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# Cognitive Pragmatic Treatment for autistic adolescents in telepractice (@CPT): A Pilot Study

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Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by difficulties in social communication<sup>1</sup>, including pragmatics<sup>2</sup>. Despite these difficulties, there is a paucity of trainings to improve pragmatics in ASD<sup>3</sup>, and even less is available for telepractice use.

We examined the effectiveness of Cognitive Pragmatic Treatment adapted for adolescents<sup>4</sup> and innovatively delivered via telepractice (@CPT). @CPT is a 15-sessions group program for pragmatic ability comprehensively focusing on several communicative aspects, e.g., language, gestures, paralinguistic cues. Nine autistic adolescents (mean age=14.88±1.96, education=9.55±2.0, IQ=95.11±17.87) participated in @CPT, and seven matched autistic adolescents (controls), attended with the same frequency Treatment-As-Usual, and matched @CTP group for age ( $t=.27$ ;  $p=.78$ ), education ( $t=.63$ ;  $p=.53$ ) and IQ ( $t=1.08$ ;  $p=.29$ ).

Before and after training both groups were assessed on (a) pragmatics, (b) cognitive and Theory of Mind (ToM)<sup>5</sup> abilities, as follows:

- (a) Equivalent forms of Assessment Battery for Communication (ABaCo<sup>6-7</sup>), a validated tool assessing several pragmatic phenomena and expressive means.
- (b) Neuropsychological Evaluation Battery<sup>8</sup>, Strange Stories<sup>9</sup> and Reading the Mind in the Eyes<sup>10</sup> tasks.

We expect to detect in the @CPT group, but not in the control group, a specific improvement in the communicative-pragmatic ability, the program's target, and not in other cognitive/ToM skills.

As expected, ABaCo total score (Wilcoxon's signed-rank test:  $z=2.54$ ;  $p=.01$ ), comprehension ( $z=2.07$ ;  $p=.03$ ), and production scales ( $z=2.19$ ;  $p=.02$ ) improved after-training in @CTP group but not in Treatment-As-Usual group (ABaCo total score:  $z=.16$ ;  $p=.86$ ; comprehension:  $z=1.18$ ;  $p=.23$ ; production:  $z=.33$ ;  $p=.73$ ).

As expected, @CPT did not lead to cognitive/ToM improvement post-training ( $.23 < z < 2.22$ ;  $.02 < p < .81$ ), with the exception of Strange Stories ( $z=2.19$ ;  $p=.02$ ) and Selective attention task ( $z=2.20$ ;  $p=.02$ ). Similarly, no cognitive/ToM improvement was detected after Treatment-As-Usual ( $.00 < z < 1.47$ ;  $.141 < p < 1.00$ ).

This encouraging preliminary results suggest the potential of pragmatic interventions for autistic adolescents in telepractice and specifically show the effectiveness of the @CPT on pragmatic ability.

SESSION	TOPIC	CONTENT AND ACTIVITIES
1	<b>INTRODUCTION AND OVERALL COMMUNICATIVE ABILITY</b>	Introduction to @-CPT program goals and structure; Self-introduction of each participant, including the description of any perceived difficulty in daily living communication; Overview of communicative-pragmatic ability using video clips and role playing tasks based on daily living situations
2	<b>LINGUISTIC ABILITY</b>	Videoclips and role playing based on the linguistic expressive modality.
3	<b>EXTRALINGUISTIC ABILITY</b>	Videoclips and role playing based on the gestural modality.
4-5	<b>PARALINGUISTIC ABILITY</b>	Videoclips, facial expression recognition tasks, tone of voice exercises and role playing.
6-7	<b>SOCIAL APPROPRIATENESS</b>	Videoclips and role playing focused on social appropriateness and communicative adequacy in different contexts.
8	<b>CONVERSATIONAL ABILITY</b>	Videoclips, role playing and exercises focused on the use of conversational rules (i.e., turn-taking and topic management).
9	<b>PHONE CONVERSATION</b>	Audioclips and role playing focused on telephone conversational rules (i.e., voice only, no paralinguistic and gestural clues, available in live interactions).
10-11	<b>SOCIAL ABILITY</b>	Videoclips and role playing focused on the ability to formulate meta-representations with respect to one's own and others' mental states.
12	<b>NARRATIVE AND PLANNING</b>	Picture-description task, aimed at eliciting story-telling by providing an adequate amount and type of information.
13-14	<b>OVERALL COMMUNICATIVE ABILITY</b>	Videoclips and role playing focused on the overall pragmatic effectiveness, expressed through all the modalities constituting communicative competence.
15	<b>CONCLUSION, AWARENESS AND FEEDBACK</b>	Feedback and conclusions about the progresses observed during @-CPT program; i.e. showing videorecording of the salient moments along the sessions where the improvements could be detected to each participant during the group session

**Table 1. Description of the @CPT protocol: topic, content and activities of each session are detailed**

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