Language acquisition in Setswana speaking infants aged 8 to 18 months

BY

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature: SYALALA Date: 29 Oct 2021

ABSTRACT

Little is known about the early acquisition of Setswana, with only a few small-scale studies of children under three-years-old. To address this gap, teams from southern Africa are adapting the MacArthur-Bates Communicative Development Inventory (CDI) for local languages. The CDI is an assessment tool completed by parents, which gauges a child's gestures and receptive and expressive vocabulary. This study aimed to adapt and pilot the first Setswana CDI for infants aged eight to 18 months living in Botswana. The original US-CDI was adapted by three linguists who are mother-tongue Setswana speakers. Thereafter, we consulted 12 informants who are mother-tongue Setswana speakers, and either work with young children or are parents of young children. The tool was adjusted and piloted on 28 parents/caregivers of infants, who were recruited from two health clinics in urban and peri-urban areas. Results show that lexical comprehension and production correlate significantly with age. At 8.9 months, children could comprehend an average of 11.5 words and produce an average of three words. By 18 months, vocabulary had grown to an average of 183 words comprehended and 22.3 produced. Nouns made up 50% of receptive vocabulary and 57.1% of expressive vocabulary, while verbs made up 33.8% and 9.5% of receptive and expressive vocabulary respectively. The infants also produced between 10 and 62 actions and gestures, and these were significantly correlated with age. Children at 8-months-old knew an average of 17.5 actions/gestures, which increased to an average of 46.3 actions/gestures by 18 months. High exposure to another language besides Setswana had a significant negative effect on the gesture scores, and the lexical scores had a similar pattern although it was not statistically significant. The factors of gender and area did not have an effect on language scores. The results of this pilot are in line with findings from other studies, however this study highlights some key issues in adapting the CDI for southern African languages and cultures. The early receptive and expressive vocabulary of Setswana-speaking children has different word types to other languages. With further adaptations, the CDI developed for Setswana will be a reliable tool for measuring early acquisition.

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CHAPTER 1 – INTRODUCTION

1.1 Research Aim and Questions

Rationale

Most of the existing research on the languages of Botswana, including Setswana, has centred around four main themes – language use and attitudes; language policies, especially in the education sector; the grammar and structure of Setswana; and the politics of minority languages in Botswana. There has been very little empirical research on early acquisition of Setswana, which has implications in many fields and disciplines outside of academic research, including early education and clinical intervention and treatment relating to language development, delays and disorders. Moreover, evidence suggests that the linguistic capabilities of a child before the second year are highly crucial and indicative of the overall development of language (Swingley, 2009). Thus, an important direction that emerging research in child language can take is how African languages, such as Setswana, develop in the early stages of childhood.

Aim

The aim of this study is to describe the development of gesture and lexicon in children acquiring Setswana between the ages of eight months and 18 months by adapting the MacArthur-Bates Communicative Development Inventory (www.mb-cdi.stanford.edu) for Setswana to answer the following research questions:

1. What is the trajectory of lexical comprehension in children aged 8-18 months?
2. What is the trajectory of lexical production in children aged 8-18 months?
3. What is the relationship of gestural acquisition to lexical comprehension and production?
4. What is the impact of specific environmental and social factors on language development?

1.2 Background to Botswana

Botswana is a small landlocked country covering 582,000km², about the same size as France, and has a population of about 2.2 million people (Eberhard, Simons, & Fennig, 2019). It is situated in southern Africa, and shares borders with South Africa to the south, Zambia to the north, Zimbabwe to the east, and Namibia to the west. During the European colonial era, Botswana was a British protectorate known as Bechuanaland. It gained its independence in 1966 and has since thrived as a peaceful and democratic nation.

The population is distributed between rural areas which are made up of villages, cattle posts and arable lands, and urban areas which include cities and towns, as well as urban villages which are villages on the periphery of cities/towns (known as peri-urban areas). Of the total population, 36.1% are living in rural areas, 43% in peri-urban areas, and 20.9% in cities and towns (Statistics Botswana, 2018). This follows rapid urbanisation between 1981 and 1991, due in part to the reclassification of some rural settlements and villages as "urban". Before this decade of reclassification, about 70% of the total population was considered to be living in rural areas (Hope & Edge, 1996).

There is a staggering disparity between the standards of living in the urban areas and the rural areas of Botswana. During the 1980s, the income inequality index[1] was at an astounding 47.4 – the highest of all countries in the world. Paradoxically, during the same period Botswana was also renowned for having one of the fastest growing economies in post-colonial Africa (Hope & Edge, 1996).

According to a study on the poverty datum line (PDL) done in 1991 by the government of Botswana (as cited in Hope & Edge, 1996), 30% of urban families were living below the PDL, compared to 64% in the rural areas. Furthermore, on average urban households below the poverty line fell 17% below the PDL, while rural households fell 33% below the PDL. Not only are there more than twice as many rural households below the poverty line than there are urban households, the average amount by which rural households fall below the line was also double that of the urban households (Hope & Edge, 1996). Over the years, national poverty levels have improved, although development is still uneven and the inequality

[1] Income inequality index is measured by the ratio of the income share of the highest 20% of households to the lowest 20% of households, for all countries in the world for which statistics are available. (*Human Development Report 1994* by United Nations Development Programme (UNDP), as cited in Hope & Edge, 1996)

between rural and urban income is still glaringly apparent. By the year 2002, the national average of people living in absolute poverty – or under the 'dollar a day' line – was just under a quarter of the total population (Statistics Botswana, 2004). Living in absolute poverty is associated with living in a rural area. About one third of the population (36.1%) live in rural areas - and in poverty - and the other two thirds live in urban and peri-urban areas (20.9% and 43.0% respectively) (Statistics Botswana, 2018).

Socio-economic status (SES), including household income and poverty levels, have been shown to have a significant effect on child development (see Hackman & Farah, 2009). The urban-rural divide in Botswana is thus a relevant factor in studying the development of a child, from when they start to learn language until the school going years. There is in fact evidence that suggests schoolchildren in urban areas are outperforming their rural counterparts. This has been found in all learning areas, including literacy (sixth grade literacy scores from a reading test showed that on average, a rural learner scores 36.7 points lower than their urban counterpart), numeracy and mathematics, as well as science and life skills (see Chinapah, 2003; Zhang, 2006).

1.3 Languages in Botswana

It is estimated that there are almost 40 languages spoken in Botswana today (Eberhard, Simons, & Fennig, 2020). However, unlike most other African countries, it has a local native lingua franca, Setswana, which is used by the overwhelming majority of people. The second largest language group is Kalanga, a southern Bantu language belonging to the Shona language family (Bagwasi, 2003). There are also the Khoe, Kx'a and Tuu languages, which are spoken by the indigenous hunter-gatherers from a diverse number of small cultures (Hammarström, Forkel, Haspelmath, Bank, & Sebastian, 2020). In official matters they are collectively recognised as one group called the Basarwa.

