Characteristics of Fictional Stories in Children with Autism Spectrum Disorder: Evidence from the Farsi

Saeideh Beytollahi [1] and Zahra Soleymani [1, *]

[1]Department of Speech Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran

Corresponding author: Department of Speech Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Enghelab Avenue, Pitch-e-shemiran, P.O. Box: 1148965111, Tehran, Iran. Tel: +98-9122036683, Fax: 77534133, Email: soleymaniz@sina.tums.ac.ir

Abstract

Background: Narrative ability is a critical component of social communication essential for participating in everyday activities. Children with autism spectrum disorder (ASD) demonstrate problems in the narrative discourse, but little is known about the features of their fictional stories.

Objectives: This study compared fictional narratives between ASD children and they're typically developing (TD) peers.

Methods: Fictional stories produced by 6- to 7-year-old males with high functioning autism (n = 14) were compared with language, sex, and age-matched TD children (n = 15). The stories were analyzed using the monitoring indicators of scholarly language. The macrostructure and microstructure elements, narrative complexity index, story knowledge index, and perspective-taking index were compared between the two groups by one-way analysis of variance (ANOVA) at the significance level of 0.05.

Results: The scores of macrostructure and microstructure elements were lower in children with ASD. The ANOVA showed significant differences between ASD and TD children in three indices (P < 0.05). Moreover, the Pearson correlation coefficients between the total macrostructure and microstructure scores were close to one in both ASD (r = 0.89) and TD children (r = 0.93).

Conclusions: Despite obtaining scores in the average range in a standard language test, Farsi-speaking children with ASD experience limitations in fictional narratives.

Keywords: Autism Spectrum Disorder, Communication Disorders, Language Disorders, Narration

1. Background

The narrative is an important language skill, often a vehicle for exhibiting personal and social nature. It permits understanding the social environment and human actions and intentions and organizing everyday experiences (1). There are three main narrative genres: script, fictional, and personal. Scripted constructions include routinized events (e.g., birthday). Fictional stories often refer to people, places, and concepts that exist (or existed) in the real world. However, fiction may be based on false beliefs about the world. Personal narratives are the restatements of personal experiences usually unknown to the listener (2).

Some researchers studied the narrative features in children with autism spectrum disorder (ASD). They mostly show limitations in comprehending and expressing narrative discourse, which continues into their juvenile (3). Length of narratives, lexical diversity (4), and mean length of utterances (5) decrease in children with ASD, and they may use the simpler syntax (6). In addition, there are often marked diversities in the composition and formation

of causal coherence for accounting happenings in important sequences (7). The cognitive theories of ASD could explain these features. These theories imply deficits in executive function (EF), and weak central coherence (WCC), and impairments in the theory of mind (TOM).

Fictional narratives of children with ASD were less coherent than those of their peers, demonstrating a defect in EF. A decreased skill to formulate aims, planning how these aims are to be attained, and performing the plan might cause a diminishing of narrative coherence (8).

The WCC hypothesis interprets the deficits in cohesion. According to the WCC, individuals with ASD focus on details due to better local information processing and poorer global information processing (9).

The TOM is also essential to correctly assess by considering the listener's knowledge and selecting the acceptable referential method that is impaired in children with ASD. They cannot view the listeners' needs and produce the most explicit form by inhibiting their perspectives (5).

Because of the critical role of narrative ability, its de-

tailed study is necessary for children with ASD. The existing evidence shows that the narratives of Farsi-speaking children with ASD have not been investigated.

2. Objectives

The present study aimed to investigate the fictional narratives of Farsi-speaking ASD children and answer the two main research questions:

(1) Are there significant differences in narrative characteristics between ASD and TD children?

(2) To what extent is there a correlation between the story elements?

