
LANGUAGE IN INDIA

Strength for Today and Bright Hope for Tomorrow

Volume 14:1 January 2014
ISSN 1930-2940

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Emergence of Expressive Grammatical Morphology Following Discrete Trial Training & Incidental Teaching: A Case Study

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Introduction

Language impairment is a major characteristic feature seen in children with Autism Spectrum Disorder (ASD) and those diagnosed with Specific Language Impairment (SLI). More specifically, deficits in expressive grammatical morphology have been increasingly reported in the past literature (Condouris, Meyer, & Tager-Flusberg, 2003; Rapin & Dunn, 2003; Kjelgaard & Tager-Flusberg, 2001; Eigsti, Benetto & Dadlani, 2007; Bedore, 2001; Rice & Wexler, 1996; vander Lely & Ullman, 2001; Eadie, Fey, Douglas & Parsons, 2002). A few studies have also been reported in the Indian context in the field of ASD (Shyamala, 2004; Shafna & Shyamala, 2011; Treasa & Shyamala, 2013c) and SLI (Prasitha & Prema,

2007; Treasa & Shyamala, 2013b). However, there is a dearth of Indian studies on language intervention in child language disorders.

Discrete Trial Training (DTT)

In this era of evidence based practice, one of the most commonly employed intervention method includes the Discrete Trial Training (DTT). It is a structured method traditionally used to teach various linguistic, cognitive, motor, social and behavioural skills.

In DTT, clear and concrete instructions are provided; in addition, the tasks are broken down into short and distinct repeated trials that accommodate the needs of individuals with short attention spans. Lovaas (1981) defined a trial as a “single teaching unit.” A particular trial typically consists of four parts: (a) the discriminative stimulus (S^D) (the instruction, prompt, model), (b) the response (R), (c) the consequence or the reinforcing stimulus (S^R), and (d) the inter-trial interval (ITI) (presentation wait time). In addition, an optional prompt (S^P) may be used to help the child respond correctly. The parts of the discrete trial are often represented symbolically in an order like the following:

$$S^D \longrightarrow R \longrightarrow S^R \longrightarrow ITI (S^P)$$

Nevertheless, use of this strategy alone excluding all other interventions is cautioned.

Incidental Teaching

In order to promote generalization, DTT could be used in combination with incidental teaching. Incidental teaching follows the child’s lead regarding interests within typical daily routines or play activities (McGee, Daly, & Jacobs, 1994). It was first recognized by Hart and Risely (1978, 1980) and uses reinforcement to promote skill learning and generalization. Thus, a combination of the structured DTT approach and the naturalistic incidental teaching method facilitate language acquisition in a holistic manner. However, the effectiveness of such eclectic approaches on the emergence of expressive morphology in children with language impairment is not well documented especially in the Indian context. Since, there is paucity of research in this direction, the present study was undertaken.

Aim of the Study

This study sought to examine the effectiveness of Discrete Trial Training (DTT) and Incidental Teaching on the emergence of expressive grammatical morphology in Malayalam speaking children with Autism and Specific Language Impairment (SLI).

Method

Participants

The participants were 2 boys with a diagnosis of mild Autism- Prem & Ashu- who were 5 and 6 years old, respectively and another boy named Ani, diagnosed with SLI. All the three boys were native speakers of Malayalam, the language spoken at Kerala, South India. They had gained a verbal repertoire consisting mostly of two-word utterances and some fragmentary answers to questions. The boys spoke essentially in “telegraphic” Malayalam, leaving out most of the bound morphemes such as case-markers, plurals and conjunctions. Both the parents of Prem and Ani were post-graduates and well employed. On the other hand, Ashu’s father studied only upto class 10th and was a field worker while his mother was not educated.

Procedure

The present study used a pre-test post-test single case design to study the grammatical morphology in two children with ASD and one child with SLI. Expressive use of six high-frequency nominal inflections- /ka/ -Plural, /e/ -Accusative, /il/ -Locative, /uɕe/ -Genitive, /kkə/ & /nə/ -Dative Case Markers and /um/ -Conjunction, was assessed using Sentence Imitation Test in Malayalam (SIT-M, Treasa & Shyamala, 2013a). SIT-M was standardized on 120 preschool children with typical language development (TLD) and has a maximum score of 60, out of which each sub-test, denoting the six target suffixes, has a maximum score of 10. The pre-test results and the morpheme acquisition order in TLD group were sought as reference to select target behaviours for DTT.

