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Toy Preferences of Children with ASD: A Preliminary Study from Southern Kerala

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Abstract

Aim: To explore the choice of toy preferences of young children with autism spectrum disorders in a free play session

Method: Twelve children with ASD were assessed on their choice of toy selection on a ten-minute-long free play session**.** The toys with which the participant demonstrated play behavior were only considered for analyzing the toy selection. The play behaviors were coded following the play coding scheme of Libby, Powell, Messer and Jordan (1998). ELAN software was employed for analyzing the video recordings.

Result: Friedman test was employed to find out any significant difference present in the choice of toy selection by children with ASD. The results indicated a strong preference for infant toys, followed by the Animal, Vehicle toy category and the toy Bat. Furthermore, the infant toys were mostly used to engage in sensorimotor play rather than functional play. However, Vehicle toy category elicited more functional play behavior in children compared to Animal toy category.

Conclusion: In a free play session, young children with ASD exhibited a preference to Infant toys, vehicles and animal toys, of which vehicle toys had the potential to elicit functional play from them. Rehabilitation professionals should give special attention to the usefulness of play skills and the type of toys that need to be selected for early assessment and interventions of these children**.**

Keywords: Children with ASD, Toy Play, Sensorimotor play, Autism, ELAN

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Introduction

Play is the primary occupation of preschool children having the potential to unveil the windows of their developmental skills (Kennedy-Behr, Rodger, Mickan, 2013).Children build their basic fundamental skills needed for the development of language, social communication, social cognition through the early pleasurable routine namely play. Knowing the importance of play in the early periods of life, the field of school psychology appreciated the possibility of play in the assessment and intervention of children with disability for decades. Following this direction, Piaget (1962) and Vygotsky (1978) initiated studies on the changes of play behavior in children during the course of their development. According to Piaget (1952), play provides a natural opportunity for children to explore, manipulate and imitate the environment around them. This fastens the development of cognitive and sensory motor skills in them.

Most of the studies on play focused on the toddler period as in this period, children become increasingly competent in their interaction with objects and adults. The more mature motor skills allow them to freely move around and explore objects in the environment. Object manipulation becomes an inevitable part of this phase (Pellegrini & Smith, 1998). Later their manipulation becomes more organized, beginning to attend and imitate the actions of the common objects, and use it more meaningfully in the daily context leading to the emergence of symbolic play. In a symbolic play, children pretend to use objects on their own, with others and in combination with other toys. Hence play objects such as toys have an integral role in the play experience of 90% of preschool children (Tizzard et al, 1976)

Previous research suggested scant studies on the effects of a toy on play skills. Yet, the studies discussing the importance of toys on play skill highlighted the physical attribute, toy preference and parent choice of toys. The physical nature of the toys influences the development in the various domains such as cognition, social, fine and gross motor function. Toys of contrasting colors and textures, with multiple parts, offer the chances for multiple responses and play manners to children. The selection of toys is often determined by the interest of the child towards the toy, the developmental level of the child, the availability of the toy and the impact of cultural beliefs. Studying the availability of toys to preschool children, Pierce, 1999 interviewed the mother and reported that children used to have the toys purchased by mothers prioritizing play items of

educational values and also from friends and relatives as gifts on any special occasion such as a birthday party.

. Research documenting the gender difference on toy selection found that the selection of toys is influenced by the play materials i.e. type of toys (Emolu, 2014), parental interaction and encouragement on gender-specific toys (Bornstein & Lamb, 2011) and the socioeconomic status of the family (Shahidi, 2012). A difference of opinion exists on how early children had this gender-typed preference on toys. Hong, Hwang, and Chi Peng, 2012 opined the presence of this gender preference in early years of life in contradiction to Kane (2006) finding of girls having gender-neutral preferences of toys than boys. In general, boys prefer to play with the model objects of vehicles, tools and construction material in contrast to the girl`s preference to play with the household items (Ruble, Martin, & Berenbaum, 2006). Shojae, Ying cui and Shahidi, 2016 studied the gender-typed preference on 256 children between 4 to 10 years of age on 5 set of toys (*car, doll, teddy bear, bicycle, throwing rings & yoyo)* and found that children displayed a gender-typed preference for Doll considering as girlish toy and car as boyish toy.

