



Accuracy and syntactic measures of written language in biliterate children with Learning Disability

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Abstract

Research on written language has mostly focused on monoliterates. The results obtained for monolinguals cannot be readily generalized to biliterate children especially in a multilingual country like India. The aim of the present study was to investigate the accuracy and syntactic abilities of written language in fourth grade biliterate children with Learning Disability (LD). The participants included fifteen children with LD who were Kannada-English (K-E) biliterates studying in the fourth grade and thirty Typically developing children (TDC). The children were instructed to compose a written narrative in both Kannada and English in response to a pictorial prompt. The written samples were analyzed for measures of accuracy and syntactic complexity using the SALT software. Non-parametric statistics were used to statistically analyze the data. The findings indicated that children with LD performed poorer than TDC in both Kannada and English. Clause Density (TDC: $p < 0.01$; LD: $p < 0.05$) was higher in English compared to Kannada; Mean length of T-Unit (TDC: $p < 0.01$; LD: $p < 0.01$) was higher in English than in Kannada; Errors in Writing conventions (TDC: $p < 0.01$; LD: $p < 0.01$) were greater in English compared to Kannada; Percentage of spelling errors (TDC: $p < 0.01$; LD: $p < 0.01$) were greater in Kannada compared to English. The results have been discussed in terms of the differences in structure of the two languages and exposure of the languages. A comparison between groups revealed that children with LD performed poorer than TDC for most of the parameters in both the languages. The deficits in these biliterate children with LD on writing measures are explained with relevance to central processing deficit hypothesis.

Keywords: Bilingualism, Accuracy, Syntactic Complexity, Written Language, Children with Learning Disability.

1. Introduction

Written and spoken languages are two important means of communication for human beings. Writing is also a way of documenting information to be passed on to the future generations. It is a form of communication which is complicated in nature requiring a myriad of processing abilities (Bain, Bailet & Moats, 1991). While writing, several aspects such as text, subject and the reader need to be simultaneously focused upon. Writing not only involves the

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lower level skills such as transcription, but also involves higher level skills such as composition and a fine amalgamation of both the skills (Bain, Bailet & Moats, 1991). It is also well known that writing is an important prerequisite for academic success and is also crucial for social and behavioral wellbeing. This is because writing is a means for demonstrating knowledge and literacy i.e., students are assessed mostly based on their written performances in exams in educational settings (Hooper, 2002). Thus writing is an indispensable skill especially in the modern society.

According to the National Joint Committee on learning disabilities (Adopted 1990, updated 2016), "Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other disabilities (for example, sensory impairment, intellectual disabilities, emotional disturbance), or with extrinsic influences (such as cultural or linguistic differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences". "The term 'specific learning disability' means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage" (IDEA, 2004).

The identification of LD has shifted from a discrepancy based criteria to a Response to Intervention (RTI) Model after the discrepancy criteria was much criticized. Out of the many criticisms, the main reason of non-acceptance of the discrepancy criteria include later identification of LD since the properties of the standardized tests used does not help us identify children until the age of 9 or older (Vaughn, Linan-Thompson & Hickman, 2003). The goal of RTI is early identification and prevention of later literacy difficulties (Hood, 2012). In RTI, students are typically screened and those children with poor literacy skills are identified and early intervention is provided (Kim, Apel & Al Otaiba, 2013). RTI looks at identification of LD from an "at risk" point of view (Vaughn, Linan-Thompson & Hickman, 2003). Vaughn, Linan-Thompson and Hickman (2003), further explain this process along these lines: all the children demonstrating academic difficulties would receive treatment and those children who would respond less to the treatment would be identified as LD. Hood (2012) also states that the specific assessment tools for RTI have not been specified but the assessment tools used must be valid, reliable and capable of detecting small improvements.



Research has found that children with LD show spelling impairments. Angelelli, Notarnicola, Judica, Zoccolotti and Luzzatti (2010) studied spelling errors in Italian children with dyslexia from grades 3 and 5. Their results showed that children at grade 3 produced higher spelling errors which included phonologically possible, simple and context-sensitive errors. In contrast, children in the fifth grade demonstrated phonologically possible errors. The authors conclude that children with dyslexia demonstrate extreme and longstanding deficits in spelling even while learning a shallow orthography. Tops, Callens, Bijn and Brysbaert (2014) in their study analyzed the spelling errors made by 100 high achieving students with dyslexia in comparison with 100 matched controls. All the participants had Dutch as their mother tongue and were studying in the first year of their bachelor's degree. The spelling errors were categorized as phonological, orthographic and grammatical. According to the results, students with dyslexia exhibited twice the amount of spelling errors made by controls. It was also found that phonological errors occurred more frequently in students with dyslexia. Saryu (2014) analyzed the spelling errors of children with Learning Disability (LD) in comparison to spelling errors of Typically Developing Children (TDC) using a linguistic pattern analysis. On qualitative analysis using Phonological, Orthographic and Morphological Assessment of Spelling (POMAS; Silliman, Bahr & Peters, 2006), it was found that children with LD produced more Phonological, Orthographic, Morphological and Phonological-Orthographic errors in comparison with TDC.

