



## Comprehension of Metonymy in Iranian Children with Autism Spectrum Disorder (ASD)

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### Abstract

Comprehension and application of figurative expressions such as metonymy happens naturally in normal children due to the natural development of cognitive processes imprinted at the interface of thoughts and language. However, it is claimed that children with Autism Spectrum Disorder (FASD) lack the inability to comprehend figurative expressions due to lack of first-order theory of mind (ToM) reasoning. Present study investigated the comprehension of metonymy in Iranian children with autism disorder regarding the role of first-order theory of mind. For this purpose, five Iranian children at the age of 4 to 5 years old with first-order theory of mind Autism Spectrum Disorder (FASD) and five 4-5-year-old Iranian children without first-order theory of mind Autism Spectrum Disorder (ASD) were selected as the participants of the study. Results of the study indicated children with autism disorder with first-order theory of mind had better comprehension of metonymy than those autistic children lacking first-order theory of mind.

**Keywords:** Autism Spectrum Disorder (ASD), first- order theory of mind, metonymy, comprehension

### INTRODUCTION

Comprehending figurative language necessitates processing the cognitive structure of it based on conceptualization (Lakoff et al, 1993). In other words, understanding figurative expressions, e.g. metonymy, requires comprehension of cognitive structure of the expression. Metonymy is defined as “a basic cognitive and conceptual mechanism” by the scholars of Cognitive Linguistics (Zhang, 2016, p. 2). Metonymy as a type of figurative language is considered to be the essential aspect of conceptual thinking (Lakoff and Johnson, 1980). Metonymy is in fact the figurative use of one concept to represent something broader. There are two types of metonymy known as referential metonymy and propositional metonymy. Referential metonymy associates one entity with another one (for example Shakespeare for the books for the books written by William Shakespeare). Propositional metonymy associates two propositions (for example: I’m having a glass for “I’m drinking”) (Falkum, 2017). Dagmara Annaz et al (2008) suggested that metonymy has more basic cognitive relations compared to other figurative

expressions such as metaphor and so it is probable that metonymy is understood before other figurative expressions by children. Falkum, (2017) in a study on the acquisition of metonymy points to the fact that young children, along with early development of pragmatic abilities, also “make use of context in interpretation of class extensions, polysemy, under some conditions, metaphors and scalar terms (p. 2) and then asks it is generalizable to metonymy.

However, comprehension of figurative expression has not been investigated only in normal children. There are also some other studies on acquisition and comprehension of figurative expressions such as metaphor and metonymy in children with mental disorders including comprehension of metaphorical expression in children with Williams’s Syndrome (Shoja-Razavi, 2017) or comprehension of figurative language in Taiwanese children with autism (Su-Fen Huang et al, 2015). Some of these studies supported the correlation between ASD and difficulty in understanding figurative language based on theory of mind (Dennis, Lazenby, and Lockyer, 2001; Martin and Donald, 2004).

Comprehension and using metonymy in normal children takes place in the natural process of linguistic and cognitive development but as Mackay and Shaw (2004) concluded, children with Autism Spectrum Disorder (ASD) had less ability to explain the meaning of metonyms compared to children with normal verbal ability. Furthermore, Zheng et al (2015) found that Children with ASD were not able to provide proper interpretation of metonyms. Su-Fen Huang et al (2015) in a study on comprehension of figurative expressions in Taiwanese children with high-functioning autism spectrum disorders (HFASDs) compared to children with low-functioning autism spectrum disorders (LFASDs) found that these children had difficulty in comprehension of figurative expressions including metaphor. They also added that having first-order theory of mind skills do not lead to the ability to understand figurative expressions including metaphor. However, it is the semantic ability which predicts their performance on metaphor tasks. Annaz et al (2008) also examined the comprehension of metaphor and metonymy in children with Williams’s syndrome and found that children with Williams’s syndrome had lower metaphorical comprehension ability. However, they found that they had higher level of understanding metonyms as metonyms were recognized like synonyms for the children with Williams’s syndrome.

