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An Examination of the Differences in General Linguistic Ability of Autistic Children (Boys and Girls) with High-functioning

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Abstract

The study was carried out to examine the differences in the general language ability of autistic children (boys and girls) with high-functioning in Mashhad in the academic year 2012-2013. This cross-sectional descriptive-analytical study selected 20 students in two groups of 10 girls and 10 boys, including high-functioning autistic children, using non-random sampling to obtain data from the Test of Language Development (told-P:3). The data was analyzed using an independent t-test and one-sample t-test in SPSS16. The results indicated that high-functioning autistic girls and boys do not vary from each other in language skills abilities (speaking, listening, semantics, general language skills). The study results indicated that the linguistic and reading status of high-functioning autistic children do not significantly differ between boys and girls.

Keywords: *High-functioning autism, general linguistic ability*

Introduction

Language is a tool to express one's thoughts and ideas, express feelings and emotions, and establish understanding between humans. In other words, language is a set of conventional sound signs showing the meanings and concepts of beings and a tool for making understanding possible. Humans express their thoughts, desires, and imaginations by speaking and writing. They understand others, and by listening and reading, they become aware of other people's thoughts and experiences. Thus, the concept of language in education encompasses all the skills and facilities providing understanding. Someone could claim to know a language that can think, speak, read, and write with that language - he can use all the tools that exist for understanding. Languages have various types, such as audible language, visual language, and so on, but spoken or audible language is superior to other languages in terms of variety and means of expression among all languages, usually connected with visual language. Hand and face movements correspond to words; thus, facial expressions are a sort of visual language (Anoushepour, 1993).

Language is one of the most complex processes a person learns during his life. Indeed, language, the most important development of humans compared to animals, could perform its main task, which is establishing communication between humans, when it has a proper and natural development. It affects all aspects of a person's personality and cognition and will make him face problems whenever this relationship becomes problematic for any reason. "Speech" is the verbal part of language. The form of words and the choice of sounds that create meanings vary in various languages. The rules and the arrangement of these words and making sentences are called syntax. A child with a speech delay may not know the meaning and code of language and may not be able to speak, even though his behavior shows that he understands the language. The children are seriously delayed in using grammar, probably delayed in production too, and it is possible that some of their errors are actually grammatical and not related to production (Isenson; translated by Alizadeh, 1993).

As this process is disturbed in some children due to different reasons, they can be easily compensated by recognizing these defects in the early stages of growth. Leo Kanner described autism first in 1943. Autism spectrum disorder (ASD) is a clinical diagnosis defined according to the following criteria: persistent deficits in communication and reciprocal social behavior, restricted benefits, repetitive behaviors and patterned movements, resistance to environmental change or change in daily life, and abnormal reactions to sensory experiences (Michael M. Hardman et al.; translated by Alizadeh et al., 2009).

Autism is a complex mental development disorder that usually appears in the first three years of one's life. It seems that a disorder in the nervous system that causes the brain to not

function properly is effective in causing this disease. The disorder in autistic patients makes the brain unable to function properly in terms of social behaviors and communication skills. Autistic children and adults face difficulties in verbal and non-verbal communication, social behaviors, fun activities, and games (Pourafkari, 1997).

Autism is growing in America with a growth rate of 10 to 17%, according to studies carried out by American study institutions. In other countries, like our country (Iran), this disorder is growing and worrying. Unfortunately, the responsible organizations have not provided an action plan to introduce it to society and the necessary cases (Zaer, 2009).

Autism could be described as a disorder with a wide spectrum. The disorder could have many symptoms, and autism could be classified from mild to severe. Autistic people may have a combination of behaviors, and they should not necessarily show the determined disorder behaviors in one place, although autism could be diagnosed by a series of behaviors. Two children with the same diagnosis could show differences in terms of behavior and vary in terms of skills, too. The parents could hear various words associated with the disease of these children - pseudo-autism, prone to autism, autism spectrum, autism with high and low functioning, and high and low functioning. Big differences exist in language and its acquisition pattern in autistic children. A few of these children do not have a significant delay in acquiring language skills. On the other hand, most autistic children learn language late and experience its development at a significantly slower rate than normal children. Therapeutic and educational approaches are used for people suffering from withdrawal: applied behavior analysis method, teaching method, communication method with image exchange method, social story method, sensory integration method, complementary treatment methods, behavioral treatment methods, and enhancing communication (Valizadeh, 2009).

