Study of Semantic and Syntactic Aspects in L2 of Bilingual Primary School Children

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ABSTRACT

The present study aimed to evaluate lexical diversity and sentence types in English. Sequential bilingual children from third (n=60) and fifth grade (n=60) were evaluated using an observation checklist and a language screening. 120 children identified with age-appropriate skills from screening were selected and written samples were collected in English using three written tasks. These samples were analyzed using TTR and Sentence Types. t-Test was done to identify the effect of age, gender, parental education, and school location on TTR, and Chi-square test was used to identify the influence of these factors on sentence production. Findings suggested that lexical diversity is not significantly influenced by grade but is influenced by gender, parental education, and school location. However, sentence types are influenced by all of these factors.

Keywords: Semantics, Syntax, Bilingual, Lexical Diversity, Sentence Types

Introduction

Language acquisition begins with the infant's ability to perceive and discriminate speech sounds. It is followed by the process of word learning, sequencing, and combining words to form phrases and sentences. As the grammatical knowledge improves, the production of lengthy and complex sentences becomes possible (Hoff, 2009). Early bilinguals develop the ability to learn two phonological systems, grammar and vocabulary depending on the time at which the second language exposure begins and the amount of such exposure (Hoff, Core, Place, Rumiche, Sero & Parra, 2012; Kim, Park & Lust, 2016; Hoff et al., 2012). The extent of proficiency in these languages is determined by measures like lexical diversity and sentence types. The current study is an attempt to study these elements in Tamil-speaking sequential bilingual children.

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Language in India www.languageinindia.com **ISSN 1930-2940 23:7 July 2023**
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Lexical Diversity

Children learn new words every day and have a vocabulary of 10,000 words by the age of 6 years (Clark, 1995). This results in a significant increase of lexical items and lexical diversity observed in their language samples. Lexical diversity is the measure of how many various types of words are used within a text. The higher the number of word varieties used, the higher the lexical diversity (Johansson, 2008). It reflects the vocabulary size and multidimensional complexity of mental lexicon usage (Edwards, Collins, Jarvis & Daller, 2013). In sequential bilinguals, lexical diversity in L2 can be a measure of productivity in that language. It may be influenced by L1 background, the L1-L2 age proximity, L2 proficiency, and the language usage context of L2 (Schmitt & Meara, 1997). In languages with limited standardized test materials for bilinguals, measures of lexical diversity are a valid tool (Treffers-Daller, 2011).

Sentence Types

Sentences communicate the meaning in form of statements, commands, exclamations, or questions (Andersen, 2014). It can be simple, compound, or complex based on the number of clauses present and how they are combined. As children grow, they begin to produce more diverse combinations of subjects and verbs, resulting in the production of longer and grammatically complex sentences. However, the scarcity of clinical literature about the development or onset of sentence types has made it difficult to use it in regular assessments. Measuring the sentence diversity along with other comprehensive analyses of syntax may provide information about the emergence of knowledge of sentence structure (Hadley, McKenna & Rispoli, 2018). This is especially important in assessing bilingual children because a complete form of sentence production is the representation of the syntactic knowledge and lexicon. It is also influenced by the frequency of use (Sadat, Martin, Alario & Costa, 2011).

The Social Basis of Language and the Role of Parental Education

The role of parental education in language development and exposure has been studied over the years. Family becomes the first learning environment for a child, providing a strong footing in shaping his/ her character. There is an abundance of direct and indirect stimulation during the early years, especially between 6- and 18 years (Syaodih, 1995). It influences physical development, cognitive abilities, and social interaction within the child's environment (Syaodih, 1995). Moreover, the capacity of teaching in parents shows a positive impact on the oral language and print skills of the children (Kalia & Reese, 2009). The impact of literacy activities like shared book reading on a child's performance is also highlighted in the literature.

Language acquisition also depends on a social basis. It can be of two types: opportunity to communicate with another person (catalyst for language development) and understanding the use of non-linguistic communication (e.g. eye gaze) (Bavin & Nigles, 2015). This learning occurs in the child's immediate environment with the community being a great influencer. The ethnic diversity within the community determines the sociolinguistic characteristics of a child during elementary school years (Firmansyah, 2018). Both these influences have been identified as vital boosters for language development, especially in bilingual children, during the primary years of language acquisition.

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English as L2 in India

English has dominated domains like education, administration, law, business, armed forces, media, national politics, and publications while existing along with other major languages like Hindi and Tamil (Sharma, 2017). Though it plays a functional role, it has not replaced the other native languages expansively. The existence of the British-influenced academic curriculum leads to a high proportion of functional literacy in English in India. Although, English in the academic curriculum exists without any modifications caused by the native varieties, an increase in the number of balanced bilinguals with English as L2 has increased its usage in informal genres. Its usage can range from an exclusively formal education setup to an informal setting like a conversation (Sedlatschek, 2009).