3. Methods

3.1. Participants

Two groups of volunteers participated in this study. Group 1 consisted of 14 males aged 6 years to 7 years and 9 months with an ASD diagnosis. They were diagnosed with ASD by a qualified pediatric psychiatrist using the DSM-5 criteria (10). The participants were recruited through convenience sampling in a private clinic. They had received rehabilitation services, including occupational therapy and speech therapy from 3 or 4 years of age and individual speech-language intervention twice per week for 30-min sessions. They were monolingual Farsi speakers with a non-verbal intelligence quotient (NVIQ) equal to or above 85 on the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (11) and the normal range of receptive and expressive language on the Persian version of the Test of language development-primary, third edition (TOLD-P: 3). The Persian version of the TOLD-P: 3 utilizes standard scores with a mean of 100 and SD of 15 for composite quotients (12).

The control group consisted of 15 school students aged 6 years and one month to 7 years and 10 months matched for sex, chronological age, NVIQ, receptive language, and expressive language. Simple random sampling was employed for selecting these children. They were monolingual Farsi speakers with normal intelligence and without a history of psychiatric problems, language delay, or learning disability.

Similar to a previous study (13), the number of ASD children with inclusion criteria was limited. On the other hand, transcribing and analyzing narratives is a time-consuming process. Therefore, 15 students with TD were selected.

3.2. Material

A three-episode story (A3) from Farsi narrative norms instrument (FNNI) (14) was selected to collect narrative samples designed for the assessment of Farsi-speaking children's narration. This story was composed of 14 wordless pictures and numerous adventures. The story was constructed according to the Stein and Glenn story grammar model (15), in which the main characters have problems and try to solve them. The psychometric features of the FNNI were investigated in 30 Farsi-speaking children. The results showed that the instrument's content validity was 92.28%, and the inter-rater reliability was 97.1% (14).

3.3. Procedure

Each participant was assessed individually in a quiet room in the experimenter's presence. The test started with a training story to familiarize the participant with the story's framework. The experimenter used cues such as telling the name of characters or part of events in this story but not in the main stories. A copy of the stories was placed in front of the child. The experimenter was not able to see the picture. Each narration was recorded using an iPad camera.

After collecting the samples, the first author transcribed the stories verbatim. As a research assistant, a speech and language pathologist reviewed all transcripts for word spelling, morpheme segmentation, and utterance segmentation. Then, two transcribers checked the recorded movie together for the third time and resolved the disagreement. The agreement between the two transcribers was 100%.

3.4. Coding and Data Analysis

The transcribed stories were analyzed using the monitoring indicators of scholarly language (MISL) rubric to calculate the narrative complexity. The MISL comprised seven macrostructure measurement items and six microstructure measurement items. Macrostructures included character, setting, initiating event, internal response, plan, attempt, and consequence. The scoring method was based on the element being absent (score of 0), emerging (score of 1), present (score of 2), or elaborated (score of 3). The maximum total score of macrostructure was 21 (16).

Microstructure items in MISL included coordinating conjunctions, subordinating conjunctions, adverbs, mental verbs, linguistic verbs, and elaborated noun phrases. For each item, a score of 0 was given if no instances were present, a score of 1 if the story included one instance of the structure, a score of 2 if two diverse instances were present, and a score of 3 if there were three or more diverse

instances of the structure within the story. The maximum complete score of microstructure is 18 ([16]).

Three indices from MISL, including narrative complexity (NC), story knowledge (SK), and perspective-taking (PT), were extracted. The total score of macrostructure and microstructure was used as an index of overall NC. The SK index was computed by compounding the main elements, including initial event, internal response, plan, attempt, and consequence. The PT index was calculated by compounding the scores of internal response, plan, and mental/linguistic verbs.

For checking the correctness of the coding, 25% of the transcripts were selected randomly and scored separately by the research assistant. The total number of items on which the raters corresponded was divided by the total number of items in each index to reach the inter-rater reliability percentages. The inter-rater reliability score was 95% for NC and 97% for SK and PT.

4. Results

The characteristics of ASD and TD children are shown in Table 1.

