

Abstract

Theoretical Background. Common ground (CG) is the mutual knowledge and understanding that discourse partners share about a particular context. This pragmatic ability constitutes the basis for constructing dialogue (Clark & Wilkes-Gibbs, 1986). There is a paucity of knowledge about how CG grows naturally over childhood and adolescence in populations with typical development (TD) and especially in atypical populations who struggle with interpersonal communication (Bauminger-Zviely, 2013; Ying Sng et al., 2018). For example, cognitively able individuals with autism spectrum disorder (CAASD) function above the intellectual disability level ($IQ \geq 70$) but reveal difficulties in pragmatic social discourse. Furthermore, prior literature has not yet sufficiently pinpointed those factors that may effectively and rapidly promote the process of CG generation over development in youngsters with and without ASD. Such knowledge could better elucidate the discourse difficulties of children with CAASD and help construct better tailored interventions to improve their social interactions and quality of life.

Objectives and hypotheses. The main objective of this study was to examine the process by which youngsters from age 6 to 16 generate CG with a peer partner during discourse, while comparing two study groups (CAASD / TD) in three age groups (early childhood / pre-adolescence / adolescence). Additional objectives of the study were to examine the correlations and contributions of three mechanisms for CG generation: (a) linguistic abilities – Vocabulary and measures of verbal quality during the CG generation process (e.g., types of combinations and expressions); (b) cognitive abilities, specifically executive functions (EFs) – those cognitive processes responsible for initiative, perseverance, inhibition, regulation, and flexibility that involve attention capacity and working memory (Bell & Cuevas, 2016); and (c) theory of mind (ToM) - the ability to attribute knowledge, beliefs, intentions, and emotions to oneself or others based on the understanding that others have a different perspective from one's own (Schuh et al., 2016). The research hypotheses were that in all groups (TD/CAASD, child/pre/adolescent), mutual learning between partners would lead to the generation of CG without external mediation from adults, but differences would emerge in the quality and efficiency of the CG generation process between the two study groups and between the three age groups. The TD group was expected to create CG more quickly, efficiently, and accurately than the CAASD

group. A similar pattern was expected to emerge in favor of the older participants over the younger participants in both study groups. Another hypothesis was that linguistic and cognitive (EF, ToM) mechanisms would contribute to the CG creation process, where higher linguistic and cognitive abilities would predict better CG generation.

Method

Participants. The study ($N = 148$) included 64 participants with TD (16 girls, 50 boys) and 84 participants with CAASD (14 girls, 70 boys) comprising three age groups: young children (6.0 to 8.5 years), pre-adolescents (>8.5 to 12.0 years), and adolescents (>12.0 to 16.0 years). The participants in each study group (TD / CAASD) were divided into pairs (32 TD dyads, 42 CAASD dyads) matched by age, sex, and IQ.

Background measures. Confirmation of the CAASD group members' clinical ASD diagnosis was obtained using the Autism Diagnosis Observation Schedule (ADOS - 2nd edition, Lord et al., 2012). Participants with an IQ score below 70 on the WISC-IV-HEB (WISC-IV-HEB, 2010), indicating intellectual disabilities, were excluded from the study. Vocabulary was determined using the WISC-IV-HEB Vocabulary subtest.

Research measures. Videotaped dyadic performance of a structured peer task was coded using a referential communication paradigm (Clark & Wilkes-Gibbs, 1986) to assess pairs' CG creation process. The dyad's task was to communicate a tangram card model under confidential knowledge conditions, where the facilitator sees the shapes on the card and explains to the operator (who does not see the shapes) how to arrange an identical card pattern. The task was repeated six times, with an exchange of roles between the facilitator and the operator at each of the six turns. The videotaped, transcribed tasks were coded for three core measures of CG creation: number of words per turn, duration of each turn, and number of turns needed for the pair to achieve a shared conceptualization (CG) of the shape. In addition, measures of verbal quality were coded: combination type (short simple or long complex sentences) and expression type (describing a whole shape or parts of it). Parents' questionnaires were administered to assess participants' ToM capabilities (Theory of Mind

Inventory, Hutchins et al., 2012) and EF abilities (Behavior Rating Inventory of Executive Function; BRIEF, Gioia et al., 2000).

Results. The main finding of the present study is that, in line with the primary hypothesis, peer pairs in both study groups (TD and CAASD) were able to generate CG spontaneously. In both groups, dyads improved over time along turns (1-6) in task performance on the core CG efficacy and speed measures, showing significantly fewer words and less time needed for the task. In addition, pairs in both groups succeeded in reaching a common conceptualization. However, the TD group was more efficient, using fewer words in a shorter time throughout the process and reaching a common conceptualization earlier than the CAASD group. Contrary to the study hypothesis, no differences emerged between the age groups for the core CG measures. However, a significant negative correlation was found between age and the CG measures, indicating that older participants in both study groups (CAASD / TD) achieved CG more rapidly and efficiently. Finally, study group, linguistic measures, and cognitive measures contributed to the speed and efficiency of CG generation. Namely, more basic linguistic combinations, more complete verbal phrases, higher EF capabilities, and better ToM abilities contributed to participants' smaller number of words and shorter duration of explanation in turns 5-6. Only linguistic measures (Vocabulary and types of combinations and expressions) contributed to the prediction of how many turns partners needed to achieve a common conceptualization.

Discussion. The present study examining peers' conversation during a play task utilized mixed quantitative and qualitative measures combining direct observations and parent questionnaires. The key innovation in the study findings is that participants in the CAASD group at all ages were successful in learning to create CG while interacting with a peer partner, without mediation or direct intervention. This finding has theoretical and practical implications. The ability shown by participants with CAASD to learn pragmatic linguistic processes spontaneously opens the door to research on possible further spontaneous learning processes for cognitive, social, and communicative abilities, such as problem solving, environment and audience consideration, and joint coordination during interaction processes with peers. In addition, this study examined a unique theoretical prediction model that included linguistic and cognitive abilities that may support learning of CG creation during peer interaction.

Regarding practical implications, deeper understanding of the CAASD group's difficulties in acquiring CG (long, incomplete, or inaccurate description of concepts in conversation) may enable the development of interventions to promote these youngsters' ability to create common concepts in a shorter, more effective, and more accurate way. The contributions made by participants' Vocabulary, types of phrases and expressions, EF, and ToM suggest that they may assist in designing appropriate intervention programs to enhance the level of dialogue and interaction essential for participation in daily life.