performance on the ABaCo, we found a significant effect of the

435   assessment time (T0, T1 and T2) on the participants' performance (F = 14.54; p < .001; η^2 = .421).

436   Post-hoc pairwise comparisons (Bonferroni) revealed that the scores at T1 (post-training) were

437   significantly higher than those at T0 (pre-training) (p = .003). Moreover, such improvement was

438   still detectable when comparing the performance scores at T0 (pre-training) with those obtained at

439   T2 (follow-up) (p < .001). Please note the performance scores remained stable between T1 (post-

440   training) and T2 (follow-up) with no significant decrease being detected (p = .056). See Figure 2.

441   In order to investigate the results in more detail, we ran the same analysis on the

442   performance scores obtained at the assessment scales of ABaCo. Specifically, we set a repeated

443   measure ANOVA with two factors: scales (linguistic, extralinguistic, paralinguistic, context scale)

444   and assessment time (T0, T1, T2). As expected, no effect was detected as for the type of scale (F =

445   .262; p = .853; η^2 = .013). The analysis revealed, instead, a significant effect of the assessment time

446   on the participants' performance at the scales of ABaCo (F = 16.81; p < .001; η^2 = .457). Post-hoc

447   pairwise comparisons (Bonferroni) revealed that the scores at T1 (post-training) were significantly

448   higher than those at T0 (pre-training) (p = .001). Moreover, such improvement was still detectable

449   when comparing the performance scores at T0 (pre-training) with those obtained at T2 (follow-up)

450   (p < .001). Please note the performance scores remained stable between T1 (post-training) and T2

451   (follow-up) with no significant decrease being detected (p = .157). See Table 2.

452

453   *Table 2. Participants' performance scores at the scales of the ABaCo, as obtained at pre-training,*

454   *post training and follow-up assessments.*

Task	T0 – Pre-training M (SD) [a]	T1 – Post-training M (SD) [a]	T2 – Follow-Up M (SD) [a]
Linguistic Scale	.754 (.120)	.818 (.095) [§]	.862 (.096) [§§]

Extralinguistic Scale	.717 (.168)	.824 (.132) [§]	.859 (.104) [§§]
Paralinguistic Scale	.779 (.143)	.805 (.122) [§]	.873 (.135) [§§]
Context Scale	.661 (.206)	.911 (.106) [§]	.845 (.176) [§§]

[a] ABaCo's scores for each item range from 0 to 1.
[§] Significantly different from T0 (pre-training), as for post-hoc pairwise comparisons (Bonferroni: *p* = .001).
[§§] Significantly different from T0 (pre-training), as for post-hoc pairwise comparisons (Bonferroni: *p* < .001).

Also, the ANOVA revealed a significant interaction *scale X assessment time* (F = 4.05; p = .001; η^2 = .168), reflecting the fact that, when considering T0 (pre-raining) vs. T1 (post-training), the mean difference between the performance scores obtained at the two assessment times was significantly higher in the context scale (.25, CI [.155, .345], t(20) = 5.48, p < .001, d = 1.57) and extralinguistic (.11, CI [.007, .207], t(20) = 2.243, p < .036, d = .73) than in the linguistic (.064, CI [-.001, .129], t(20) = 2.038, p = .055, d = .60), and paralinguistic (.026, CI [-.056, .108], t(20) = .67, p = .513, d = .20) scales.

Cognitive and ToM assessment

In order to investigate whether there had been any change in participants' cognitive and ToM performance after taking part in the training program, we analyzed the performance scores obtained on the cognitive and ToM tasks administered pre- and post-training (see Table 3).

We first considered the cognitive functioning, as a total score resulting from the average performance on the overall neuropsychological battery, and found no difference when comparing the overall standard score before (T0) and after (T1) training (T-test; t = 1.42; *p* = .171; d = .34).

In order to investigate the results in more detail, we ran a repeated measure ANOVA with two factors: cognitive tasks (*Token Test, Lexical denomination, Digit Span, Corsi block-tapping, Long term memory - immediate & deferred recall, Selective cancellation task, Tower of London, Modified Card Sorting Test*) and assessment time (T0, T1). No effect was found for either task type (F = 2.286; *p* = .121; η^2 = .107), nor for the assessment time (F = 1.533; *p* = .231; η^2 = .075).

Analysis did not reveal a significant *cognitive task X assessment time* interaction (F = .255; *p* = .970; η^2 = .013). In addition, in order to obtain a more accurate picture of the results task by task, we also performed paired-samples T-test for each cognitive task, and applied Bonferroni's correction. These results are shown in Table 3.

We applied the same analysis as for the ToM assessment. We first considered overall ToM functioning, as resulting from the mean performance at the ToM tasks, and found no difference when comparing the overall percentage score before (T0) and after (T1) training (T-test; t = 1.23; *p* = .234; d = .25).

In order to investigate the results in more detail, we ran a repeated measure ANOVA with two factors: ToM tasks (*Sally & Ann, Strange Stories, Reading the Mind in the eyes*) and assessment time (T0, T1). An effect was detected as for the task type (F = 7.451; *p* = .004; η^2 = .27), whereas no effect was detected for the assessment time (F = 1.504; *p* = .234; η^2 = .07). Analysis did not reveal a significant *ToM task X assessment time* interaction (F = .461; *p* = .595; η^2 = .023).