Autistic children suffer from a type of delay in verbal ability or do not talk at all and cannot get it through other non-verbal communication methods. About 50% of the children with autism never start to talk. There are many different types of children who talk. Some only use single words. Others use many words and speak properly. However, most of them repeat clichés or things that others have said regardless of the situation. A few have a fully developed language that they speak spontaneously. Nonetheless, all of them have problems starting and continuing the conversation, and all of them have defects in understanding the language, especially their understanding of the deeper meanings of the language. It is common that they have a fixed and literal interpretation of language, even among the ones with more vocabularies and speaking spontaneously.

Some studies indicate that at around age one, autistic children react less to their own name or to someone speaking compared to other children (Lord, 1995; Sterling and Dawson, 1994; quoted by Rabii, 2008).

In a longitudinal study of toddlers, Lord, Shelman, and Dilawer (2004) concluded that language "regression" after a normal onset is unique to autism and not seen in other developmental delays. Regression is generally a gradual process in which the child does not learn new words and avoids participating in daily communicative activities that he could do before. Language loss in these children happens when the expressive words are still few and the vocabulary has not grown much. Although the speaking skills of an autistic child are very low before they fall back, it is very difficult and distressing for parents to see that the child has lost some of his communication skills (Rabii, 2008).

Most speech production skills are normal or even better than normal among autistic children who speak. However, Baltaxe et al. (1975) figured out that production development is sometimes below normal. These delays were more transient in the group of high-functioning autistic boys than in non-autistic boys who were linguistically matched and had severe cognitive and expressive delays in mid-childhood. Rutter et al. (1992) reported that one-third of high-functioning autistic and Asperger individuals retain stuttering errors on sounds such as /S/, /L/, and / into adulthood. However, the onset of these errors in the general population is 1% (Rabii, 2008).

In the groups of high-functioning autistic adults and adolescents, a minority of them meaningfully use words with a specific meaning or metaphorical language, as Connor (1946) called it, a strange phenomenal phenomenon. Bookish and overly obsessive speech is observed in Asperger's and high-functioning autism and is one of the best distinguishing features of pervasive developmental disorders from language disabilities. Moreover, immediate and delayed echoing is a prominent feature of speech in autism; nonetheless, it is not unique to this syndrome. Although sometimes echoing in autism could be seen as useless and some sort of self-stimulation, immediate and delayed echoing both pursue communication goals for the speaker. Translinguistic characteristics, like voice quality, tone, and catchphrase patterns, are other characteristics of autistic people that have been written about many times. Strange vocal patterns are the first clinical signs to be understood in autism. One of the most prevalent speech rhythm abnormalities in autistic individuals is monotonicity. These patterns result from an emotional state showing a low mood, inability to express oneself, or suppressed anger (Lord & Luther, 1994). Fay and Selchore (1980) reported that a subset of autistic individuals used fluctuating patterns rather than identical ones. Wachstein and Wachstein (1966) stated abnormally high baseline frequency

levels in autistic speakers. Other voice disorders like nasality and hoarseness were seen among these children. Among autistic children, a significant difference in language comprehension exists in conversations and other conversational contexts, as the aspects of language usage and semantics are closely connected with non-verbal social communication and other aspects of social adaptation (Rabii, 2008).

Language is rarely used to describe events that happened in a conversational context among older, high-functioning autistic children. There are similarities in the functional language abnormalities of autistic children who use spoken language. Problems in listening, talking to oneself, following politeness rules, and making irrelevant comments are seen in many autistic children and adults. The problems in the social use of language, especially in conversations and other contexts of conversation, have profusely been reported by researchers and doctors in high-functioning autism and Asperger's (Baltaks, 1977; quoted by Rabii, 2017).

Reading is a language-based skill, too; many aspects of language development could have a role in reading skills. Most general indices of language development, like expressive and receptive skills, have a role as basic skills in helping children understand complex texts (Berry, 2007). Barry stressed the role of various aspects of preschool children's language skills, like verbal memory, vocabulary, and language complexity, as the predictors of development in reading comprehension in elementary grades in his study (Pirouz et al., 2008).