The seTswana and Kalanga people (or Batswana and Bakalaka as they are known in Setswana, and from henceforth) make up 79% and 11% of the population respectively, while the Basarwa make up 3% (Bagwasi, 2003). The remaining 7% is made up of smaller Bantu language-speaking tribes that migrated into Botswana from the northern and western regions of Africa, as well as non-African migrants who speak Afrikaans, English, Gujarati and Mandarin Chinese, among others (Janson & Tsonope, 1991). Table 1.3.a expounds on the

Language Family	*Sub-family*	*Language*
Narrow Bantu (Niger-Congo)		
	Central-Western Bantu	
		Diriku
		Herero
		Mbukushu
		Yeyi
	East Bantu	
		Birwa
		Chewa
		Kalanga
		Kgalagadi
		Lozi
		Nambya
		Ndebele
		Tswana
		Sotho, Southern
		Sotho, Northern
		Subiya (Kuhane)
		Tswapong
		Xhosa
		Zezuru
		Zulu
Khoe		
	Khoekhoe	
		Hai‖om
	Kalahari Khoe	
		Khwedam
		Naro
		ǀGwi
		‖Gana
		‖Ani
		Tshuwau
		Kua
		Shua
Kx'a		
	ǂ'Amkhoe	
		N!aqriaxe
		ǂHoan
		Sasi
	!Kung	
		Juǀ'hoansi
		Ekoka !Kung
Tuu		
	Taa	
		Lower Nossob
		!Xóõ

Table 1.3.a Languages Spoken in Botswana

languages in Botswana (cf. Eberhard, Simons, & Fennig, 2020; Hammarström, Forkel, Haspelmath, Bank, & Sebastian, 2020).

Setswana is used for everyday communication in government offices, local business, traditional courts etc. and is the national language of the country. The official language of the country is English, and it is the high-status language reserved for official use in business, administration, legal courts, etc. (Nyati-Ramahobo, 2000). In education, the national policy states that Setswana is the language of instruction in early education, and from the third year of primary onwards the language of teaching and learning is English (Bagwasi, 2003). The realities of educational and classroom practices are that the policy is not always strictly adhered to, and Setswana is often used as the medium of instruction throughout primary education (Nyati-Ramahobo, 2000). Nevertheless, as a result of its official status and use in economic functions, English is often given a higher value in Botswana, while the value of Setswana is linked with cultural identity and heritage (Bagwasi, 2003).

As a result of these language attitudes, a significant proportion of Batswana are fluent in both languages. According to Bagwasi (2003), 35% to 40% of the population speaks English, over and above the 70-80% of the population that speaks Setswana. Therefore, the role of both languages in the society does not always in practice adhere to official policy, not only in education, but also in official domains such as business, administration etc. For example, although English is the official language in legal courts, Setswana is occasionally used in the courtroom, when one of the parties involved is not well-versed in the English language and may not be able to fully comprehend the legal proceedings (Nyati-Ramahobo, 2000).

1.3.1 Description of Setswana

Setswana is a south-eastern Bantu language in the Sotho-Tswana language family and is spoken in southern Africa by approximately 13.6 million people as either a first or a second language (Eberhard, Simons, & Fennig, 2019). Setswana is geographically the most widely spread southern Bantu language (Cole, 1955). It is the national language of Botswana, one of the 11 official languages of South Africa, and is also a recognised language in both Namibia and Zimbabwe where it is spoken by a small minority (Eberhard, Simons, & Fennig, 2019).

Before 1966, the year of Botswana's independence from British colonial rule, Batswana were politically grouped by their tribes into many different states. Our oral history narrates the movement of these tribes including how some tribes were formed as a result of having splintered away from another (Janson & Tsonope, 1991). For instance, four of the major groups recognised to this day are closely related: the Batawana had splintered from the Bangwato, and the Bangwato and Bangwaketse had earlier splintered away from the Bakwena (Janson & Tsonope, 1991). The other major tribal groups in Botswana are the Balete, Batlokwa, Barolong, and the Bakgatla. (See Figure 1.3.b for the major tribes and their secessions).

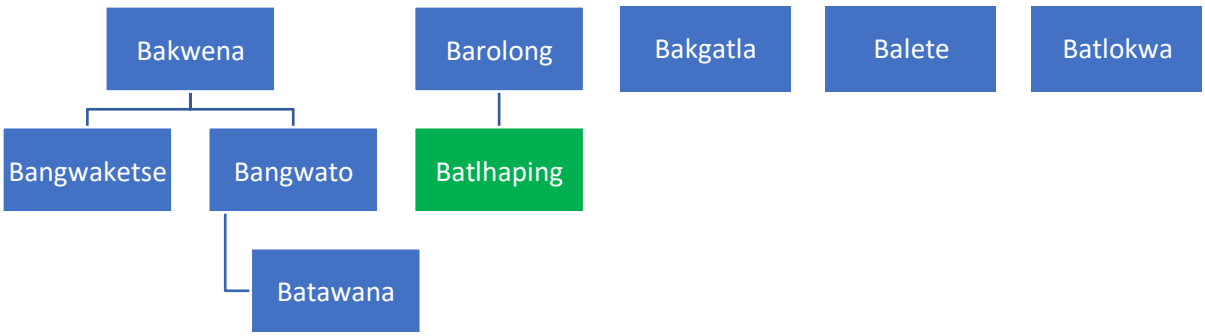

Figure 1.3.b Tribal Groups of Batswana

The dialectal variations of Setswana spoken by these tribes are considered to be what make up the language of Setswana – indeed they are the eight tribes and dialects recognised in the constitution as the majority (Nyati-Ramahobo, 2000). The term 'majority' here does not refer to number, but rather dominance, and whether or not a tribe or dialect is one of the eight that constitute Batswana/Setswana. For example, in the North-West district of Ngamiland live the Wayeyi tribe, who originate from Namibia and arrived in the region before any Setswana tribes and make up 40% of the population in the district. However, they are considered to be a minority as they are not one of the eight Setswana tribes. The majority tribe is the Batawana, who 'rule' over and represent in the national assembly the Wayeyi and

other tribes in that region, even though Batawana make up about 1% of the Ngamiland population (Nyati-Ramahobo, 2000).

The Batlhaping, who splintered from the Barolong tribe, mostly live in present day South Africa (Cole, 1955), which is why they are not recognised as a majority tribe in Botswana. However, they are significant from a linguistic perspective because early missionaries first settled among them and thus used the Setlhaping dialect as a basis for written language in the Bible translations and educational materials produced. (Cole, 1955).

The orthographic system based on Setlhaping phonology mostly persisted as the standard orthography, until a conference[2] in 1937 – more than 100 hundred years after the introduction of written language – where purposeful language planning efforts resulted in the standard orthography used today. This orthography is not based on the sound system of any one dialect, but rather is generalised to be inclined towards forms found in and close to the centre of the area where Setswana is spoken (Janson & Tsonope, 1991). This area is mostly on the eastern side of the country, around the Central, South-East and Kweneng districts (areas three, seven and nine respectively on Figure 1.3.c).

Differences between the Setswana dialects include phonetic structure, grammatical structure and vocabulary (Janson & Tsonope, 1991). Some phonetic variations include words such as ‘soap’, which is known as *molora* in dialects like Sengwato, and as *sesepa* in dialects like Sekgatla. The traditional dish ‘samp and beans’ is known as *lehata* in Sengwato, while those who speak Sengwaketse refer to it as *dikgobe*. The phonetic structure of Sengwato differs from most other dialects, for example, by replacing /f/ with /h/ and replacing /tl/ with /t/ (Janson & Tsonope, 1991) thus *lehata* in ‘standard’ Setswana would be *lefatla*. For the purposes of this study however, dialectal differences are acknowledged only so far as they relate to variations in vocabulary.