Nevertheless, in order to get a more accurate picture of the results task by task, we also ran paired-samples T-tests for each ToM task, and applied Bonferroni correction. These results are displayed in Table 3.

Table 3. Performance scores pre- and post- training at the cognitive assessment: BVN 12-18 and ToM tasks

	T0 – Pre-training Score M (SD)	T1 – Post-training Score M (SD)	t	p*	d
Neuropsychological Evaluation Battery – BVN 12-18 [a]					
Overall score	85.74 (24.62)	92.24 (13.39)	1.42	1	.34
Token Test	68.37 (65.35)	62.67 (41.13)	-.214	1	.11
Lexical denomination	78.80 (17.48)	89.23 (17.17)	3.440	.024	.62
Digit Span	85.01 (16.72)	88.54 (16.03)	1.158	1	.22
Corsi block-tapping	94.95 (16.54)	99.91 (18.39)	1.213	1	.29

22

Long term memory – immediate & deferred recall	87.67 (28.15)	95.01 (22.01)	2.597	.136	.30
Selective cancellation task	92.02 (24.63)	103.41 (23.62)	2.833	.08	.48
Tower of London	96.93 (26.14)	101.82 (25.04)	.614	1	.20
Modified Card Sorting Test	82.19 (28.53)	97.38 (28.86)	2.338	.24	.54
Theory of Mind (ToM) assessment [b]					
Overall score	67.35 (18.83)	71.83 (18.04)	1.23	1	.25
Sally & Ann	80.95 (40.24)	85.71 (35.86)	.568	1	.13
Strange Stories	58.69 (22.78)	66.67 (24.72)	1.607	.992	.34
Reading the Mind in the eyes	62.41 (11.27)	63.09 (9.20)	.394	1	.07

499   * p-values were adjusted using the Bonferroni correction to account for multiple comparisons.

500   [a] Standard scores (M = 100; SD = 15), as for standardized Italian norms for the age range (see BVN 12-18; Gugliotta et
501   al., 2009. *Erikson*).
502   [b] Total scores expressed in percentage.
503

504 **Discussion**

505   The present study focused on the feasibility of the adapted version for adolescence of the Cognitive

506   Pragmatic Treatment (A-CPT) and its capacity to improve the communicative-pragmatic abilities of

507   verbally fluent adolescents with ASD. The first good result is represented by a very high attendance

508   rate, suggesting that the structure and the content of the CPT are suitable for verbally fluent

509   adolescents with ASD; this result suggests that despite the difficulties in social interaction often

510   exhibited, these individuals may actually enjoy and get engaged in the type of group activities

511   included in the CPT. Then, the administration - pre- and post-training - of the equivalent forms of

512   the Assessment Battery for Communication (Bosco et al., 2012), testified a significant improvement

513   in participants' overall comprehension and production of the pragmatic tasks investigated. More

514   specifically, our findings demonstrated an improvement in participants' ability to use the different

515   communicative modalities - linguistic, extralinguistic and paralinguistic – addressed during the

516   program in a more effective way, as testified by the increased performance detected in all the scales

517   composing the ABaCo. Our results also showed that when comparing pre-training vs. post-training,

518   the difference between the performance at the two assessment times was significantly higher in the

519   context and extralinguistic scales, than in the linguistic and paralinguistic ones.

520   We tested the participants' performance again three months after the treatment program had

521   ended, and the findings indicated that the improvement in their communicative-pragmatic abilities

522   remained stable over time: indeed, participants' performance on the ABaCo scales – linguistic,

523   extralinguistic paralinguistic and context – at the follow-up assessment was still significantly better

524   than that obtained at the pre-treatment assessment phase.

525   Our results are in line with other studies that have reported an improvement in pragmatic

526   language skills after taking part in specific training programs (for a review see Parsons et al., 2017)

527   and contribute to filling the gap concerning the scarcity of empirical evidence in favor of the

528   efficacy of treatments that specifically target communicative-pragmatic ability. Pragmatics refers to

529   the ability to use different expressive means in a given context, such as linguistic, non-

530   verbal/extralinguistic, i.e. gestures, facial expressions, prosody, tone of voice and rhythm (Bara,

531   2010; Cummings, 2014) and it also includes the ability to use conversational and narrative skills -

532   as well as social and contextual appropriateness; finally it is based on the inferential ability, that is

533   the capacity to go beyond the literal meaning of a communicative act.

534   Furthermore, our study explored another topic that has been investigated little in the

535   literature: maintenance of the target skill once the treatment program has ended. Our results provide

536   positive and promising evidence that the improvements were still observable three months after the

537   training. We wish to highlight that the use of the equivalent forms of a same tool in the pre- and the

538   post-treatment assessment phases reduced the possibility of any improvement in performance being

539   explained by a learning or practice effect.