Table 1. Characteristics of Participants in Autism Spectrum Disorder and Typically Developing Groups [a]

	ASD (n = 14)	TD (n = 15)	P
Age (years; months)	6.6 ± 0.5	6.5 ± 0.52	0.88
WPPSI	88.28 ± 3.09	92.66 ± 5.57	0.09
GARS	83.08 ± 2.86	-	-
Receptive language	90.57 ± 3.52	91 ± 4.03	0.43
Expressive language	90.58 ± 2.47	92.6 ± 4.06	0.07

Abbreviations: WPPSI, Wechsler Preschool and Primary Scale of Intelligence; P-GARS-2, Persian Gilliam Autism Rating Scale-2; TD, typically-developing.
[a]Values are expressed as mean ± SD.

The first research question was about the participants' narrative characteristics and the differences between the two groups (ASD and TD). The mean scores (± SD) of macrostructure and microstructure elements in each group are presented in Table 2. The mean scores of narrative elements were higher in TD children than in ASD children in all items.

As seen in Table 2, the lowest score of macrostructure elements was related to setting and the highest to character in ASD children. Moreover, the lowest and highest scores of microstructure elements were related to elaborated noun phrases and coordinating conjunction in this group, respectively. The Shapiro-Wilk test indicated the normal data distribution for all indices (NC P = 0.1, SK P = 0.3, and PT P = 0.2). Accordingly, the between-group (ASD

Table 2. Mean and Standard Deviation of Macrostructure and Microstructure Elements in Autism Spectrum Disorder and Typically Developing Children in Farsi Narrative Norm Instrument [a]

	ASD (n = 14)	TD (n = 15)
Character	1.92 ± 0.61	2.13 ± 0.63
Setting	0.80 ± 0.69	2.14 ± 0.60
Initial event	1.64 ± 0.74	2.66 ± 0.61
Internal response	1.35 ± 0.49	2.20 ± 0.56
Plan	0.78 ± 0.80	2.20 ± 0.77
Attempt	1.57 ± 0.64	2.60 ± 0.50
Consequence	1.21 ± 0.57	2.13 ± 0.51
Coordinating conjunction	1.28 ± 0.61	2 ± 0.53
Subordinating conjunctions	0.57 ± 0.64	1.86 ± 0.63
Adverbs	0.64 ± 0.49	1.66 ± 0.72
Mental verbs	0.85 ± 0.53	1.53 ± 0.74
Linguistic verbs	0.85 ± 0.53	1.53 ± 0.51
Elaborated noun phrases	0.21 ± 0.42	1.26 ± 0.70

Abbreviations: FNNI, Farsi narrative norm instrument; ASD, autism spectrum disorder; TD, typically-developing.
[a]Values are expressed as mean ± SD.

and TD) one-way analysis of variance (ANOVA) was used for group comparisons. The analysis revealed significant differences in the NC index, SK index, and PT index with large effect sizes. Table 3 shows the results of these comparisons. The effect sizes of 0.10, 0.30, and 0.50 represented small, medium, and large effects, respectively ([17]).

Then, we predicted that there would be a correlation between macrostructure and microstructure elements. Therefore, we used the Pearson correlation coefficient between the total scores of macrostructure and microstructure elements. The correlation coefficient was high in ASD children (P = 0.0, r = 0.89) and TD children (P = 0.0, r = 0.93).

5. Discussion

The present study showed that Farsi-speaking participants with ASD scored lower in the organization of story elements than controls in fictional narratives. This hypothesis was confirmed after controlling for NVIQ and receptive and expressive language.

This research had three significant findings. First, despite equal proficiency on standardized language assessments, the use of microstructure elements such as adverbs or elaborated noun phrases were less than TD children, and the bounded use of subordinating conjunction indicated impairment in causal language. This finding is in line with the results of previous English language-based studies. The

Table 3. Statistical Results of One-way Analysis of Variance in Narrative Complexity, Story Knowledge, and Perspective Taking Indices [a]

	ASD (n = 14)	TD (n = 15)	F	P	ES
Narrative complexity	13.71 ± 3.33	25.93 ± 4.84	61.61	0.00	0.695
Story knowledge	6.57 ± 1.60	11.80 ± 2.07	56.96	0.00	0.687
Perspective taking	3.85 ± 1.40	7.46 ± 1.99	31.27	0.00	0.537

Abbreviation: ES, effect size.