This study compares the linguistic characteristics of autistic students in the field of receptive language (listening), organization, expressive language (speaking), semantics, syntax, and reading status. which is related to the above items given the significance of language and proper communication for high-functioning autistic children.

Unfortunately, no studies have been carried out on this topic in Iran, but some have been conducted for autistic children and on the linguistic issues that are stated in short.

Nemati et al. (2008) carried out a study to compare the linguistic status of 7- and 8-year-old Persian-speaking dyslexic children with normal children using the TOLD test, with the outcome that dyslexic children are weaker in the ability of semantics, syntax, and phonology compared to normal children of the same age.

Maliki Shah Mahmoud (2011) examined the language functions of children with special language impairment in Persian, stating that all the language functions of Persian-speaking children with this disorder were below the expected performance for their age, similar to children with special language impairment in other languages.

By examining the profile of language development of students with and without attention-deficit/hyperactivity disorder (ADHD), Alizadeh et al. (2009) concluded that in some aspects of language development, children with ADHD have a lower level than normal children.

Mirzakhani et al. (2013) compared explicit and implicit motor learning in children with HFA and Asperger's with normal peers. They concluded that the deficiency of explicit motor learning and its consolidation in the group of autism spectrum disorders with high-functioning could be due to dysfunction of the left hemisphere, which specializes in explicit learning. Further, the consolidation of explicit learning depends on sleep, and there are sleep disorders in the group of autism spectrum disorders; therefore, this defect is expected. The soundness of implicit learning and its consolidation could be associated with the effect of the right hemisphere on implicit motor learning.

By comparing the ability to recognize basic emotional states in high-functioning autistic children with normal counterparts, Jalili et al. (2011) concluded that high-functioning autistic children are equal to normal children in recognizing the emotions of happiness, anger, and neutral facial expressions. However, they are weaker than normal children in recognizing the emotion of sadness on the face.

In their recent study on twenty children with HFA disorder, Faran et al. showed that these children are slow in processing emotions like fear, anger, and sadness. However, they showed no difference in response to emotions such as surprise, disgust, and happiness compared to the control group (Jalili et al., 2011).

Mohammad Khani (2011) examined the effectiveness of the Dosa method in improving social skills and stereotypic behaviors of children with HFA, concluding that the effectiveness of Dosa's psychological rehabilitation in improving social skills and reducing effective behaviors. There were no improvements in the scale of harmful social behaviors in the group. The results of the intervention were consistent during the follow-up period of one month.

Nejati Izadi and Najaf Abadi (2012) carried out a study to compare the executive functions of autistic children with high-functioning and normal peers. They concluded that response inhibition (dominant and motor) and sustained attention are among the healthy cognitive executive functions in people. The health of response inhibition in autism could be because of the defects of these people in understanding the material, brain regions involved, or the type of tasks presented. The health of sustained attention in autistic people shows a tendency to rely on specific stimuli and repetitive behaviors as symptoms of autism.

Pirouz et al. (2008) carried out a study to compare the linguistic characteristics of gifted and normal students. According to the results, one can state that gifted students in the study sample

are superior to normal students in terms of linguistic characteristics.

Taghavi et al. (2009) carried out the effectiveness of group training of emotional, social, and cognitive skills to children with Asperger's and HFA and compared the statistical results during the pre-test stages and after each training block and showed the significant effect of this training program on improving emotional, social and cognitive skills. Group training of skills based on art therapy methods can provide the basis for the favorable development of these children, given the significance of developing individual and social skills in children with Asperger's and autism.

Baghrian Khosrowshahi and Pourt Emetad (2010) examined the effect of the educational package "Little Bird" on reducing the communication problems of children with autism spectrum disorders. The results showed that the educational package "Little Bird" has an effective role in reducing communication problems. Considering that the package stated contains PEX and SPELL techniques - and these techniques have an effect on reducing communication problems, and also materials to increase awareness about autism and group meetings that have a supportive role – it will increase mothers' skills in communicating with their children and thus children's communication problems will reduce.

In a study entitled Sound Therapy in the Treatment of Left-behind Children, Sarlek and Rasoulian (2009) stated different sound therapy approaches to enhance hearing and communication performance.