540   A further contribution of our study is the provision of evidence in favor of the feasibility of

541   a treatment program focused on communicative-pragmatic ability during adolescence, since this

542   developmental period has not been the subject of sufficient attention in the literature and there is a

543   "gap in the continuity of effective interventions for individuals with ASD as their social

544   environment evolves and becomes more complex" (Parsons et al., 2017, p. 38). Adolescence is a

545   crucial developmental phase for social cognition (Brizio, Gabbatore, Tirassa, & Bosco, 2015) and it

546   requires more sophisticated communicative skills, when compared to childhood, to prepare

547   individuals for their adult life. As Parsons et al. (2017) argued, interventions that recognize the

548   specificity of this developmental period could be useful in order to reduce the psychological impact

549   that difficulties associated with ASD could have on social interactions (Whitehouse, Watt, Line, &

550   Bishop, 2009) and social exclusion (Hampton & Kaiser, 2016), also in a long term perspective. See

551   also Watkins, Kuhn, Ledbetter-Cho, Gevarter, & O'Reilly (2017).

552   Finally, given the complex interplay of cognitive - including executive - functions, ToM,

553   and pragmatics in typical and atypical development (see Hyter, 2017; Matthews, Bineya & Abbot-

554   Smith, 2018), a cognitive battery and ToM tasks were also administered to the participants before

555   and after the program in order to verify that the effect of the training was specific for the target

556   variable of the study, i.e. pragmatic ability, and not for the other variables – cognitive and ToM

557   skills - investigated. The findings showed no significant differences in the participants' performance

558   pre- and post-treatment in the cognitive abilities investigated, namely linguistic comprehension,

559   long-term memory, and EF (selective attention, planning and shifting), with the only exception of

560   expressive vocabulary. The improvement of expressive vocabulary is actually not a surprising

561   result, since semantics and pragmatics are close abilities, both being different aspects of language

562   processing: although CPT does not specifically focus on expressive vocabulary, this ability may

563   have been elicited as a side effect of the training. Moreover, we can't exclude this increase in the

564   performance scores post-training might also derive from a learning effect, due to the administration

565   of the same task in the assessment pre- and post-training, as no parallel form is available for such

566   task. Similarly, we did not observe any improvement in performance on ToM tasks after the

567   training. Considered as a whole, these results testify a specific improvement in the ability on which

568   the training program is focused, namely the communicative-pragmatic ability, that is the target

569   variable of the training, rather than an "aspecific" effect due to the simple participation of a group

570   social activity. Our results appear to be complementary to those of Marraffa & Araba (2016), who

571   observed that programs focused on improving ToM did not affect communicative abilities in

individuals with ASD. Our findings seem to support a relative independence of the communicative-pragmatic and theory of mind domains (see Bosco et al., 2018), since the improvement in the communicative-pragmatic ability did not affect the performance on ToM tasks. ToM is a complex and useful theoretical construct for gaining a deeper understanding of the symptomatology of a number of clinical conditions, but appears to be a domain that does not completely overlap with the pragmatic one (Bosco, Gabbatore, & Tirassa, 2014; Bosco et al., 2018; Laghi et al., 2014, Bambini et al., 2016). Globally considered, the results of the present investigation consolidate the idea that pragmatic ability, even when supported by these functions, addresses something more and is not merely the sum of ToM and executive functioning (see Bambini, 2016; Bosco et al 2018a; 2018b; 2019; Bosco & Gabbatore 2017a; 2017b).

Despite its merits, this investigation does have some limitations: the main one being the small number of participants and the second regarding the absence of a control sample. We preferred to test whether our treatment was able to improve the communicative-pragmatic abilities of verbally fluent adolescents with ASD, before conducing a larger scale study. Future research should be conducted on larger samples, and with the recruitment of a control treatment ASD group, in order to confirm the feasibility of the training on the basis of more robust empirical evidence. It should be also interesting to investigate the maintenance of the improvement on the communicative pragmatic ability in a longer follow-up period.

Finally, previous research (Bosco et al., 2018; Parola et al., 2019) using the CPT with individuals with traumatic brain injury showed a significant effect of the training in improving participants' pragmatic ability, as assessed using also different tools rather than the ABaCo, i.e., the Communicative Assessment of Daily Life (CADL, Holland, Frattali, & Fromm, 1999) and narrative tasks (Marini, Andreetta, del Tin & Carlomagno, 2011). Future researches should verify the capacity of the A-CPT to improve communicative pragmatic skills of verbally fluent adolescents with ASD, using additional assessment tools, such as parent or teacher reports of the adolescents' functioning in daily life.

598   To conclude**,** this study has clinical implications for practice. It suggests that, in the

599   rehabilitative centers for autism spectrum disorder, more emphasis should be placed in supporting

600   clinicians to respond even more effectively to pragmatic deficit in adolescents with ASD. Such

601   deficit represents maybe a less severe but still pervasive forms of language-communication

602   problem, and interventions in such direction may help in order to reduce their difficulty in social

603   interactions. Comprehensive protocols of treatment, including programs specifically devoted to

604   communicative-pragmatic ability, should be included, based on and supporting empirical evidence.

