

BAR-ILAN UNIVERSITY

**The Efficacy of a Technology- Based Social
Intervention to Facilitate Conversation
Skills between Peers with High Functioning
ASD**

Revital Bitton

**Submitted in partial fulfillment of the
requirements for the Master's Degree
in the School of Education,
Bar-Ilan University**

Abstract

Background

Studies show much variability in language abilities in children with Autism Spectrum Disorder (ASD). Nevertheless, there is a wide consensus regarding the presence of pragmatic impairment in the said population, even in children with High Functioning Autistic Spectrum Disorder (HFASD, i.e., IQ > 70). The term “Pragmatics” refers to the human ability to use communication appropriately in the social context. In children with typical development, we observe complex pragmatic abilities that allow them to hold a conversation while taking into account the interlocutor and context (Adams, 2002). In contrast, in children with ASD, there is considerable difficulty in the field of pragmatics and discourse, as this area is a significant challenge for them. The said impairment is widespread and is expressed in a variety of ways, such as speaking in a register that is not appropriate for the listener, difficulty in maintaining eye contact, providing too much information and irrelevant information, difficulty in maintaining the subject of conversation and more (Landa, 2000). Even the discourse ability, a central skill in the field of pragmatics, is seriously flawed in children with ASD. Children with ASD show a more limited repertoire of communicative functions (Miller Wetherby, 1986). Past studies focused mainly on the discourse between a child and an adult. There is also lack of intervention programs that measure changes in the pragmatic disorder and discourse abilities, in children with autism concerning conversation with their peers.

The purposes of this study

To examine the efficacy of a technology - supported intervention program in the topic of discourse, concerning the following issues: reduction of pragmatic abnormality, raising activity types, range and frequency of speech acts in children with ASD during spontaneous discourse and improving spontaneous discourse, all this during a conversation with the child’s peer. In addition, we will examine the correlation between background indices, such as verbal IQ and the severity of autism according to the Autism Diagnostic Observation Schedule (ADOS), and the score change during intervention in this study: indices of pragmatics, speech acts, turns and chains of communication during a conversation.

Study hypotheses

Study hypotheses were that we would observe a decrease in pragmatic abnormality between the middle to the end of the intervention program (lesson 3 and lesson 6). There will be an increase in speech acts types and a variety, and the frequency of speech acts thereof will rise between lessons 3 to 6. Those two lessons were selected because lesson 3 is the first lesson in which the children were required to hold a full or complete conversation, having learned how to start a conversation as well as how to

maintain and develop a conversation by changing the topic. Lesson 6 was chosen as representative of all that was learned in the intervention program.

Methodology

Study participants were part of a broader study (Bauminger - Zviely, Eden, Zancanaro, Weiss & Gal, 2013), which included two groups of children in two regular schools in Israel. The children were 8 to 12 years old, and all of them have been diagnosed with ASD, and IQ of 70 and higher. The subjects were divided into two groups. One group of participants received first a “Join – In” (JI) type of intervention (which was focus on on social cooperation abilities), and then they received a “No – Problem” (NP) type of intervention (which was focused on discourse abilities). The second group of participants received the same interventions, in reverse order. During the intervention, which included 12 sessions, the children experienced a computer software that taught cooperation, and another software that taught social conversation. The applications included two parts: learning and experience based on a Cognitive Behavioral Therapy (CBT) principle. In part of the experience, the children were filmed during the sessions, practicing the various tasks. From the “No Problem” intervention program, we have chosen two lessons for conducting the measurement: lessons 3 and 6. In order to examine the Pragmatic properties and speech acts, we have filmed all the conversations held between the children, and analyzed the conversations held on lessons 3 and 6. The coding of these conversations was done by speech therapist with experience in the field, having established reliability with two speech therapists, regarding the coding of pragmatic impairment and speech acts. The said coding used the following tools:

- *The "Pragmatic Rating Scale (PRS)"* (by: Landa et al., 1992; Paul et al., 2009), an index for analysis of pragmatic impairment. The scale includes 29 items grouped into three categories:

Pragmatic Behaviors - behaviors that included difficulty maintaining the topic of conversation and reciprocity during discourse (term for excessive talkativeness, irrelevant talk, inadequate explanations, faulty reference to the interlocutor’s responses, inappropriate humor).

Speech and Prosody Behaviors - behaviors that characterized the speaker's Manner of speech (intonation, intensity, fluency).

Paralinguistic Behaviors- Nonverbal behaviors that accompany speech (impaired eye contact and inappropriate gestures and expressions). In the said index, a higher score reflects a more serious pragmatic impairment.

- *Scale of Speech Acts* according to Dore (1979), included four main categories of:

Assertives, This group comprised speech acts portraying "reality"; in other words, determining facts and assessment of situations. This topic is divided into three sub-categories: evaluation, declarations, and report.

Requestives, This group included speech acts that asked for information or an action. It consisted of two sub-categories: questions and requests. **Responsives**, It contained speech acts that provided information as a reaction to the conversation partner's utterance. It also comprised two sub-categories: answers and replies.