Several studies have demonstrated syntactic deficits in children with LD. Amoolya and Shanbal (2012) investigated the sentence comprehension abilities in 6 to 12 year old children with LD using a grammaticality judgement task in Kannada. They found that children with LD were both less accurate and slower to respond to the tasks when compared to age matched TDC. This study highlights the categories of grammar in which children with LD showed deficits which include tenses, conditional clauses, comparatives, causatives etc. The results of the study also revealed that children with LD exhibited lesser sensitivity to subject-verb agreement compared to age matched TDC. Abrahamsen and Shelton (1989) studied reading comprehension abilities in children with LD. They found that combined syntactic and semantic modifications as well as syntactic modifications to the text resulted in better comprehension whereas semantic modifications alone did not improve reading comprehension. This study demonstrates that the syntactic deficits in children with LD affect their literacy skills. Other studies have also shown that children with LD demonstrate difficulties with various other aspects of syntax such as passive voice, center embedded sentences (Huggins & Adams, 1980), grammatical morphemes (McClure, Kalk, & Keenon, 1980) etc. It is possible that a lot of children with dyslexia or LD could have deficits in writing because of deficits in reading and reading comprehension.

In conditions such as Learning Disability, research on written language difficulties has often taken a backseat compared to research on reading difficulties. Research on written language difficulties in children with Learning disabilities is evolving only since the past two decades (Hooper,

2002) and more research evidences are documenting the difficulties faced by these individuals. On assessment, both children and adults with learning disabilities were reported to manifest equal difficulties in both reading and writing (Berninger, Abbott, Thomson & Raskind, 2001). On follow up of participants of treatment studies it was found that children with dyslexia had persistent difficulties with writing even after their reading difficulties had resolved and they found it difficult to find access to appropriate intervention services for remediation of their writing problems (Berninger, 2006). According to DSM-V-TR, difficulties in these three particular domains of writing characterize Written Language Disorders which include spelling accuracy, grammar and punctuation accuracy, and clarity and organization of written expression. In studies involving children with LD, reading has been focused to a greater extent, while very little attention has been paid to the nature of written language difficulties faced by these children. Children who present with disorders of writing are at an increased risk of long term undesirable personal and economic consequences and lead to financial burdens on the entire society as well (Grigorenko, 2007; Hooper, 2002).

Exploring reading and writing deficits in such children with LD is a greater challenge when the children are exposed to more than two languages. Approximately two thirds of the world's children are growing up in an environment where they are exposed to two languages (Bhatia & Ritchie, 2012; Crystal, 2003). Bilinguals are those who use two or more languages (or dialects) in their everyday lives (Grosjean, 2010). The term biliteracy is used to describe children's competencies in two written languages, developed at varying degrees, either simultaneously or successively (Dworin, 2003). Research in the area of written language development has mostly concentrated on one language (Gort, 2006). Grosjean (1985, 1989), in fact, has condemned the application of monolingual research to bilingual children by suggesting that it is a fractional or monolingual view of a bilingual. De Silva (1998) suggests that we need to study the development of writing in both the languages of bilingual children so that we can develop evaluation and management strategies that are developmentally, linguistically and culturally appropriate.

Most of the research done in bilingual writing have focused on skills that develop early such as phonological processing, inventive spelling and word reading (Bialystok, 2007; Geva, 2006; Shanahan & Beck, 2006). There are fewer studies that have focused on the development of higher level skills such as composition skills in bilingual children. The studies conducted have focused on biliterate children learning many languages such as Spanish-English (E.g., Danzak, 2011; Escamilla, 2007; Gort, 2006; Lanauze & Snow, 1989 etc.); Spanish- Swedish (E.g., Hedman, 2012); Japanese- English (E.g., Kabuto, 2011); Korean-English (E.g., Velasco & Garcia, 2014) and there is a dearth of such studies in the Indian context.