605   Despite its limits, the present investigation offers an initial contribution in such direction.

606

609   **Declaration of interest statement**

610   No potential conflict of interest was reported by the authors.

611

612   **Reference**

613   Adams, C. (2002). Practitioner review: The assessment of language pragmatics. In *Journal of Child*

614   *Psychology and Psychiatry and Allied Disciplines* (Vol. 43, Issue 8, pp. 973–987). John Wiley

615   & Sons, Ltd. https://doi.org/10.1111/1469-7610.00226

616   Adams, C., Lockton, E., Freed, J., Gaile, J., Earl, G., McBean, K., ... & Law, J. (2012). The Social

617   Communication Intervention Project: a randomized controlled trial of the effectiveness of

618   speech and language therapy for school-age children who have pragmatic and social

619   communication problems with or without autism spectrum disorder. *International Journal of*

620   *Language & Communication Disorders,* 47(3), 233-244. https://doi.org/10.1111/j.1460-

621   6984.2011.00146.x

622   Angeleri, R., Bosco, F. M., Gabbatore, I., Bara, B. G., & Sacco, K. (2012). Assessment battery for

623   communication (ABaCo): Normative data. *Behavior Research Methods,* 44(3).

624   https://doi.org/10.3758/s13428-011-0174-9

625   Angeleri, R., Gabbatore, I., Bosco, F. M., Sacco, K., & Colle, L. (2016). Pragmatic abilities in

626   children and adolescents with autism spectrum disorder: A study with the ABaCo battery.

627   *Minerva Psichiatrica*, *57*(3).

628   Angeleri, R, Bara, B. G., Bosco, F. M., Colle, L., & Sacco, K. (2015). *Batteria per l'Assessment*

629   *della Comunicazione (ABaCO)*. Firenze: Giunti OS.

630   Angeleri, R., Bosco, F. M., Zettin, M., Sacco, K., Colle, L., & Bara, B. G. (2008). Communicative

631   impairment in traumatic brain injury: A complete pragmatic assessment. *Brain and Language*,

632   *107*(3), 229–245. https://doi.org/10.1016/j.bandl.2008.01.002

633   APA, A. A. P. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*.

634   American Psychiatric Pub. https://doi.org/10.1176/appi.books.9780890425596.744053

635   APA, A. P. A. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington,

636   DC. qui non c'è doi?

637   Baixauli-Fortea, I., Casas, A. M., Berenguer-Forner, C., Colomer-Diago. C., & Roselló-Miranda,

638   B.

639   (2019). Pragmatic competence of children with autism spectrum disorder. Impact of theory of

640   mind, verbal working memory, ADHD symptoms, and structural language. *Applied*

641   *Neuropsycholgy: Child,* 8, 101–112. https://doi.org/10.1080/21622965.2017.1392861 dopo

642   child il numero del volume dovrebbe essere in corsivo

643   Bambini, V., Arcara, G., Bechi, M., Buonocore, M., Cavallaro, R., & Bosia, M. (2016). The

644   communicative impairment as a core feature of schizophrenia: Frequency of pragmatic deficit,

645   cognitive substrates, and relation with quality of life. *Comprehensive Psychiatry*, *71*, 106–120.

646   https://doi.org/10.1016/j.comppsych.2016.08.012

647   Bara, B. G. (2010). *Cognitive pragmatics: The mental processes of communication*. MIT Press.

648   Baron-Cohen, S. (1995). *Mindblindness* (MIT Press). Cambridge MA.

649   Baron-Cohen, Simon. (2000). Theory of mind and autism: A review. *International Review of*

650   *Research in Mental Retardation*, *23*, 169–184. https://doi.org/10.1016/S0074-7750(00)80010-

651   5 simon è scritto per intero, da abbreviare

652   Baron-Cohen, Simon, Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of

653   mind"? *Cognition*, *21*(1), 37–46. https://doi.org/10.1016/0010-0277(85)90022-8 anche qui

654   simon è intero

655   Baron-Cohen, Simon, O'Riordan, M., Jones, R., Stone, V., & Plaisted, K. (1999). A new test of

656   social sensitivity: Detection of faux pas in normal children and children with Asperger

657   syndrome. *Journal of Autism and Developmental Disorders*, *29*(5), 407–418. idem come sopra

658   Baron-Cohen, Simon, Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the

659   Mind in the Eyes" Test revised version: a study with normal adults, and adults with Asperger

660   syndrome or high-functioning autism. *The Journal of Child Psychology and Psychiatry and*

661   *Allied Disciplines*, *42*(2), 241–251. https://doi.org/10.1111/1469-7610.00715 idem come sopra

662   Barry, T. D., Klinger, L. G., Lee, J. M., Palardy, N., Gilmore, T., & Bodin, S. D. (2003). Examining

663   the Effectiveness of an Outpatient Clinic–Based Social Skills Group for High-Functioning

664   Children with Autism. *Journal of Autism and Developmental Disorders*, *33*(6), 685–701.

665   https://doi.org/10.1023/B:JADD.0000006004.86556.e0

666 Begeer, S., Gevers, C., Clifford, P., Verhoeve, M., Kat, K., Hoddenbach, E., & Boer, F. (2011).

667   Theory of mind training in children with autism: A randomized controlled trial. *Journal of*

668   *Autism and Developmental Disorders*, *41*(8), 997–1006. https://doi.org/10.1007/s10803-010-

669   1121-9

670 Bisiacchi, P. S., Cendron, M., Gugliotta, M., Tressoldi, P. E., & Vio, C. (2005). *BVN 5-11: Batteria*

671   *di valutazione neuropsicologica per l'età evolutiva.* Trento: Centro Studi Erikson.