Need

The extent of learning multiple languages by a child is determined by the learning processes and various language experiences (Gathercole & Hoff, 2007). In a multilingual country like India, bilingualism has become a norm (Kalia & Reese, 2009). In urban areas, a large number of people with various linguistic and cultural backgrounds come together. This leads to the routine use of additional languages along with the mother tongue (Mishra & Stainthorp, 2007). In such conditions, a common language is required to bridge the gap to infuse daily life across institutions, media, and education (Crystal, 2003). English has been identified as a common language and it has been dominating as the medium of instruction, especially in higher educational forums (Parasher, 1991). However, the developmental processes involved in the achievement of English education in children whose native language is not English has not been clearly understood (Kalia & Reese, 2009). The present study attempts to highlight a few aspects like semantics and syntax in bilingual children from two different socio-cultural backgrounds (urban and rural) along with the effect of parental education on these aspects. Measures like lexical diversity and sentence diversity have been used as it measures productivity in a language, especially in bilinguals (Dewaele & Paulenko, 2003).

Aim

The present study aims to profile the semantic (lexical diversity) and syntactic (sentence types) aspects of English (L2) used by bilingual primary school children with Tamil as their L1. The influence of parental education and socio-cultural background has also been studied.

Methodology

The study was carried out to explore the lexical diversity and sentence types used in English by bilingual third and fifth graders of two schools within the Chennai district.

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Participants

A total of 120 sequential bilingual children (with L1: Tamil and L2: English language) from third (n= 60) and fifth grades (n=60) of English medium urban and rural primary schools were selected to be the participants. Children developed L2 following school entry by 3 years of age. Those who scored 60% marks or above in the 3 most recent academic examinations conducted by the school and identified with age-appropriate speech and language Skills were alone included. Children with known complaints of learning difficulties, and hearing/ ear infections were excluded from the study. Care was taken to maintain the gender ratio.

Materials Used

- Student Observation Checklist adapted from 'Observing, Recording and Reporting Children's Development' (Laffranchini, 2017) to be completed by the respective class teachers.
- Typical Communication Development Checklist adapted from 'Language Development: from Theory to Practise- 3rd Edition' (Turnbull & Justice, 2017) to screen the age-appropriate language skills in children selected for the study
- Picture of the park for picture description task adapted from 'Assessment in Speech-Language Pathology' (McAfee & Shipley, 1992)

Procedure
Phase I: Subject Selection

Permission was obtained from the school authorities for carrying out the study on their premises. Ascent and consent were obtained from each participant to collect the demographic details along with information about parental education and participation in the study. The class teacher of III and V grades in each school were given the 'Student Observation Checklist' and were requested to administer the same for each child. The checklist has eight developmental domains about which the teacher marks her comments through informal observation. Children who got 'present' on all the skills proceeded to the second screening. The Speech and Language screening was carried out by the investigators using the 'Typical Communication Developmental Checklist'. Of the children identified with age-appropriate speech and language skills, 60 children (30 boys and 30 girls) were randomly selected from each grade from both schools as participants.

Phase II: Data Collection

This phase marks the collection of the data required for analysis. Children selected through the process explained in Phase I was seated in groups in their respective classrooms. Children were given three tasks that were to be completed within 20 minutes each. Three different tasks, namely essay writing, picture description, and story writing were given. Three different topics were chosen for each of the tasks following consultation with a senior speech-language pathologist and three primary school teachers with an experience of at least 10 years. Topics given were – 'My Mother' for essay writing; 'Picture of the park' for picture description and 'The Thirsty Crow' for story writing. These topics were chosen based on the participant's abilities and familiarity. All the instructions provided and collected samples were in English

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(L2). Children were instructed to limit their writing to 10 lines for each task to maintain the length of the sample.

Phase III: Analysis
Lexical Diversity
The written samples were analyzed using the 'Type Token Ratio (TTR)' to measure the lexical diversity. The type-token ratio gives the number of diverse words used by the child in each sample. The number of different words is the type and the total number of words is the tokens. Hence, the number of different words divided by the total number of words in the sample gives the ratio. The final score taken for statistical analysis was the average obtained from all three tasks.

Sentence Types
Sentences in each sample were identified as 'simple/ compound/ complex. Sentences that contained only one single independent clause were marked as 'simple', those with at least two independent clauses with equal importance to both were marked as 'compound'. Sentences with independent and dependent clauses were marked as 'complex'. The total number of sentences in each category taken for statistical analysis was the average obtained from all three tasks.

All written samples were analyzed by three speech-language pathologists. Following the analysis, the acquired data were further classified based on the location of the school (rural and urban) and the parental education (parents with high school certification and those without the certification). These records were obtained from the school authorities with prior permission and the consent of the participant's parents.

Result
The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0. Student t-test was used to identify the difference in TTR scores among groups based on grade, gender, parental education, and school location. Chi-square test was used to identify if the age, gender, parent's education, and school location affected the ability to construct different sentence types.

Semantic Diversity Using TTR
The semantic diversity was analyzed using the type-token ratio. It was separately analyzed based on class, gender, and school location.