Firstly, three bound morphemes locative /il/, dative case /kkə/, and plural/ ka/ were selected as targets for intervention, since they were acquired early in TLD group as compared to conjunction /um/, accusative /e/ and genitive /uɕe/ (Treasa & Shyamala, 2013a). Secondly, stimulus was created for teaching the target morphemes sequentially. A set of 10 simple sentences for each of the target morpheme was selected and suitable pictures were either drawn or collected to elicit those sentences during therapy. In DTT, the therapist gave clear

instructions to the child to repeat the sentence heard after presentation of the picture stimulus. A maximum of 5 trials per sentence was permitted in each therapeutic session. For correct response, the child was praised or verbally reinforced; and for incorrect or no response, the child was provided with visual and echoic prompts.

The intervention was carried out at the Institute of Cognitive & Communicative Neurosciences (ICCONS), Kavalappara P.O., Shoranur, Kerala by three Speech Language Therapists under the supervision of the current investigator. Subsequent to the therapeutic intervention, parents' were trained to facilitate the use of newly acquired bound morphemes to real life context. Incidental teaching was employed with the parents' cooperation to promote learnt skill generalization into daily-routines. Following the learning of the productive use of /il/, /kkə/, and /ka/, the next set of three bound morphemes /um/, /e/ and /uɽe/ of Malayalam were taught using the same method. The participants Prem (ASD₁), Ashu (ASD₂) and Ani (SLI) attended a total of 14, 26 and 12 therapy sessions (45 minutes duration), respectively, over a period of 2 months. Subsequently, they underwent a post-test for the six targets using the same SIT-M (Treasa & Shyamala, 2013a) tool.

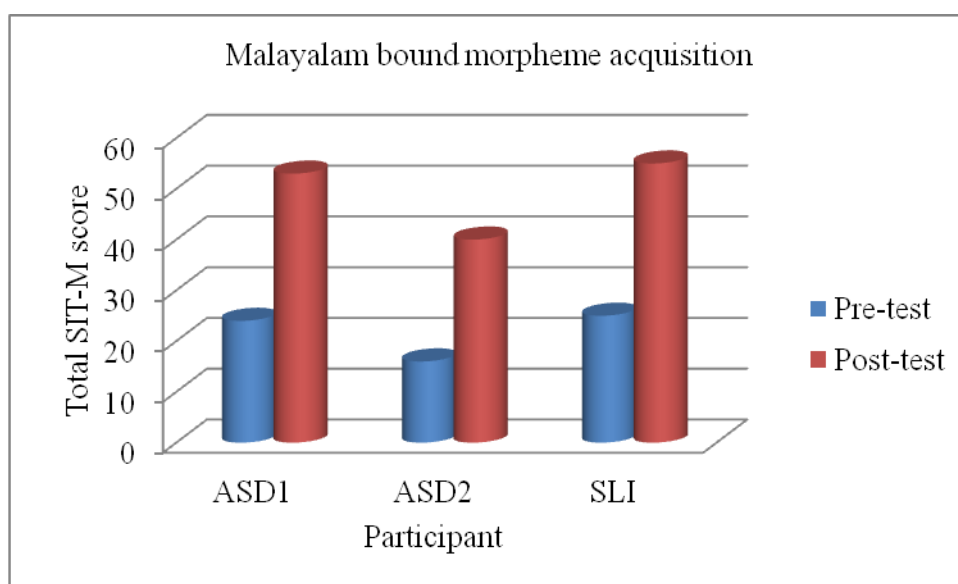
The pre-test and post-test responses were video-recorded and the scores obtained by the three participants were subjected to further statistical analysis using Smith's Statistical Package (SSP, version 2.80). Test for equality of proportions was conducted for individual participants to evaluate the difference in performance on SIT-M sub-tests in pre-test and post-test conditions.