672 Bosco, F. M., Gabbatore, I., Gastaldo, L., & Sacco, K. (2016). Communicative-Pragmatic

673   Treatment in schizophrenia: A pilot study. *Frontiers in Psychology*, *7*(166).

674   https://doi.org/10.3389/fpsyg.2016.00166

675 Bosco, F. M., Angeleri, R., Zuffranieri, M., Bara, B. G., & Sacco, K. (2012). Assessment Battery

676   for Communication: Development of two equivalent forms. *Journal of Communication*

677   *Disorders*. https://doi.org/10.1016/j.jcomdis.2012.03.002

678 Bosco, F. M., Berardinelli, L., & Parola, A. (2019). The Ability of Patients with Schizophrenia to

679   Comprehend and Produce Sincere, Deceitful, and Ironic Communicative Intentions: The role

680   of theory of mind and executive functions. Frontiers in psychology, 10, 827.

681   https://doi.org/10.3389/fpsyg.2019.00827 Frontiers da mettere in corsivo così come il 10 del

682   volume

683 Bosco, F. M., Colle, L., De Fazio, S., Bono, A., Ruberti, S., & Tirassa, M. (2009). Th.o.m.a.s.: An

684   exploratory assessment of Theory of Mind in schizophrenic subjects. *Consciousness and*

685   *Cognition*, *18*(1), 306–319. https://doi.org/10.1016/j.concog.2008.06.006

686 Bosco, F. M., Gabbatore, I. (2017a). Sincere, deceitful, and ironic communicative acts and the role

687   of the theory of mind in childhood. *Frontiers in Psychology*, 8, 21.

688   https://doi.org/10.3389/fpsyg.2017.00021

689 Bosco, F. M., & Gabbatore, I. (2017b). Theory of mind in recognizing and recovering

690   communicative failures. Applied Psycholinguistics, 38(1), 57.

691   https://doi.org/10.1017/S0142716416000047 Titolo rivista e volume in corsivo

692   Bosco, F. M., Gabbatore, I., Angeleri, R., Zettin, M., & Parola, A. (2018). Do executive function

693   and theory of mind predict pragmatic abilities following traumatic brain injury? An analysis of

694   sincere, deceitful and ironic communicative acts. *Journal of Communication Disorders*, 75,

695   102-117. https://doi.org/10.1016/j.jcomdis.2018.05.002 numero volume in corsivo

696   Bosco, F. M., Gabbatore, I., & Tirassa, M. (2014). A broad assessment of theory of mind in

697   adolescence: The complexity of mindreading. *Consciousness and Cognition*, *24*, 84–97.

698   https://doi.org/10.1016/J.CONCOG.2014.01.003

699   Bosco, F. M., Parola, A., Angeleri, R., Galetto, V., Zettin, M., & Gabbatore, I. (2018).

700   Improvement of communication skills after traumatic brain injury: the efficacy of the

701   Cognitive Pragmatic Treatment Program using the communicative activities of daily

702   living. *Archives of Clinical Neuropsychology*, *33*(7), 875-888. doi:10.1093/arclin/acy041

703   Bosco, F. M., Parola, A., Valentini, M. C., & Morese, R. (2017). Neural correlates underlying the

704   comprehension of deceitful and ironic communicative intentions. *Cortex*, *94*, 73–86.

705   https://doi.org/10.1016/j.cortex.2017.06.010

706   Bosco, F. M, Tirassa, M., & Gabbatore, I. (2018). Why Pragmatics and Theory of Mind Do Not

707   (Completely) Overlap. *Frontiers in Psychology*, *9*, 1453.

708   https://doi.org/10.3389/fpsyg.2018.01453

709   Brizio, A., Gabbatore, I., Tirassa, M., & Bosco, F. M. (2015). "No more a child, not yet an adult":

710   Studying social cognition in adolescence. *Frontiers in Psychology*, *6*(AUG).

711   https://doi.org/10.3389/fpsyg.2015.01011

712   Brizzolara D., Chilosi A., Cipriani P., D. P. L. (1993). L'apprendimento del linguaggio scritto in

713   bambini con difficoltà di linguaggio orale: contnuità o discontinuità? In G. Masi & A. Martini

714   (Eds.), *Apprendimento e Patologi Neuropsichica nei Primi Anni di Scuola* (pp. 124–135).

715   Roma (Italy): Borla.

716 Castellino, N., Bosco, F. M., Marshall, W. L., Marshall, L. E., & Veglia, F. (2011). Mindreading

717   abilities in sexual offenders: An analysis of theory of mind processes. *Consciousness and*

718   *Cognition*, *20*(4), 1612–1624. https://doi.org/10.1016/J.CONCOG.2011.08.011

719 Chung, Y. S., Barch, D., & Strube, M. (2014). A Meta-Analysis of Mentalizing Impairments in

720   Adults With Schizophrenia and Autism Spectrum Disorder. *Schizophrenia Bulletin*, *40*(3),

721   602–616. https://doi.org/10.1093/schbul/sbt048

722 Colgan, S. E., Lanter, E., McComish, C., Watson, L. R., Crais, E. R., & Baranek, G. T. (2006).

723   Analysis of social interaction gestures in infants with autism. *Child Neuropsychology*, *12*(4–5),

724   307–319. https://doi.org/10.1080/09297040600701360

725 Cotugno, A. J. (2009). Social Competence and Social Skills Training and Intervention for Children

726   with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, *39*(9),

727   1268–1277. https://doi.org/10.1007/s10803-009-0741-4

728 Cummings, L. (2014). Pragmatic disorders and theory of mind. *Cambridge Handbook of*

729   *Communication Disorders*, 559–577.

