Factors in toddlers with late language emergence in a middle-income South African sample

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Abstract

Late language emergence (LLE) may result from genetic and environmental factors. Little is known about environmental factors in LLE in South Africa. The study describes the nature of differences in language functioning between toddlers with LLE and without LLE, and which factors were associated with LLE in a middle-income area in South Africa. Toddlers, aged 24- to 36 months with LLE (n=20) were matched with a control group (n=21) for household income, age, gender, maternal education and parental employment. The research group showed moderate delays in expressive and receptive language, and play skills, while the controls exhibited no delay. Significant differences in early feeding history and multilingual exposure were found between the groups. As far as known it is the first study utilising a South African middle-income sample indicating that multilingual exposure may play a role in LLE. The study focusses the attention on environmental factors which are potentially modifiable in LLE.

Keywords Late language emergence, LLE, toddlers, South Africa, middle-income sample, early multilingual exposure

Introduction

Late language emergence (LLE) in toddlers refers to a population of children who do not meet age expectations for expressive vocabulary size and emergent grammar structures at the age of 24 months (Capone Singleton, 2018). While typically developing toddlers show a variation in the onset of expressive language it is expected that they produce at least 50 words and start to combine them at 24 months (Rescorla, 1989). Young children are identified with LLE when not accomplishing this milestone. They are a separate group from children with other conditions for whom expressive language delay is a secondary symptom (Collisson et al., 2016).

LLE may be the result of a multifactorial causal mechanism of genetic and environmental factors. Boys are three times more likely to be diagnosed with LLE. Young children with LLE who develop language impairment may have a family history of language difficulties, with a first-degree relative mostly affected (Hammer et al., 2017). Environmental factors like socio-economic status, parental practices such as positive time spent with children, and the mental state of the mother also play a role in LLE (Collisson et al., 2016). Quality childcare has shown a positive effect on the development of young toddlers' language development, especially to buffer the effects of parental stress (Vernon-Feagans & Bratsch-Hines, 2013).While the search for causal factors is ongoing, future risks for a toddler with LLE have become clear.

Children with specific language impairment are known to have a history of LLE (Rudolph, 2017). They are at risk for less successful educational outcomes (Conti-Ramsden & Durkin, 2015). For this reason, LLE need to be identified as early as possible for early intervention services which may prevent ongoing delays (Capone Singleton, 2018). Since known risk factors for LLE were mostly studied in the USA and other countries it is important to determine how factors differ in South Africa.

Certain similarities in genetic risks such as male gender bias and family history of LLE are expected to remain the same but environmental factors may show variations. South African children learn language in multilingual environments with 11 official languages. Within the context of multilingual learning, there is often a mismatch between the different languages that young children are exposed to in the home setting and at early childhood development (ECD) centres (Margrain & Löfdahl Hultman, 2019). A child's two parents may speak different languages and the dominant language used at an ECD centre may differ from the home language/s. Middle-income households in South Africa sometimes recruit domestic workers to look after young children, while attending to household chores as well (Hilterman, 2018). Such a caregiver may be unprepared for the task when not schooled in ECD and not fluent in the child's dominant language. This may present another multilingual context for young children acquiring language.

While multilingual exposure cannot cause a language disorder, young children need sufficient exposure to each language in order to reach proficiency for school readiness (Collisson et al., 2016). Successful early language learning is greatly dependent on the child's language environment which relies on the quantity and quality of the linguistic input provided by caregivers (Ambrose et al., 2015). In a multilingual acquisition context, toddlers' language input is divided between two or more languages and they are likely to have less exposure to each language than toddlers who only hear one language (Hoff et al., 2012). (Nayeb et al., 2021). The exact relationship between monolingual and multilingual children with LLE is not clear because of limited research. As a guideline to clinicians and parents, it has been suggested that the combined word count of all languages involved reflect the early language knowledge of multilingual children (Hoff et al., 2012; Nayeb et al., 2021; Pearson, 2013). About 5 to 8% of monolingual children with LLE are later diagnosed with specific language impairment, but due to a lack of data available for multilingual LLE children, the percentage is believed to be the same (Eisenwort et al., 2020). Bilingual children with specific language impairment experience linguistic difficulties in both languages and learn both at a slower pace than monolingual peers (Aguilar-Mediavilla et al., 2019).