TABLE 1:
Mean and Standard Deviation of Type-Token Ratio Scores obtained by III and V graders

CLASS	NUMBER	Mean	Std. Deviation
3	60	50.66	9.38
5	60	53.93	9.11
Total	120	52.30	9.35

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Table 1 shows the mean scores obtained by the third and fifth graders. The t-Test results show that there is no significant difference between the performance of children in third grade (M=50.66, SD= 9.38) and fifth grade (M=53.93, SD = 9.11), t= 1.94, p= .05. This means that there is no observable difference or improvement in lexical diversity within the selected age group.

TABLE 2:
Mean and Standard Deviation of Type-Token Ratio Scores obtained by male and female children

GENDER	NUMBER	Mean	Std. Deviation
FEMALE	60	51.09	6.06
MALE	60	53.50	11.69
Total	120	52.30	9.35

Table 2 describes the mean and standard deviation of scores obtained by both genders. The t-Test results showed a significant difference between scores obtained by male children (M== 53.50, SD= 11.69) and female children (M=51.09, SD= 6.06), t= 1.419, p= .15. Male children outperformed female children when the TTR was the measure of semantic diversity used.

TABLE 3:
Mean and Standard Deviation of Type-Token Ratio Scores obtained based on parental education.

PARENTAL LITERACY	NUMBER	Mean	Std. Deviation
No Higher Secondary	23	45.73	8.00
Higher Secondary and Above	97	53.85	9.00
Total	120	52.30	9.35

The mean scores and standard deviation based on parental education are shown in Table 3. The Children with parents with higher secondary education (M= 53. 85, SD= 9.0) performed better than children with parents with no high school certification (M= 45.73, SD = 8.0), t = -3.97, p < 0.001*, across tasks when lexical diversity was the measure used.

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TABLE 4:
Mean and Standard Deviation of Type-Token Ratio Scores obtained between children of rural and urban schools.

LOCATION	NUMBER	Mean	Std. Deviation
RURAL	60	46.53	6.04
URBAN	60	58.06	8.50
Total	120	52.30	9.35

Table 4 shows the scores obtained by children studying in rural schools and urban schools. The t-Test results ascertain that a significant difference exists between the performance of children from the rural school (M= 46.53, SD= 6.04) and children from urban school (M=58.06, SD = 8.50), t= -8.56, p < 0.001*. Children from urban schools presented with better semantic diversity when compared to children from rural schools.

Sentence Types

Sentences from each of the written samples were analyzed and identified as simple, compound, or complex sentences depending on the number of clauses present in each of them. These sentences were further categorized as poor, average, and good under each type, based on the qualitative analysis by the investigators. When sentences were broken or incomplete, they were classified as poor. Similarly, the sentences that sound semantically correct but do not follow the sentence structure rules were classified as average and sentences that were semantically and structurally correct are labeled as good. However, the complex sentence types found in the samples were very rare (hardly 2, poorly framed) and hence, were not considered for the statistical analysis. Chi-square test was used to find the relation between the use of sentence types and grades, gender, parental education, and school area.
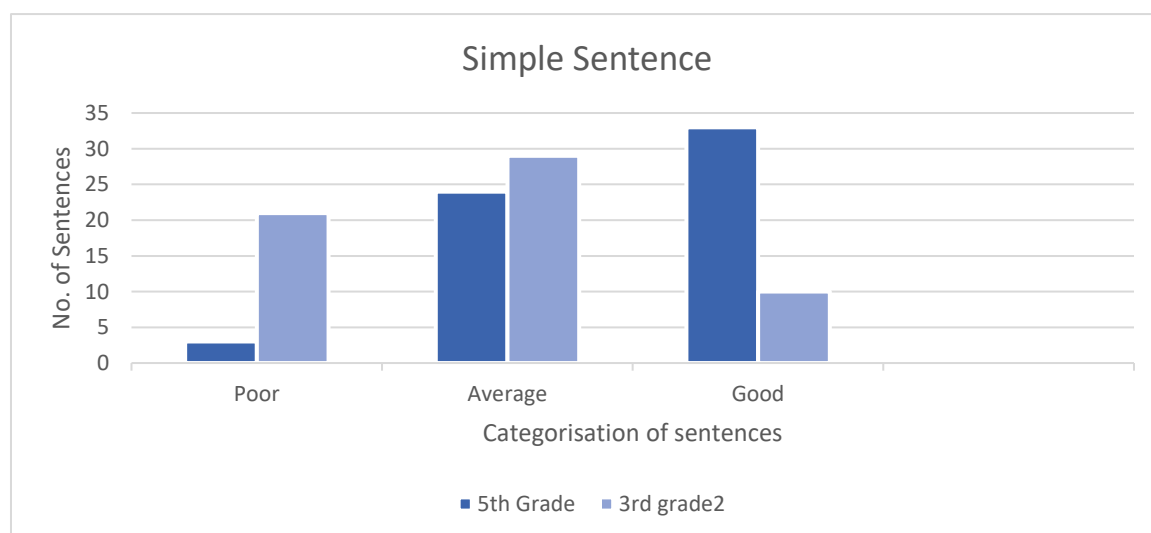
Sentence Types and Grade

Figure 1. The number of poor, average, and good simple sentences used across the grades.