In the Indian context, children are primarily required to learn reading and writing in two languages with different scripts, one of the languages being regional and the other being English. Kannada is a Dravidian language spoken in the south Indian state of Karnataka. Most of the words in Kannada are bi-syllabic and tri-syllabic along with words having four, five and six syllables (Nag, Treiman, & Snowling, 2010). Nag, Treiman and



Snowling (2010) also noted that the symbols used in the written forms of alphasyllabaries such as Kannada, more or less represent syllables, but these symbols can also be decomposed to show the phoneme within them. For instance, the Kannada grapheme 'ಕೆ' (/ke/) consists of two components: the component 'ಕ' represents the phoneme /k/ and the component 'ೆ' represents the phoneme /e/. In Karnataka, the children are required to learn written language in Kannada (which is the regional language) and English simultaneously. The nature of Kannada and English scripts are very different. Kannada follows a semi-syllabic script with transparent orthography, whereas English follows an alphabetic script with opaque orthography (Shanbal, 2010). In alphabetic scripts such as English, symbols represent phonemes, whereas in alphasyllabic scripts such as Kannada, written symbols approximately represent syllables (Nag, Treiman, & Snowling, 2010). Alphasyllabaries are also known as abudigas demonstrate features of both alphabets and syllabaries (Bright, 1996; Daniels, 1996). Sheetal and Sangeetha (2010) compared written language skills of typically developing Indian children and children with LD studying in the first to fifth grades. The children were Kannada-English biliterates and they were given an expository task of writing on the topic 'My school' in English. On analysis of their written compositions on SALT software, it was found that children with LD showed poorer performance on all the measures of productivity, accuracy and complexity. Children with LD exhibited lesser total number of words and number of T-units (i.e. a sentence with one main clause along with embedded subordinate clauses) calculated by the SALT software indicating deficiency in productivity and written fluency (indicated by lesser total number of words) along with deficits in syntactic complexity (indicated by lesser number of T-units). Thus the author concludes that children with LD might have difficulties in one or more levels of processing and production of written language. Though the participants were Kannada-English biliterates only the medium of instruction, English, was assessed in the study.

Shanbal (2010), in her doctoral research, investigated the process of acquisition of biliteracy in Kannada-English emerging bilingual-biliterate children studying in the fifth, sixth and the seventh grade. Listening comprehension, phonological awareness, rapid verbal naming, reading and written language skills were assessed. Assessment of written language skills through an expository writing task in Kannada-English biliterate children was one component of Shanbal's study. The topic given to the participants was 'My School'. The results of the study revealed that children of all the grades produced greater 'Total Number of clauses' (TNC) in English compared to Kannada. Shanbal (2010) attributed this finding to the structural differences between Kannada and English. The nature of English language is such that it requires more number of clauses to convey a particular meaning, while in Kannada the same meaning can be conveyed with a single clause. For instance, the sentence in English "I eat the lunch that my mother packs" has two clauses, whereas, the same sentence written in Kannada 'ಒಂದು ಊಟವನ್ನು ತಿನ್ನುತ್ತಿರುವೆ. ಅದು ನನ್ನ ತಾಯಿಯು ತಯಾರಿಸಿರುವುದು.' contains only a single clause consequently leading to higher Clause Density in English

compared to Kannada. With respect to spelling errors, it was found that children made errors in English compared to Kannada. This result is explained again by the difference between Kannada and English. Spelling in Kannada requires the use of 'orthographic principles' (Prema, 1998), whereas English spelling requires the mastery of phoneme-to-grapheme correspondence. Thus Shanbal (2010) reasons out that children in the younger grades incorrectly applying the orthographic principles for spelling in English led to greater spelling errors in English compared to Kannada. Shanbal (2010) also found that the grammatical T-units were found to be greater in Kannada compared to English. She attributes this result to the dependency of written language on the development of oral language. Kannada, being the native language of children had developed better compared to English, which was the academic language was probably taking more time to develop.

Sheetal and Sangeetha's (2010) study, though conducted on Kannada-English biliterate children, assessed expository writing only in one language i.e., English. Shanbal's (2010) study used an expository task to assess written language skills in Kannada and English. But the present study uses a narrative task for the assessment of written language skills in biliterate children. Narrative texts include those which describe events by providing details about when, where and how the event took place and the people involved in the event. Narrative texts require the presentation of events/experiences in a chronological order (Quellmalz & Burry, 1983). Expository writing involves presenting facts, ideas and opinions and supporting them by providing appropriate details and explanation along with logical presentation of thoughts (Quellmalz & Burry, 1983). Since expository tasks and narrative tasks use different mechanisms, the results obtained for expository tasks cannot be generalized to narrative tasks as well. Thus the present study was conducted to bridge this gap in previous research in Indian Kannada-English emerging biliterate children.

Thus, the present study aimed to investigate the accuracy and syntactic abilities of written language in the fourth grade biliterate children with Learning Disability (LD) in comparison to age and language matched Typically Developing Children (TDC). The research questions that directed the present study included:

- a) Are there differences in the accuracy measures of written language in Kannada and English between emerging biliterate TDC and children with LD?
- b) Are there differences in the syntactic measures of written language in Kannada and English between emerging biliterate TDC and children with LD?