Socio-economic status has been described as a contributing environmental factor to LLE (Collisson et al., 2016; Conti-Ramsden & Durkin, 2015). As the child's ability to effectively acquire language has been strongly linked to their family's financial status (Korpilahti et al., 2016) monolingual as well as multilingual acquisition in children in deprived socio-economic households should be negatively affected. Past studies have included participants in both low- and high-income groups (Collisson et al., 2016; Hammer et al., 2017; Korpilahti et al., 2016; Nayeb et al., 2021) thereby not focusing on one socio-economic group only. In South Africa studies tend to focus on low socio-economic groups as there is such a dire need for services. In a recent study by Du Toit (2021) exposure to multiple languages was found to be the strongest indicator of developmental delay in children under 42 months in a low-income community in South Africa. Little is known about how multilingual learning affects children’s development in middle-income communities in South Africa.

The following research questions were posed: What is the nature of differences in language functioning between toddlers with LLE and a matched group with typical language development; and which factors are associated with LLE in toddlers from a South African middle-income area? The hypothesis is that known factors such as a family history of LLE, negative maternal mental state, a history of otitis media, serious illness, or hospitalizations in the first two years of life in the child, feeding difficulties directly after birth, and exposure to more than one language will be associated with LLE in research group participants. In contrast, being breast fed, born in a specific birth order, had siblings, attendance of an ECD centre or staying at home with a parent will be associated with typical language development in control group participants.

The study was conducted to increase an understanding of language differences associated with LLE and identify possible local factors associated with LLE that can be addressed in early communication intervention and parent guidance.

Method

Independent Ethics Board clearance was obtained (HUM18/0719). All parents gave written informed consent for their children to participate in the study.

Participants

A prospective two-group comparative design was followed. Toddlers, aged 24- to 36 months, with LLE (Research Group [RG] n=20) and with typical language development (Control Group [CG] n=21) were selected after they self-reported for the study. Thirty-one participants heard of the study through information that was sent out at two ECD centres in a homogeneous middle-income geographical area. The outstanding ten participants (RG=6; CG= 4) contacted the first author after they heard of the study through participants who were already recruited. The ECD centres were used for recruitment purposes as they offered similar caregiving and learning environments. Both centres had at least one trained ECD practitioner per class and implemented programs to facilitate early childhood development. Attendance of an ECD centre was not an inclusion criterion for the study. Recruitment was based on parental report of LLE, i.e. less than

50 words in the child's vocabulary (RG), or typical language development based on guidelines (CG) (Rice et al., 2008). LLE in the RG and typical language development in the CG was confirmed by administering the Rossetti Infant-Toddler Language Scale [RITLS] (Rossetti, 2006). Since there is no standardised vocabulary test in South Africa, parental report of the child's vocabulary size was initially used to recruit children for the study. Parental report was confirmed by using a language scale, the Rossetti Infant-Toddler Language Scale [RITLS] (Rossetti, 2006). The results of the RITLS were used to allocate participants to the RG and the CG. All children performing six months and more below their chronological age on the RITLS were included in the RG, indicating a language delay as per scoring guidelines. A score of three months or above, or three months or below chronological age on the RITLS, was considered age-appropriate language development and those children were included in the CG.

All participants were born at term and did not receive any neonatal intensive care. Since there is no universal newborn hearing screening legislation in South Africa, approximately 10% of newborns receive a hearing screen before leaving the birth hospital (de Kock et al., 2016). Possibly due to middle-income status and living in a large city, 14 of the 20 RG participants and 19 of the 21 CG participants received a newborn hearing screen. Participants had no known diagnosed genetic, neurological or cognitive conditions according to the Vineland Adaptive Behavior Scale [Vineland-3] (Sparrow et al., 2016) and normal sensorineural hearing as they passed a hearing screen at the time of data collection. Two participants in the RG received early communication intervention for less than three months. Household incomes were between US$ 370 to $ 2640 (ZAR 5600 to R40000) which is classified as middle-income in South Africa. All fathers worked full time (n=41). Mothers either worked full time (n=11 in the RG and CG), worked part-time (n=3 in the RG and CG), stayed at home full time to take care of the children (n=6 in the RG and the CG) and one mother was unemployed at the time (in the CG). The numbers for parental employment in the individual categories were too small to determine p-values for each section and a combined p-value = 1.0 was determined, indicating no significant difference between the groups. Participants either owned their own house or rented a place of living within a suburban area. There were two participants from single parent families, but both parents were involved with the children. All parents were required to read and write English proficiently to complete the Vineland-3 and the caregiver self-completed questionnaire.