There have been many studies on comprehension of figurative expressions in normal children and children with disorders including Williams’s syndrome and Autism Spectrum Disorder (ASD). However, there is a lack of study on comprehension of metonymy as different from metaphor or other figurative expressions in children with Autism Spectrum Disorder (ASD), Furthermore, most of the studies have been on English-speaking children and those speaking other languages such as Japanese and Taiwanese. Studies on Persian-speaking children have mostly focused on comprehension of metaphorical expressions in normal children or those with William’s Syndrome. Following the study of Su-Fen Huang et al. (2015) on comprehension of figurative expressions in Taiwanese children with autism, this study focuses on comprehension of metonymy in children with Autism Spectrum Disorder (ASD).

Research questions are as following: (1) Do Iranian children with first-order theory of mind Autism Spectrum Disorder (ASD) differ from those without first-order theory of mind Autism Spectrum Disorder (ASD) in comprehension of metonyms? (2) Does theory of mind understanding relate to comprehension of metonyms in Iranian children with first-order theory of mind Autism Spectrum Disorder (ASD)?

## **METHODOLOGY**

### **Participants**

Five children with first-order theory of mind Autism Spectrum Disorder (ASD) and five children without first-order theory of mind Autism Spectrum Disorder (ASD) ranging from 4 to 5 years old participated in this study. They were divided into two groups. First group included 5 children diagnosed with first-order theory of mind Autism Spectrum Disorder (ASD) based on the child's primary psychiatrist using Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria. Second group included 5 children without first-order theory of mind Autism Spectrum Disorder (ASD) again diagnosed using the same instrument. Both groups of children were from the monolingual families with Persian-speaking parents raised in Tehran and attending schools for Autistic children. Both groups were homogenized in terms of receptive language development using short form of Persian Peabody Picture Vocabulary Test-Revised (PPVT-R) adopted from Pouretemad (2011), age, and gender. Participants of both groups had no difficulty in hearing or other sensory and physical disabilities.

They had no marked hearing or other major sensory or physical disabilities. All of them lived with their parents at home and attended the pre-school classes. Following the study of Su-Fen Huang et al., (2015), all the participants were assessed in terms of intelligence using the WISC-III (Wechsler Intelligence Scale, third edition) to see if they had normal intelligence. The scores of participants on full-scale intelligence quotient (FIQ) ranged from 80 to 122 (mean 95.12; SD 9.89), on verbal intelligence quotient (VIQ) ranged from 76 to 113 (mean 95.09, SD 8.7) and on the performance intelligence quotient (PIQ) ranged from 74 to 123 (mean  $\frac{1}{4}$  94.79, SD 9.7). None of the participants received any special educational services.

### **Procedure**

Two tasks of Persian version of Peabody Picture Vocabulary Test-Revised (PPVT-R) and the experimental task developed by Annaz et al (2008) were used to collect the required data.

The Persian version of Peabody Picture Vocabulary Test-Revised (PPVT-R) was used to ensure the homogeneity of the participants in terms of receptive language development.

The experimental task of Annaz et al (2008) includes ten lexicalized metaphors and ten lexicalized metonyms incorporated into 20 short, simple picture-stories. Each story is accompanied by three to four simple, hand-drawn colored pictures to limit memory demands and help to the comprehension of the story. The stories included everyday situations ending either with a metaphor or a metonym. The picture-stories related to metonyms were used for the purpose of the present study. After reading each story, the

participants were asked an open-ended question about what the metonym referred to. Each participant was tested in a separate and quiet room where the researcher read the stories and at the same time showing them the pictures. The stories were read based on a random order.

## RESULTS

Total scores of participants on Persian Peabody Picture Vocabulary Test-Revised (PPVT-R) ranged from 87 to 127 (mean=108.76, SD= 10.97) in children with first-order theory of mind Autism Spectrum Disorder (ASD) and from 90 to 134 (mean=110.93, SD=9.83). Mann-Whitney U-tests showed no significant difference in PPVT-R total score between two groups ( $U=1124$ ,  $p=0.95$ ).