The developmental status of the child decides the use of toys and the related manners of play. In the early period of life, around 3 to 4 months of age, typically developing infants shift their attention from caregivers to objects around them (Tre-varthen, 1979, 1988). They attempt to grasp, manipulate, and inspect objects indiscriminately resulting in sensorimotor exploration evidenced by waving, banging and mouthing. At around 6 months of age, the increased levels of exploration help them to understand nature and relationship of different objects and develop related action schemas (Uzgiris & Hunt, 1975). Towards the end of the first birthday, children started to use everyday objects in a conventional manner (Ungerer & Sigman, 1981). Functional play emerges in children by around 13-15 months of age. As they grow older, functional plays become more elaborated & other-directed one (Fenson & Ramsay, 1980) paved the way for the emergence of symbolic play.

Unlike typically developing children, play studies of children with ASD displayed significant impairment on object use. Their exploratory play is characterized by unusual features such as odd patterns of visual inspection, twisting of objects near the eyes (Dahlgren & Gillberg,

1989); visual scrutiny of single object or parts of object for a longer period (Freeman etal.,1979); more sniffing and mouthing of objects (Freeman, Ritvo, & Schroth, 1984) & atypical interest in the odor & texture of objects (APA, 1994). Children with ASD showed a preponderance of sensorimotor play in comparison to language matched typically developing children (Libby, Powell, Messer, and Jordan (1998). Studies also reported stereotypic fashion of object use in children with ASD such as lining up of objects, piling up objects one over the others & ordering & reordering the objects repeatedly (Adrien et al.,1987). This disrupts them from exploring the conventional use of objects. Williams et al, 2001 closely examined the functional play in children with ASD and suggested their play as simple, less varied & elaborate.

In this context, play is a potential natural platform to elicit the optimal performance of children with and without disabilities. Considering the importance of toys in play experience and limited indigenous studies on the same, the present study attempts to contribute to the literature on the toy preferences of children with ASD.

Purpose and Objectives of the Study

The purpose of the study was to explore the choice of toy preferences of young children with autism spectrum disorders in a free play session. The present study investigated the following specific research question.

a) Do children with autism spectrum disorders (ASD) exhibit any specific preference for toys while engaging in a free play session?

Method

Participants

Twelve children with ASD recruited from an early intervention center in Kerala, served as the participants. The participants who met the diagnosis of ASD on Diagnostic and Statistical Manual-5 (DSM-5) and Childhood Autism Rating Scale (CARS) were considered for the study. The participants were distributed into 3 age groups, 2-3; 3-4; & 4-5 yrs. respectively comprising 4 members in each group. The participants were distributed to socioeconomic status of SES- III and

SES-IV (Venkatesan,2012) with the education of father and mother not below graduation. Informed written consent was obtained from the parents to participate in the study.

Materials

The play materials used in the study, comprised of a set of traditional toys selected based on the guidelines given by Venkatesan (2010) in Toy kit for Kids with developmental disabilities (User manual) and also glean support from the study of Libby, Powell, Messer, and Jordan, (1998). The examiner had given consideration to include toys that were familiar and had the potential to evince different types of play behavior. The play object categories employed in the study are listed down in Table 1 with example.

Table 1 Play object category and the items

	Category of the Play object	Items
1	Infant toy	Xylophone, drum, rattles, flute
2	Construction toy	Blocks, Puzzles
3	House toys	Kitchen set
4	Plastic animals	Pet animals & wild animals
5	Vehicles	Car, bus, JCB, Bike
6	Dolls	A doll
7	Functional	Bat, Ball, Phone, Torch
8	Action figure	Chottabheem-windup toy
9	Pre-literacy	Books, Crayons
10	Bubbles	Bubble

A Sony Camcorder fixed in a tripod stand was used to record the free play of children as it was portable as well as convenient for videotaping in clinical rooms.

Procedure

To ensure the best results from participants, attempts were made to make the procedure of free play recording very natural and flexible. The recording was carried out in an intervention room with limited furniture and free space for arranging the toys. The selected set of toys were spread out in a semi-circular fashion as this arrangement provided easy access and visual scanning of all the toys from the middle of the toy array. A free recording of a single participant was carried out at a time. The participant was seated at the middle of the toy array with a parent, either father or mother, sitting in line or one line behind the child's seat. Parents were instructed strictly not to provide any instruction, demonstrate any play behavior and or label any toys for their child. Instead, they were directed to respond naturally whenever their children show distress and also to encourage their children to play. Free play was video recorded for a duration of ten minutes. The recording was continuous until the child wandered out of the view of the camera for longer than 60 seconds. In such a scenario, the examiner resumed recording only after the child starts playing with the toys again.