2. Methodology

2.1. Participants

Fifteen children with LD and thirty TDC in the age range of 9-10 years ($9.0 \text{ years} \leq A < 10.0 \text{ years}$, where 'A' is the age of the child; Mean age: 9.5 years) studying in the fourth grade were selected as participants for the study. In the TDC group, an equal number of males and females were included i.e., 15 males and 15 females. In the LD group, only three of them were females and the rest, i.e., 12 were males. For all the children Kannada was the native



language/ first language (L1) and English was the medium of instruction (second language/L2) in academic settings. The participants were sequential bilinguals who learnt Kannada first at home and were gradually exposed to English mostly in academic settings. All the participants had about six to seven years of exposure to English. All the participants in the study, including those children with LD knew how to read and write Kannada. However, Kannada was taught only as a single subject whereas English was the medium of instruction for the rest of the subjects. TDC were chosen from a school in Mysore. They were screened using the WHO Ten Questions Disability Screening Checklist (Singhi, Kumar, Malhi & Kumar, 2007) and those with a history of delayed development, behavioral, neurological or sensory issues were excluded from the study. These children were also screened using the Tool for screening children with writing difficulties (ToSc-WD) (Shanbal, 2003) to ensure they did not have any written language difficulties.

Children with LD were selected among those who came to avail Speech and Language services at the Institute. They were diagnosed jointly by Speech Language Pathologists (SLPs) and Clinical Psychologists. SLPs assessed these children through their performance on Early Reading Skills by Loomba (1995) for Indian children. Those children who performed at least two Standard Deviations below their actual grade level on the Test of Early Reading Skills were selected as participants for the present study. The IQ of children was evaluated by Clinical Psychologists and all the children with Performance Intelligence quotient (PIQ) > 80 as per Ravens Progressive Matrices were included in the study. Children with LD included in this study did not have a speech and language delay, but they performed poorly in the syntax section of the Linguistic Profile test in Kannada (Karanth, Ahuja, Nagaraja, Pandit & Shivashankar, 1991) and their scores ranged from 55.95 to 69.07 indicating that they performed at the 7 to 8 year age range . Also, all the children included in the clinical group had reading and writing difficulties in both Kannada and English. All the participants in the study belonged to the middle socio-economic status which was ensured using the revised version of the NIMH Socio-economic status scale (Venkatesan, 2011). Language Use Questionnaire (Shanbal, 2010) was used for the present study to investigate the language use of children in each of the two languages. The questionnaires were given to the parents to rate their children's amount of exposure to the two languages and their abilities in the two languages. The results obtained from the questionnaire revealed that the participants obtained a higher score meaning higher exposure to Kannada (ranging from 75 % to 100%) compared to English (scores ranged from 25 % to 50%). The results also revealed that children had better abilities in comprehending and speaking Kannada (scores ranged from 75 % to 100%) compared to English (scores ranged from 25 % to 50 %).

2.2. Test material and Procedure

Children were asked to produce written narratives to a pictorial prompt depicting the story of a child falling from a tree. Pictorial prompts have been used earlier by researchers to assess narrative writing abilities in children

(Cain and Oakhill, 1996). They found that picture prompts produced causally related narratives than the verbal prompts. Hence picture prompts were used in the present study. The pictures used in the present study were adapted from a standardized Italian battery for the assessment of writing skills developed by Tressoldi and Cornoldi (1991) (See Appendix) after making appropriate modifications to suit the Indian context. These pictures were also previously used by Carretti, Maria Re and Arfe (2013) in the assessment of written language skills in children. The modifications done in the picture stimulus included: addition of an extra picture to show the branch breaking and the child falling, changing the colour of the white bedspread in the hospital scene to green so that Indian children would get a better idea that it is a hospital. Also, a blood stained band-aid was added around the child's head and a drip set was added in the background. The colour of the background walls were changed from pale orange to blue so that it contrasts with the plaster of the fractured leg and the plaster is highlighted better. Children were asked to write the story as if narrating to a friend. Children were given thirty minutes to complete the task. Children were asked to write in Kannada and English on two different occasions with counterbalanced order of presentation. The written narratives produced by children were analyzed using the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2001) software. The assessment protocol suggested by Puranik, Lombardino and Altmann (2008) was modified and used for the present study. The parameters included were divided into accuracy measures and syntactic complexity measures. The accuracy measures included Percentage of grammatical T-units (GRAM T-unit), Errors in writing conventions (CON) and Percentage of spelling errors (SPELL). The syntactic complexity measures included Total number of clauses (TNC), Clause Density (CD) and Mean Length of T-Unit (MLT-UNIT).