Results

The overall findings of the present study suggest statistically significant ($p < 0.001$) difference in the total scores (see Figure 1 & Tables 1, 2 & 3) between the pre-test and post-test conditions for all the three participants indicative of the effectiveness of DTT along with incidental teaching in teaching expressive grammatical bound morphemes. This also indicates the usefulness of SIT-M (Treasa & Shyamala, 2013a) in assessing the productive usage of nominal inflections of Malayalam, which in turn helps in setting goals for morphological intervention and progress evaluation.

Figure 1

Comparison of pre-test and post-test scores across participants



The results also reveals individual variations across the different morpheme acquisition depending on various factors such as participant's age, severity of the problem, number of therapy sessions attended, parents' education/motivation and home training. This is evident from the results (Figure 1), since Ashu (ASD₂) had the least difference between the pre-test and post-test scores although he received a maximum of 26 therapy sessions. On the contrary, parent participation and language stimulation was good for Prem (ASD₁) and Ani (SLI) resulting in faster learning of the target morphemes.

Furthermore, Figure 2 depicts the pre-test and post-test scores of participant ASD₁ on DTT and incidental teaching. Prior to intervention, the participant used to express in two word utterances omitting most of the inflections. Moreover, in an agglutinative language like Malayalam, nominal inflections play a major role in conveying semantic intentions. So the participant had significant difficulty in communicating basic semantic intentions in daily routine due to the morpho-syntactic impairment. These results support the notion that children with ASD exhibit specific grammatical morphology deficits (Tresa & Shyamala, 2013c; Condouris, Meyer, & Tager-Flusberg, 2003; Rapin & Dunn, 2003; Kjelgaard & Tager-Flusberg, 2001). Nevertheless, the participant showed a significant ($p < 0.05$) improvement in verbal expression of plurals, accusative, locative, genitive case markers and conjunctions after receiving 14 sessions of therapeutic intervention (Table 1).