[2] A conference in Johannesburg, South Africa, with representatives from the education departments of the Bechuanaland Protectorate, the Cape Province, Orange Free State and the Transvaal, as well as the Inter-University committee for African Studies. Recommendations published as *A practical orthography for Tswana* (Lestrade, 1937)

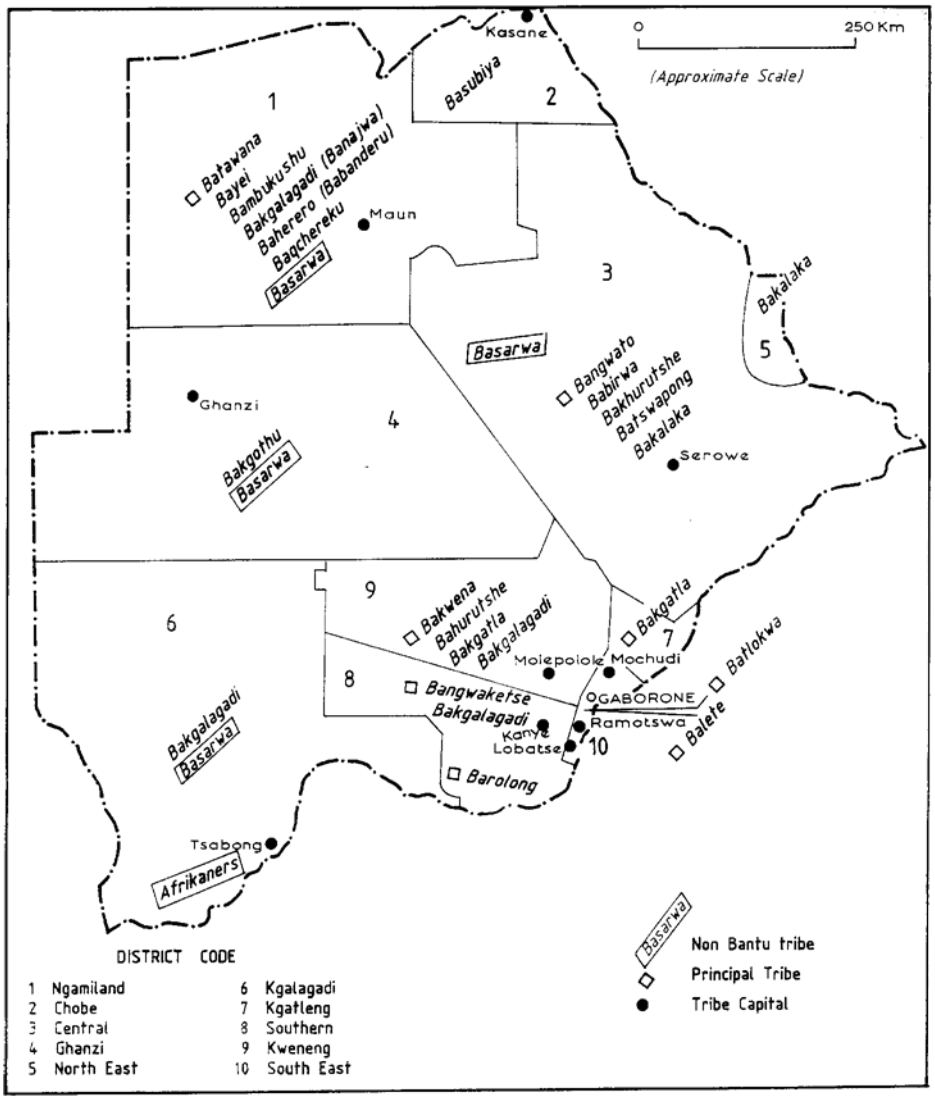

Figure 1.3.c Botswana Tribal Distribution by District (Nyati-Ramahobo, 1999, p. 83)

Based on the distribution of Setswana varieties as shown in the map above, and the area where participants in this study were recruited from, I expect that the sample in this study will be from the Batlokwa and Bakgatla tribes. If they were to speak any languages other than Setswana, these will most likely be English and Sekgalagadi.

CHAPTER 2 – LITERATURE REVIEW

This chapter gives an overview of the existing research on early language development. It begins with a summary of studies focusing on the acquisition of Setswana. Thereafter, tools that measure language development are discussed, specifically the CDI tool which was implemented in the present study, as well as some important considerations to be made when adapting tools across cultures and languages are outlined. Next, the observed patterns of lexical and gestural development are discussed. This includes the progression of receptive and expressive vocabulary over the first two years of life, especially that of nouns and verbs. Also outlined is the different gesture types found in the CDI, and how they develop in both typical and atypical populations. Finally, various individual factors and SES factors that have been shown to have an effect on language development are summarised.

2.1 The Acquisition of Setswana and Related Languages

Very little research on Setswana and languages in Botswana has had a psycholinguistic focus, and so we have very little evidence of how the language develops in children. The few acquisitional studies which have been done and are described below, all involved a sample of children aged two years and above, and so the very early developmental features and trajectory remain unexplored.

There are some acquisitional studies on Setswana-speakers and their acquisition of a second language. For example, Magogwe & Oliver (2007) looked at how mother-tongue Setswana-speaking children at school level acquire English as a second language. There was also a study which focused on how children who have hearing impairments acquire the formal Botswana sign language as a second sign language, having first developed a homesign system as their first language (Mukhopadhyay & Sison, 2006).

There are only a few studies which have described child language development in Setswana. Grammatical aspects are discussed in an unpublished dissertation by Tsonope (1988) who conducted a longitudinal study using a sample of two children to study the acquisition of the noun class system and agreement morphology, focusing mainly on demonstratives and possessives. Tsonope also discusses the acquisition of noun class

prefixes, and how concord and agreement markers develop (Tsonope, 1993; 1991/92). These are the only acquisition studies with a sample from Botswana, while the rest were with a South African sample.

A study by Bortz (2013) demonstrated the acquisition of the passive construction in Setswana, with a sample of 114 preschoolers aged between 2.6 and 5.5 years old. Phonological aspects of development have been studied in preschoolers aged 2;0 to 6;5 years acquiring the Kwena dialect of Setswana in South Africa (Mahura & Pascoe, 2016; Mahura 2021).

There are two studies which have been done on the lexical development of Setswana, particularly pertaining to specific semantic categories. Davies, Corbett, McGurk, & Jerrett (1994) studied the acquisition of Setswana colour terms in primary school children aged 5-9 years old, as a test of the theory of basic colour term universals by Berlin & Kay (1991). The second study is an unpublished dissertation by Tshule (2014) which focuses on interrogatives (such as 'who', 'what', etc.) in Setswana. He used a sample of 347 preschoolers aged 3.0 to 5.11 to describe development in the comprehension and production of *who, what, when, where, why, which,* & *how* in Setswana. This study concluded that not only is the comprehension of information words easier than their production but additionally, question words *what, where,* and *who* were easiest for all the children. This was followed by *how* and *why* questions, while*when* and *which* were more complex concepts which children across the age range struggled to comprehend or produce, and the youngest cohort of 3-year-olds did not produce *when* questions at all.