2.3. *The Accuracy measures*

1) Percentage of grammatical T-units (GRAM T-unit): A T-unit is a sentence which is one main clause with all the sub-ordinate clauses embedded within it (Hunt, 1965). This criteria proposed by Hunt (1965) was used to calculate T-units in the present study. Any violation of grammar in the sentences of the respective languages were considered as ungrammatical T-units. The T-units without any grammatical error were considered as grammatical T-Units. Percentage of grammatical T-units was calculated as the ratio of number of grammatical T-Units divided by the total number of T-units in the sample multiplied by 100.

$$\text{GRAM T-Unit} = \frac{\text{Number of T-units without errors}}{\text{Total number of T-units}} \times 100$$

2) Errors in writing conventions (CON): Written conventions refer to handwriting, writing letters in a line, correct use of punctuation, page setting, use of capital and small letters, writing words correctly, starting a paragraph (Kameenui & Simmons, 1990). In the present study, use of punctuation marks like initial capital letters, apostrophes, commas etc. in the text were considered under writing conventions. Any error in the appropriate use of the aforementioned writing conventions were



considered as Errors in writing conventions, and the number of such errors were coded and fed into the SALT software. The software provided the total number of errors in writing conventions.

- 3) Percentage of spelling errors (SPELL): Any error in spelling, whether it was a substitution, addition or omission was considered as a spelling error. Percentage of spelling error was calculated by dividing the number of spelling errors by Total Number of Words multiplied by 100.

$$\text{SPELL} = \text{Number of spelling errors} / \text{Total number of Words} * 100$$

2.4. *The syntactic complexity measures*

- 1) Total number of clauses (TNC): A clause is a group of words containing a subject and a predicate. Clauses were coded into SALT and the Total number of clauses was calculated automatically by the program.

- 2) Clause Density (CD): This was calculated as ratio of Total Number of Clauses (TNC) by Number of T-Units (No T-Unit).

$$\text{CD} = \text{TNC} / \text{No T-Unit}$$

- 3) Mean Length of T-Unit (MLT-UNIT): It was calculated by dividing Total Number of Words (TNW) by number of T-Units.

$$\text{MLT-UNIT} = \text{TNW} / \text{T-Unit}$$

Inter-rater reliability was also determined for the study, wherein 10 % of the samples were given to two other examiners who were experienced Kannada-English biliterate Speech-Language Pathologists. These examiners were familiarized with the SALT software and its conventions. The two examiners analyzed the data separately without mutual consultation. In case of discrepancy between the examiners for any of the parameters, the analysis was repeated and the results that were mutually agreed upon by all the examiners were noted as final. The inter-rater reliability showed moderate to good reliability (0.7-0.8)

3. Findings

The written samples were subjected to analysis using the SALT software. The parameters were examined for both languages in both the groups. Non parametric statistics were used for statistical analyses as the results of Shapiro-Wilk's test revealed that most of the parameters were following a non-normal distribution ($p < 0.05$). The non parametric tests were administered to compare between the groups and across languages in both the groups. η^2 was used to calculate the effect size using the formula suggested by Field (2009) to calculate 'r'. The formula used to calculate effect size was

$$r = \frac{z}{\sqrt{N}}$$

Wilcoxon signed rank test was administered to check for differences in the performance of TDC in English and Kannada and to check for differences in the performance of children with LD in English and Kannada. Mann Whitney

test was administered to compare the performance of TDC and children with LD. Table 1.1 and Table 1.2 show the Mean, Median and Standard Deviation values of the measures on SALT for TDC and LD in Kannada and English respectively.

Table 1.1
Mean, Median and Standard Deviation values of the measures on SALT for TDC and LD in Kannada.

Sl No.	Parameters	TDC			LD		
		Mean	Median	SD	Mean	Median	SD
Syntactic complexity measures							
1.	TNC	9.10	9.00	2.52	6.40	6.00	1.68
2.	CD	1.18	1.11	0.25	1.18	1.00	0.25
3.	MLT-UNIT	5.39	5.15	1.35	5.62	5.00	1.33
Accuracy measures							
4.	GRAMT-UNIT	88.21	95.84	15.11	52.03	60.00	25.51
5.	CON	1.07	0.00	1.78	4.13	5.00	2.07
6.	SPELL	19.52	13.08	15.86	54.34	57.14	15.62

Note- TNC: Total Number of Clauses, CD: Clause Density, MLT-UNIT: Mean Length of T unit, GRAMT-UNIT: Percentage of Grammatical T-Unit, CON: Errors in writing conventions, SPELL: Percentage of spelling errors.

Table 1.2
Mean, Median and Standard Deviation values of the measures on SALT for TDC and LD in English.

