Improving The Use Of Mental State Verbs By Children With Autism Spectrum Disorders In Two Narrative Production Tasks: Story Retelling And Spontaneous Story Generation.

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Abstract

Children diagnosed with ASD often experience marked difficulty in the comprehension and production of narrative discourse that extends well into their adolescent and adult years (Asberg, 2010; Diehl, Bennetto, & Young, 2006; Eigsti, Marchena, Schuh, & Kelley, 2010; Kelley, Paul, Fein, & Naigles, 2006). These narrative difficulties appear to be linked directly to the core symptoms of ASD that manifest in failure to plan using information from multiple sources, a hyper-focus on details at the expense of gist-level propositions and limited use of mental state and causal language to encode goals and motivations of characters (Capps, Losh, & Thurber, 2000). Theory of Mind (ToM) accounts propose that a core deficit in ASD is an inability to infer the emotional or mental states of others. Deficits in ToM have been shown to significantly impair one's ability to engage in ongoing social interactions and to develop the linguistic knowledge (e.g., mental state and causal language) necessary for understanding the relationship between events in discourse (Eigsti, Marchena, Schuh, & Kelley, 2010). Mental state and causal language is necessary for the establishment of a causal framework to link story grammar elements together. The overarching goal of this project was to test whether a program designed to teach narrative language skills was effective for increasing the use of mental state and causal language for children with high functioning autism (ASD). A multiple baseline across participants study was conducted with 5 children with ASD (ages 8-12). Intervention was provided for two 50-minute individual sessions per week for a total of 21-33 sessions (depending on the student). Children's spontaneous stories and story retells, collected weekly, were analyzed for the use of mental state and causal language before, during and after intervention. All of the children made clinically significant gains after participating in the instruction, with clear changes in the use and complexity of mental state verbs during both types of narrative production tasks (story retell, spontaneous generation). The gains were maintained after intervention was discontinued.

Keywords: Children, Autism, Mental Verbs

1. Introduction

Children diagnosed with Autism Spectrum Disorder (ASD) often experience marked difficulty in the comprehension and production of narrative discourse that extends well into their adolescent and adult years. These narrative difficulties appear to be linked directly to the core symptoms of ASD that manifest in failure to plan using information from multiple sources, a hyper-focus on details at the expense of gist-level propositions and limited use of mental state and causal language to encode goals and motivations of characters. Theory of Mind (ToM) accounts propose that a core deficit in ASD is an inability to infer the emotional or mental states of others. Deficits in ToM have been shown to significantly impair one's ability to engage in ongoing social interactions and to develop the linguistic knowledge (e.g., mental state and causal language) necessary for understanding the relationship between events in discourse. The

overarching goal of this project was to test whether a program designed to teach narrative language skills was effective for increasing the use of mental state and causal language for children with high functioning autism (ASD).

2. Purpose

The overarching goal of this project was to test whether a program designed to teach narrative language skills was effective for increasing the use of mental state and causal language for children with high functioning autism (ASD).

3. Methodology

A multiple baseline across participants study was conducted with 5 children with ASD (ages 8-12). Intervention was provided for two 50-minute individual sessions per week for a total of 21-33 sessions, depending on the students' level of performance. Children's spontaneous stories and story retells, collected weekly, were analyzed for the use of mental state and causal language before, during and after intervention**.**

4. Participants

We recruited 5 children, 2 girls and 3 boys with high functioning autism (ASD), ages 8-12. Their language skills on the *Clinical Evaluation of Language Fundamentals-4 (CELF-4;* Semel, Wiig & Secord, 2003) assessment and their IQ on the *Universal Nonverbal Intelligence Test (UNIT;* Bracken & McCallum, 1998) subtests fell within 1.5 SD above or below the mean. There were no known co-morbidities; however, all children demonstrated difficulties with social interaction skills.

5. Measures

Monitoring Indicator of Scholarly Language (MISL) was used as a measurement in intervention. MISL is an assessment tool that monitors the progress of the microstructure and macrostructure elements of a child's narrative language development. The microstructure elements include character (a boy, a girl), setting (location of story), initiating event (conflict), internal response (reaction to conflict), plan (how to solve conflict) and consequence (outcome of plan). Microstructure elements involve coordinated clauses (FANBOYS- for, and, nor, but, or, yet, so), subordinating conjunctions (when, after), elaborated noun phrases (the brown dog), mental (realized, chose, forgot) and linguistic verbs (asked, told, said), and adverbs (very, quickly). Each client has the potential of attaining 39 points on the rubric. Each story that the children told was evaluated for the total number of mental verbs each participant used in both spontaneous stories and story retells. Mental verbs are defined as verbs that describe a cognitive process, such as thought, decided, and wanted.

6. Intervention

During intervention, the clients were provided the SKILL Intervention program. This program uses attractive icons and graphic organization to assist participants in learning to tell stories. This narrative intervention program is divided into three different phases. In the first phase, the primary elements of story grammar are taught. Following this phase, participants learn about elements of elaboration, such as linguistic structures, mental and causal language. Phase three prompts the establishment of independence in story telling, comprising of editing and metacognitive strategies. The benefits of this intervention program include its ability to move at the rate of the individual, allowing an adaptation to each child's unique speed of learning and explicit lessons on story elements. Students are given multiple opportunities to create and evaluate their own stories, stories told by others, and in children's literature.