Scoring

An overall ten minutes of free play of each child were analyzed for coding the types of toys engaged for the play. ELAN software was employed for analyzing the video recordings. The selection of toys by the participant and its frequency were analyzed and coded for the number of times the child held that particular toy. The toys with which the participant demonstrating play behavior were only considered for analyzing the toy selection. The object play with the toy was coded for different types of play behavior following the play coding scheme developed by Libby, Powell, Messer, and Jordan (1998). The current study particularly focused on the choice of toy selection made by the participant.

Inter-rater Reliability Measures

Inter-rater agreement for classification of play behavior was calculated using intraclass correlation (Bishop et al., 1975) on all of the 12 videos. The scores for the

categorization of play behavior ranged from 0.947 to 0.997. These obtained scores represent excellent agreement.

Analysis

Non-parametric measures were employed in the study as the variation in the sample failed to follow a normal distribution. The Friedman test was performed to find out if there exists a significant difference in the different types of toy`s use among the whole 12 participants**.** Descriptive statistics were used to find out the most frequently engaged toy categories in each age group.

Results

Toy Category

Table 2 provides an overview of the frequency data in percentage for different types of toys across three age groups, 2-3 years, 3-4 years and 4-5 years respectively.

Table 2

Frequency percentage of different toy category selected.

Participant	Inf	Con	Veh	Ani	Hou	Dol	Bal	Phn	Tor	Bat	PreL	Bub	Act
S1 (2-3yrs)	26	6	29	3	3	16	10	0	0	3	3	0	0
S2	25	6	31	3	3	16	9	0	0	3	3	0	0
S3	6	6	0	28	22	6	6	6	0	11	6	0	6
S4	41	6	0	0	0	12	0	0	0	0	29	0	12

S5 (3-4yrs)	0	17	23	9	9	0	0	20	6	0	0	17	0
S6	31	0	3	0	0	3	0	19	0	32	0	5	6
S7	12	20	32	20	8	0	0	4	4	0	0	0	0
S8	15	3	53	26	0	0	3	0	0	0	0	0	0
S9 (4-5yrs)	0	0	8	68	3	0	5	0	5	11	0	0	0
S10	0	60	0	0	0	0	20	0	0	20	0	0	0
S11	50	6	0	31	0	6	0	0	0	0	0	6	0
S12	19	8	14	8	3	8	3	3	0	22	8	0	5

Note. Inf=Infant toy; Con=Construction toy; Veh= Vehicle toy; Ani=Animal toy; Hou=House toy; Dol=Doll toy;Bal=Ball toy; Phn=Phone toy; Tor Tor=Torch toy; Bat=Bat toy; Pre-L=Pre-Literacy toy, Bub=Bubble toy and Act=Action Toy.