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There is a significant relationship between the use of simple sentence and grades, $X^2(2, N = 120) = 26.27, p < 0.001$. Children in 5th grade were found to be using a higher number of well-framed simple sentences that were labelled as 'good' when compared to the 3rd graders. While most of the children from both grades were observed able to construct averagely constructed simple sentences, third graders were noted to be using more poorly framed simple sentences.
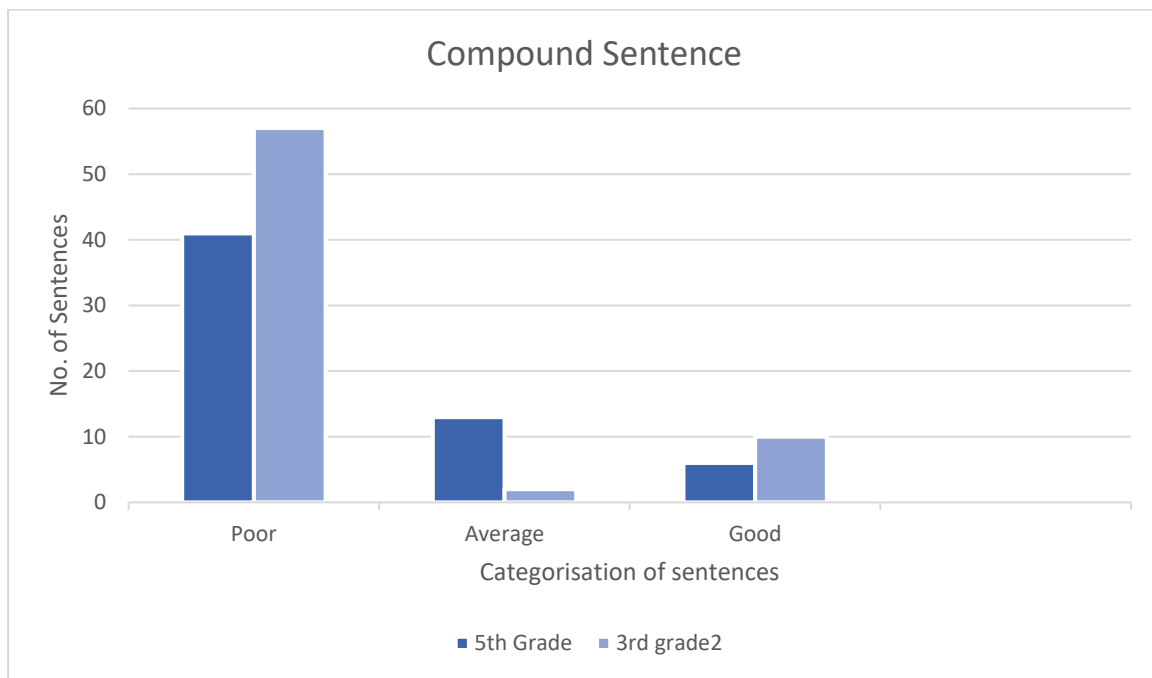
Compound Sentences

Figure 2. The number of poor, average, and good compound sentences used across the grades

The number of compound sentences found in the sample was comparatively less. There is a significant relationship between the number of compound sentences and grades, $X^2(2, N = 120) = 14.25, p < 0.001$. Children in 5th grade were able to form more compound sentences but most sentences were found to be poorly framed.

Sentence Types and Gender

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Figure 3. Simple sentence categories used by female and male children

Figure 3 depicts the usage of simple sentences by both genders. On qualitative assessment, female children were seen to be using a greater number of well-formed simple sentences that were labeled 'good'. However, there is no statistically significant difference observed between the genders and the use of simple sentences, $X^2(2, N = 120) = 1.977$, p > 0.001.
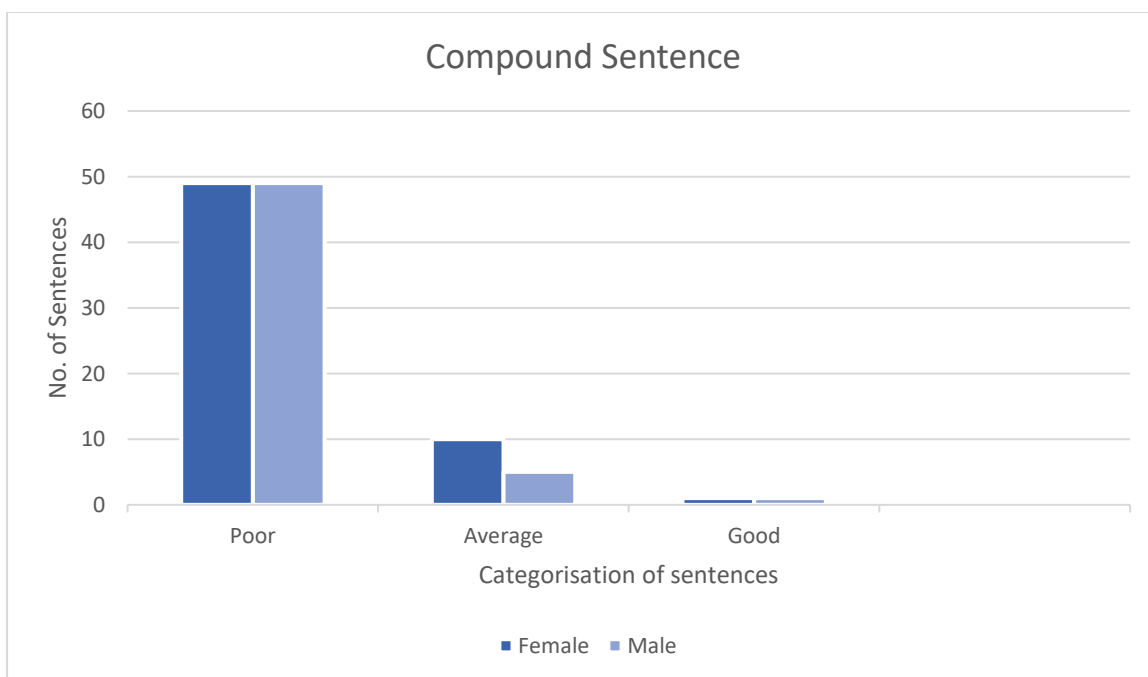