Sl No.	Parameters	TDC			LD		
		Mean	Median	SD	Mean	Median	SD
Syntactic complexity measures							
1.	TNC	8.90	9.00	2.72	9.60	10.00	3.25
2.	CD	1.43	1.40	0.34	1.47	1.33	0.43
3.	MLT-UNIT	8.84	8.63	2.29	9.45	9.20	2.34
Accuracy measures							
4.	GRAMT-UNIT	47.46	55.56	29.37	59.02	66.67	21.51
5.	CON	3.77	3.00	3.41	8.60	7.00	6.37
6.	SPELL	4.55	4.22	4.23	16.29	12.90	9.90

Note- TNC: Total Number of Clauses, CD: Clause Density, MLT-UNIT: Mean Length of T unit, GRAMT-UNIT: Percentage of Grammatical T-Unit, CON: Errors in writing conventions, SPELL: Percentage of spelling errors.



3.1. *Comparison across languages for TDC*

Analysis of results on Wilcoxon signed ranks test revealed a significant difference between the following parameters: Clause Density ($|Z| = 3.178$, $p < 0.01$, $\eta^2 = 0.58$), with clause density being higher in English (Mean = 1.43, SD= 0.34) than in Kannada (Mean 1.18, SD= 0.25); Mean length of T-Unit ($|Z| = 4.782$, $p < 0.01$, $\eta^2 = 0.87$), with Mean length of T-Unit being greater in English (Mean = 8.84, SD= 2.29) than in Kannada (Mean = 5.39, SD = 1.35); Grammatical T-Units ($|Z| = 4.374$, $p < 0.01$, $\eta^2 = 0.80$) – greater number of grammatical T-units in Kannada (Mean = 88.21, SD= 15.11) than English (Mean = 47.46, SD= 29.37); Errors in Writing conventions ($|Z| = 4.134$, $p < 0.01$, $\eta^2 = 0.76$), with greater number of errors in English (Mean = 3.77, SD= 3.41) compared to Kannada (Mean= 1.07, SD= 1.78); Percentage of spelling errors ($|Z| = 4.357$, $p < 0.01$, $\eta^2 = 0.80$) were higher in Kannada (Mean = 19.52, SD= 15.86) compared to English (Mean = 4.55, SD= 4.23). The results also revealed that there was no significant difference between total number of clauses ($|Z| = 0.526$, $p > 0.05$, $\eta^2 = 0.10$) between Kannada and English.

3.2. *Comparison across languages for children with LD*

The results of the pair wise comparisons using Wilcoxon's signed rank test (see Table 3) revealed a significant difference between the following parameters in Kannada and English: Total number of clauses ($|Z| = 3.210$, $p < 0.01$, $\eta^2 = 0.83$) with TNC being greater in English (Mean=9.60, SD=3.25) compared to Kannada (Mean=6.40, SD=1.68); Clause Density ($|Z| = 1.978$, $p < 0.05$, $\eta^2 = 0.51$) with greater clause density in English (Mean = 1.47, SD= 0.43) than in Kannada (Median = 1.18, SD= 0.25); Mean length of T-unit ($|Z| = 3.294$, $p < 0.01$, $\eta^2 = 0.85$) with greater Mean Length of T-unit in English (Mean = 9.45, SD= 2.34) than Kannada (Mean = 5.62, SD= 1.33); Errors in writing convention ($|Z| = 2.608$, $p < 0.01$, $\eta^2 = 0.67$) with greater number of errors in English (Mean = 8.60, SD= 6.37) compared to Kannada (Mean=4.13, SD= 2.07); Percentage of spelling errors ($|Z| = 3.408$, $p < 0.01$, $\eta^2 = 0.88$) with greater errors in Kannada (Mean = 54.34, SD= 15.62) in comparison with English (Mean=16.29, SD=9.90). There was no significant difference between Kannada and English on the Percentage of Grammatical T-units ($|Z| = 1.223$, $p > 0.05$, $\eta^2 = 0.32$).

3.3. *Comparison between TDC and children with LD*

The results of Mann Whitney test revealed that there was a significant difference between the performance of TDC and children with LD on the following measures in Kannada language: Total number of clauses ($|Z| = 3.360$, $p < 0.01$, $\eta^2 = 0.50$), where TDC produced significantly higher Total Number of Clauses (Mean= 9.10, SD= 2.52) compared to children with LD