Jamie Craig and Simon Baron-Cohen, translated by Hosseinpour (2005), examined the story-telling ability of children with Asperger's syndrome. They concluded that both normal children and Asperger's children produced fewer fictional elements in their stories when they were given a real topic and were asked to tell a story, but Asperger's children were more capable than normal children when the children were given a fictional topic.

Sharifi Daramadi (2004) examined the differential diagnosis of Asperger's syndrome and high-functioning withdrawal, focusing on the increase in the number of children with withdrawal syndrome, stating that the reason for this increase is the awareness of experts and the general public and registration of figures.

John O'Conor Brune French and Hester Henderson, translated by Ashour Firouzkohi (2005), emphasized the use of physical activities to improve the behavior of autistic children and concluded that physical activity programs for autistic children reduce inappropriate behaviors and increase their level of physical fitness.

In the book With Autism from Diagnosis to Treatment, according to the theory of the American Association of Child and Adult Psychology (AACAP), Naseh (2008) has stated the similarities and differences between Asperger's syndrome and high-functioning autism. For example, it was stated that there is generally no delay in language development, although the speech patterns of a child with Asperger's may be unusual. There is no evidence of a delay in growth or the development of individual skills and adaptive behaviors in an Asperger's child, unlike an autistic child, and these people show curiosity about their surroundings during childhood.

In a study entitled "Prevention of isolation," Zaer (2009) examined the latest findings regarding the etiology of autism and examined the neurological causes of autistics in the brain with the help of different brain imaging methods and other neuropsychological tests. Quoting Fujinami (2009), Kinney et al. (2009) have said that mercury pollution in the living environment is related to the increased risk of autism.

By investigating the effect of using the Ayora project on improving the social skills of children with autism spectrum, Daghighi Khodashahri et al. (2010) concluded that robotic systems are probably the most exciting and amazing tools used today in technology to treat and educate autistic children. The study carried out on assistive robots in the last few years has affected the field of Treatment of these children by the results of their remarkable research. The tremendous effect of using robots in the Treatment and rehabilitation of children with autism, especially in social communication, is widely introduced into the field of science, and every day, it goes further until perhaps one day it will solve some of the problems of these children and their families. However, most of these robots are systems considered for research purposes and are not suitable for clinics due to the lack of a safety system. However, one should not ignore the importance of knowing this technology in the Treatment of autistic children.

By examining the relationship between the age and biological health of parents with the birth of autistic children, Rasouli et al. (2008) concluded that there was no significant relationship between the age of parents and the increase of autistic children. However, there is a significant difference between the biological health of the mothers of these children and the increase in self-harm.

Methodology

The study was descriptive. The purpose of descriptive studies is to examine the status of variables or the possible investigation of a behavioral pattern. Thus, the subjects who have the desired characteristics or variables are selected, and the number of variables in them is examined (Delavar, 2005). In this study, the researcher tries to examine the linguistic status or language skills of aesthetic students.

Target Population

The population was all primary school students with high-functioning autism disorder studying in the government school for autism in Mashhad under the official services of

exceptional education and training in the academic year 2012-2013. It has to be stated that in these schools, the classes are two types of preparation or clinic and part of school or elementary school, including both boys and girls. The number of students in the school section is 56; in the clinic or preparatory section, there are 32 students, including 25 boys and 7 girls, studying in 8 classes. In the elementary school, there are 24 students, including 21 boys and 3 girls, studying in 6 classes. Education and rehabilitation are in small groups. In other words, the minimum number of students in each class is three, and the maximum is four students. The educational content is different from the others depending on the performance of each student.

Sample and sampling method

Given the operational limitations, the present sample was selected using a convenient sampling method. Then, 26 students with the criteria of HFA disorder were selected after obtaining the necessary permits for the protection of education and legal measures by referring to the Mashhad Autism School and examining the educational and behavioral records of the students. Thus, the initial sample size was 26 people. However, they encountered a drop in the subjects, and finally, due to the non-cooperation of 6 people due to the long absence and non-attendance of two other students, 20 participants took part in the tests when the researcher with the cooperation of other educators (the researcher is one of the autism spectrum educators) started the process of implementing the language development test (told-P:3).