Figure 4. Compound sentence categories used by female and male children

Figure 4 shows the number of compound sentences used by both genders in each category. Most of the compound sentences in the samples were poorly framed but were observed to be in usage as in the case of simple sentences. Though there is no significant relationship between the gender and use of compound sentences, $X^2(2, N = 120) = 5.238$, p =

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0.073, female children were noted to use more averagely framed sentences compared to their male counterparts on qualitative assessment.
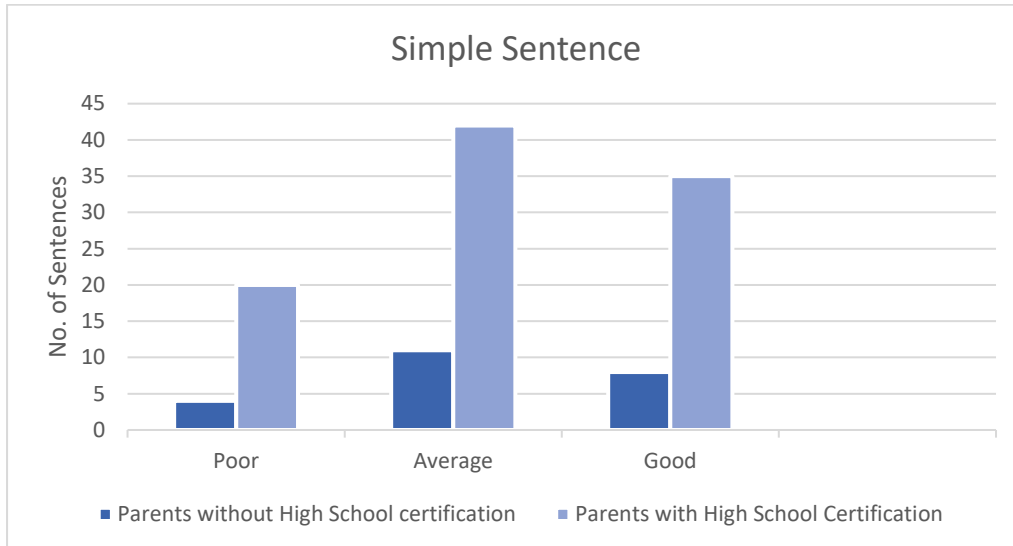
Sentence Types and Parental Education

Figure 5. Simple sentence categories used by children based on parental education

Figure 5 shows the number of poor, average, and good simple sentences used by the children with parents with and without high school certification. There is a statistically significant relationship between the use of simple sentences and parental education, $X^2(2, N = 120) = 0.192$, p = 0.909. Children of parents with high school qualifications performed better than those with parents without high school certifications.
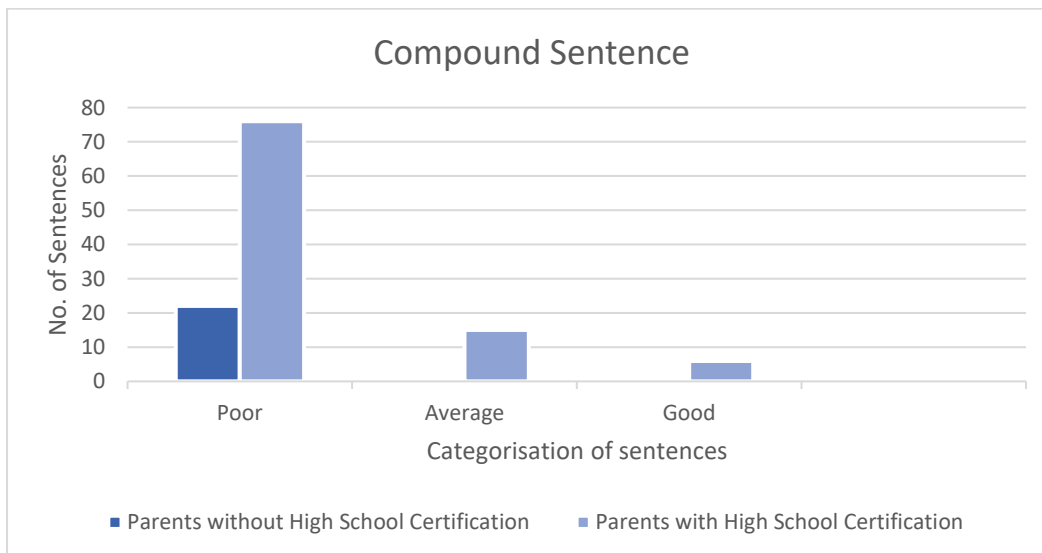