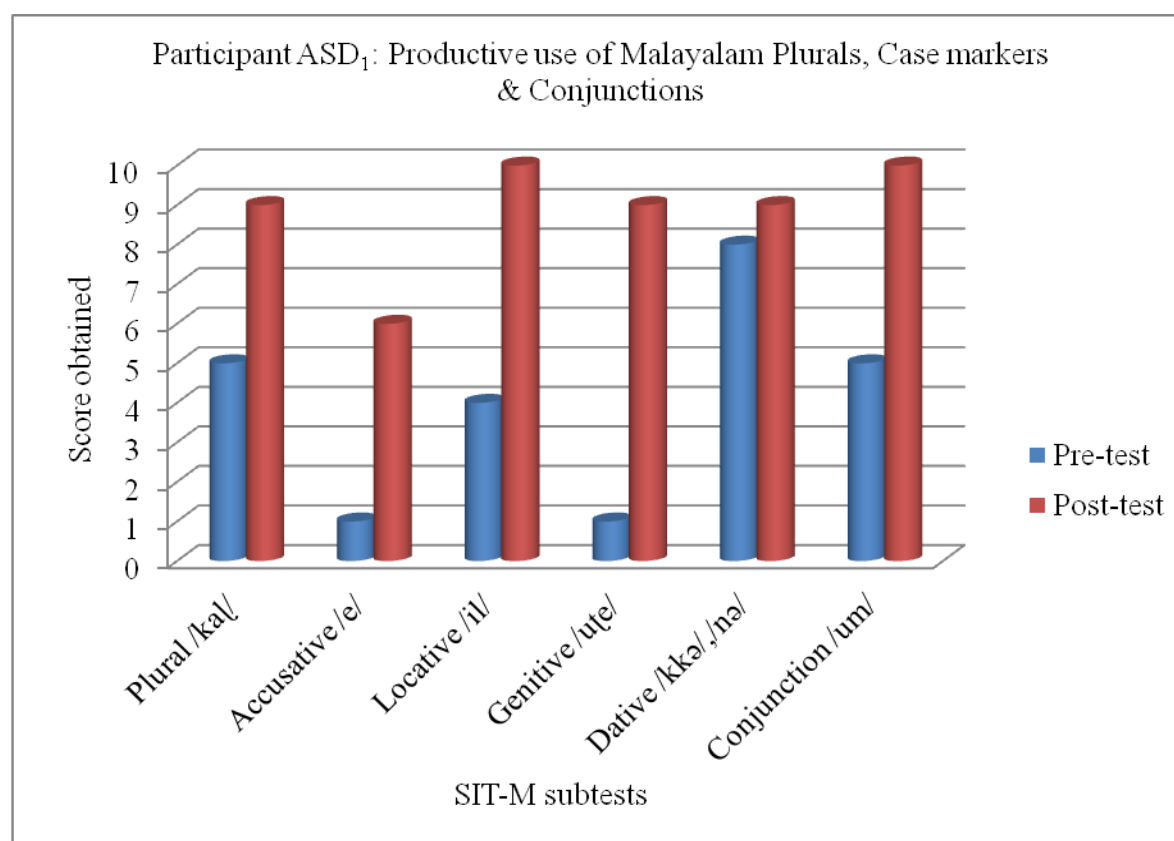
Table 1

Results of Test for Equality of Proportions: Participant ASD₁

| ASD ₁ 14 sessions | Plural /ka/ | Accusative /e/ | Locative /il/ | Genitive /ute/ | Dative /kka/,/na/ | Conjunction /um/ | Total score |
|---------------------------------|----------------|-------------------|------------------|-------------------|----------------------|---------------------|----------------|
| Pre-test Score | 5 | 1 | 4 | 1 | 8 | 5 | 24 |
| Post-test Score | 9 | 6 | 10 | 9 | 9 | 10 | 53 |
| Z value | 1.952 | 2.344 | 2.928 | 3.578 | 0.626 | 2.582 | 5.521 |
| p value | ≤0.05 | <0.05 | <0.005 | <0.001 | >0.05 | <0.05 | <0.001 |

Figure 2

Comparison of pre-test and post-test SIT-M subtests scores: Participant ASD₁



Similarly, subsequent to the morphological intervention, participant ASD₂ performed well on all the SIT-M subtests indicative of emerging grammatical inflections (see Figure 3). But, the difference between the pre-test and post-test scores was found to be statistically

significant ($p < 0.05$) for locative, genitive case markers and conjunction alone, as illustrated in Table 2.