Studies on the acquisition of closely related languages may also be relevant. For example, South Sotho is a language that is closely related and mostly intelligible with Setswana. It has been much more extensively researched, mainly by K. Demuth and colleagues. Several studies have been completed on the development of aspects such as prosody and tone (see Demuth, 1995), phonology (Demuth, 2007); passive constructions (cf. Demuth, 1989; Demuth, Moloi & Machobane, 2010); as well as the noun class system and agreement (cf. Demuth & Ellis 2009; Demuth & Weschler, 2012; Demuth, Machobane & Moloi, 2009). However, these are all also based on evidence from children above two years of age.

2.2 Measuring Language Acquisition in Children

There are a number of methods that can be used to describe and measure language development in children, whether for clinical, research or educational purposes, and each of them has advantages and disadvantages. One could use direct testing as with assessment tools, analyse recorded language samples, or alternatively, use a parent's report of their child's language skill (Feldman et al., 2005). The most commonly used method in non-clinical research is analysing recordings of child speech. However, this method is time consuming, and it is difficult to analyse enough children to establish typical development. To establish typical development, parent report instruments can be used.

2.2.1 The MacArthur-Bates Communicative Development Inventory

One of the most widely used standardised tools that has been constructed to describe language development in children, is the MacArthur-Bates Communicative Development Inventory (CDI). The CDI is a measure that uses parental reporting to gauge a child's language skills.

The CDI is a parental report assessment in questionnaire format; it is a checklist of the comprehension and production of gestures, words and sentences in children aged eight months to 36 months (Fenson et al., 1994, 2007). The CDIs have been used extensively for academic research, as they provide normative data to describe early language acquisition (Law & Roy, 2008). The CDI measures language development in terms of the production of gestures, words and sentences, as perceived by the primary caregiver (Fenson et al., 2007). They have also been used in clinical assessments, to aid in identifying and describing children whose language development is delayed or atypical (Law & Roy, 2008). The CDI has been used to establish norms describing the age at which various linguistic features are established. However, while CDI norms can describe the age at which different linguistic features are established and can identify children whose language is delayed or developing atypically, the CDIs are not designed to diagnose Specific Language Disorders (Fenson et al., 2007). Nevertheless, it is the most widely used assessment and research tool for language development and within the 20 years since it was first developed, it has been adapted into nearly 100 languages (CDI Advisory Board, 2015).

Parental assessments can be disadvantageous in that it is possible for a parent to overestimate or even underestimate their child's language skills. Some studies show that parents with a higher education level are more likely to report language skills accurately, while parents with lower education tend to overestimate them (Law & Roy, 2008), but evidence from different studies can be contradictory in this regard (Feldman, et. al., 2005). Also, when a child reaches two years of age, their linguistic receptive ability grows so extensively that it can be difficult for even their parents to monitor and judge accurately (Law & Roy, 2008). On the other hand, parental reports also have an important advantage in that they rely on a parent's extensive knowledge of their own child's speech within many and varying natural settings. The CDI has been shown to be reliable, with parents able to be reasonably reflective of their child's actual language ability. The CDI has also been proven to have long-term reliability and can predict a child's vocabulary growth over a period of six months (Law & Roy, 2008).

The CDI is divided into two questionnaires – namely the CDI I: Words and Gestures Infant Form, and the CDI II: Words and Sentences Toddler Form, which are for children aged eight to 18 months and 16-30 months respectively. Several language adaptations have also created short forms, which are useful for large scale applications such as population studies. All these characteristics make the CDI, particularly Words and Gestures Infant Form, the best fit for a study such as the current one, which aims to describe how children between eight and 18 months develop their vocabulary.

2.2.2 CDI development in sub-Saharan Africa

Although this tool has been adapted into almost a hundred languages around the globe, only six adaptations have been made into Bantu languages. The first adaptation made into a Bantu language was for two related (but not mutually intelligible) Kenyan languages, Kiswahili and Kigiriama (Alcock et al., 2015). Other adaptations for African languages that have been devised include short forms of the CDI into the Chiyao and Chichewa/Chinyanja languages of Malawi (Prado et al., 2011), as well as the XiRonga and Changana languages found in Mozambique (Vogt, Mastin, & Aussems, 2015).

Findings from the few Bantu language CDI adaptations show that it is a reliable measurement of gestural and lexical development. However, with regards to grammatical development, the grammar sections have been shown to be less reliable (for the Kenyan

CDIs, the grammar section had a Cronbach's alpha of .750, compared to the words and gestures sections that had coefficients of .987 and .954 respectively) (Alcock et al., 2015). This may be owing to the unique noun class system found in Bantu languages and the grammatical aspects that need to be taken into consideration in constructing the grammar section. A characteristic of all Bantu languages is the grammatical noun class system – morphological affixes which mark and agree in concordance for various grammatical functions. Children need to learn to produce and comprehend an extensive number of forms of nouns, verbs, function words and adjectives because of the extensive affixation (Alcock et al., 2015). However, the grammatical inflections are similar in structure and semantic meaning across the Bantu languages, and so Alcock et al. (2015) suggest that a standardised technique of measuring these inflections be developed for Bantu CDI adaptations. This consideration, albeit a valid one, is not relevant to the current study, as it focuses on lexical development from eight to 18 months and does not include any grammatical aspects, not even those intrinsic to words (i.e., the prefixes of the noun class system).

With regards to the lexicon, early expressive vocabulary in Kigiriama- and Kiswahili-speaking children in Kenya consisted predominantly of nouns – which is true across many languages studied – while early receptive vocabulary was equal for nouns and verbs (Alcock, Rimba, Abubakar, & Holding, 2005). Children in Malawi acquiring Chiyao and Chichewa/Chinyanja were reported to start pronouncing single words from as early as 10.21 months (Prado et al., 2016), which is consistent with current language acquisition theory (see Alcock & Alibhai (2013) for a review of literature on various aspects of language development done in sub-Saharan African countries/languages).

The Mozambican CDI adapted by Vogt, Mastin, & Aussems (2015) was developed in two communities – a rural, monolingual Changana speaking community, and an urban, bilingual XiRonga and Portuguese speaking community. The combined scores for all participants showed that receptive vocabulary had reached 80 words by 25 months, while expressive vocabulary had reached 50 words by 23 months.

Because of the different settings, they were able to compare the scores of rural children with those of urban children. They found that the average expressive vocabulary of the urban children was significantly higher than that of the rural children. Statistically, location was the strongest predictor and explained 4.7% of variance. By about 22 months, the urban children could produce an average of 50 words, whereas the rural children's expressive vocabulary did

not reach an average of 50 words – at its highest score, the rural children were producing on average 41 words at 23 months.

Conversely, the average receptive vocabulary of the urban children was significantly lower than that of the rural children, and location explained 1.8% of the variance in receptive vocabulary. At 12 months, urban children could understand about 39 words, while rural children could understand 54 words. This considerable difference reduced with age, and by 24 months urban children understood 74 words and rural children 77 words.

Vogt and colleagues concluded that location was a strong predictor of vocabulary as it is linked to several other significant variables. For instance, variables with strong positive associations, such as higher levels of SES through higher income and higher levels of education, were mostly found in the urban community, while variables with strong negative associations, such as health problems and having a sibling as a secondary caregiver, were more common in the rural communities. This is relevant to the current study, as I hypothesised that SES and individual differences between the urban and peri-urban communities in Botswana will result in similar differences in levels of lexical comprehension and production in this study.