The two groups of participants were matched as close as possible for the following factors known to impact language development: age, gender and maternal education. As shown in Table 1, no significant differences were found between the groups for these factors. Similar to maternal employment status the categories for education were too small to determine individual p-values and a combined value was determined.

Table 1. Similarities between RG and CG

	RG n=20	CG n=21	P-value
Mean age in months	31 (SD 3,6)	29 (SD 4,3)	0.4
	n (%)	n (%)	
Gender	Boys 17 (85%)	Boys 14 (67%)	0.158
	Girls 3 (15%)	Girls 7 (33%)	0.277
Maternal education			0.655
	Matric only 2 (4.8%)	Matric only 1 (10.0%)	
	Diploma 4 (23.8%)	Diploma 5 (20.0%)	
	Bachelor's degree 11 (42.9%)	Bachelor's degree 9 (55.0%)	
	Postgraduate degree 3 (28.6%)	Postgraduate degree 6 (15%)	
Maternal employment			1.0
	Full time 11(52%)	Full time 11 (55%)	
	Part time 3 (14%)	Part time 3 (15%)	
	Stayed at home 6 (29%)	Stayed at home 6 (30%)	
	Unemployed 1 (5%)	Unemployed 0 (0%)	

*SD=Standard deviation

Material

The Vineland-3 (Sparrow et al., 2016), a parent-reported measure is a reliable indicator to identify a developmental delay (Pepperdine & McCrimmon, 2018). It was used to exclude any genetic, neurologic and cognitive conditions in prospective participants. The RITLS (Rossetti,

2006) was used to assess the participants' communication functioning. The scale is a comprehensive criterion-referenced instrument that identifies preverbal and verbal communication skills in young children from birth to three years, measured according to 3-month age intervals. The six subscales include Interaction-attachment between parent and child, Pragmatics, Gesture, Play, Language comprehension and Language expression. The scale is administered using a combination of parental report, elicitation by play and child behaviors observed. Only the subscales of Play, Language comprehension and Language expression could be used in the study as there are no test items for the other subscales in the participants' age category.

Caregivers supplied information through a self-completed questionnaire on factors that could have influenced the child's language development. The main sections included pregnancy and birth history, medical and development history, information about childcare and language learning environments during daytime, and information about the household and electronic screen-time exposure. A specific question was included to address the child's development: 'Was there ever a diagnosis made that could affect speech development?' All questionnaires were filled out by mothers (n=41). The questionnaire is available on request from the corresponding author.

Procedures

All data were collected within one session of approximately 60 minutes by the first author, an experienced speech-language pathologist. Results of the session were discussed with the caregivers. Referrals for intervention were made if the child was allocated to the RG. Eighteen of the 20 participants in the RG were referred for early communication intervention. Two participants were already enrolled in therapy.

The hearing screen was conducted to exclude children with permanent hearing loss and identify a possible middle ear condition. Six participants (RG=4; CG=2) with a middle ear condition were referred for a medical follow-up but not excluded from the study as recurrent otitis media was a factor in the investigation. An otoscopic examination and immittance measurements were performed. Tympanometry included a reflex measurement at 1000Hz. The testing was conducted onsite, using the portable Biologic Audx equipment. Results were indicated as pass or fail.

When performing the RITLS (Rossetti, 2006), the first author played with participants for approximately 40 minutes to elicit appropriate communication behaviors. Scoring started six months below the child's chronological age until they failed any items of a subsequent interval. According to the RITLS scoring instructions, a child must demonstrate all behaviors of a particular age interval to score within that developmental age. Three months below or three months above age level are considered typical language development. A score of six months below chronological age is determined as mildly delayed, while six and twelve months below age expectations are moderately delayed, and more than twelve months below age expectations are ruled as severely delayed. The scale has been used successfully in South Africa (Van der Linde et al., 2016).