(Mean= 6.40, SD=1.68); Percentage of grammatical T-units ($|Z|= 4.494, p<0.05, \eta^2= 0.67$) where TDC (Mean = 88.21, SD= 15.11) exhibited greater percentage of grammatical T-units compared to children with LD (Mean = 52.03, SD= 25.51) ; Errors in writing conventions ($|Z|= 4.045, p<0.01, \eta^2=0.60$) where children with LD (Mean = 4.13, SD= 2.07) produced higher errors in writing conventions compared to TDC (Mean= 1.07, SD= 1.78) ; Percentage of spelling errors where children with LD (Mean = 54.34, SD= 15.62) produced significantly higher ($|Z|= 4.539, p< 0.01, \eta^2=0.68$) percentage of spelling errors in Kannada compared to TDC (Mean= 19.52, SD= 15.86) . There was a significant difference between the performance of TDC and children with LD on the following measures in English language: Errors in writing conventions ($|Z|= 2.949, p< 0.01, \eta^2=0.44$) where children with LD (Mean = 8.60, SD= 6.37) produced significantly greater number of errors in writing conventions compared to TDC (Mean = 3.77, SD= 3.41) and percentage of spelling errors ($|Z|= 4.545, p<0.01, \eta^2=0.68$) where children with LD (Mean = 16.29, SD= 9.90) produced significantly higher number of percent spelling errors compared to TDC (Mean = 4.55, SD= 4.23). There was no significant difference between the performances of children in the Kannada language on the following measures: Clause Density ($|Z|= 0.203, p > 0.05, \eta^2= 0.03$), Mean length of T-Unit ($|Z|= 0.603, p> 0.05, \eta^2=0.09$). The results also revealed that there was no significant difference between the performance of TDC and children with LD in the English language with respect to Total Number of Clauses ($|Z|= 0.824, p> 0.05, \eta^2=0.12$), Clause Density ($|Z|= 0.048, p> 0.05, \eta^2= 0.01$); Mean Length of T-Unit ($|Z|=1.024, p> 0.05, \eta^2= 0.15$) and Grammatical T-Units ($|Z|=1.617, p> 0.05, \eta^2= 0.24$).

4. Discussion

4.1. Comparison across languages

The results of the present study revealed that percentage of grammatical T-Units were greater in Kannada compared to English. In the present study, it can be understood that a better performance in syntax for Kannada language could be due to increased exposure in Kannada than English. Children used Kannada most of the time at home as observed on language use questionnaire. Similar results were reported by Shanbal (2010) when she studied the written language of Kannada-English biliterate children. Though Kannada and English reading and writing were introduced to the participants at the same time, children might have performed better in Kannada due to greater language experiences they might have had with Kannada since it was their native language and hence had better language representation in Kannada. This result also supports the hypothesis that written language is dependent on the development of oral language abilities



in children (Shanbal, 2010). This indicates that the underlying proficiency in the languages could have contributed to a better performance in Kannada than in English in both TDC and LD, where number of grammatical T-units is indicative of better grammatical abilities in Kannada than English.

It was also found that errors in writing conventions were greater in English compared to Kannada. The reason for this finding may be the presence of initial capitalization errors in English. The nature of Kannada orthography does not involve capitalization of letters. Similar findings were found for children with LD also.

Further, Percentage of spelling errors were more in Kannada compared to English. The spelling errors made in Kannada were mostly with respect to geminates and mixed clusters. In Kannada, certain words are of the CCV (Consonant-Consonant-Vowel) type. The sequence of consonants can either be the same (as in 'CPÀì' /akka/ meaning 'sister') or different (as in 'JμÄÄÖ' /eʃTu/ meaning 'how much?'). The consonant sequences with the same consonants are referred to as 'geminates' and those with different consonant sequences are referred to as 'mixed clusters' (Nag, Treiman & Snowling , 2010). This finding is in consonance with the findings of Nag, Treiman & Snowling (2010) where they report that fourth and fifth grade children performed poorly in spelling complex aksharas such as geminates and mixed clusters. Further, in the present study, the spelling errors were found to be lesser in English compared to Kannada. This could be because children study all the subjects in school in English (which is the medium of instruction) , whereas Kannada is only one subject in school. It could possibly be that children in schools currently are taught with greater emphasis to rehearse spelling in English which may have led to lesser spelling errors in English when compared to Kannada. It could also be possible that children have not attained an understanding to use of geminates which require additional skill of conjugating two graphemes together to form one combined form. Similar pattern was observed for children with LD also, however children with LD performed poorer than TDC. In children with LD, there was no significant difference between Kannada and English for the syntactic measure of percentage of grammatical T-units. This could be attributed to the syntactic and grammatical difficulties in children with LD which are manifested in both the languages. Several studies have demonstrated difficulties in various aspects of syntax and grammar in children with Learning disability (Amoolya & Shanbal, 2012; Abrahamsen & Shelton, 1989; Huggins & Adams, 1980; McClure, Kalk & Keenon, 1980). This finding can also be explained by the central processing deficit hypothesis. The central deficit hypothesis posits that if there are problems in reading, they should be manifested in both the languages since it is due to more of a central processing deficit. In other words, children who exhibit problems in reading second language must also exhibit similar problems in their first language. This theory suggests that children with linguistic and cognitive deficits would experience problems in reading

regardless of the language (Fontoura & Siegel, 1995). Writing problems could be a mere reflection of reading problems often seen in children with LD. In the present study, deficits in writing were seen in children with LD, which could be due to a reading deficit, which is probably more a central processing deficit. Hence, the children are showing problems in writing in both the languages.