2.3 Cross-cultural Adaptations

A lack of culturally and linguistically appropriate research and assessment tools can produce results that are biased or inaccurate. In clinical settings, this means that diagnostic accuracy will be compromised, and treatment methods and outcomes may not be effective (Carter et al., 2005). However, this is often the reality as tools developed in Western countries are (erroneously) used in radically different environmental and cultural settings. It is important for researchers and professionals alike to recognise the potential for bias from not only linguistic variation but cultural variation as well (Carter et al., 2005). Nonetheless, there are few guidelines available for the proper development of culturally valid assessments.

Cross-cultural assessments were first designed in the early twentieth century, under the assumption that human behaviour occurs independently to the surrounding culture, and thus the most reliable and valid assessments were culturally neutral and conducted in decontextualized clinical settings using ‘culture-free assessments’ (Carter et al., 2005). Subsequently, the new hypothesis was that culture infiltrates every aspect of behaviour, and

so the approach to cross-cultural adaptations was to target behavioural expressions that are found commonly across different cultures (Carter et al., 2005). This notion of 'culture-common' or 'culture-fair' assessments made use of non-verbal items instead of verbal items, as this was thought to lessen the effects of culture. However, Boivin (1991) concluded that the validity of 'culture-fair assessments' was most likely coincidental as it was based on western research and theories. In a different context the results would likely be completely different.

In fact, Boivin (1991) found that children in the former Zaire (now known as the Democratic Republic of Congo) scored significantly lower than the age-related norms of European children on various non-verbal cognitive assessments which were regarded as 'culture-fair' measures. Not only can cross-cultural assessments reflect scores that are lower than average, but they can also reflect scores indicative of atypical behaviour. For instance, healthy adults from Sudan and South Africa scored in the same range as that of US adults with brain damage on a cognitive test (see Stanczak, Stanczak, & Awadalla, 2001; Anderson, 2001).

There are several factors that can influence cross-cultural linguistic and cognitive assessments. These include the child's familiarity with the testing situation, exposure to and quality of formal education, and levels of literacy (Carter et al., 2005). In Botswana, English medium schools generally provide a better quality of education as compared to Setswana medium schools, thus children from English medium schools tend to perform better on cognitive assessments than children from Setswana medium schools (Mwamwenda & Mwamwenda, 1991).

Modern developments of cross-cultural assessments acknowledge the necessity of ethnographic research on the language and culture of the targeted study population (Carter et al., 2005). However, this approach is not feasible for many research and clinical situations, as it is time consuming and demands a lot in terms of resources. There are some alternative approaches which can be made use of (see Carter et al., 2005):

- Dynamic assessments – administering an assessment twice to the same child, before and after an intervention aimed at teaching the child skills and concepts that will allow them to perform to their maximum ability on the re-test.

- Re-norming a standardised assessment – using a large sample of typically developing children from the targeted population to establish culturally relevant normative data for an existing assessment.
- Modifying a standardised assessment – revising and adapting an existing assessment to make it more linguistically and culturally appropriate for the targeted population.

These methods have various advantages and disadvantages, not the least of which is compromised validity, high demand of time and resources, and better determination of cultural and functional equivalence (Carter et al., 2005). The current study is based on the model of modifying a standardised assessment and adapting the existing CDI tool to make it appropriate for use with Setswana-speaking children in Botswana.

2.4 Lexical acquisition in infants

Word-form learning in infants is a factor in language acquisition in that they build upon that knowledge as they continue to learn the language. They start to build phonetic categories based on the phonological and prosodic features that they are exposed to, which later become the basis of phonology in the native language (Mehler & Christophe, 1994). With the onset of babbling and the early construction of a phonetic system, the spoken word forms that infants develop provide the foundation for the development of the lexicon (Swingley, 2009).

The lexical abilities of a child are an indexical unit of measurement for language development. From the baby's first word to the number of words in an utterance, and the size of the vocabulary, the lexicon is often used as a reliable indicator of both typical and atypical language development (Pearson, 1998). Studies show that a delay in the emergence of the lexicon can be used as early identification for a child being at risk of language impairment, while children with deficiencies in the vocabulary – both comprehension and production – are indicated as being "at the greatest risk for persistent clinically significant language delay" (Bello, Giannantoni, Pettenati, Stefanini, & Caselli, 2012, p. 590).

Studies have shown that language comprehension develops earlier and more rapidly than language production, (see e.g., Reznick & Goldfield, 1992; Swingley, 2009). Vocabulary checklists such as the CDI confirm the generally accepted language milestones – production of the first word occurs around 12 months, and production goes from an average of no more than 10 words at 12 months to 40 words at 16 months (Rescorla, Mirak, & Singh,

2000). In contrast, observed median scores of word comprehension at 12 months is over 50 words, and grows to 169 words at 16 months (Fenson et al., 1994).

2.4.1 Acquisition of nouns and verbs

There is evidence (mainly from studies with Western populations) that suggests that children acquire a higher proportion of nominals in their vocabulary, i.e., nouns and adjectives. Nominals consist of up to 55% of the total vocabulary before the lexicon reaches 200 words, at about 20 – 24 months (Bates et al., 1994). This is in contrast to the acquisition of action verbs, pronouns, prepositions, question words, and other function words, which make up a small proportion of vocabulary. Furthermore, there seems to be a positive correlation of nominal acquisition and early vocabulary growth (Rescorla, Mirak, & Singh, 2000). Research in an African setting similar to that of the current study found that while nouns predominate in production, nouns and verbs are equal in comprehension (Alcock & Alibhai, 2013).

The lexical categories in the CDI are comprised of different word types. Table 2.4.a shows which word types are in each category (cf. Moyane, 2012).

Category	***Word Types***
Sounds	Ideophones
Animal words	Nouns
Vehicle words	Nouns
Words for toys	Nouns
Food and drink	Nouns
Words for clothes	Nouns
Words for body parts	Nouns
Small household items	Nouns
Furniture words	Nouns
Outside words	Nouns
Words for places	Nouns
Words about people	Nouns
Games and routines	Nouns, verbs, adjectives, adverbs, quantitatives

Action words	Verbs
Describing words	Adjectives
Words about time	Adverbs
Words about people and things	Pronouns
Question words	Adverbs
Words about places	Adverbs, Prepositions
Words about amounts	Quantitatives, Adverbs

Table 2.4.a Word Types in the CDI Categories

2.5 Development of Gestures

Several studies, most of which are based on the CDI (see Bavin et al., 2008), have shown that the onset and development of gestures has a significant correlation with the development of oral communication, including the comprehension and production of vocabulary, and aspects of grammar.

2.5.1 Types of gestures

Two major categories of gesture are deictic gestures and representational gestures. The former is used to establish a reference to a particular object or event, while representational gestures are used both to establish reference and to specify or represent semantic content relating to the object or event (Crais, Watson, & Baranek, 2009). These types of gestures are described below, as they relate to the CDIs.