All child participants' expressive language was recorded in writing during the data-collection sessions to determine the total number of utterances as well as mean length of utterance (MLU) per participant. All utterances were recorded, regardless of the language used (Nayeb et al., 2021). For multilingual participants, parents reported toddlers' words in both languages, Afrikaans and English. As recommended by Pearson (2013) the total conceptual score was used instead of recording words in one language only. The concepts instead of the total number of words were counted. If the child had both 'cat' and 'kat' (Afrikaans for cat) in their inventory, only one word, indicating a similar concept, was counted to reach the total conceptual score. MLU is a reliable measurement of morpho-syntactic development in language acquisition studies of monolingual language acquisition as well as multilingual language development (Ezeizabarrena & Garcia Fernandez, 2018).

Data analysis

The RITLS (Rossetti, 2006) was analyzed by allocating a number on a scale of 1 to 5 to each of the following possible options as per scoring guidelines: 1 (allocated when there are no test items for an age interval, a typical feature of the scale), 2 for typical development, 3 for a mild delay, 4 for a moderate delay and 5 for a severe delay. Only Play, Language Comprehension and Language Expression could be analyzed as those were the subscales with a complete set of items. Data were analyzed using the T-test for equality of means with a 95% confidence interval. The RITLS (Rossetti, 2006) is scored in categorical intervals which makes it impossible to determine a mean age for Language Comprehension, Language Expression and Play. Therefore, the RG and CG were not compared in terms of developmental ages for the three subscales.

MLU was determined by calculating all morphemes spoken by a participant and dividing it by the total number of utterances during the particular data collection session. Fillers such as uhm were not counted, but words like hi, no and yeah were included; inflectional morphemes like plurals were counted as two morphemes and compound words were counted as one (Ezeizabarrena & Garcia Fernandez, 2018). The Sig (2-tailed) test for equality of variances was performed with a 95% confidence interval to compare the number of words and MLU of the RG and the CG.

The data of interest for the research in the questionnaire mainly consisted of categorical data. The CG was compared to the RG to determine similarities or differences in their early developmental history, medical history, multilingual exposure, daycare practices, parenting practices and RITLS results. P-values of less than 0.05 were considered as a statistically significant result. The t-test, Pearson Chi-Square and Fisher's exact test were used to analyze data with the SPSS software.

Reliability

Information about the study was given to all caregivers of 24 to 36-month toddlers at two similar ECD centres in the same geographical area. Social media posts were also sent out by the centres to ensure that parents had the same opportunity to self-report for the study. Some participants self-reported after hearing about the study from participants who were already included in the study. Recruitment of participants for the research was therefore largely non-biased. Strict inclusion criteria were followed to ensure that a homogeneous group of children with LLE (RG) and typical development (CG) were included for the study. Reliable measures like the Vineland-3 (Sparrow et al. 2016) and RITLS (Rossetti, 2006) were used to differentiate LLE from typically developing toddlers.

Results

Language characteristics

The results showed that the RG and the CG differed statistically (p= 0.00) in the subscales of Play, Language Comprehension and Language Expression. This indicates that the RG not only showed a significant delay in the expected receptive and expressive language skills but also in development of play skills when compared to the CG. All the participants in the RG showed delayed language acquisition according to the RITLS and none of the participants in the CG showed a delay. Mean scores as determined by the guidelines of the RITLS on a scale of 1 to 5, with 5 indicating a severe delay, were determined for the RG and the CG. The RG was moderately delayed (mean 4.35, 4.5 and 4.5; SD 0.745, 0.686 and 0.686) and the CG was typically developing (mean 2, SD 0.0) for all three subscales, with almost no difference between the subscales. As shown in Figure 1 the differences between the three subscales for the RG indicate that Play (4,35) showed a slightly better score than Language Comprehension and Expression (4,45 for both) but was still moderately delayed.