Organizational Devices, These speech acts were concerned with the discourse flow control. For purposes of the current study, we added two general indices of speech acts: **Total Number of Speak Acts** - for each subject we calculated the sum of all speech acts he or she used in discourse. **Variety of Speech Acts**- for each subject, we calculated the number of speech acts types he or she used in discourse.

- *Discourse Coding Scale*, based on Yegerman's *Chains of Communications* (2005) and Molcho & Haimovich's *Couple Interaction Scale* (2010). This tool focused on counting the turns during conversation in each chain of discourse, so that one turn included the child's initiative or response towards his or her friend. The friend's response was considered as that friend's turn. In addition, we counted the chains of discourse. As previously mentioned, indices of the said scale included a total value of the following behaviors that appeared in each lesson: the number of turns and the number of discourse chains.

Results

In accordance with the study hypotheses, there was a decrease in pragmatic abnormality between the middle to the end of the intervention program (lessons 3 and 6) i.e., the children made progress on the pragmatic behaviors index. On the Speech and Prosody Index, no decrease in pragmatic abnormality was observed between lessons 3 to 6. However, an analysis of variance calculated for each index separately, found significant differences between lesson 3 and lesson 6 in the indices of 'awkward expression of ideas', 'rate of speech is too rapid/slow', 'intonation is unusual', and 'unusual timing of responses, reformulations'. On these indices, there was progress. The index of the paralinguistic behaviors showed no significant rate difference between lessons 3 and 6. However, in the group that received the "NP" type of intervention first, we had seen an improvement on the following indices: 'physical distance', 'gestures', and 'facial expressions'. Among the group that received the "JI" type of intervention first, there was no noticeable improvement in these indices. Among the group that

received the “JI” type of interventions first, there was a noticeable increase in pragmatic abnormalities on the 'gaze' index.

Contrary to the study hypotheses, we have not found an increase in the Total Number of Speech Acts between lessons 3 and 6, on the indices of Speech Acts that included the four categories. In accordance with the study hypothesis, we have found a significant difference on the 'organizational devices of conversation' Measures Index- the number of Organizational Devices in the discourse increased between lessons 3 to 6. In addition, no significant differences were in the quantity and variety of Speech Acts between lessons 3 to 6. However, we have found that the group that received the “JI” type of intervention first had, to begin with, higher levels of speech acts quantity and variety, than those of the group that received the “NP” type of intervention first.

In accordance with the study hypotheses, we have found that the subjects increased the number of turns in each discourse. Nevertheless, the number of Interaction Chains remained unchanged between lessons 3 and 6.

As for the third question of the study, we have found the following correlations between the PRS indices and the background indices: Significant positive correlation was found between the ADOS scores and change score on the 'irrelevant/ inappropriate detail' Index. A negative correlation was found with the change score on the 'intonation is unusual' Index. Thus, the higher the severity of ADOS is, the higher is the improvement on the 'irrelevant/ inappropriate detail' Index, while the improvement on 'intonation is unusual' Index is lower.

Significant positive correlations were found between the verbal IQ scores and the change score on the following indices: 'unresponsive to examiner's cues' and 'facial expressions'. Thus, the higher the verbal IQ score is, the higher is the improvement on the indices of 'unresponsive to examiner's cues' and 'facial expressions'. As for Speech Acts: significant positive correlations were found between the severity of ADOS and the change score on the indices of 'requestives speech acts' and 'organizational devices', so the higher the severity of ADOS is, the higher is the improvement in 'requestives speech acts' and 'organizational devices'. In addition, another positive correlation was found between verbal IQ and the change score in 'requestives speech acts' and 'organizational devices'. Thus, the higher the verbal IQ is, the higher is the improvement in 'requestives speech acts' and 'organizational devices'. No significant correlations were found between the background indices and the change score in the index of Turns and Chains.

Conclusions

The innovation of this present study is its examination of conversations between pairs of children diagnosed with HFASD, aged 8 to 12 years, at the middle and at the end of a technological intervention program in the fields of discourse and cooperation.

The study found progress in various pragmatic indices from the middle to the end of the intervention program in children diagnosed with ASD, such as 'irrelevant/inappropriate detail, 'out of sync content/ unannounced topic shifts', 'unresponsive to examiner's cues'. In addition, contrary to the study hypothesis, no improvement was observed in the quantity and variety of Speech Acts from the middle to the end of the intervention program. This scale may be suitable for use at younger ages, or at the beginning of language acquisition process, and had this been the population studied, we possibly would have seen improvement during the intervention program. The children have made a noticeable progress in their turns within the interaction. This study has clinical and practical implications: it enables therapists to focus on certain pragmatic characteristics that we know the children are advanced in, like pragmatic behaviors such as 'irrelevant/ inappropriate detail, 'out of sync content/ unannounced topic shifts', 'unresponsive to examiner's cues' and more. It is an initial basis for further studies of the connection between the intervention program itself and the children's progress in discourse and pragmatics. These two fields are so significant because they are linked with, and contribute to, the child's social skills in general.

Future studies should incorporate an examination of the pragmatic characteristics in different surroundings of the children's lives, and examine the difference between the various surroundings in general and following interventions. It is also desirable to develop a measure to examine the discourse in a developmental manner, suitable for school ages, and to continue exploring children's discourse with their peers.