Deictic gestures

Deictic gestures draw attention to an object or event and can only be understood within their context (Crais, Watson, & Baranek, 2009). These gestures can be done with physical contact (such as giving a toy) or they can be done distally (such as pointing at a toy) (Crais, Watson, & Baranek, 2009). Infants start using deictic gestures such as pointing and showing from the ages of eight to 10 months (Bavin et al., 2008). This is also around the time when they start to show evidence of understanding words, thus there is a strong correlation between deictic gestures and word comprehension (Bates & Dick, 2002; Bavin et al., 2008). Unlike

representational gestures, deictic gestures in children are not entirely dependent on modelling and input from caregivers, and they are not as much of a reflection of the parents' behaviour, beliefs and practices (Crais, Watson, & Baranek, 2009). However, a gesture such as pointing may have elements of mimesis in that the form of the hand while pointing (whether they extend the index or middle finger) is often modelled by their caregivers/community.

Object-related gestures

Representational gestures which refer to an object and signify its use or features are known as object-related gestures (Crais, Watson, & Baranek, 2009). When infants start naming objects at around 12 months of age, they also start to use gestures that show their awareness and recognition of an object's purpose (hence object-related gestures being referred to as *recognitory gestures* in some literature) (Bavin et al., 2008; Bates & Dick, 2002). For example, a child may take a cup and hold it up to their lips, to demonstrate their understanding of its use, and later for pragmatic use to signify that they want something to drink. These enactment type gestures with objects correlate with both word comprehension and production. They have been shown to contribute more variance to word comprehension scores (Bavin et al., 2008), and at the same time, children who start to use object-related gestures early also start to name or produce words early (Bates & Dick, 2002). Object-related gestures are positively related to vocabulary, in that infants with a large repertoire of gestures tend to also have a large vocabulary and often reach the first-ten-words milestone earlier (Capone & McGregor, 2004).

Object-related gestures are also a significant component of *symbolic play acts* (Crais, Watson, & Baranek, 2009). This involves using objects for play schemes, such as pushing a toy car, or even pushing a block as if it were a toy car. Symbolic play is also related to both comprehension and production of words and has been shown to be predictive of later language skills (Crais, Watson, & Baranek, 2009). In clinical settings, symbolic play schemes are an important component in assessments as it can be indicative of development delays or impairments (see section 2.5.3).

Conventional gestures

Representational gestures can also be used to refer to an action or concept and are defined by the cultural or social context (Crais, Watson, & Baranek, 2009). Between the ages of eight and 10 months, when word comprehension begins to emerge, children start producing some gestural routines such as waving goodbye (Bates & Dick, 2002). These are derived from the context of their culture and come about as a result of social interaction and imitating or miming what others do (Bavin et al., 2008). There is a strong correlation between conventional gestures and word production (Bavin et al., 2008).

2.5.2 Gestures in the CDI

In the CDIs, there are five subsections in the gesture category: First communicative gestures, games and routines, actions with objects, pretending to be a parent, and imitating other adult actions. The first two subsections are known as 'early gestures' as they tend to emerge towards the end of the first year of life, while the last three subsections are 'later gestures' as they emerge during the second year of life (Fenson et al., 2007; Bavin et al., 2008).

First Communicative Gestures include deictic gestures such as pointing, requesting, giving and showing. These deictic gestures signify the beginning of intentional communication, and can be used to initiate joint attention with the caregiver (Bavin et al., 2008). There are also some conventional gestures, such as waving goodbye, shaking head 'no' or nodding head 'yes'. *Games and routines* has conventional gestures such as clapping hands, singing and dancing, which are learnt through rituals in social interaction.
Actions with objects are object-related gestures, such as drinking from a cup and putting a phone to their ear, and are learnt mostly through imitation.
Pretending to be a parent includes symbolic gestures and involves play schemes such as completing a bedtime routine and putting a 'baby' to bed, covering it with a blanket and patting it on the back.
Imitating other adult actions are also conventional gestures which are mimetic, and include sweeping with a broom, writing with a pen/pencil and putting a key in a lock.

2.5.3 Gesture and lexical comprehension and production

The onset of gesture production precedes that of word production (Capone & McGregor, 2004). Infants use vocal and gestural signals as initial communicative skills to express their intentions. Later, as they start to understand the function of objects, they begin to use words as symbols for these objects (Bavin et al., 2008). For instance, a study by Goodwyn & Acredolo, (1993; as cited in Capone & McGregor, 2004) showed that an infants' first gesture appears around 11.94 months, while the first word appears around 13.05 months. The first five gestures appear around 13.55 months, and the first five words around 14.5 months. Thus, the onset of gesture precedes that of word production by an average of 1.03 months in their study. Using gestures to identify or 'name' objects (known as gestural naming) decreases as oral language increases. The rate of word learning in infants grows exponentially, especially in the second year of life, and this overshadows the gestural naming system (Bates & Dick, 2002).

The positive correlation between gesture and word development means that gesture can be a predictor of vocabulary and language development, and if there is not a positive correlation, this can be indicative of language delay at a later stage (which is discussed further in section 2.2.2) (Bates & Dick, 2002). A longitudinal study by Bavin et al. (2008) on the predictive value of gesture showed that the gesture scores of children at 12 months are better predictors than gesture scores at eight months, especially for the number of words produced. This is because early development can differ in children, and some infants may have a delayed onset of communicative behaviours.

In most studies such as those discussed above, gesture has been shown to have a significant correlation with both word comprehension and word production. However, there is evidence of a dissociation between gesture production and word production, especially in the early stages of language production (Bates, Thal, Whitesell, Fenson, & Oakes, 1989). In Bavin et al. (2008) gesture scores at 12 and 24 months were better predictors of word comprehension than they were of word production. In their study, Bates, Thal, Whitesell, Fenson, & Oakes (1989) took a subsample of children whose expressive vocabulary was 10 words or below. The children in this subgroup produced an average of 31.3 gestures, which is only slightly lower than the average of 37 gestures for the sample as a whole (gestures range from 13 to 47 in the subgroup and 13 to 52 for the whole sample). Furthermore, there was not a single child in the sample who produced more object words than object gestures, even

though the number of possible items for words was much larger than that of possible gestures (Bates, Thal, Whitesell, Fenson, & Oakes, 1989).

Infants can use a word and a gesture together to convey a meaning they cannot yet produce orally (Iverson & Goldin-Meadow, 2005; Rowe & Goldin-Meadow, 2009). For instance, a child can point at a toy and say "mine", or can mimic the action of drinking from a cup while saying "milk". These gesture-word combinations would be used instead of the sentences "this toy is mine" or "I want to drink milk" – utterances they are as yet unable to produce verbally. Just like the onset of gesture precedes the onset of word production, the use of gesture-word combinations develops before the use of two-word combinations (for example, "toy mine" and "drink milk" in the instances above), and children who start using gesture-word combinations also quickly start using two-word combinations (Iverson & Goldin-Meadow, 2005). Furthermore, while gesture use is a predictor of later vocabulary use, gesture-speech combinations are a good predictor of later grammar skills, specifically of sentence complexity (Rowe & Goldin-Meadow, 2009).

As with other language facets, there are other factors that can affect the development of gesture. For instance, an investigation into the effect of SES and parental input (Rowe & Goldin-Meadow, 2008) showed that parents from a higher SES background used gestures more frequently and with more meaning than those from a lower SES background. This in turn resulted in children from different SES backgrounds communicating with more or fewer gestures from as early as 14 months of age. Parents' gesture use with their infants was not directly related to the child's vocabulary development, however it was related to the child's use of gestures at 14 months, which in turn was a strong predictor of the child's vocabulary size at 42 months and 54 months of age (Rowe & Goldin-Meadow, 2008; Rowe, Özçalış¸kan, & Goldin-Meadow, 2008).