[a] Values are expressed as mean ± SD unless otherwise indicated.

majority of the studies have reported that oral stories produced by ASD children are shorter, less complex (6), less coherent, and contain fewer causal statements (7, 18). In addition, it was observed that mental and linguistic verbs were used less frequently by ASD children. These results are consistent with the results of some studies (6, 19, 20), although conflicting results have also been reported, indicating no differences between ASD children and TD children. Reasons for different results may be task-specific. For example, the Tuesday storybook consists of many circumstances in which the mental state language can be utilized (20). As an alternative, the picture book 'Frog, where are you?' that is used frequently may not comprise so many mental state expressions (21). The extraction approach in the present study stimulated the use of mental state language sufficiently.

The second finding demonstrated that ASD children were weak at organizing and using macrostructure elements to create a story, similar to the past studies (7). Finally, the third finding showed a high correlation between both groups' total macrostructure and microstructure elements scores. In other words, using microstructure elements makes use of macrostructure elements better and vice versa. For example, when someone establishes a causal coherence for conveying events in meaningful chains, (s)he has to use subordinating conjunctions (16).

This study suffered several limitations that should be noted. First, the sample size was relatively small. Second, although the children's oral language level has a vital role in narrative production, their life experiences may impact the results since ASD children do not have sufficient experiences of natural situations because of communication disorders. Due to time constraints, children with other developmental difficulties were not included in this study, so the findings may not be specific to children with ASD.

5.1. Conclusions

The study showed that Farsi-speaking preschool children with ASD who have unimpaired formal language produce poor fictional self-generated narratives in both aspects of macrostructure and microstructure. The ability of narrative discourse has positive effects on social and academic skills. Thus, reinforcement of narrative abilities could facilitate academic, communicative, and social achievements of ASD children. The present study emphasizes the need for narrative interventions that specifically foster the use of connectors, adverbials, and mental and linguistic verbs and teach story coherence across different narrative genres.

Footnotes

References

1. Hilvert E, Davidson D, Gámez PB. Examination of script and non-script based narrative retellings in children with autism spectrum disorders. *Res Autism Spectr Disord*. 2016;**29-30**:79–92. doi: 10.1016/j.rasd.2016.06.002.
2. Spencer TD, Slocum TA. The Effect of a Narrative Intervention on Story Retelling and Personal Story Generation Skills of Preschoolers With Risk Factors and Narrative Language Delays. *J Early Interv*. 2010;**32**(3):178–99. doi: 10.1177/1053815110379124.

3. Eigsti I, de Marchena AB, Schuh JM, Kelley E. Language acquisition in autism spectrum disorders: A developmental review. *Res Autism Spectr Disord*. 2011;**5**(2):681–91. doi: 10.1016/j.rasd.2010.09.001.

4. Mäkinen L, Loukusa S, Leinonen E, Moilanen I, Ebeling H, Kunnari S. Characteristics of narrative language in autism spectrum disorder: Evidence from the Finnish. *Res Autism Spectr Disord*. 2014;**8**(8):987–96. doi: 10.1016/j.rasd.2014.05.001.

5. Baixauli I, Colomer C, Rosello B, Miranda A. Narratives of children with high-functioning autism spectrum disorder: A meta-analysis. *Res Dev Disabil*. 2016;**59**:234–54. doi: 10.1016/j.ridd.2016.09.007. [PubMed: 27643571].

6. Siller M, Swanson MR, Serlin G, George A. Internal State Language in the Storybook Narratives of Children with and without Autism Spectrum Disorder: Investigating Relations to Theory of Mind Abilities. *Res Autism Spectr Disord*. 2014;**8**(5):589–96. doi: 10.1016/j.rasd.2014.02.002. [PubMed: 24748899]. [PubMed Central: PMC3988534].

7. Diehl JJ, Bennetto L, Young EC. Story recall and narrative coherence of high-functioning children with autism spectrum disorders. *J Abnorm Child Psychol*. 2006;**34**(1):87–102. doi: 10.1007/s10802-005-9003-x. [PubMed: 16485176].