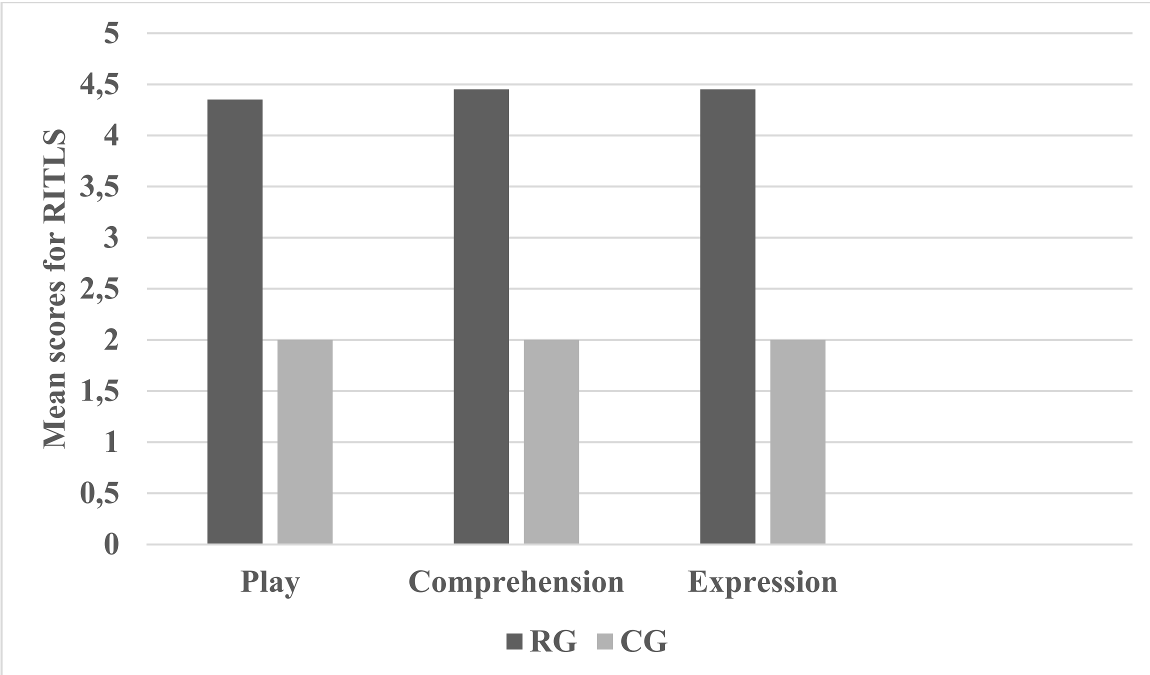

Figure 1. RG and CG mean scale scores for RITLS (n=41)

The expressive language characteristics of the RG and CG were further compared by determining the total number of words they produced during the play-based data collection session. As previously reported in Table 1, the mean age of the two groups were 31 months and 29 months, with no statistical difference between the mean ages. The mean number of words per session, counting separate words produced in either language (total conceptual score), for the RG was 17.8 words (SD 15.67), which indicates a high deviation within the dataset. The mean number of words for the CG was 46.5 (SD 7.67). The difference between the RG and the CG was 28.7 words (p=0.00, 95% confidence interval [CI]). The number of words for the RG varied between 1 and 63 words produced by the individual participants, while the variation in the CG was between 14 and 79 words.

The MLU of the RG, another measure of language expression, was 1.65 morphemes (SD 0.93). The MLU for a 31-month-old child is 2.85 morphemes (Ezeizabarrena & Garcia Fernandez, 2018). Since the mean age of the RG was 31 months this indicates a significant delay and supports the evidence from the RITLS mean scores. The MLU of the CG was 4.10 morphemes (SD 1.13) which were higher than the expected mean of 2.54 morphemes for the age of 29 months (Ezeizabarrena & Garcia Fernandez, 2018). A significant difference (p= 0.00, 95% CI) was determined between the two groups.

Differences in factors between RG and CG

The parent-reported questionnaire allowed investigation of certain genetic, health and environmental factors known to be associated with LLE. No statistically significant differences ($p < 0.05$) within the small sample size were found for a family history of LLE (p=0.547), being breast fed (p= 0.284), maternal mental well-being after birth (p=0.87), current maternal self-reported mental health (p=0.4), serious illness and hospitalizations of the child in the first three years of life (p=0.462), birth position of participant (p=1.0), number of siblings in the family (p=0.309), child care practices like attending ECD centres, staying at home with a mother or paid caregiver for the first two years of life (p=0.406) or recurrent episodes of otitis media (p=0.290). There were ten RG participants (47.62%) and 11 CG participants (52.38%) with no incidents of otitis media. Two RG participants (40%) and three in the CG (60%) had one incident of otitis media. Eight participants (53.33%) of the RG and seven (46.67%) of the CG had more than one incident of otitis media.