2.5.4 Gesture and atypical development

As mentioned earlier, patterns of gesture development can be associated with, and indicative of, possible language impairments. Children who are subject to biological or social risks, for instance due to premature birth or poverty, may have developmental delays (Capone & McGregor, 2004). However, a longitudinal study by McGregor & Capone (2001, as cited in Capone & McGregor, 2004) showed that although the emergence of gestures and language was delayed in at-risk children, it still followed the predicted sequence of development, and

deictic gestures preceded the emergence of spoken words, also appearing at the same rate as in typically developing children.

Late talkers are identified as infants who fall in the lowest 10th percentile of word production norms (Capone & McGregor, 2004). However, some of these infants will catch up to their age mates by the age of three years, while those who are truly late talkers will not recover by age three. Word production scores alone are not sufficient to differentiate between these two groups. When compared to their age mates, late talkers have poorer word comprehension and gesture skills, while late bloomers use both deictic and symbolic gestures to compensate for their communication skills (Capone & McGregor, 2004).

Children with Specific Language Impairment (SLI) tend to make immature forms of representational gestures. These gestures are immature in that they may not be abnormal or divergent from that of typically developing children, but rather may have errors such as in the spatial reference or orientation of the gestures (Capone & McGregor, 2004). Nevertheless, it has been shown that children with a persisting SLI eventually grow to use gestures as compensatory communicative skills to make up for the deficit in their language production skills (Capone & McGregor, 2004).

Children on the autism spectrum generally show language development that is deviant from the norm, including their development of gesture (see discussion by Crais, Watson & Baranek, 2009). However, this tends to be related more to the social-emotional and referential use of symbols rather than the types of symbols (Capone & McGregor, 2004). While they present with impairments in pointing gestures, they are more likely to be able to use pointing as a naming activity with a picture book, non-verbally and without any eye-contact, although very few children with autism will use pointing with eye-contact for joint attention or activity (Goodhart & Baron-Cohen, 1993, as cited in Capone & McGregor, 2004). However, like most other children with language difficulties, children with autism will use compensatory representational gestures when communicating conversationally (Capone & McGregor, 2004).

For children with Down Syndrome (DS), gesture emerges as expected and precedes the emergence of spoken words, however when they become toddlers, children with DS are unable to produce gesture-word combinations (Capone & McGregor, 2004). Children with DS have been shown to have gestural abilities that are not only stronger than their expressive and receptive language abilities but are also much more varied in comparison to other

children. When matched with typically developing children that have comparable word comprehension scores, the gesture repertoire of children with DS is much larger, with scores between the 77th and 80th percentile of normative data (Capone & McGregor, 2004). This is true with typically developing children as well as children with a different developmental difficulty, such as Williams Syndrome (WS), and when matched for word comprehension and production, children with DS have higher gesture scores than children with WS (Caselli et al., 1998, as cited in Capone & McGregor, 2004).

2.6 SES and Individual Factors

There is great variation in children's patterns of language growth, and while there are many factors that can account for these differences, SES has a strong association with language outcomes. By the age of 18 months there are already significant differences in children's oral language as a function of SES, and in the development of gesture, SES differences can be seen from as early as 14 months (Fernald, Marchman, & Weisleder, 2013; Rowe & Goldin-Meadow, 2008). Children from low SES families have been found to have lower vocabulary levels than their higher SES counterparts, with the differences being equivalent to a six-month discrepancy by the age of 24 months (Fernald, Marchman, & Weisleder, 2013). Bavin et al. (2008) found that SES presented a stronger difference in receptive vocabulary than expressive vocabulary. Parents from a higher SES background were more likely to underestimate their children's comprehension at 12 months, while parents from a lower SES background would tend to overestimate comprehension (Bavin et al., 2008). Language differences persist throughout development. Children from less advantaged backgrounds start pre-school with lower language and cognitive skills as compared to those from more affluent backgrounds, which can be indicative of future success or failure in academics (Fernald, Marchman, & Weisleder, 2013).

SES is generally measured through the combination of income, education and occupation. Fenson et al. (1994) used a combination of education and occupation to determine social class, while Bavin et al. (2008) used the Australian national index of SES quintiles based on the combination of all three factors. However, findings show that these indicators perform differently across cultural groups (Bradley & Corwyn, 2002).

In a recent cross-linguistic study on vocabulary development in South African children (Southwood et al., 2021), a combination of what they termed 'microsystem factors' were

measured to determine if they can account for variance in the data. These microsystem level factors were number of adults and children in the home, maternal education, and SES (a composite score with a range of 0-10, including maternal and paternal education, maternal and paternal employment status, household income, and household expenditure on food). The variable of SES correlated to only two semantic categories[3], namely animals and toys, and this correlation was found only in Afrikaans, one of the four languages studied. A regression analysis further showed that the combination of microsystem factors accounted for 1.2% of the variance in the data.

Southwood and colleagues explain that the reason why a semantic category such as animals would be sensitive to SES differences may be the level of exposure that children have to animals, both real and in likeness:

> "Children who have early exposure to representations of animals in the form of toys or on television and in books (which is more likely in urban areas with more resources) will produce more animal names than children who have little exposure to animals (in under-resourced urban areas and rural areas)" (Southwood, et. al., 2021, p. 12).

This likelihood of exposure in certain areas can also be the reason for toys being the other semantic category correlated with SES. With regards to Afrikaans being the only language where this difference was found, it is important to note that in their sample, the Afrikaans speaking participants had higher and more diverse SES scores than the other languages. Afrikaans and English speaking participants had SES scores of 6.27 and 7.25 respectively, compared to the isiXhosa and XiTsonga speaking participants who had SES scores of 4.66 and 4.85 respectively. Further, Afrikaans participants had a wider range of SES scores than English participants (1.92-9.09 compared to 2.86-9.39), which is not surprising considering the English sample was almost exclusively from an urban area.

2.6.1 Maternal education

Educational levels are a more stable variable than family income, and are also less controversial to measure (Dollaghan et al., 1999). They can also be predictive of

[3] Only ten of the semantic categories found in the CDI were analysed in this study. These categories were those that consist of nouns, namely Animals, Clothing, Food and drink, Furniture, Games and routines, People, Places to go, Small household items, Toys, and Vehicles.

developmental patterns, for instance lower levels of maternal education have been identified as a risk factor for 'late talking' (Law & Roy, 2008).

There is evidence to suggest that less educated parents give higher estimates of receptive vocabulary, especially for male children (Fenson et al., 1994). In the study by Dollaghan et al. (1999) on the effect of maternal education on early speech and language development, they found that in measures of spontaneous language production there is a significant difference in favour of children with mothers who are college graduates. Using a standardised and normed test – the Peabody Picture Vocabulary Test (Dunn, Dunn, Bulheller, & Hacker, 1965) – they found that there was also a significant difference in favour of children whose mothers had completed high school compared to those whose mothers had not completed high school.

While maternal education is widely used as a representation for SES in Western settings, some studies show that in African settings, there are specific types of stimulation and factors in the child's home environment which are more significant in improving language and cognitive outcomes, than maternal education alone (Nampijja et al., 2018).