The scoring of experimental task of simple picture-stories was done following the study of Annaz et al (2008). As the task was qualitative in nature, to quantitatively analyze the children's performance on the task, their responses were classified as "either literal or figurative interpretations of the target word" (Annaz et al, 2008, p.6). The participants got score one in case of clearly demonstrating comprehension of metonyms. Otherwise, they scored zero. To ensure that the wrong response was not due to lack of comprehension, those who scored zero were again asked to describe the meaning of the related word. The maximum score was 10 correct answers for the metonym construction. For first group of children with first-order theory of mind Autism Spectrum Disorder (ASD), the accuracy on metonyms was higher than those without first-order theory of mind Autism Spectrum Disorder (ASD) ( $R^2=0.68$  and  $R^2=52$ , respectively). Results of the tests showed that metonym comprehension in children with first-order theory of mind Autism Spectrum Disorder (ASD) was in line with their receptive language ability and slightly superior to the children without first-order theory of mind Autism Spectrum Disorder (ASD).

**Table 1.** Correlation between verbal ability of children with first-order theory of mind Autism Spectrum Disorder (FASD) and comprehension of metonyms

	FASD (n=5)	
	Simple-pic	PPPVT-R
Metonym	0.213	0.221

**Table 2.** Correlation between verbal ability of children without first-order theory of mind Autism Spectrum Disorder (NFASD) and comprehension of metonyms

	NFASD (n=5)	
	Simple-pic	PPPVT-R
Metonym	0.187	0.192

## CONCLUSION

The present study aimed at investigating the comprehension of metonymy in Iranian children with autism disorder with first-order theory of mind ability and how their performance compares with that of autistic children without first-order theory of mind

ability. This is one of the first studies to investigate the metonymy comprehension empirically in Persian-speaking children with autism disorder with first-order theory of mind ability. This study was conducted following the studies of Annaz et al (2008) and Su-Fen Huang et al (2015). There have been little empirical studies in Iran on comprehension of metonymy in children with Autism Spectrum Disorder (ASD) who have the first-order theory of mind ability. Following the analysis of data, the answer to the first research question that if Iranian children with first-order theory of mind Autism Spectrum Disorder (ASD) differ from those without first-order theory of mind Autism Spectrum Disorder (ASD) in comprehension of metonyms was yes. Iranian children with first-order theory of mind Autism Spectrum Disorder (ASD) performed lower than those without first-order theory of mind Autism Spectrum Disorder (ASD) in comprehension of metonyms. Regarding the comprehension of figurative languages Adachi et al (2006) found that children with first-order theory of mind Autism Spectrum Disorder (ASD) performed as well as the normal children. Yata and Oi (2009) found that children with first-order theory of mind Autism Spectrum Disorder (ASD) and the normal children had similar performance on sarcasm or indirect reproach. Annaz et al (2008) found that overall performance on metonymy improved with receptive vocabulary ability in children with William's Syndrome.

The answer to the second question asking if theory of mind understanding relate to comprehension of metonyms in Iranian children with first-order theory of mind Autism Spectrum Disorder (ASD) was partially yes. Regarding the relationship between first-order theory of mind and metonym comprehension, participants with Autism Spectrum Disorder (ASD) who have first-order theory of mind ability showed higher performance in terms of comprehension of metonyms when compared with autistic children without first-order theory of mind ability. The results of the study are in line with the study if Happe (1993) and Norbury (2005) who found no significant impact of first-order theory of mind on figurative language comprehension. Results of the present study showed that first-order theory of mind is an influential factor associated with metonymy comprehension. This may indicate that the children with Autism Spectrum Disorder (ASD) who have first-order theory of mind ability rely on theory of mind when they comprehend metonyms while the autistic children without first-order theory of mind do not. In other words, the present study in terms of the relationship between children with Autism Spectrum Disorder (ASD) with first-order theory of mind ability and metonymy comprehension supports the notion that "pragmatic impairment is an emergent property under which basic cognitive and social factors interact as compensatory adaptations to brain pathology" (Su-Fen Huang et al, 2015, p.10).

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