A significant difference (p=0.031) was calculated between the RG and CG regarding sucking and feeding difficulties after birth. The finding is based on a question in the questionnaire: 'Did your baby have any sucking or feeding related problems after birth? If yes, explain.' The self-reported difficulties included 'poor latching onto the breast' (n=4) and 'severe cramps when drinking' (n=1) in the RG. Cramps may possibly refer to infantile colic. No difficulties related to feeding were reported in the CG.

A significant difference (p=0.001) was calculated between the RG and CG for being exposed to additional languages. The RG showed significantly more additional language exposure than the CG. The parent-reported variables included the early and current language exposure of the child. Table 2 demonstrates the complex variety of monolingual and multilingual learning, distinguishing between Language 1 (L1), Language 2 (L2) and Language 3 (L3) in the participants. Three different language exposure groups could be distinguished among the participants (Pearson, 2013). Monolinguals, where participants had only been exposed to a single language at home and daycare; simultaneous bilinguals, where participants were exposed to both L1 and L2 at the same time since birth and when enrolled at daycare one of these languages was spoken; and early sequential multilinguals where participants were regularly exposed to L2 and L3 during daycare, or when cared for by a domestic worker at home in the absence of parents, before L1 was established.

The simultaneous bilinguals (n=4) were exposed to both L1 and L2 in equal parts because their parents spoke different languages. Mothers reported that these four participants had no dominant language at the time of assessment. The balanced bilinguals were all in the RG, displaying moderate delays in language expression and comprehension, and play skills. The early sequential bilinguals had different combinations of exposure to additional languages (RG n=14; CG n=7).

Within the RG, seven participants had L2 exposure only at the ECD centre, five participants had L2 and/ or L3 exposure when cared for by domestic workers at home, and two participants had L2 exposure through siblings who attend primary schools where the medium of instruction is the children's L2. Within the CG, only seven participants had bilingual exposure, either through ECD (n=4) or at home (n=3) where L2 was intentionally taught by parents.

Table 2. Variations in participants' language exposure (n=41)

Language learning group	**Languages**	**RG**	**CG**	**Total**
Monolinguals	Afrikaans (L1) only	2	14	16
Simultaneous bilinguals	Balanced Afrikaans and English exposure	4	0	4
Early sequential bilinguals	Afrikaans (L1) with some English (L2) exposure	9	5	14
	English (L1) with some Afrikaans (L2)	3	2	5
	English (L1) with Afrikaans. (L2) and Sesotho (L3)	1	0	1
	Afrikaans (L1) with English (L2) and isiZulu (L3)	1	0	1
	Total	n=20	n=21	n=41

Table 3 shows a detailed summary of individual RG participants' RITLS (Rossetti, 2006) scores on the subscales Play, Language comprehension and Language expression with the language/s that the child was exposed to.

Table 3: RITLS results and language exposure of individual RG participants (n=20)

Participant	Play	Language comprehension	Language expression	Language Exposure
1	4	4	4	*Early sequential bilingual*: Afrikaans (L1) with some English
2	3	5	5	*Monolingual*: Afrikaans (L1)
3	5	5	5	*Simultaneous bilingual*: Balanced Afrikaans & English
4	5	5	5	*Simultaneous bilingual*: Balanced Afrikaans & English
5	5	5	5	*Simultaneous bilingual*: Balanced Afrikaans & English
6	3	3	3	*Monolingual*: Afrikaans (L1)
7	5	5	5	*Early sequential bilingual*: Afrikaans (L1) with some English (L2)
8	5	5	5	*Early sequential multilingual*: Afrikaans (L1), English (L2) & Sesotho (L3)
9	5	5	5	*Early sequential multilingual*: Afrikaans (L1), English (L2) & Isizulu (L3)
10	4	4	4	*Early sequential bilingual*: Afrikaans (L1) with some English (L2)
11	4	4	4	*Early sequential bilingual*: Afrikaans (L1) with some English (L2)
12	5	5	5	*Early sequential bilingual*: English (L1) with some Afrikaans (L2)