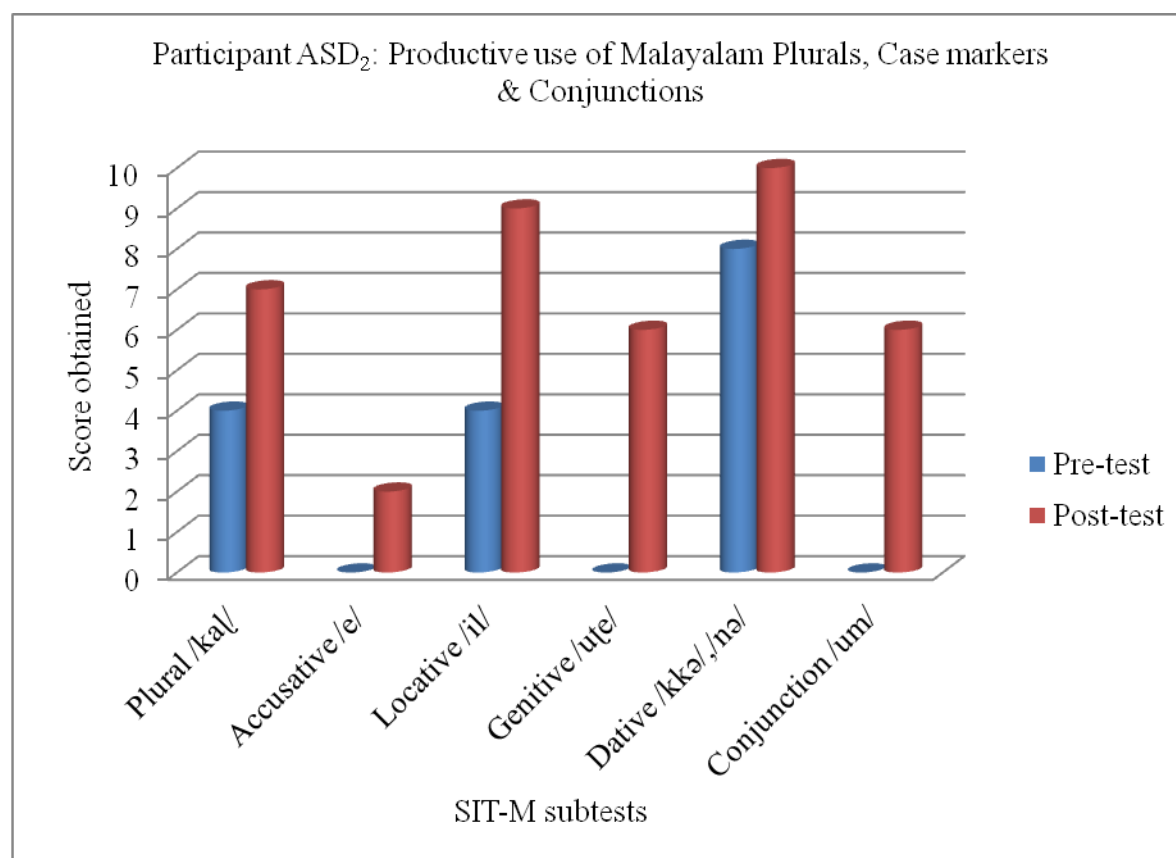
Table 2

Results of Test for Equality of Proportions: Participant ASD₂

| ASD ₂ 26 sessions | Plural /ka/ | Accusative /e/ | Locative /il/ | Genitive /ute/ | Dative /kka/,/na/ | Conjunction /um/ | Total score |
|---------------------------------|----------------|-------------------|------------------|-------------------|----------------------|---------------------|----------------|
| Pre-test Score | 4 | 0 | 4 | 0 | 8 | 0 | 16 |
| Post-test Score | 7 | 2 | 9 | 6 | 10 | 6 | 40 |
| Z value | 1.348 | 1.491 | 2.344 | 2.928 | 1.491 | 2.928 | 4.392 |
| p value | >0.05 | >0.05 | <0.05 | <0.005 | >0.05 | <0.005 | <0.001 |

Figure 3

Comparison of pre-test and post-test SIT-M subtests scores: Participant ASD₂



Unlike the participants with ASD, the participant Ani with SLI, obtained the maximum score (10) for four sub-tests of SIT-M on post-test evaluation (Figure 4). This could be because children with SLI do not have co-existing social or behavioral or cognitive deficits, and hence, their course of morphosyntactic development is accelerated on providing early intervention and intensive language stimulation. The results of test for equality of proportions (Table 3) show significant difference between the pre-test and post-test scores for four nominal inflections, i.e., plural, genitive, dative and conjunction. The participant had the highest scores on locative before and following intervention. This supports the result of Treasa & Shyamala (2013b) that both children with SLI and the typical children acquire locatives earlier to other morphemes. In addition, the participant obtained the least score on accusative case marker, which was also found to be one of the late acquired morpheme in typically developing children (Treasa & Shyamala, 2013a).