Figure 6. Compound sentences used by children based on parental education

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A significant statistical relation was seen between the use of compound sentences and parental education, $X^2(2, N = 120) = 4.346$, p = 0.114, as shown in figure 6. Children of parents with high school education were found to be better at framing compound sentences when compared to those of parents with no high school education. Though compound sentences were present in samples of children with no high school education, they were poorly framed.
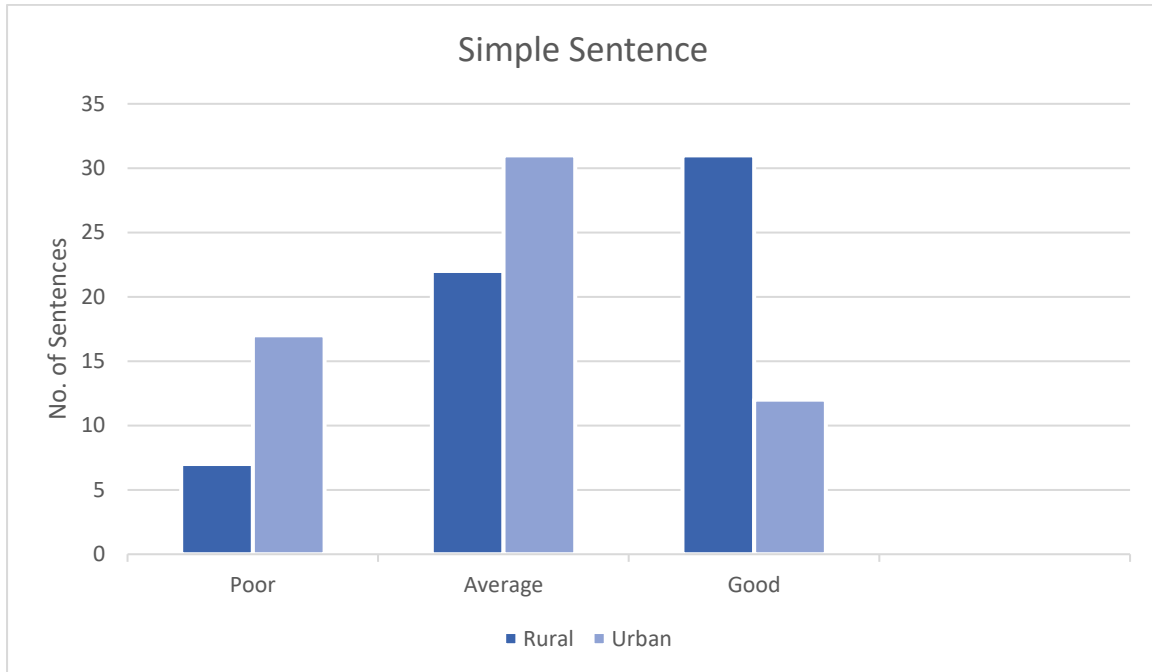
Sentence Types and Rural or Urban Area

Figure 7. Simple sentence categories used by rural and urban area children

In Figure 7, the number of simple sentences used by children in urban and rural areas is depicted. There is a significant $X^2(2, N = 120) = 14.090$, p < 0.001, the relationship between the use of several simple sentences and children from rural and urban schools. The children from the urban areas could frame good simple sentences than children from rural areas. However, both groups were able to frame a good number of averagely constructed simple sentences when compared to the other two categories.
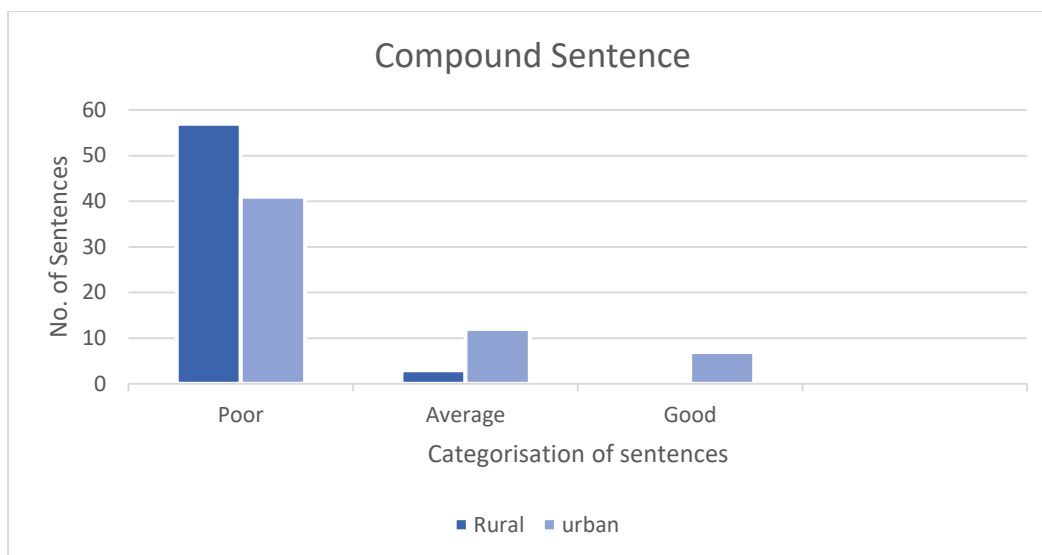
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Figure 8. Compound sentence categories used by rural and urban area children