13	5	4	4	*Early sequential bilingual*: English (L1) with some Afrikaans (L2)
14	4	4	4	*Early sequential bilingual*: English (L1) with some Afrikaans (L2)
15	5	5	5	*Monolingual*: Afrikaans (L1)
16	4	4	4	*Simultaneous bilingual*: Afrikaans & English
17	5	5	5	*Early sequential bilingual*: Afrikaans (L1) with some English (L2)
18	4	4	4	*Simultaneous bilingual*: Afrikaans & English
19	3	3	3	*Simultaneous bilingual*: Afrikaans & English
20	4	4	4	*Early sequential bilingual*: Afrikaans (L1) with some English (L2)

Discussion

The results showed significant differences between the RG and CG for three different measures of language learning, where the RG showed significant poorer results in the areas of Play, Language Comprehension and Language Expression, mean word count and MLU. Variations in standard deviations among participants in the RG were considerable, while more even scores were observed within the CG. The two groups were closely matched for age, gender, household income, maternal education and employment. Based on maternal report, there were no significant genetic, health-related and environmental differences, such as childcare practices between the groups that could have influenced language acquisition. The difference in language measures between the two groups was expected, as LLE was the focus of the study, but the nature of differences became clearer with further analysis.

Although it is reported that there are two separate groups of children with LLE, one group with an expressive and receptive language delay and another with an expressive delay only (Bleses & Vach, 2013; Collisson et al., 2016), all RG (n=20), participants in this study showed both receptive and expressive language delays. The presence of an expressive and receptive language delay at the age of 24 months has been linked to persistent language disorder at the age of four years (Capone Singleton, 2018).

Within the small sample size participants in the RG also showed a concomitant delay in play skills. None of the CG participants showed a depression in play skills. Play skills are known to be challenging for children with LLE and may influence their social competence at the age of 33 months (Brekke Stangeland, 2017). Both symbolic play and language acquisition emerge during the second year of life and have been shown to be closely associated (Quinn et al., 2018). Specific play skills shown to be delayed in the RG with the RITLS were inability to choose two toys deliberately, imitate housework activities, show pretend play using two toys, show variation in play with toys, group objects in play, put away toys on request and perform longer sequences of play. LLE combined with a lack of symbolic play are more strongly associated with long-term difficulties than LLE by itself (Paul & Weismer, 2013). The results may have clinical implications for the assessment of children with LLE. It appears that children with LLE should be assessed comprehensively, moving away from a narrow focus on expressive language only.

Statistically significant differences were determined between the RG and CG for the total number of words (concepts) used and MLU, indicating that participants with LLE indeed develop language differently from typically developing toddlers. The results not only indicated the degree of language delay (moderate delay according to the RITLS), but also the reduced number of words used within a play session with an adult, and reduced length of their utterances. The mean MLU of 1.65 morphemes in the RG indicates that their productions rarely showed combinations of morphemes. At the average age of 31 months the RG mostly used single morpheme productions. The result confirms that the RG represent a group of LLE toddlers who, in the in the absence of any other complications like low birth weight, prematurity, neurological or genetic conditions, did not combine two words by the age of 24 month (Rice et al., 2008).

Possibly due to the small sample size the results did not show any significant differences between the RG and CG for topics being investigated in recent LLE studies, such as a family history of LLE (Hammer et al., 2017), recurrent otitis media (Zumach et al., 2010), history of breastfeeding (Mahurin Smith, 2015), maternal mental-health (Collisson et al., 2016), birth position and siblings (Collisson et al., 2016), or childcare practices like attending ECD centres, and staying at home with a mother or paid caregiver (Hammer et al., 2017; Vernon-Feagans & Bratsch-Hines, 2013).