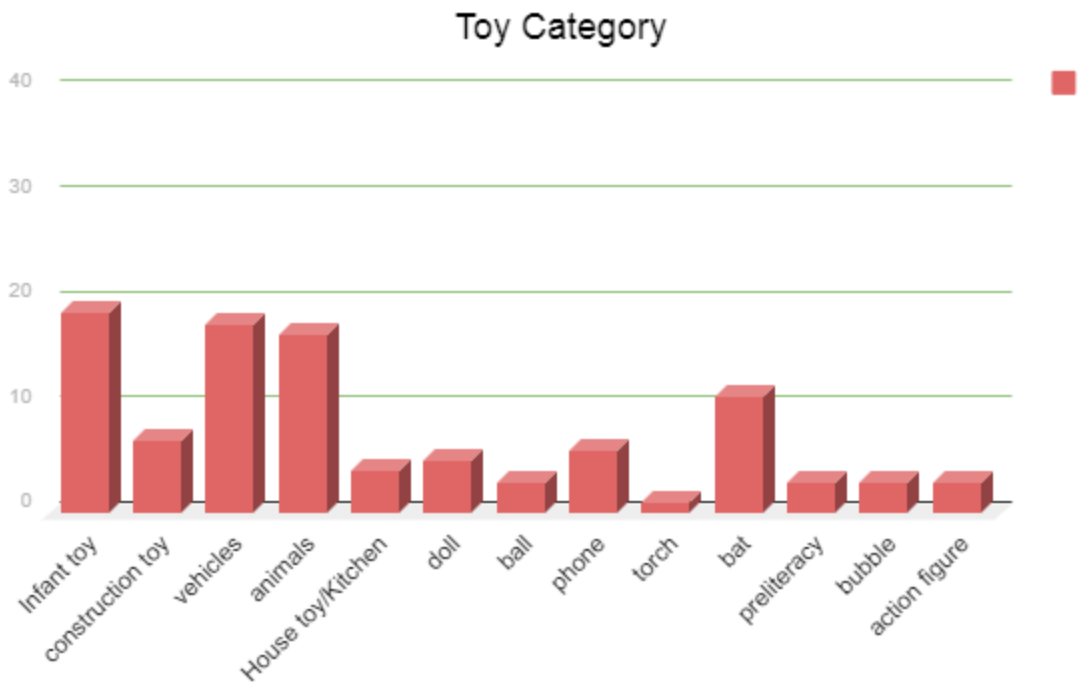

Figure 1. Total frequency percentage of toy category used in free play. This figure illustrates the total percentage of different types of toys selected by children with ASD.

The results of the Friedman test indicated a significant difference in the toy category used by children with autism spectrum disorders with a $\chi 2$ (11) = 26.25, p=0.010 (p<0.01). Subsequent to that a post hoc analysis with Wilcoxon signed -rank test was conducted to find out the toy categories preferred mostly by children with ASD. The obtained results are as follows.

Toy Preference of Young Children with ASD

Infant toy

A post hoc analysis of Wilcoxon sign rank test indicated that children showed a significant difference in the preference of Infant toys compared to other toy categories such as House toy (|z|=0.037, p<0.05),Doll(|z|=0.012, p<0.05),Ball(|z|=0.046, p<0.05),Torch(|z|=0.09, p<0.05),Pre Literacy (|z|=-0.012, p<0.05) and Action figure(|z|=0.012, p<0.05) and Bubbles (|z|=0.017, p<0.05). This result indicated the strong preference of children with ASD to engage in infant toys

that can explicitly stimulate their atypical sensory responses. Descriptive statistics also revealed that 75 percent of children showed interest and preferred to engage with Infant toys.

However, Wilcoxon sign rank test failed to find a statistically significant difference between infant toys, vehicles, animals and the bat among children with ASD suggesting these toys caught their attention and were manipulated for almost the same count.

Animals & Vehicles

Children with ASD revealed a statistically significant difference in the preference of both the animal and vehicle category toys with the House toy($z=0.028$, $p<0.05$);($z=0.038$, $p<0.05$), Action figure($|z|=0.040$, $p<0.05$); ($|z|=0.047$, $p<0.05$),Torch($|z|=0.007$, $p<0.05$); ($|z|=0.012$, $p<0.05$) and Bubbles ($|z|=0.041$, $p<0.05$; ($|z|=0.024$, $p<0.05$). Except for three children with ASD, all others enjoyed playing with animal and vehicle category toys.

Construction Toys

Construction toys including blocks and puzzles were more preferred statistically than the ball ($|z|=0.005$, $p<0.05$) and bubbles ($|z|=0.014$, $p<0.05$) by children with ASD.

House Toy

Only five children with ASD were interested in playing with house toys, specifically the kitchen utensil and cup. This preference was significantly more than the use of the toy, Torch ($|z|=0.025$, $p<0.05$).

Play Behavior with the Preferred Toy

The play behavior displayed for highly preferred four toys (Infant toy, Animal, Vehicles and Bat) by children with ASD were coded using the play coding scheme developed by Libby, Powell, Messer and Jordan, 1998. It was observed that 71 percent of the time, infant toys were used for sensorimotor exploration. Only 21 percent of the time, it was used functionally by children with ASD. In comparison to the infant toy, the vehicle toy was engaged more in a conventional functional manner, i.e. around 41 percent of the time. At the same time, animal category toys were

played functionally for 19 percent of time. Children with ASD were more interested in visual examination, banging, mouthing the toy bat for 77 percent of the time than using it to hit for 22 percent of the time. A total of less than 30 percent of the time, children with ASD exhibited relational play with the Infant toy (9 %), Vehicle (10%), and animal (13%).

Discussion

The aim of the study was to explore what type of toys young children with ASD prefer during a free play session of no longer than ten minutes. Overall, the examiner found a significant difference in the toy preference of children with ASD. They prefer mostly the infant toys consisting of flute, drum, xylophone, rattles etc. keeping up with the findings of the study by Dominguez, Ziviani and Rodger, (2006) and Doody and Mertz (2013). The greatest preference of infant toys may be attributed to the potential of such objects to provide a structure through an external stimulus (Malone & Langone, 1994) or such toys could elicit a rapid response of sensory stimulation (Ziviani, Boyle and Rodger, 2001). This was also evidenced in the current study as 71 percent of the time, the infant toy was engaged for sensorimotor exploration by nine children with ASD. On the other hand, children with ASD played less frequently with house toys, dolls, balls, books, etc.