730 De Renzi, E., & Faglioni, P. (1978). Normative Data and Screening Power of a Shortened Version

731   of the Token Test. *Cortex*, *14*(1), 41–49. https://doi.org/10.1016/S0010-9452(78)80006-9

732 Fletcher-Watson, S., McConnell, F., Manola, E., & McConachie, H. (2014). Edinburgh Research

733   Explorer Interventions based on the Theory of Mind cognitive model for autism spectrum

734   disorder (ASD) Citation for published version: General rights.

735   https://doi.org/10.1002/14651858.CD008785.pub2

736 Fletcher-Watson, S., McConnell, F., Manola, E., & McConachie, H. (2014). Interventions based on

737   the Theory of Mind cognitive model for autism spectrum disorder (ASD). *Cochrane Database*

738   *of Systematic Reviews*, *3*. https://doi.org/10.1002/14651858.CD008785.pub2 questa cit e quella

739   sopra sono uguali, quindi ripetute. a quella sopra mancano i punti nei nomi quindi consiglio di

740   togliere quella

741 Gabbatore, I., Sacco, K., Angeleri, R., Zettin, M., Bara, B. G., & Bosco, F. M. (2015). Cognitive

742   Pragmatic Treatment: A Rehabilitative Program for Traumatic Brain Injury Individuals.

743   *Journal of Head Trauma Rehabilitation*, *30*(5).

744   https://doi.org/10.1097/HTR.0000000000000087

745   Gabbatore, Ilaria, Bosco, F. M., Geda, E., Gastaldo, L., Duca, S., Costa, T., … Sacco, K. (2017).

746   Cognitive Pragmatic Rehabilitation Program in Schizophrenia: A Single Case fMRI Study.

747   *Neural Plasticity*, *2017*, 1–9. https://doi.org/10.1155/2017/1612078 nome ilaria intero

748   Giunti O.S. (2008). *SPM Standard Progressive Matrices. Standardizzazione italiana*. Firenze:

749   Giunti O.S. Organizzazioni Speciali.

750   Hampton, L. H., & Kaiser, A. P. (2016). Intervention effects on spoken-language outcomes for

751   children with autism: a systematic review and meta-analysis. *Journal of Intellectual Disability*

752   *Research*, *60*(5), 444–463. https://doi.org/10.1111/jir.12283

753   Happé, F. G. E. (1994). An advanced test of theory of mind: Understanding of story characters'

754   thoughts and feelings by able autistic, mentally handicapped, and normal children and adults.

755   *Journal of Autism and Developmental Disorders*, *24*(2), 129–154.

756   Holland, A. L., Frattali, C., & Fromm, D. (1999). Communication activities of daily living: CADL-

757   2. Austin, TX: Pro-ED.

758   Hyter, Y. D. (2017). Pragmatic Assessment and Intervention in Children. In L. Cummings (Ed.),

759   Research in Clinical Pragmatics (pp. 493-526). Cham, Switzerland: Springer.

760   Jolliffe, T., & Baron-Cohen, S. (2000). Linguistic processing in high-functioning adults with autism

761   or Asperger's syndrome. Is global coherence impaired? *Psychological Medicine*, *30*(05),

762   1169–1187.

763   Kasari, C., Gulsrud, A. C., Wong, C., Kwon, S., & Locke, J. (2010). Randomized Controlled

764   Caregiver Mediated Joint Engagement Intervention for Toddlers with Autism. *Journal of*

765   *Autism and Developmental Disorders*, *40*(9), 1045–1056. https://doi.org/10.1007/s10803-010-

766   0955-5

767   Laghi, F., Cotugno, A., Cecere, F., Sirolli, A., Palazzoni, D., & Bosco, F. M. (2014). An

768   exploratory assessment of theory of mind and psychological impairment in patients with

769   bulimia nervosa. *British Journal of Psychology*, *105*(4), 509–523.

770   https://doi.org/10.1111/bjop.12054

771   Laugeson, E. A., Frankel, F., Gantman, A., Dillon, A. R., & Mogil, C. (2012). Evidence-Based

772   Social Skills Training for Adolescents with Autism Spectrum Disorders: The UCLA PEERS

773   Program. *Journal of Autism and Developmental Disorders*, *42*(6), 1025–1036.

774   https://doi.org/10.1007/s10803-011-1339-1

775   Levinson, S. C. (1983). *Pragmatics* (Cambridge textbooks in linguistics). Cambridge, UK:

776   Cambridge University Press.

777   Losh, M., & Capps, L. (2003). Narrative ability in high-functioning children with autism or

778   Asperger's syndrome. *Journal of Autism and Developmental Disorders*, *33*(3), 239–251.

779   Loukusa, S., & Moilanen, I. (2009). Pragmatic inference abilities in individuals with Asperger

780   syndrome or high-functioning autism. A review. *Research in Autism Spectrum Disorders*, *3*(4),

781   890–904. https://doi.org/10.1016/j.rasd.2009.05.002

782   Marini, A., Andreetta, S., del Tin, S., & Carlomagno, S. (2011). A multi-level approach to the

783   analysis of narrative language in aphasia. *Aphasiology,* 25(11), 1372–1392.

