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Expressive Bound Morphemes in Malayalam Speaking Children with Down Syndrome

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Abstract

This study is an attempt to examine expressive bound morphemes of Malayalam in 10 children, aged 6-18 years, with Down Syndrome (DS) as compared to 10 typically developing (TD) mental age matched controls. All the participants were having an expressive language level of two-word utterances and were native speakers of Malayalam. The productive use of six high-frequency nominal inflections of Malayalam- Plural /kal/, Accusative /e/, Locative /il/, Genitive /ute/, / Dative case markers kkə/ & /nə/ and Conjunction /um/ was investigated using elicited Sentence Imitation Test in Malayalam (SIT-M, Treasa & Shyamala, 2013). Results revealed that

DS group obtained significantly ($p<0.05$) poorer scores than the controls on all the subtests of SIT-M except on accusative case marker /e/. This suggests specific bound morpheme errors in children with DS which could serve as targets for grammatical morphology intervention.

Key Words: Down syndrome (DS), sentence imitation, grammatical morphology

Introduction

"Since I have Down syndrome I can teach my big brother how to work harder and never quit." - Eden Rapp (2009)

The above quote by a 12 year old individual with Down syndrome (DS) eloquently shows that despite the challenges they face, individuals with DS possess good pragmatic skills.

Review of Literature

Down syndrome is the major genetic cause of intellectual disability, occurring in approximately 1 in 700 live births (Centers for Disease Control and Prevention, 2006). Though there is considerable individual variability, individuals with DS have a distinctive profile of linguistic abilities. Receptive language is typically stronger than expressive language (Caselli, et al., 1998; Chapman, Hesketh, & Kistler, 2002; Laws & Bishop, 2003), with phonology and morphosyntax presenting particular difficulties. Review of past literature also indicates special focus on emergence of grammatical morphology in DS.

Another study by Price et al. (2007) found that boys (N=45) with DS scored lower on comprehension of grammatical morphology (prepositions and bound morphemes) than younger typically developing boys of similar nonverbal mental age. Considerable evidence points to productive syntax deficits in young individuals with DS that cannot be explained by cognitive level. The emergence of two-word combinations is delayed in young children with DS (Iverson et al., 2003), and children and adolescents with DS continue to produce shorter and less complex utterances than typically developing children of the same nonverbal mental age as they get older (Caselli et al., 2008; Chapman et al., 1998; Price et al., 2008; Rosin et al., 1988).

Past research also suggest that DS followed the same course of grammatical development as TD children do, but the children with DS may take 12 years to do what most children accomplish in 30 months (Fowler et al., 1994). Fowler (1988) suggested that an IQ greater than 50 may be necessary for progress beyond that point. Majority of the children with DS have low IQs, and so they do not fully master grammatical morphology (Fowler et.al., 1994). Furthermore, impaired production of specific grammatical morphemes in individuals with DS compared to MLU-matched typically developing children (Eadie, Fey, Douglas, & Parsons, 2002; Hesketh & Chapman, 1998) has also been reported. Specifically, Eadie and colleagues (2002) found that children with DS scored lower than TD children on tense (past tense *–ed*, third person singular *–s*, and modals) and non-tense (articles, present progressive *-ing*) morphemes.

Omission of Grammatical Morphemes

Many studies have also reported frequent omission of grammatical morphemes in DS (Chapman et al., 1998; Eadie et al., 2002; Laws & Bishop, 2003), but the precise nature and extent of these omissions has thus far not been clearly delineated.

Contrastive to English, the Dravidian languages are highly agglutinative as they have no prefixes and infixes for words. Words are usually formed by adding suffixes to the root word serially in these languages. Compared with the research on morphological development in English speakers, there is dearth of studies in the Dravidian languages, especially in clinical populations. Nevertheless, review indicates research on other domains such as phonotactic patterns in speech of children with DS (Rupela & Manjula, 2007).

Treasa & Shyamala (2013) attempted to study the expressive bound morpheme deficits in Malayalam speaking children with autism spectrum disorders and specific language impairment. They used the Sentence Imitation Test-Malayalam (SIT-M, Treasa & Shyamala, 2013) which was standardized on 120 typically developing Malayalam speaking children aged between 3-6 years. SIT-M has six subtests having 10 test sentences each to examine the productive use of 6 Malayalam bound morphemes i.e., one Plural- /kal/, four Case markers-accusative /e/, locative /il/, genitive /ute/, dative /kkə or nə/, and one Conjunction /um/. Their

results indicated significantly poorer performance of the clinical group as compared to the typically developing children for all the six subtests of SIT-M.

Need of the Study

Most of the studies in the Indian context have focused on mean length of utterance, syntactic comprehension and in mental retardation (Shyamala, 2002; Mariam & Shyamala, 2011). There is hardly any focus on specific bound morpheme deficits in children with Down syndrome, which would aid in establishing the baseline to set goals for morphological intervention in these children. Lack of suitable assessment tool could be the probable reason for such deficiencies in the existing literature in Indian languages. So, the present study was planned as a preliminary attempt in this direction.

Aim of the Study

To examine specific expressive bound morphemes i.e., Plurals, Case markers & Conjunctions, of Malayalam language in children with DS as compared to mental age-matched typically developing children (TD).

Null hypothesis: There is no significant difference between DS and TD participants in terms of the productive use of the six target bound morphemes of Malayalam.