A total of eight children with ASD preferred to play with vehicle toys, choosing it with a frequency of 18 percent of their total play time. This is the only toy category that elicited maximum functional play from children with ASD. Surprisingly, a similar finding of functional play behavior is not replicated in a related study by Dominguez et al, 2010 and it could be due to the difference in the toys chosen for the Vehicle category. The present study included toys such as the model of bus, car, bike, airplane, and wheeled fish instead of a tractor, horse, trailer and ambulance. The latter set of vehicle toys such as a tractor, trailer, and an ambulance may not be a prototypical representation of the toy category- vehicle in our Indian culture due to the ethnographical difference.

Studies investigating the gender influence on toy selection in infants using eye tracking method employed toy category vehicle-car & doll for the research (Alexander, Wilcox and Woods, 2009). They reported a gender-specific toy preference of typically developing infants as young as

8 months wherein boys had longer visual attention to toy trucks than girls. The results of the present study also replicated the gender preference of toy vehicles though was not chosen as an objective. Except two, all the remaining boys showed a preference for Toy category- vehicles. This gender specific selection of toys could also be attributed to the parental encouragement to use gender typical toy play (Pasterski et al., 2005)

Though seven children with ASD engaged with the animal toy category for 17 percent of total time, they used it conventionally only for a frequency count of six times. All boys except one engaged with the animal toys in comparison to single girl participants. In general, all three boys between 3 to 4 years of age maximally engaged with the toy category vehicle and animals in comparison to preference of infant toys in younger age groups (2-3yrs). This could be attributed to either the familiarity or the developmental advantage as supported by the cognitive theorist, Piaget. Overall, children with ASD showed less preference for construction toys and house toys, this could be hypothesized to their longer engagement in the sensorimotor exploration of preferred toy categories such as Infant toy, vehicles, animals etc.

Surprisingly, in comparison to the toy Ball, children with ASD showed a preference for the toy Bat. The toy category bat and ball are semantically associated and expected to play with either together or to show a greater preference to ball than the bat by typically developing children. The reverse results obtained in the study may be due to the availability of more opportunities for atypical sensorimotor exploration for the toy bat such as visual scanning by tilting the bat and examining it. Another reason could be the toy category ball, typically could arouse more enthusiasm and interest in social play than in isolation. Though not functionally used, all girl participants engaged the toy doll contributing a total play time of two percent with it.

Conclusion

From the results of the present study, it would be observed that young children with ASD exhibited a preference to Infant toys, Vehicles and animal toys, of which vehicle toys had the potential to elicit functional play from them. Considering the developmental advantage, young children between 3-4 years of age exhibited functional play with Vehicle toys compared to the

preponderance of sensorimotor exploration with infant toys usage in younger counterparts of 2-3 years of age. With the findings of the present study, educators as well as practitioners should give special attention to the usefulness of play skill and the type of toys that need to be selected for early assessment and interventions of these children. As evidenced in the study, a list of toys consisting of infant toy, vehicle, animal, doll, house toy and Construction toy should be included in free play assessment to record the possible play profile of children with ASD. The potential of the toy category vehicles and animal toys to elicit functional play along with the timely introduction of infant toys as a reinforcer helps to successfully engage in play based early intervention. Future directions are recommended to conduct the study on a large sample to obtain a functional relationship between the toy preferred and the play behavior displayed as well as to investigate the truthfulness of gender specific toy play in our culture.

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References

Adrien, J. I., Faure, M., Perrot, A., Hameury, I., Garreau, B., Barthelemy, C., et al. (1991). Autism & family home movies: Preliminary findings. *Journal of Autism & developmental disorders, 21*(1), 43-49.

Alexander, G.M., Wilcox, T., & Woods, R. (2009) Sex differences in infants: visual interest in toys. *Archives of Sexual Behaviour*, *38*(3): 427–433.

Bornstein, M. H. & Lamb, M. E. (2011). Neural, physical, motor, perceptual, cognitive and language development: An introduction and overview. In M.H. Bornstein & M. E. Lamb (Eds). Cognitive development: An advanced textbook. (pp.1-18). Psychology Press. Taylor & Francis G. New York.