8. O'Hearn K, Asato M, Ordaz S, Luna B. Neurodevelopment and executive function in autism. *Dev Psychopathol*. 2008;**20**(4):1103–32. doi: 10.1017/S0954579408000527. [PubMed: 18838033].

9. Happe F, Frith U. The weak coherence account: detail-focused cognitive style in autism spectrum disorders. *J Autism Dev Disord*. 2006;**36**(1):5–25. doi: 10.1007/s10803-005-0039-0. [PubMed: 16450045].

10. Regier DA, Kuhl EA, Kupfer DJ. The DSM-5: Classification and criteria changes. *World Psychiatry*. 2013;**12**(2):92–8. doi: 10.1002/wps.20050. [PubMed: 23737408]. [PubMed Central: PMC3683251].

11. Razavieh A, Shahim S. Retest reliability of the Wechsler Preschool and Primary Scale of Intelligence restandardized in Iran. *Psychol Rep*. 1990;**66**(3 Pt 1):865–6. doi: 10.2466/pr0.1990.66.3.865. [PubMed: 2377704].

12. Hasanzadeh S, Minaei A. [Adaptation and standardization of the test of TOLD-P: 3 for Farsi-speaking children of Tehran]. *J Except Child*. 2002;**1**(1):35–51. Persian.

13. Mohammadzaheri F, Koegel LK, Bakhshi E, Khosrowabadi R, Soleymani Z. The Effect of Teaching Initiations on the Communication of Children with Autism Spectrum Disorder: A Randomized Clinical Trial. *J Autism Dev Disord*. 2022;**52**(6):2598–609. doi: 10.1007/s10803-021-05153-y. [PubMed: 34296374].

14. Soleymani Z, Nematzadeh S, Tehrani LG, Rahgozar M, Schneider P. Language sample analysis: development of a valid language assessment tool and determining the reliability of outcome measures for Farsi-speaking children. *Eur J Dev Psychol*. 2016;**13**(2):275–91. doi: 10.1080/17405629.2016.1152175.

15. Stein NL, Glenn CG. An Analysis of Story Comprehension in Elementary School Children: A Test of a Schema. In: Freedle RO, editor. *New directions in discourse processing, advances in discourse processing*. **2**. Norwood, NJ: Ablex; 1975. p. 53–120.

16. Gillam SL, Gillam RB, Fargo JD, Olszewski A, Segura H. Monitoring Indicators of Scholarly Language: A progress-monitoring instrument for measuring narrative discourse skills. *Commun Disord Q*. 2016;**38**(2):96–106. doi: 10.1177/1525740116651442.

17. Keselman HJ, Huberty CJ, Lix LM, Olejnik S, Cribbie RA, Donahue B, et al. Statistical Practices of Educational Researchers: An Analysis of their ANOVA, MANOVA, and ANCOVA Analyses. *Rev Educ Res*. 2016;**68**(3):350–86. doi: 10.3102/00346543068003350.

18. Loveland KA, Tunali-Kotoski B. The School-Age Child with an Autistic Spectrum Disorder. In: Volkmar FR, Paul R, Klin A, Cohen D, editors. *Handbook of Autism and Pervasive Developmental Disorders*. **1**. 3rd ed. John Wiley & Sons; 2005. p. 247–87.

19. Capps L, Losh M, Thurber C. "The frog ate the bug and made his mouth sad": narrative competence in children with autism. *J Abnorm Child Psychol*. 2000;**28**(2):193–204. doi: 10.1023/a:1005126915631. [PubMed: 10834770].

20. Rumpf AL, Kamp-Becker I, Becker K, Kauschke C. Narrative competence and internal state language of children with Asperger Syndrome and ADHD. *Res Dev Disabil*. 2012;**33**(5):1395–407. doi: 10.1016/j.ridd.2012.03.007. [PubMed: 22522198].

21. King D, Dockrell JE, Stuart M. Event narratives in 11-14 year olds with autistic spectrum disorder. *Int J Lang Commun Disord*. 2013;**48**(5):522–33. doi: 10.1111/1460-6984.12025. [PubMed: 24033651].