The depiction of several compound sentences framed by children from rural and urban schools is seen in figure 8. Though a statistically significant (X^2(2, $N = 120$) = 15.012, p < 0.001) relationship existed between the sentence type and location of the school, most compound sentences were poorly framed. Only children from the urban schools were able to frame good compound sentences and were fewer than the simple sentences.

Discussion

Acquisition of language in bilinguals is a complex process influenced by the magnitude of cross-language relationships. It changes with the development, language experiences, and proficiency. Moreover, in sequential bilinguals, proficiency in both languages plays an important role in their daily environment (Konhert, 2010). The present study was an attempt to study aspects like lexical diversity and sentence types in sequential bilingual primary school children who were exposed to English (L2) as part of their academic curriculum.

Lexical Diversity in Bilinguals

The findings of the current study showed that lexical diversity does not significantly improve with grades during primary schooling. This lack of difference could be attributed to the variation in quality and quantity of input and the influence of literacy conditions at home and school (Huang & Kua, 2020; Moyer, 2014). In the early learning stage of successive bilinguals, the productivity in L2 is usually reduced (Rossello, 2001). They show a tendency to use a higher proportion of high-frequency words. This represents the presence of a limited lexicon in L2 that forces the less proficient users to use only the basic terms. It further limits the lexical detailing used in their descriptions (Noyau & Paprocka, 2000), as was seen in the present study. However, with the improvement in proficiency, productivity may also improve (Dewale & Paulenko, 2003). As a child passes from one grade to another, these experiences are likely to increase in frequency and quality.

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Concerning gender, literature has documented superior language functioning in females at an early age (Le Normand, Marie-Therese, Parisse & Cohen, 2008). As part of the dynamic language acquisition process, at age of 3 years, girls have increased vocabulary than boys. This could be due to the biological substrates catalyzing early word mapping and the cognitive abilities change more rapidly and earlier in girls (around 14 to 24 months) than boys (around 20 to 24 months). However, these gender differences appear early and diminish by 3 years. Later language acquisition mostly depends on the sociocultural influence rather than the gender difference. The most frequently occurring influence is the type and quality of care received (Ebert et al., 2013). The interaction patterns of the caregivers also differ with gender (Johnson, Caskey, Rand, Tucker & Vohr, 2014). These factors can highly influence language use and production in children.

In this study, male children have outperformed female children in lexical diversity. This could be the effect of the sociocultural influence and attitude towards English education for girls, especially in rural India (Natta, Saswathi, Desai & Vanneman, 2017). There is literature evidence that shows better vocabulary performance of males in a foreign language when compared to females during primary school (Edelenbos & Vinje, 2000).

Another important factor is the influence of the societal language and diverse home and school experiences (Huang & Kuo, 2020). Word learning depends on the opportunities obtained to process words and multiple exposures to the word that help in creating a flexible mental representation (Wasik, Barbara, Hindman & Snell, 2016). This learning occurs in the child's immediate environment with the community being a great influencer.

The ethnic diversity within the community determines the sociolinguistic characteristics of a child during elementary school years (Firmansyah, 2018). In the present study, English is the L2 for all participants. English in India has been used in its filtered forms and the indigenized form is used expansively. For example, extensive use of 'this', 'that', and 'some' instead of articles, 'a', and 'the' is noted, more frequently by the South Indian speakers. Similarly, source features transfer from the first language system like reduplication, lack of auxiliary inversion, and system-internal regularization like the count of mass nouns or emergence of verb-particle constructions. This causes the occurrence of a range in the competency of the L2 learners (Sharma, 2017).

Moreover, the L2 learners learn vocabulary additional to their L1 lexicon (Karslen, Lyster & Lervag, 2017). L2 learners often show a limitation in their vocabulary knowledge and a significant gap is noticed between them and their monolingual peers during their early years. This gap is later reduced by factors such as parental education and literacy activities at home. The literacy activities at home and the number of books available at home for the children have been identified as primary reasons for the development of lexicon in bilingual children (Rindermann & Baumister, 2015; Hoff, 2006). The other factor is the increasing number of English speakers in the urban cities and improvement in English education could be the reason for the better performance of children in the urban schools.