Two significant differences in factors were found between the two groups. Both these factors may point to environmental differences in language learning exposure between the two study groups. A significant difference was found regarding early feeding difficulties. It is reported that children with language impairment are three times more likely to have a history of feeding problems (Malas et al., 2017). In a prior study the same authors suggested that feeding difficulties may be used as a possible marker for risk of language delays (Malas et al., 2015). They suggest that feeding problems influence communication interaction between the parent and child during mealtimes, which provide important opportunities for language stimulation and social interaction. The authors further suggest that oral motor difficulties involved in sucking might have an influence on later neurodevelopmental outcomes. The current finding is therefore supported by previous studies, and points to the importance of reviewing a child's feeding history during speech-language assessments. It appears that feeding difficulties in the RG may have been the earliest indicator of their risk of LLE. The results also indicate to the importance of resolving early feeding difficulties in infants and raising awareness of the possible risk of deprived language learning during problematic mealtimes.

The second environmental factor indicating a significant difference between the groups was multilingual exposure. Participants who were exposed to more than one language (multilinguals) were more likely to be identified with LLE. Patterns of bilingual exposure involved both simultaneous and sequential bilingual learning. The monolingual participants in the CG (n=16) were the least likely to develop LLE. Since language acquisition depends on the conversation experiences that children participate in, multilingual exposure may not always reflect the same quality and quantity as in monolingual development (Hoff, 2018).

Some studies report an associative link between LLE and an early bilingual language learning environment (Bleses & Vach, 2013; Collisson et al., 2016; Rice et al., 2008). The results should also be viewed against the temporary nature of language delay during bilingual acquisition. Young children who are early simultaneous bilinguals or sequential bilinguals may be misdiagnosed with an impairment of language acquisition, while it may only reflect that they have not yet fully mastered both languages they are exposed to (Eisenwort et al., 2020). The true nature of language delay may only be revealed in a longitudinal study investigating LLE in the RG, but where two groups are matched for bilingual exposure.

Although it is challenging to determine assessment measures for bilinguals with LLE, certain guidelines have been suggested by Pearson (2013). By 30 months a child should be able to combine words in either single or mixed utterances. A lower vocabulary inventory should be viewed as transitory, but late onset of language may be more serious. Since participants in the RG (mean age 31 months) showed late onset of language and were not yet combining two morphemes, it may be more likely that they are presenting with LLE. There is also evidence that a bilingual delay can be observed in the delayed emergence of syntax (Pearson, 2013). All participants in the RG may therefore be at risk of persistent language disorder and should be followed-up in early communication intervention, with specific guidance to parents on bilingual learning.

The diagnosis of LLE has become an important predictor in the identification of specific language impairment (Rudolph, 2017). Identifying specific language impairment earlier, rather than later may lead to more effective intervention (Diepeveen et al., 2016). Multilingual children show greater individual variability in languages than monolingual children, which causes difficulties when assessing for a specific language impairment (Marinis et al., 2017) Marinis et al. (2017) suggest that all languages that the child is exposed to should be assessed to address specific language impairment effectively, but reliable norms are not available for multilingual children. South African speech-language pathologists are challenged to identify the linguistic differences in multilingual children with specific language impairment as clinicians are often not skilled in wide variety of languages (Khoza-Shangase & Mophosho, 2021) .

The current study's findings are supported by another recent South African study in a low-income peri-urban area. The study indicated that exposure to multiple languages in young children of 42 months was most indicative of a risk of developmental delay (du Toit et al., 2021). Participants with LLE in the current research were from a middle-income area but it appears that exposure to an additional language and sometimes a third language may have played a role in the late emergence of language, even without the risk of low household income. The finding may suggest a link between some children with LLE and multilingual exposure regardless of SES. As far as known no other studies of middle-income groups only are available to provide any comparitive data.

Conclusion

The study described differences in language characteristics, early feeding history and multilingual exposures between participants with LLE and a typically developing matched group from a middle-income South African suburb. Further questions are raised about environmental factors, in particular the quality and quantity of young children's language exposure when they display early feeding difficulties and within multilingual learning settings. As far as known it is the first study utilising a South African middle-income sample indicating that multilingual exposure may play a role in LLE. The results showed the complexity of distinguishing between toddlers who are multilingual learners and display LLE. Longitudinal follow-up of multilingual learners may clarify differences. The study focusses the attention on environmental factors which are potentially modifiable in LLE. Due to the small sample size the study is viewed as exploratory and the topic requires further investigation with a larger sample.

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