7. Results

7.1 Retell Data

To obtain retell data, clinicians told stories to the students and then asked them to retell the story without picture prompts. Participants then restated the story in their own words. Stories were digitally recorded, orthographically transcribed and then analyzed for fundamental story elements, as well as matched and novel mental verbs. Matched mental verbs include mental verbs modeled by the clinician during intervention and baseline that were replicated by participants in their stories. Novel mental verbs are mental verbs that were never modeled at any time in intervention but that participants produced on their own in their stories.

Figure 1 shows participant 001's data. Participant 001 produced 10 mental verbs (wanted, decided, agreed, remember, forgot, want, thought, know) during baseline (range of 1-4 per story). She demonstrated an increase in her use of modeled and novel mental verbs throughout therapy. During Phase III she produced 3 mental verbs (hoped, recognized, and concentrating) that were never modeled at any time in intervention. Her use of modeled mental verbs increased steadily from baseline, and there was a noticeable increase in her use of novel mental verbs during Phase III, when narrative proficiency became more stable.

Participants showed a steady increase in use of both matched and novel verbs throughout retell intervention. Figures 2 shows examples of mental verbs that were modeled by the clinician during intervention and baseline. Figure 3 includes examples of novel mental verbs produced by participants that were never modeled at any time in intervention.
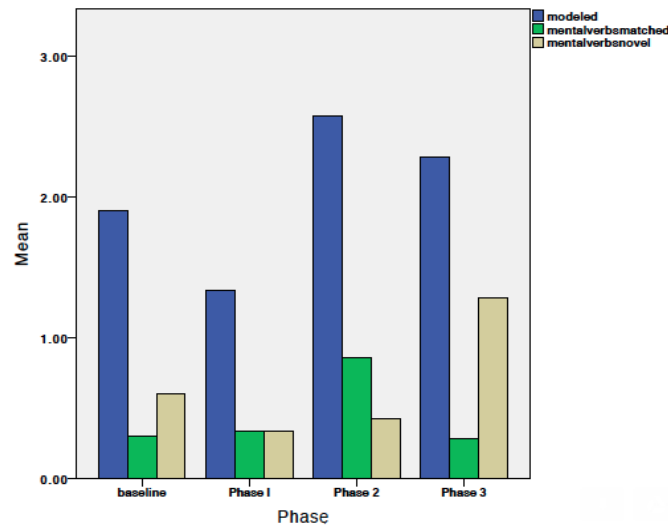

Figure 1. Matched and Novel Verbs in Retells for Participant 001
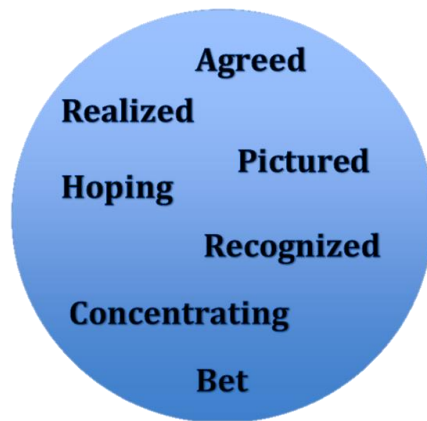

Figure 2. Examples of Modeled Mental Verbs

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Figure 3. Examples of Novel Mental Verbs

7.2 Spontaneously Generated Stories Data

To acquire spontaneously generated story data, participants were shown a picture and asked to tell a story about it. They were shown a single scene that did not elicit an obvious story, for example, the picture may have depicted a child smiling.

Figure 4 illustrates changes in the use of mental verbs in spontaneously generated stories over the course of the 3-phase intervention. Three out of five participants showed substantial increases in their use of mental verbs from baseline throughout intervention. The two participants that did not show an increase in mental verb usage in spontaneously generated stories did not show an increase in mental verb usage in their retell data.

Visual analysis of mental verb usage in both retell and single scene stories showed that intervention was effective for bringing about change in the use of mental state verbs for three out of five children. It was found that participants used significantly more mental verbs in spontaneously generated stories than in their story retells.
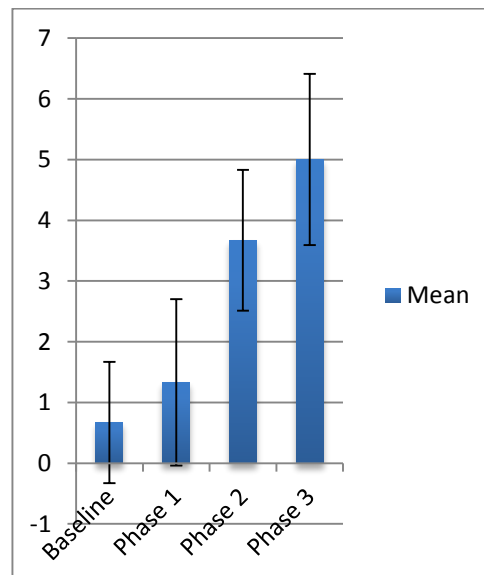

Figure 4. Mental Verbs in Single Scenes for Participant 004

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8. Summary

The overarching goal of this project was to test whether a program designed to teach narrative language skills was effective for increasing the use of mental state and causal language for children with high functioning autism (ASD). Children's spontaneous stories and story retells were collected and analyzed for the use of mental state language before, during and after intervention. For 3 of 5 children with ASD, as they proceeded through intervention, their use of mental verbs increased in both story retells and stories elicited using single scene picture prompts. Some participants began to use novel mental verbs that were never modeled at any time in intervention or in assessment contexts.

 We can conclude that narrative intervention used in this study was associated with positive results for at least 3 of 5 children with ASD who participated. The results provide promising preliminary evidence that teaching narrative structure may improve the use of mental state language for children with ASD.

9. Acknowledgements

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