Data collection tool

The Test of Language Development (told-P:3)

One of the reliable, common, and comprehensive tools in measuring children's linguistic development, which Hassanzadeh and Minaii (2002) translated and standardized into Persian, is the average coefficients obtained from the validity of the test for the sub-tests of visual, relational, oral vocabulary, grammatical understanding, sentence imitation and grammatical completion - 0.77, 0.84, 0.87, 0.78, 0.88 and 0.83, respectively. The highness of these coefficients shows that the current test has a small error, and the results obtained can be trusted. Regarding the content validity of this test, one can state that the creators of the original version of the test (Newcomer and Hamill, 1997; translated by Hassanzadeh and Minaii, 2011) emphasize that the format used in the sub-tests varies from other common tests that have been used for decades. They have been successfully used and selected, and this is proof of their validity. This test is based on a two-dimensional model, in one of whose dimensions there are linguistic systems and the components of listening (receptive), organizing (composite-intermediate), and speaking (expressive), and there are linguistic coordinates in the other. The two-dimensional model stated is the theoretical base for preparing 9 sub-tests. Six sub-tests associated with semantics and syntax, which are part of the main sub-tests, and three supplementary sub-tests specific to semantics are provided by three sub-tests: the visual vocabulary sub-test, which includes the listening system, the relational vocabulary sub-test, which includes the organizational system and the sub-test oral vocabulary that includes the system of speaking. These three sub-tests measure vocabulary. The syntax is provided by three sub-tests: the grammatical comprehension sub-test - mainly including the listening system; the sentence imitation sub-test, including the organizing system; and the grammatical completion sub-test - including the speaking system. The grammatical comprehension sub-test measures the ability to understand word order, and the grammatical completion sub-test measures the child's ability to use appropriate single words in the sentence context. The sub-tests that measure the listening system are word discrimination (phonology), picture vocabulary (semantics), and grammatical comprehension (syntax), which assess aspects of decoding operations that test aspects of encoding used to produce meaningful speech. The scoring method is thus: in each sub-test, one score is given for each correct answer, and zero score is considered for each wrong answer. From the total scores obtained and the age group in which the subject is located, the age equivalent, percentage rank, and standard score of the subject should be extracted from the relevant tables in the test manual and written in the score registration section. The standard scores of the six main sub-tests should be added together and converted using the table related to the spoken language gain to calculate the spoken language gain. Accordingly, this benefit, among other benefits, is the best and most comprehensive estimate of a person's overall language ability. This is because all the related features and systems have been mentioned, and five more benefits can be obtained by combining the standard scores of the sub-tests. These benefits are syntactic, semantics, listening, organization, and speaking.

TOLD sub-tests are as follows:

1-Sub-test: Picture Vocabulary. Objective and areas: It measures children's understanding of the meanings associated with words (semantics, listening). The child's performance or response: The child must point to one of the 4 pictures in front of him, and there is no need for him to answer verbally according to the examiner's words.

2-Sub-test: Relational Vocabulary. Objective and areas: It measures the child's ability to understand and verbally express the relationship between two words (semantics, organization). The child's performance or response: The child must understand the meaning of the spoken words, recognize their

semantic class, and express their relationship. No image is used here.

3-Sub-test: Oral Vocabulary. Objective and areas: It measures the child's ability to provide oral definitions of Persian words spoken by the examiner (semantics, speaking). It measures the child's ability to produce the important speech sounds of the Persian language (phonology and speaking). The child's performance or response: The child answers verbally.

4-Sub-test: Syntactic Understanding. Objective and areas: It measures the child's ability to understand the meaning of words (syntax, listening). It measures the child's ability to produce the important speech sounds of the Persian language (phonology and speaking). The child's performance or response: The child must choose one from the three pictures that are the target of the examiner's sentence. There is no need to say it verbally, and the goal is syntax.

5-Sub-test: Sentence Imitation. Objective and areas: It measures the child's ability to produce Persian sentences correctly and use words and grammatical signs in the sentence (syntax and organization). It measures the child's ability to produce the important speech sounds of the Persian language (phonology and speaking). The child's performance or response: In this subtest, the child must imitate and express the sentences said by the examiner.