In the present study, there was no significant difference between the TNC in Kannada and English. But, Clause Density was found to be higher in English. It would normally be expected that if number of clauses were almost equal in Kannada and English, then the Clause Density would also be nearly equal in Kannada and English. But in this particular study, the total number of sentences were more in Kannada. In English, due to lesser total number of sentences, the TNCs also decreased. But, the CD in English was higher since each sentence had more number of clauses in English compared to Kannada. A sentence such as "I eat lunch that my mother packs" has two clauses. The same sentence in Kannada /naanu namma amma kaTTida UTa tinnuttEne/ has only one clause. Therefore in Kannada, information through writing can be conveyed via lesser number of clauses. On the other hand, English requires the usage of more number of clauses to convey the same information (Shanbal, 2010). In case of children with LD, they showed both higher TNC and greater CD in English compared to Kannada. Also, children with LD showed significantly greater MLT-UNIT in English compared to Kannada similar to TDC indicating that English requires more number of words to convey the information, whereas Kannada would require lesser number of words to convey the same information.

4.2. *Comparison between children with LD and TDC*

In Kannada, TDC showed a higher percentage of grammatical T-units and greater TNC compared to children with LD. This finding could be attributed to the syntactic difficulties noticed in children with LD (Amoolya & Shanbal, 2012; Abrahamsen & Shelton, 1989; Huggins & Adams, 1980; McClure, Kalk & Keenon, 1980).

The results of the present study also revealed that children with LD showed more errors in writing conventions in both English and Kannada. In the present study, children with LD omitted the use of periods to mark the end of a sentence and also made capitalization errors in English more often than TDC. This finding is in consonance with several other studies which have found that children with LD make mistakes in the correct use of punctuation and the use of capital letters while beginning a sentence (Isaacson, 1987; Lerner, 1993).

It was also found that children with LD made more spelling errors in both English and Kannada compared to TDC. This finding is supported by several research studies which have demonstrated that spelling difficulties are a



common characteristic of children with Learning Disability for languages with both opaque and transparent orthographies (Angelelli, Notarnicola, Judica, Zoccolotti, & Luzzatti, 2010; Saryu, 2014; Tops, Callens, Bijn, & Brysbaert, 2014).

5. Conclusions

In a nutshell, when written compositions in Kannada and English were compared, the results showed that Clause Density, Mean length of T-unit and Errors in writing conventions were found to be higher in English compared to Kannada. These results have been explained by the differences in linguistic structure of Kannada and English, where English requires more number of words and clauses compared to Kannada to convey the same information. Percentage of spelling errors were found to be greater in Kannada compared to English. This result has been explained by greater academic exposure to English compared to Kannada therefore greater opportunities to rehearse spelling leading to poorer spelling abilities in Kannada compared to English. It was also found that syntax (GRAM T-UNIT) was better in the native language compared to the second language i.e., English. This shows that written language was dependent on oral language abilities and that syntax is a language independent measure which did not transfer from native language to the second language in terms of writing. This pattern was similar to both TDC and children with LD.

When the performance of TDC and children with LD were compared, it was found that children with LD performed poorer than TDC in the accuracy and syntactic measures of written language in both the languages. This can be explained by the central processing deficit hypothesis, which states that children with LD exhibit deficits which are common to both the languages. That is to say that the presence of syntactic deficits in one language makes it highly likely that similar deficits can be seen in the other language also.

The present study is the first step in documenting the written language skills of Kannada-English biliterate children with LD. The results of the present study stresses the importance of assessing both the languages in biliterate children so that we get a complete picture of children as emergent biliterate writers. Children with LD in the present study showed syntactic deficits in both the languages assessed, showing more of a central processing deficit. This may suggest that, during intervention, we may need to work upon certain metalinguistic strategies along with working on syntactic and other skills in each of the two languages.

We have noted a few limitations of the present study, the most important one being less sample size. Also, usage of other measures to analyze the data would have yielded a better, complete picture of the writing capabilities of these children. The present study utilized a narrative task, utilization of an

expository task would also be beneficial in understanding how the nature of the task might affect the written language skills in these emerging biliterate children. Also, the present study was conducted only in one grade, conducting such studies in successive grades would help us uncover the developmental trend, if any, in the written language of these developing biliterate children.

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Appendix

Stimulus used for the study (Adapted from Tressoldi & Cornoldi, 1991)