Figure 4

Comparison of pre-test and post-test SIT-M subtests scores: Participant SLI

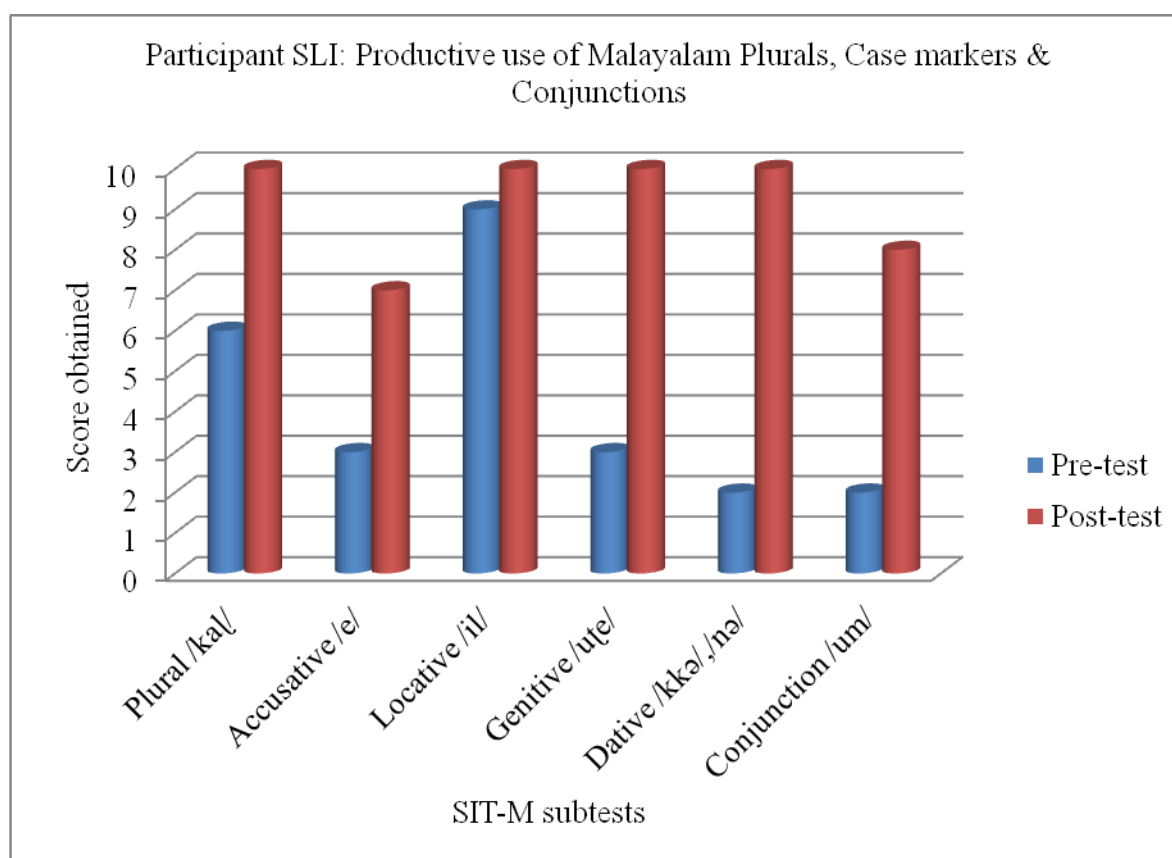


Table 3*Results of Test for Equality of Proportions: Participant SLI*

| SLI 12 sessions | Plural /ka/ | Accusative /e/ | Locative /il/ | Genitive /uɽe/ | Dative /kkə/,/nə/ | Conjunction /um/ | Total score |
|--------------------|----------------|-------------------|------------------|-------------------|----------------------|---------------------|----------------|
| Pre-test Score | 6 | 3 | 9 | 3 | 2 | 2 | 25 |
| Post-test Score | 10 | 7 | 10 | 10 | 10 | 8 | 55 |
| Z value | 2.236 | 1.789 | 1.026 | 3.282 | 3.652 | 2.683 | 5.809 |
| p value | <0.05 | >0.05 | >0.05 | ≤0.001 | <0.001 | <0.05 | <0.001 |

Conclusion

To conclude, DTT and incidental teaching was found to be effective for morphological intervention in children with ASD and SLI. The test for equality of proportions revealed significant difference ($p < 0.001$) between the pre-test and post-test scores for all the participants. Out of the three participants, the child with SLI showed maximum learning, followed by participant ASD1 with the combined effect of specific goal-based DTT and incidental teaching. Also, SIT-M (Treasa & Shyamala, 2013a) was found to be useful for intervention-based assessment and progress evaluation.

In addition, results indicate that following acquisition of the target morphemes, the responses generalized to sets of untrained and novel stimuli for all participants. This suggests that the newly acquired morphological features or inflections are stored in the lexicon. Parents also reported more spontaneous use of similar utterances in natural settings with increased usage of multi-word utterances. Some errors like over regularization were observed, which may occur as in the typically developing children, until the morphemes are mastered fully. The results of the present study cannot be generalized due to the small sample size. Future research on grammatical morphology of other Indian languages and cross-population experimental studies is suggested.