Dahlgren, S. O. & Gillberg, C. (1989). Symptoms in the first two years of life: A preliminary population studies of Infantile autism. *European archives of psychiatry and neurological sciences,* 238,169-174.

Dominguez, A., Ziviani, J., & Rodger, S. (2010). Play behaviors and play object preferences of young children with autistic disorder in a clinical play environment. *Autism, 10* (1), 53-69.

Doody, K. R., & Mertz, J. (2013). Preferred play activities of children with autism spectrum disorders in naturalistic settings. *North American journal of medicine and science,6* (3), 128-133.

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Emolu, E. (2014). Play, toys and gender socialization. *Journal Plus Education, 6*(2), pp. 22-30.

Freeman, B. J., Ritvo, E. R., & Scroth, P. (1984). Behavior assessment of the syndrome of autism: Behaviour observation system. *Journal of American Academy of Child Psychology*, 23, 588-594.

Freeman, B. J., Guthrie, D., Ritvo, E., Scroth, P., Glass, R. & Frankl, F. (1979). Behaviour Observation scale: Preliminary analysis of similarities & differences between autistic & mentally retarded children. *Psychological reports,* 44, 519-524.

Hong, J. C., Hwang, M. Y., & Chi Peng, Y. (2012). Gender difference of social behavior in the cooperative- competitive game. *Procedia - Social and Behavioural Sciences 64*, 244 –254.

Kane, E. W. (2006). No way my boys are going to be like that!: Parents 'responses to children's gender nonconformity. *Gender & Society,* 20, 149–176.
Libby, S., Powell, S., Messer, D., & Jordan, R. (1998). Spontaneous pretend play in children with autism: A reappraisal. Journal of Autism and Developmental Disorders, 28, 487–497.

Pasterski, V. L., Geffner, M. E., Brain, C., Hindmarsh, P., Brook, C., & Hines, M. (2005).

Pellegrini, A.D., & Smith, P. K. (1988). The development of play during childhood: Forms and possible functions. *Child Psychology & Psychiatric review,3* (2),51-57.

Piaget, J. (1952). *The origins of intelligence in children.* New York: International University Press.

Piaget, J. (1962). Play, dreams, and imitation in childhood. New York: W.W. Norton.
Psychology 5, 139–48.

Prenatal hormones and postnatal socialization by parents as determinants of male-typical toy play in girls with congenital adrenal hyperplasia. Child Development, 76, 264–278.

Ruble, D. N., Martin, C. L., & Berenbaum, S. A. (2006). Gender development. In W. Damon & R. M. Lerner (Series Eds.), and N. Eisenberg (Vol. Ed.), Handbook of child psychology. Vol. 3: Social, emotional, and personality development (6th ed., pp. 858– 932). New York: Wiley.

Shahidi, M. (2012). Culture within play and play within culture. *International Journal of Current Research. 4*(10); 282-286

Trevarthen, C. (1979). Communication & Cooperation in Early Infancy: A description of preliminary intersubjectivity. In M. Bullowa (ed.) *Before Speech. The beginning of interpersonal Communication.* New York: Cambridge University Press.

Trevarthen, C. (1988). Universal Cooperatives Motives: The language & Culture of their parents, in G. Jahoda & I.M.Lewis (eds). *Acquiring Culture: Cross- Cultural studies in child development.* London: Croom Helm.

Ungerer, J.A.& Sigman, M. (1981) 'Symbolic Play and Language Comprehension in Autistic Children. *Journal of the American Academy of Child Psychiatry* 20: 318–37.

Uzgiris, I.C. & Hunt, J.M. (1975). Assessment in Infancy. Urbana. University of Illinois Press.

Venkatesan, S. (2012). The NIMH-Socio-Economic Status Scale: Improvised Version. Mysore: All India Institute for Speech and Hearing.

Vygotsky, L. S. (1978) Mind in Society: The Development of Higher Psychological Processes (trans. from 1932). Cambridge, MA: Harvard University Press.

Williams, E., Reddy, V.& Costall,A . (2001). Taking a Closer Look at Functional Play in Children with Autism. *Journal of Autism and Developmental Disorders 31* (1): 67–77.

Ziviani, J., Boyle, M. & Rodger, S. (2001). An Introduction to Play and the Preschool Child with Autistic Spectrum Disorder. *British Journal of Occupational Therapy 64* (1), 17–22.
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