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Sentence Types in Bilinguals

As children grow, the lexicon improves and they begin to make sentences in correct word order (Hadley, McKenna & Rispoli, 2018; Rispoli & Hadley, 2011). A child uses a different level of discourse genres as he/she progresses through school (Westerveld & Moran, 2011). Moreover, to effectively gain the power of grammar, the child must be able to integrate the knowledge of vocabulary and syntactic structure in real-time to produce sentences (Hadley, McKenna & Rispoli, 2018).

The emergence of simple sentences in children is seen around 24 to 26 months with simple subject-verb-object or subject-verb combinations (Hadley, McKenna & Rispoli, 2018; Klee & Gavin, 2010). A steady increase in the number of such sentences is seen around 3 years of age. When children achieve the ability to frame more simple sentences with correct word order, they begin combining one sentence with another to form compound sentences (Mishra & Jha, 2013). The ability to produce compound sentences increases with the child's generative capacity and age (Mishra & Jha, 2013; Brown et al., 1969).

As seen in the present study's findings, children in fifth grade have used a greater number of compound sentences when compared to the third graders. This could be the effect of the input frequency and progression of language experience in the fifth graders. However, the use of complex sentences was limited and rarely noted in the samples. This is because the expression of complex relationships and ideas requires the utilization of complex syntactic structures (Lundine & McCauley, 2016).

The processing of complex sentences requires an understanding of the semantic account (iconicity); syntactic account (main and subordinate clause orders that are easier to process); frequency-based account (assumes forms frequently heard in the input) and capacity constrained (working memory capacity). Experimental studies have shown difficulty in processing such complex sentences even at 6, 9, or 12 years of age (de Ruiter, Theakston, Brandt & Lieven, 2018). This persisting difficulty in the formulation of well-framed complex sentences was seen across the samples in the current study as well.

A good number of researches have linked language learning and gender (Alahmadi & Lahlali, 2019). Although individual differences in language learning can occur, gender differences are apparent, especially when L2 performance is considered. Age and gender of sequential bilinguals affect the L2 in stages while inviting, processing, and producing the information received. Kissau (2006) showed, in his research findings, improved performance of females when compared to males primarily due to their motivation level. While females learn language due to interest and motivation, males may learn it for more practical reasons. Moreover, the various learning strategies used by females may also contribute to this effect (Tercanliogh, 2004). Thus, females can produce longer, syntactically correct sentences (Piasecka, 2010). Similar findings were obtained from this study. Some aspects of language acquisition are easier and faster in females than in males due to certain predetermined tendencies (Matiini, 2019).

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L2 learning also requires the adjustment of one's existing linguistic knowledge to accommodate the features of language in the context (Kaan, Futch, Fuertes, Mujcinovic & de la Fluente, 2019). Hence, in bilingual individuals, the complete form of sentence production could be the representation of the syntactic knowledge and lexicon that varies with the frequency of use (Sadat, Martin, Alario & Costa, 2011). This could be the reason for the regular use of well-framed simple sentences among both groups in this study.

Furthermore, in India, English (L2) has been adapted into informal genres with a great influence on the native substrate languages. Since the social category and parental education also largely determine the mode of acquisition for the individual, most errors seen in second language acquisition are interlingual, overgeneralization, incomplete application of the structural rules, and ignoring the rule of restriction (Corder, 1975). These errors mostly occur due to the negative transfer of the L1 structure (Al-khresheh, 2016). These errors are common when a language is newly introduced, with familiar patterns being more rightly produced, especially in young sequential bilinguals. It is most importantly dependent on the ability to perceive the newly received information, the L2 (Alahmadi & Lahlali, 2019). Sequential bilinguals communicate the intended meaning by overlying on the structure of the first language (Alahmadi & Lahlali, 2019). However, they are seen to correctly produce the most familiar and frequently known patterns. They store complete sentence structures in their declarative memory due to adaptation from repeated exposure (Kaschak & Borrenggine, 2008). Such examples were noted in the samples in the present study as well. Children were able to reproduce the most familiar patterns that they have heard and read, especially when they were simple sentence structures. An increasing number of English speakers at home due to higher education and urban exposure was identified as an important influence in such cases.

Conclusion

The present study considered semantic and syntactic aspects in young sequential bilinguals. While lexical diversity is a reliable measure of language production, other external influences may affect the performance. The constraints of a structural combination of words operate following qualitative constraints on word meanings that determine the grouping of words into phrases. Thus, for the study of syntactic development in children, clausal density also becomes an important measure when used along with utterance length and overall length of expository discourse (Westerveld & Moran, 2011; Nippold et al., 2005). Differentiation of problems in word combination to form sentences can be one important diagnostic feature to identify early difficulties in sentence structure formulation (Hadley, McKenna & Rispoli, 2018; Rispoli & Hadley, 2011). Thus, it can be said that semantic integration is influenced by the syntactic analysis, but does not contribute to the syntactic structure (Friederici & Weissenborn, 2007; Cruse, 2004; Hagoort, 2003). The role of external influences is to be kept under careful consideration while assessing bilingual language samples.

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