6-Sub-test: Morphological Completion. Objective and areas: It deals with the child's ability to recognize, understand, and use the common mono-lexical forms of the Persian language. The emphasis is on the awareness of morphological forms (syntax, speaking). Note: It measures auditory and organizational skills, which are also correlated with academic achievement. The child's performance or response: The examiner reads incomplete sentences in this completion method, and the child must express the omitted cognitive morpheme.

7-Sub-test: Word Discrimination. Objective and areas: It measures the child's ability to recognize the differences in speech sounds (phonology, organization). The child's performance or response: The child must judge whether the pairs of words presented by the examiner are the same or different.

8-Sub-test: Word Analysis. Objective and areas: It measures the child's ability to divide words into phonological units (phonology, organization). The child's performance or response: This sub-test measures an aspect of auditory processing, specifically the ability to break down words into smaller phonemic units.

9-Sub-test: Word Articulation. Objective and areas: It measures the child's ability to produce the important speech sounds of the Persian language (phonology and speaking). The child's performance or response: Stimulating pictures and sentences are used to spontaneously produce different words that have the original speech sounds.

Autism Spectrum Screening Questionnaire (ASSQ)

It has 27 questions filled out by the teacher or parents. Each question has three options: "yes," "somewhat," and "no," respectively, showing the scores of 2, 1 and 0 for that question. If parents have completed the form, a total score of 19 or higher; if the teacher has completed it, a score of 22 or higher indicates autism spectrum disorders with high functioning. The validity and reliability of the test were determined by Kasechi in 2011. He announced that the Persian version of the ASSQ has adequate face validity and acceptable reliability. The test-retest reliability coefficient of the ASSQ for autistic children was estimated at r = 0.467 in the parents' group and r = 0.614 in the teachers' group, indicating the acceptable reliability and validity of this instrument in autistic people. Cronbach's alpha coefficient obtained in the group of parents and teachers of normal and autism spectrum children shows that the ASSQ items are suitable for screening HFA children. In the present study, most questionnaires were completed by a consultant and assessment expert who diagnosed autism with high functioning (Nejati and Izadi Najafabadi, 2012).

Table 1. Distribution of subjects based on gender

Gender	Frequency	Percentage
Boys	10	50%
Girls	10	50%
Total	20	100%

The age range of the subjects in the boys' group was from 6 years and 4 months to 10 years and 4 months (S=1.36; M=8.24). In the boys' group, the age range of the students varied from 5 years and 8 months to 11 years and 4 months (S=1.77; M=8.75). The age range of all subjects was from 5 years and 8 months to 11 years and 4 months (S=1.55; M=8.5).

Table 2. Mean and standard deviation of the variables examined among the girls and boys

Variables	Groups	Mean	SD
Speaking	Boys	11	7.23
	Girls	8.3	6.6
	Total	9.6	6.88
Listening	Boys	18.3	8.17
	Girls	13.2	8.27
	Total	15.75	8.42
Semantics	Boys	24.1	11.72
	Girls	17.4	11.85
	Total	20.75	11.98
Overall linguistic ability	Boys	126.9	64.92
	Girls	96.6	69.4

	Total	111.75	67.22

Prior to administering the independent t-test, its assumptions are first examined. Given the interval data and as the kurtosis and skewness of the data were between ±1.5, these indices showed that the data are normal. The variance of all groups was homogeneous as well.

Is there a significant difference between the speaking skills of autistic girls and boys?

Table 3. Independent t-test to compare the mean speaking skills between boys and girls

Groups	Frequency	Mean	SD	Homogeneity of variance	Leven's test		T-test		
					F	*p*	*t*	df	*p*
Girls	10	11	7.23	The variances are homogenous	0.009	0.926	0.872	18	0.394
Boys	10	8.3	6.6						

As Table 4 shows, the variances are homogeneous; thus, the assumption of the test has been met. Given the information obtained from the data analysis, one can state that the difference in the mean speaking skills of autistic boys and girls is insignificant, and the existing difference is haphazard or due to sampling error (p = 0.394, t = 0.872).

Is there a significant difference between the listening skills of esthetic girls and boys?