784   https://doi.org/10.1080/02687038.2011.584690

785   Marraffa, C., & Araba, B. (2016). Social communication in autism spectrum disorder not improved

786   by Theory of Mind interventions. *Journal of Paediatrics and Child Health*, *52*(4), 461–463.

787   https://doi.org/10.1111/jpc.13178

788   Matthews D., Bineya, H. & Abbot-Smith K. (2018) Individual differences in children's pragmatic

789   ability: A review of associations with formal language, social cognition, and executive

790   Functions. *Language Learning and Development,* 14, 186-223.

791   https://doi.org/10.1080/15475441.2018.1455584

792   McConnell, S. R. (2002). Interventions to Facilitate Social Interaction for Young Children with

793   Autism: Review of Available Research and Recommendations for Educational Intervention

794   and Future Research. *Journal of Autism and Developmental Disorders*, *32*(5), 351–372.

795   https://doi.org/10.1023/A:1020537805154

796   Morett, L. M., O'Hearn, K., Luna, B., & Ghuman, A. S. (2015). Altered Gesture and Speech

797   Production in ASD Detract from In-Person Communicative Quality. *Journal of Autism and*

798   *Developmental Disorders*, 1–15. https://doi.org/10.1007/s10803-015-2645-9

799   Ozonoff, S., & Miller, J. N. (1995). Teaching theory of mind: A new approach to social skills

800   training for individuals with autism. *Journal of Autism, Developmental Disorders*, *25*(4), 415.

801   Parola, A., Berardinelli, L., & Bosco, F. M. (2018). Cognitive abilities and theory of mind in

802   explaining communicative-pragmatic disorders in patients with schizophrenia. *Psychiatry*

803   *Research*, *260*, 144–151. https://doi.org/10.1016/j.psychres.2017.11.051

804   Parola, A., Bosco, F. M., Gabbatore, I., Galetto, V., Zettin, M., & Marini, A. (2019). The impact of

805   the Cognitive Pragmatic Treatment on the pragmatic and informative skills of individuals with

806   traumatic brain injury (TBI). *Journal of Neurolinguistics*, *51*, 53-62.

807   https://doi.org/10.1016/j.jneuroling.2018.12.003

808   Parsons, L., Cordier, R., Munro, N., Joosten, A., & Speyer, R. (2017). A systematic review of

809   pragmatic language interventions for children with autism spectrum disorder. *PLOS ONE*,

810   *12*(4), e0172242. https://doi.org/10.1371/journal.pone.0172242

811   Parsons, S., & Mitchell, P. (1999). What Children with Autism Understand about Thoughts and

812   Thought Bubbles. *Autism*, *3*(1), 17–38. https://doi.org/10.1177/1362361399003001003

813   Picone, L., Orsini, A., & Pezzuti, L. (2017). Raven's Standard Progressive Matrices: Contribution to

814   Italian standardization for subjects between ages 6 and 18. *BPA-Applied Psychology Bulletin*

815   *[Bollettino di Psicologia Applicata]*, *65*(280), 70-81.

816   Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and*

817   *Brain Sciences*, *1*(4), 515–526. https://doi.org/10.1017/S0140525X00076512

818   Rapaport, D., Gill, M. M., Schafer, R., & Holt, R. R. (1968). *Diagnostic psychological testing*. (R. .

819   Hold, Ed.). New York, NY: International University Press.

820   Raven, J.C. (1938). *Progressive Matrices*. London: Lewis.

821   Saban-bezalel, R., Hess, S., Dolfin, D., Hermesh, H., & Vishne, T. (2017). Hemispheric processing

822   of idioms in schizophrenia and autism spectrum disorder. *Journal of Cognitive Psychology*,

823   *29*(7), 809–820. https://doi.org/10.1080/20445911.2017.1325893

824   Sacco, K., Gabbatore, I., Geda, E., Duca, S., Cauda, F., Bara, B. G., & Bosco, F. M. (2016).

825   Rehabilitation of communicative abilities in patients with a history of TBI: Behavioral

826   improvements and cerebral changes in resting-state activity. *Frontiers in Behavioral*

827   *Neuroscience*, *10*(MAR). https://doi.org/10.3389/fnbeh.2016.00048

828   Schuwerk, T., Vuori, M., & Sodian, B. (2015). Implicit and explicit Theory of Mind reasoning in

829   autism spectrum disorders: The impact of experience. *Autism*, *19*(4), 459–468.

830   https://doi.org/10.1177/1362361314526004

831   Shallice, T. (1982). Specific impairments of planning. *Philosophical Transactions of the Royal*

832   *Society of London.Series B, Biological Sciences*, *298*(1089), 199–209.