Method

Participants

The present study recruited 10 children, aged 6 - 18 years, diagnosed with DS according to DSM-IV and ICD-10 criteria and 10 mental age-matched typically developing children (TD group) as participants of the study. Language was assessed using Three Dimensional Language Acquisition Test (3D-LAT, Herlekar & Karanth, 1993) and Comprehensive Language Assessment Tool for children (CLAT, Navitha & Shyamala, 2009). All the participants had a verbal repertoire of two-word phrases and were monolingual speakers of Malayalam. The clinical group children were receiving speech, language and psychological intervention at the time of testing.

Task design and stimuli

The elicited Sentence Imitation Test in Malayalam (SIT-M, Treasa & Shyamala, 2013) was employed to study the productive use of six nominal inflections. The digitized stimuli of SIT-M included 60 simple sentences with pictures that were presented using power point presentation of laptop computer and headphones. The participants were tested individually and were instructed to repeat the sentence heard on slide show of the stimuli. For those children who did not cooperate to put on headphones or those who got distracted from the task by wearing headphones, testing was done in free field. The maximum score for sentence imitation task was '60'. A score of '1' was allocated for correct response; score of '0' was assigned for incorrect response/ omission of morphemes and a score of 0.5 was allocated for 50% correct response.

Procedure

Data was collected from Institute of Cognitive and Communicative Neurosciences (ICCONS), Kavalappara, Shoranur, Kerala after obtaining written informed consent from the parents/caregivers and the institution authorities. The responses were video recorded for transcription and analysis by three experienced Master's degree holders. The reliability testing results (Cronbach's $\alpha > 0.8$) reveal good inter-judge reliability across all participants. The data obtained was subjected to further statistical analyses using independent samples t-test of SPSS 18.0 (Statistical Package for Social Science, version 18.0) software.

Results and Discussion

The mean and standard deviations obtained by the DS (N=10) and TD group (N=10) for the six subtests of SIT-M are shown in Table 1, while the results of independent sample t-test is depicted in Table 2. The results reveal statistically significant difference between the two groups for morphemes /kal, /il/, /ute/, /kkə/ and /um/ rejecting the null hypothesis for these five morphemes. On the other hand, no significant difference ($p>0.05$) was found between the groups for accusative /e/.

Table 1: Mean and SD scores of DS and TD groups for six morphemes

Group		/kal/	/e/	/il/	/ute/	/kkə/	/um/
DS	Mean	3.35	2.7	5.8	1.1	2.9	2.0
	SD	2.8	2.9	3.3	2.5	3.1	2.6
TD	Mean	9.1	4.6	9.3	5.1	9.6	6.25
	SD	1.85	2.71	1.25	3.17	0.69	1.95

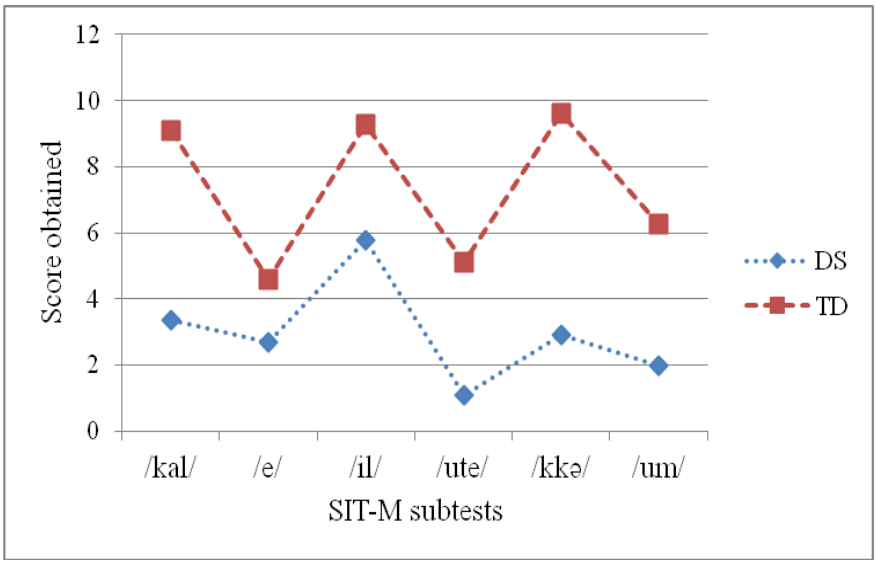
Table 2 Comparison of inflectional morphemes across DS & TD group

Independent t-test (df=18)	**/kal/**	**/e/**	**/il/**	**/ute/**	**/kkə/**	**/um/**
t-value	-5.43**	-1.51	-3.142*	-3.121*	-6.726**	-4.104**

**p≤0.001 *p<0.05

These results provide evidence that children with DS exhibit more difficulty with specific Malayalam nominal inflections such as plural, locative, genitive, dative case markers and conjunctions than the TD group. However, they performed similar to the mental-age matched group on use of accusative case marker. Figure 1 shows the graphical representation of the mean scores obtained by the two groups across the six SIT-M subtests. A similar pattern of overall performance was observed. It is also evident that both the groups performed relatively well on locative case subtest.

Figure 1: Mean scores for the target morphemes across groups



The findings of this study support previous studies (Eadie, Fey, Douglas, & Parsons, 2002; Hesketh & Chapman, 1998) on specific grammatical morphology impairments in children with Down syndrome. This study would aid in selecting specific goals for morphological intervention in young children with Down syndrome. Implementation of such goal-specific intervention strategy would facilitate faster emergence of multi-word sentences from the early word or phrase level language. Generalization of the results of present study is cautioned as the sample size is small. Furthermore, future Indian studies could be done across various clinical populations.

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