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Social Conversation Intervention for Minimally Verbal Children with Autism: The Role of Executive Function

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Abstract

Background

Autism spectrum disorder (ASD) is a neurodevelopmental disorder encompassing several main deficits, including a deficit in social-communicational skills (*DSM-V*, 2013) that is more severe in children with minimal verbal ability. Minimally verbal children with ASD (MVCwA) use fewer than 30 spoken words (Cohen, Conduit, Lockley, Rajaratnam, & Cornish, 2014).

Maljaars, Noens, Scholte, and Van Berckelaer-Onnes (2012) found that the verbal functioning of MVCwA was lower than that of younger non-disabled children of the same mental age and was also lower than that of children with intellectual disabilities of similar chronological and mental age. In addition to the linguistic impairment, social capabilities are deficient in MVCwA. The social functioning of children with ASD already differs from their non-disabled peers in early childhood (Konst, Matson, Goldin, & Williams, 2014). Furthermore, as a result of their greater symptom severity, MVCwA show diminished social skills compared to their counterparts with higher language skills (Lidstone, Fernyhough, Meins, & Whitehous, 2009).

Executive functioning is another main deficit in ASD. Executive functions refer to a group of cognitive processes that are responsible for the behavioral organization and coordination necessary to perform actions related to complex goals (Bell, & Cuevas, 2016). Deficient executive functioning affects socio-communicative behavior in ASD (Best, Miller, & Jones, 2009; Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002).

Various studies examined different intervention programs aiming to assist children with ASD in developing language and social skills that would replace

maladaptive behaviors (Witmer, Nasamran, Parikh, Schmitt, & Clinton, 2015). Previous studies examined the development of speech skills in children with ASD (Pickett, Pullara, O'Grady, & Gordon, 2009, Kasari et al., 2014); language development via argumentative and alternative communication (Gordon, McElduff, Wade, Howlin, & Charman, 2011); and the development of social interaction and social skills for high-functioning children with ASD (Bauminger, 2002). Yet, only a few studies have investigated the development of social skills in children with ASD who are not high functioning (DiStefano, Shih, Kaiser, Landa, & Kasari, 2016; Zercher, Hunt, Schuler, & Webster, 2001). Studies have not yet focused specifically on the development of social conversation for MVCwA.

Study Objectives

Despite the difficulties MVCwA have in developing social conversation with peers and despite their obvious need for this type of activity, a comprehensive study that focus in the intervention programs intended for the development of social conversation with peers in these children was not found. The uniqueness of the current study lies in its pioneering examination of an intervention program specifically constructed for the development of peer conversational skills in MVCwA and their connection to executive function. This intervention program was especially designed for these children and adapted to their unique abilities and characteristics.

Study Hypotheses

The first three hypotheses of this study were devised regarding social conversations and executive functions, following the current intervention program delivered to an experimental study group of MVCwA compared to a control group of MVCwA who were wait-listed for the intervention. The first hypothesis predicted that

the intervention group would reveal larger gains in social conversation skills than the control group. The second hypothesis predicted that the intervention group would reveal greater improvement in communication and social adaptation than the control group. The third hypothesis predicted that the intervention group would reveal larger improvement in executive functions than the control group. The fourth hypothesis predicted links between children's higher verbal IQ and greater improvement in conversational abilities, and the fifth hypothesis predicted links between children's higher exectutive IQ and greater improvement in conversational abilities. The sixth hypothesis predicted a link between greater severity of ASD symptoms and lower gains in social conversation.

Methodology

Participants were 36 MVCwA who were part of an extensive study on joint attention, conversation, and cooperation skills in 54 MVCwA ages 8-16 years. Selection criteria for the 36 participants were: a vocabulary of up to 30 spontaneous spoken words; a command of at least 20 symbolized vocabulary words (through argumentative and alternative communication); language and executive skills that corresponded with the high end of moderate intellectual disabilities, according to the Peabody Picture Vocabulary Test III (Dunn & Dunn, 1997) as an index of verbal skills, and the Raven Colored Progressive Matrices test (Raven, 1976) as an index of performance abilities; and a previous clinical diagnosis of ASD on the parent-reported Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003). All these data were gathered by special education experts who were blind to the study's goals and to the children’s group affiliation.