Acknowledgements

We express our sincere gratitude to the Director, All India Institute of Speech & Hearing (AIISH), Mysore for permitting us to carry out this study. We are very grateful to Dr. P. A. Suresh, Director, Institute of Cognitive & Communicative Neurosciences (ICCONS), Shoranur, Kerala for granting us consent to collect data from ICCONS. This paper is based in part on Maria Grace Treasa's doctoral thesis under the guidance of Professor Shyamala K. Chengappa, University of Mysore. We offer special thanks to the children and families for their patience and cooperation.

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References

- Bedore, L.M.** (2001). Assessing morphosyntax in Spanish-speaking children. *Seminars in Speech and Language*, 22 (1), 65-77.
- Condouris, K., Meyer, E., & Tager-Flusberg, H.** (2003). The relationship between standardized measures of language and measure of spontaneous speech in children with autism. *American Journal of Speech-Language Pathology*, 12, 349-358.
- Eadie, P.A., Fey, M.E., Douglas, J.M., & Parsons, C.L.** (2002). Profiles of grammatical morphology and sentence imitation in children with specific language impairment and Down syndrome. *Journal of Speech, Language, and Hearing Research*, 45(4), 720-32.
- Eigsti, I.M., Bennetto, L., & Dadlani, M.B.** (2007). Beyond pragmatics: morphosyntactic development in autism. *Journal of Autism and Developmental Disorders*, 37(6), 1007-23.
- Kjelgaard, M., & Tager-Flusberg, H.** (2001). An investigation of language impairment in autism: Implications for genetic subgroups. *Language and Cognitive Processes*, 16, 287-308.
- Hart, B. M., & Risley, T. R.** (1978). Promoting productive language through incidental teaching. *Education and Urban Society*, 10, 407-429.
- Hart, B. M., & Risley, T. R.** (1980). In vivo language intervention: Unanticipated general effects. *Journal of Applied Behavior Analysis*, 13, 407-432.

- Lovaas, O. I.** (1981). *Teaching developmentally disabled children: The me book*. Baltimore: University Park Press.
- McGee, G. G., Daly, T., & Jacobs, H. A.** (1994). The Walden Preschool. In S. L. Harris & J. S. Handleman (Eds.), *Preschool education programs for children with autism* (pp. 126-162). Austin, TX: Pro-Ed.
- Prasitha, P., & Prema, K.S.** (2007). *Temporal processing deficit in specific language impairment - is it universal?* Proceedings of the International Symposium Frontiers of Research on Speech and Music, p.212-216.
- Rapin, I., & Dunn, M.** (2003). Update on the language disorders of individuals on the autistic spectrum. *Brain and Development*, 25(3), 166-172.
- Rice, M.L., & Wexler, K.** (1996). Toward tense as a clinical marker of specific language impairment in English-speaking children. *Journal of Speech and Hearing Research*, 39, 1239-1257.
- Shyamala, K. C.** (2004). Language impairment in Autism. Online journal www.languageinindia.com, Vol. 4, 12.
- Shafna, J., & Shyamala, K.C.** (2011). Agrammatism in Malayalam speaking Children with Autism Spectrum Disorders, Student Research AIISH, Vol.VIII, Part – B - Speech – Language Pathology, 227-235.
- Treasa, M.G., & Shyamala, K.C.,** (2013a). *Sentence Imitation Test in Malayalam (SIT-M)*. Unpublished part of the ongoing Doctoral thesis titled “Emergence of expressive grammatical morphology in Malayalam-speaking children with and without language impairment”, AIISH, University of Mysore, Mysore.
- Treasa, M.G., & Shyamala, K.C.,** (in-press 2013b). *Expressive bound morphemes in Malayalam-speaking children with Specific Language Impairment*. Manuscript submitted for publication. *Journal of All India Institute of Speech and Hearing*.
- Treasa, M.G., & Shyamala, K.C.,** (in-press 2013c). *Expressive bound morphemes in Malayalam-speaking children with Autism Spectrum Disorders*. Manuscript submitted for publication. *International Journal of Dravidian Linguistics*.

Van der Lely, H.K.J., & Ullman, M.T. (2001). Past tense morphology in specifically language impaired and normally developing children. *Language and Cognitive Processes*, 16 (2/3), 177-217.

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