833   Shukla-Mehta, S., Miller, T., & Callahan, K. J. (2010). Evaluating the Effectiveness of Video

834   Instruction on Social and Communication Skills Training for Children With Autism Spectrum

835   Disorders: A Review of the Literature. *Focus on Autism and Other Developmental*

836   *Disabilities*, *25*(1), 23–36. https://doi.org/10.1177/1088357609352901

837   Silverman, L. B., Bennetto, L., Campana, E., & Tanenhaus, M. K. (2010). Speech-and-gesture

838   integration in high functioning autism. *Cognition*, *115*(3), 380–393.

839   https://doi.org/10.1016/j.cognition.2010.01.002

840   Solomon, M., Olsen, E., Niendam, T., Ragland, J. D., Yoon, J., Minzenberg, M., & Carter, C. S.

841   (2011). From lumping to splitting and back again: Atypical social and language development

842   in individuals with clinical-high-risk for psychosis, first episode schizophrenia, and autism

843   spectrum disorders. *Schizophrenia Research*, *131*(1–3), 146–151.

844   https://doi.org/10.1016/j.schres.2011.03.005

845   Spek, A. A., Scholte, E. M., & Van Berckelaer-Onnes, I. A. (2010). Theory of Mind in Adults with

846   HFA and Asperger Syndrome. *Journal of Autism and Developmental Disorders*, *40*(3), 280–

847   289. https://doi.org/10.1007/s10803-009-0860-y

848   Sperber, D., & Wilson, D. (2002). Pragmatics, modularity and mind-reading. *Mind & Language*,

849   *17*(1-2), 3–23. https://doi.org/10.1111/1468-0017.00186

850   Spinnler, H., & Tognoni, G. (1987). *Standardizzazione e taratura italiana di test neuropsicologici*.

851   Masson Italia Periodici.

852   Tager-Flusberg, H., & Joseph, R. M. (2005). How Language Facilitates the Acquisition of False-

853   Belief Understanding in Children with Autism. In J. W. Astington & J. A. Baird (Eds.), Why

854   language matters for theory of mind (p. 298–318). Oxford University Press.

855   https://doi.org/10.1093/acprof:oso/9780195159912.003.0014

856   Thomeer, M. L., Smith, R. A., Lopata, C., Volker, M. A., Lipinski, A. M., Rodgers, J. D., … Lee,

857   G. K. (2015). Randomized Controlled Trial of Mind Reading and In Vivo Rehearsal for High-

858   Functioning Children with ASD. *Journal of Autism and Developmental Disorders*, *45*(7),

859   2115–2127. https://doi.org/10.1007/s10803-015-2374-0

860   Tirassa M., Bosco F.M. (2008). On the nature and role of intersubjectivity in human

861   communication. *Emerging Communication: Studies in New Technologies and Practices in*

862   *Communication*, 10, 81-95 qui manca & tra i due nomi, doi non c'è, immagino di no

863   Tirassa, M., Bosco, F. M., & Colle, L. (2006). Sharedness and privateness in human early social

864   life. *Cognitive Systems Research*, *7*(2), 128–139. https://doi.org/10.1016/j.cogsys.2006.01.002

865   Volden, J. (2002). Features leading to judgements of inappropriacy in the language of speakers with

866   autism: A preliminary study. *Journal of Speech Language Pathology and Audiology*, *26*(3),

867   138–146.

868   Volden, J., & Phillips, L. (2010). Measuring Pragmatic Language in Speakers With Autism

869   Spectrum Disorders: Comparing the Children's Communication Checklist—2 and the Test of

870   Pragmatic Language. *American Journal of Speech-Language Pathology*, *19*(3), 204.

871   https://doi.org/10.1044/1058-0360(2010/09-0011)

872 Watkins, L., Kuhn, M., Ledbetter-Cho, K., Gevarter, C., & O'Reilly, M. (2017). Evidence-based

873   social communication interventions for children with autism spectrum disorder. *Indian Journal*

874   *of Pediatrics*, 84(1), 68-75. corsivo numero volume

875 Whitehouse, A. J. O., Watt, H. J., Line, E. A., & Bishop, D. V. M. (2009). Adult psychosocial

876   outcomes of children with specific language impairment, pragmatic language impairment and

877   autism. *International Journal of Language & Communication Disorders*, *44*(4), 511–528.

878   https://doi.org/10.1080/13682820802708098

879 Williams White, S., Keonig, K., & Scahill, L. (2007). Social skills development in children with

880   autism spectrum disorders: A review of the intervention research. *Journal of Autism and*

881   *Developmental Disorders*, *37*(10), 1858–1868. https://doi.org/10.1007/s10803-006-0320-x

882   nome autore prima del cognome ed è intero

883 Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of

884   wrong beliefs in young children's understanding of deception. *Cognition*, *13*(1), 103–128.

885   https://doi.org/https://doi.org/10.1016/0010-0277(83)90004-5

886 Winner, M. G., & Crooke, P. J. (2009). Social Thinking: A Training Paradigm for Professionals and

887   Treatment Approach for Individuals With Social Learning/Social Pragmatic Challenges.

888   *Perspectives on Language Learning and Education*, *16*(2), 62–69.

889   https://doi.org/10.1044/lle16.2.62

890

891

892