Table 4. Independent t-test to compare the mean listening skills between boys and girls

Groups	Frequency	Mean	SD	Homogeneity of variance	Leven's test		T-test		
					F	*p*	*t*	df	*p*
Girls	10	18.3	8.17	The variances are homogenous	0.241	0.629	1.387	18	0.183
Boys	10	13.2	8.27						

As Table 5 shows, the variances are homogenous; thus, the assumption of the test has been met. Based on the information obtained from the data analysis, one can state that the difference between the average listening skills in autistic boys and girls is insignificant, and the existing difference is due to chance or sampling error (p = 0.183, t = 1.387).

Is there a significant difference between the semantic skills of aesthetic girls and boys?

Table 5. Independent t-test to compare the mean semantic skills between boys and girls

Groups	Frequency	Mean	SD	Homogeneity of variance	Leven's test		T-test		
					F	*p*	*t*	df	*p*
Girls	10	24.1	11.72	The variances are homogenous	0.638	0.552	1.27	18	0.22
Boys	10	17.4	11.85						

As Table 6 shows, the variances are homogeneous; thus, the assumption of the test has been met. Based on the information obtained from the data analysis, one can state that the difference in the mean of semantics in autistic boys and girls is insignificant, and the existing difference is due to chance or sampling error (p = 0.22, 1.27 =t).

Is there a significant difference between the general language skills of esthetic girls and boys?

Table 6. Independent t-test to compare the mean general language skills between girls and boys

Groups	Frequency	Mean	SD	Homogeneity of variance	Leven's test		T-test		
					F	*p*	*t*	df	*p*
Girls	10	126.9	64.92	The variances are homogenous	0.614	0.444	1.01	18	0.327
Boys	10	96.6	69.4						

As Table 6-4 shows, the variances are homogeneous; thus, the assumption of the test has been met. Based on the information obtained from the data analysis, one can state that the difference in the mean of general language skills in autistic boys and girls is insignificant, and the existing difference is due to chance or sampling error (p = 0.327, t = 1.01).

Discussion and conclusion

The Test of Language Development (told-P:3), one of the reliable, common, and comprehensive tools in the field of measuring child language development, translated and standardized by Hassanzadeh and Minaii into Persian language, was used to obtain linguistic information.

The study results were reached using independent t-test and single-sample t-test, and the study hypotheses were tested. The data obtained from the study were analyzed in SPSS16. The results of the first to fourth questions, associated with the comparison of language abilities (speaking, listening, semantics, and general language ability) of autistic children with high-functioning in terms of gender (girls and boys), showed no significant differences. This means that autistic girls and boys act like each other in language skills, and according to the study results, the resulting differences, which are insignificant, could be due to chance or sampling error and other cases - in speaking skill (t = 0.872, p = 0.394) and in listening skill (t = 0.183, t = 1.387) and in semantic skill (p = 0.22, t=1.27). These results only show the weakness of these children in language skills, consistent with the ideas of various people about the language abilities of these children, including Simon Baron Cohen, Val Kamin, Julia Leach, and Gil Stephenson (2014), quoted by Kazemi (2009). Moreover, the lack of difference in language abilities in the gender variable is consistent with the results of Alizadeh et al. (2010), who conducted a similar study on children with and without ADHD. In Iranian society, children with autism have fewer opportunities for growth and development compared to normal children, and society imposes more restrictions on them according to the existing ideas; such results are expected. On the other hand, speech therapy interventions for children with autism can be justified due to the low performance of these children relative to the education of normal children with speech disorders in schools or referring to therapy clinics.

It has to be stated that the above study has faced limitations, such as the small sample size, the lack of access to a wide range of children with autism, and the lack of random sampling to select the subjects because of the small number of autistic children with high-functioning. This is because the study sample is for Mashhad, and it is also better to do it in other cities.

Moreover, the fact that the samples are trained and treated could be another factor that can affect the results of the above study, as the samples were selected from schools to educate autistic children.

Moreover, the lack of comparison of groups according to verbal intelligence is considered one of the other limitations of this study, which is suggested to be considered in future studies. Among the other problems in such studies is the heterogeneity in the autism disorder itself and its related definitions - there could be autism disorders with various definitions, contexts, and foundations that result in various interpretations and definitions and different clinical manifestations.

It is recommended to examine the linguistic status of other groups of exceptional children, like mental retardation and learning disorders using this language development test. Further, more studies need to be carried out to introduce and Told-P:3 for academic progress and language improvement of autistic students in other Iranian cities.

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