BAR-ILAN UNIVERSITY

Using iPads as a Tool for Testing Narrative Ability in Young Children with High-Functioning ASD

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ABSTRACT

Background. Narrative ability is in fact the most meaningful and organized linguistic ability for man. It is the ability to reconstruct events that are ostensibly unrelated to each other in an organized manner by arranging them in a meaningful sequence from a specific point of view (Segal, 2008). The stories begin early in our lives and play an important role in children's development of self-concept, comprehension of their experience, and interactions with family members and peers. In fact, narrative understanding is an important, if not the major, cognitive tool through which all human beings in all cultures make sense of the world (Franke & Durbin, 2011). The ability to tell stories is a skill that develops from early childhood through adulthood. This development takes place in several areas: cognitive, pragmatic, social, communicative, and linguistic (Losh& Caps, 2003). An impaired narrative limits the ability of one's interaction and affects social-emotional understanding and communication between individuals. Since it is based on cognitive, social-emotional, and linguistic skills, studies have found that for people with ASD (Autism Spectrum Disorder), creating a story is a complicated and sometimes impossible task (Bruner & Feldman, 1993; Franke & Durbin, 2011; Losh& Caps, 2003). Most studies until now have tested the learning and narrative abilities of children with HFASD (High Function Autism Spectrum Disorder) on structured tasks by using images or by asking them to retell a story they have heard (Capps, Kehres & Sigman, 1998; Diehl, Benneto& Carter Young, 2006; Losh, 2003; Norbury & Bishop, 2003; Regneri & King, 2012; Rollins, 2014). Very few studies have tested the narrative ability using technology devices (Doenyas, 2014; Kucirkova, Messer, Critten& Harwood, 2014; Mariotti, 2012) And so far no research has been done to examine the narrative ability while using an iPad in particular.

Research objectives. In light of the increase in the use of iPads, and especially in working with children with ASD, we found it important to examine the iPad as a learning tool for them.

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The present study examined whether there is a preference or advantage for using the iPad as a learning tool for narrative abilities in children with HFASD. Therefore, this research had three main objectives: First, we wish to examine the narrative ability of children with normal development compared to children with HFASD. Second, we will compare the narrative abilities presented by the two research groups in the two research tools- picture book and the iPad. Third, we will examine the narrative abilities presented by children with HFASD while using the different tools and testing the connection to the preference they presented between the research tools and their grades in the narrative tasks.

Research hypotheses. We hypothesized that children with HFASD would show lower narrative abilities than children with normal development in the use of the language (length, structure, sequence, and extensions), and mainly in reference to the understanding of the social situation in the story. We further hypothesized that children with HFASD will show a clear preference for the iPad and therefore their scores will be higher with the iPad use. And last, that we will find a difference in the abilities of the narrative that the children with HFASD presented in the iPad task compared to the picture task.

Method. The sample included 30 children on the autistic spectrum disorder who are high- functioning (IQ above 75) and 30 children with normal development aged 4-6, who were matched on with age and verbal ability. First, all subjects in the study were given a language diagnosis based on sub-tests from the Goralnik test, which is a test for language screening of Hebrew speaking children at a pre - school age (Goralnik and Rom, 1995) This screening test was conducted to determine that everyone is at a language level compatible with their age peers. The parents of the children in the ASD group were also given the SCQ questionnaire (Social Communication Questionnaire) to determine their level of functioning [social functionality]. During the course of the study, each participant participated in two sessions, in which he was presented with two books from the Frog books series of Mayer ("frog on his own", "frog where are you", Mayer, 1969). These are books without words, which are used to neutralize the influence of language. The books were presented in two different means- one in a picture book format and the

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other on an iPad. At first, the participants browsed through the pages of the book / iPad and got to know the story. Afterward, the children were asked to tell the story while looking at the pictures. The participants had to tell [talk or explain] about 7 pages per task, using one tool - a book / iPad. In the session that followed, they had to perform the same task usingthe other tool, which was not used in the first session. The sessions were recorded by audio recording for analysis of the language samples. The narrative scores were analyzed using two different narrative scales taken from formal Hebrew tests (Goralnik and Rom, 1995; katzenberger, 1994).

Findings. The results of the study showed that participants with HFASD scored higher in both scales (Goralnik and Katzenberger) while using the iPad as opposed to the book. The main aim of the study was to examine whether there would be differences in the abilities of the narrative produced by using a digital book on the iPad, as opposed to the narrative produced by a picture book among children with HFASD. This hypothesis was confirmed. The results of the study indicate that children with HFASD show greater use of language and a better understanding of the story, the main events and of the main characters while using an iPad to produce a narrative. We also found that there is a clear preference among children of HFASD for use of the iPad, and there is a clear connection between their preference and their scores on the tasks. The comparison of children with HFASD with typical development showed that there are significant differences in narrative abilities both linguistically and narratively. By comparing the narrative abilities presented by each group separately using the two different means, we found that children with typical development scored significantly higher than children with HFASD when both children useda book, but not when the platform was an iPad. These results illustrate in fact that by using the appropriate means, children with HFASD exhibit good abilities and in some of the measures, show similar scores to those with typical development. Another hypothesis that was confirmed, was that children with typical development showed better understanding of the social situationthanchildren with HFASD.

Conclusions. The contribution of the research is expressed both on the clinical level and practical- educational level. On the clinical level our research joins a series of studies which tested

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the use of technology in working with children with ASD. But in fact, our research is one the first to directly test the use of an iPad as a learning tool of narrative abilities. The findings of this research, as widely reported in the literature, show that despite the difficulties attributed to children on the autistic spectrum, which include significant difficulties in narrative abilities, there is great difference in the abilities they show when using the right means. On the practicaleducational level, this research is important to understand the sources of motivation for t learning in ASD population. From the practical side, it is very important to work with children with ASD in developing their narrative ability. Children need narrative abilities for social and academic success (Franke & Durbin, 2011). The ability to tell a story contains the potential to develop imagination and inspiration, verbal fluency, encouraging words, improving public speaking abilities, promoting learning abilities, encouraging children to write and ultimately as Franke and Durbin wrote: Narrative skills help us and the children on the spectrum to be part of the world and understand it well (Franke & Durbin, 2011, pp. 138). The present study helps to see that there are language and social abilities that children with ASD find difficult to express, but this does not mean they do not exist. By using appropriate means, it is possible to build therapeutic and educational programs and bring children to their full potential.