Children who met these criteria were randomly assigned into two groups of 18 (9 dyads each): the intervention group who received immediate intervention and the

control group who received delayed intervention after collecting posttest data. Analysis (*t*-tests and chi-squared tests) conducted to examine intergroup differences found no significant differences between the study and control groups on child age, sex, IQ, autism severity, or on mother education.

To evaluate the effects of the intervention program, three assessments of children's abilities were administered at pretest and posttest: (a) observation of each child's conversations using a social conversation interaction coding scale (Capps, Kehres, & Sigman, 1998) that was adapted to the MVCwA's characteristics; (b) the semi-structured Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984) completed by teachers to assess children's adaptability in communication, socialization, and everyday skills; and (c) the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, & Kenworthy, 2000) completed by teachers to assess children's executive functions.

The intervention program targeting social conversation abilities for MVCwA was administered to the intervention group in pairs, focusing on improving several abilities in social conversation with peers: initiation, perseverance, reciprocity, and pragmatics.

Results

In line with the first study hypothesis, based on the Capps et al. coding of the observed conversations, children in the intervention group demonstrated larger gains in social conversation skills than the control group, showing actions that were more relevant to the conversation, use of more words when approaching the peer partner, and initiation of more interactions with the peer. In addition, a reduction in self-stimulation was measured during conversation. That said, in other conversation measures (eye

contact, communicational gestures, social smiling, and vocabulary), the intervention group did not significantly outperform the control group.

In line with the second study hypothesis, based on the Vineland teacher questionnaire, children in the intervention group demonstrated larger gains on the social adaptation measures (interpersonal relations and play) than the control group. However, in contrast to the hypothesis, no such intergroup differences emerged on the communication adaptation and problem solving measures.

In line with the third hypothesis, based on the BRIEF teacher questionnaire, the intervention group showed more significant gains in their overall executive functions score compared to the control group. Regarding the specific executive functions, three out of the five cognition measures (planning and goal setting, organization, and control over execution) showed greater improvement in the intervention group than the control group (with initiation and working memory showing no significant group difference). However, out of the behavior regulation measures, only the impulse restraint measure showed near-significant intergroup differences, whereas the flexibility and emotional control measures showed no differences between groups.

Regarding the fourth and fifth study hypotheses, inconsistent findings emerged between progress in conversational and social skills, and the verbal and executive skills (the IQ measures) in the intervention group children compared to the control group. Regarding the sixth study hypothesis, only a weak correlation emerged between ASD severity (measured by the pre-intervention parent-reported SCQ) and children's improvement in directly observed conversation skills, in the intervention group compared to the control group. However, indirect support of the sixth hypothesis was demonstrated by the significant links found between lower ASD severity (parent-reported SCQ) and larger gains on the Vineland adaptability scale, both for specific

communicational measures (comprehension, expression) and for the overall communication domain, with significantly higher correlations emerging in the intervention group compared to the control group.

Conclusions

This study examined, for the first time, an intervention program that was constructed specifically to promote social conversation abilities in an under-investigated population of children with ASD who have limited verbal skills. Previous literature reported the significant language and social difficulties experienced by children with ASD, but most of these reports focused on high-functioning children with a wide vocabulary range (Pickett et al., 2009), not on the population of MVCwA. The current study showed that promoting social conversation components is possible even with MVCwA. Moreover, intervention targeting social conversation skills with these children was found to contribute to greater social adaptation, as well as to significant gains in some executive functions.

That said, the results did not fully corroborate the study hypotheses. The reasons may be related to the instruments used in this study, the difficulty in examining MVCwA, and the program's short duration. Despite these limitations, it is important to remember that social relations with peers are essential for children's emotional well-being and for the development of their cognition, language, and social skills. The ability to converse with peers is one of the keys to success in such interactions (Coplan & Arbeau, 2009), so it is crucial to continue empirical and clinical work promoting programs for developing social conversation and social skills in MVCwA.