In Fernald, Marchman, & Weisleder's (2013) study of the differences between children from 'low' and 'high' SES, the average number of years of maternal education was 15.3 years for all participants, 13.7 years for the low SES group and 16.7 years for the high SES group. However, Botswana still being a developing country, a significant proportion of the population has not gone beyond secondary school level education[4], e.g., 78.5% of the heads of households (who are most often females) have not completed any post-secondary training. In fact, only 28.8% of the national population has had tertiary level training (i.e., certificate, diploma or degree), while 35.4% have only primary school as their highest level of education, and 30.6% have not received any formal education at all (Statistics Botswana, 2004). This means that had Batswana been divided into SES groups using the same criterion as the one used by Fernald & colleagues, then most or almost all would fall under 'low SES'.

Vogt, Mastin, & Aussems (2015) found that in Mozambique, children of mothers who had attended both primary and secondary school produced an average of 62% more words than children of mothers who had only primary level education. While this shows a

[4] Formal education in Botswana: Primary school = 1-7 years; Secondary school = 8-12 years; tertiary = 13 years or more.

significant difference between a mother having both primary and secondary schooling or having primary schooling only, there was not a significant difference found between a mother having primary schooling only or not having any formal education.

For children in South Africa, maternal education as an individual variable did not have an effect on vocabulary (Southwood et. al., 2021). Generally, research suggests that the level of maternal education is significant in an indirect manner, in that it does not necessarily affect the level of language development, but rather the type of language input that the child receives. However, it is common in homes around southern Africa for a child's primary caregiver to be another female relative and not just the mother. Thus, language socialisation practices as they relate to children may not necessarily be influenced by the mother only, and this may be a more important consideration than maternal education in such contexts (Southwood et. al., 2021).

2.6.2 Gender

It is generally believed that there is a gender difference in the rate of human development, with females being known to develop or mature faster than their male counterparts. However, with regards to language abilities, studies on gender differences are inconclusive (see Berglund, Eriksson, & Westerlund, 2005). The normative data for US English speaking children (Fenson et al., 1994) show that although infant females' pace of development in word comprehension, production and gesture use is slightly ahead of males, the difference is very small and accounts for only about 1-2% of variance. When comparisons are made at the different age levels, the differences in gender were not statistically significant. There were two exceptions to this overall trend – for the gesture subscale "pretending to be a parent" there was a larger and more significant gender difference, with females having the advantage, and the gesture subscale "imitating other adult actions" had no gender difference at all (Fenson et al., 1994).

The effect of gender was slightly larger in Swedish infants and explained between 2.2% and 4.4% of variance in expressive vocabulary (which corresponds to a difference of about one word and is thus still a small difference) (Berglund, Eriksson, & Westerlund, 2005). In an African setting, Vogt, Mastin, & Aussems (2015) found that gender accounted for 3.5% of variance in expressive vocabulary and 0.4% of receptive vocabulary, meaning that girls were producing 14% more words and comprehending 7% more words than boys.

2.6.3 Birth order

Fenson et al. (1994) found that 'later-borns' (children who are not the first born to their mother) have a significant but small disadvantage in expressive vocabulary and total gestures as compared to first-born children. Berglund, Eriksson, & Westerlund (2005) suggest that the effect of birth order is limited only to the onset of language production, as their study supported claims that first-born children reached the 50-word mark before later- born children, while birth order did not have an effect on children with an expressive vocabulary of more than 50 words. According to Fenson et al. (1994) the highest level of significance that birth order has in CDI studies is a 3.5% effect on the 6-month correlation ofexpressive vocabulary between 20 and 27 months of age. However, the amount of variance determined by this factor was much smaller than that of gender and SES (Law & Roy, 2008).

In a study of Swedish infants aged 18 months, Berglund and colleagues found that birth order was more significant when taken into account with other variables, specifically gender and type of childcare (i.e., home care, family childcare or day-care centre). For instance, the vocabulary production scores indicated that boys (both first-born and later-borns) scored highest when cared for at home or at a day-care centre, while first-born girls scored highest when cared for at home and later-born girls scored highest when at a day-care (Berglund, Eriksson, & Westerlund, 2005). This means that while birth order may be an important factor in other aspects of child development, its effect may not be as significant in early language development.

2.6.4 Multiple caregivers

Having a secondary caregiver is a common occurrence in African settings. In Mozambican infants, the effect of this explains only 0.4% of variance in expressive vocabulary (Vogt, Mastin, & Aussems, 2015). However, what is significant is whether this secondary caregiver is an adult or another child (i.e., anyone under the age of 18, such as an older sibling.) When the secondary caregiver is an adult then the effect on expressive vocabulary is not significant, whereas with a sibling as the secondary caregiver, there is a negative effect and children produce 18% less words than children with only an adult primary caregiver (Vogt, Mastin, & Aussems, 2015).

Conversely, having a secondary caregiver had a positive effect on receptive vocabulary, regardless of whether the secondary caregiver was a sibling or an adult. This explained 1.6% of variance, with an increase of 26% and 25% more words in children who had a sibling or adult secondary caregiver respectively (Vogt, Mastin, & Aussems, 2015).

This suggests that a child benefits from the presence of a secondary caregiver, in that they have increased language input which benefits the child's receptive abilities. However, when the secondary caregiver is another child, they do not seem to facilitate production as much as an adult caregiver. This will be tested to see if the same can be observed in the context of the current study.

2.6.5 Exposure to other languages

Being exposed to another language besides the home language plays a significant role in the child developing a second language and being bilingual. The linguistic environment within the home, and the status of the two languages outside the home are tied to how much input the child receives in each language (MacLeod, Fabiano-Smith, Boegner-Page, & Fontolliet, 2012). A second language can be learnt informally when a child is exposed to it outside the home through peers, the media, etc., especially in cases where the second language is the majority language of the community (Pearson, Fernandez, Lewedeg, & Oller, 1997). Alternatively, a second language can be learnt through formal education, for example, when it is used as a medium of instruction at school or taught as a subject or in a language class (Baker, 1993).

For many African countries, a relic trait from colonialism is the use of foreign European languages in education as media of instruction (Nyati-Ramahobo, 1999). In Botswana, a former British protectorate, English is theoretically the sole medium of instruction from as early as the second year of schooling, hence bilingualism is the reality for a significant proportion of the population (Nyati-Ramahobo, 2000). The simultaneous high value of Setswana and the high status of English in Botswana is another factor in the strong probability of bilingualism in the population (Bagwasi, 2003). As a result, the likelihood of small children being exposed to another language besides Setswana is very high.

The level of direct input for each language has been shown to influence the level of proficiency in each respective language (Pearson, Fernandez, Lewedeg, & Oller, 1997). The

development of a second language in children can be slower than the development of the majority language which they are primarily exposed to (Pearson, Fernandez, Lewedeg, & Oller, 1997). Literature has shown that one of the main differences between bilingual children and their monolingual peers is in the size of their vocabularies; bilingual children generally know fewer words in each language than a monolingual child (MacLeod, Fabiano-Smith, Boegner-Page, & Fontolliet, 2012). Moreover, in the US English norming study by Fenson et al. (1994), coming from a non-English speaking background was identified as a risk factor for 'late talking'.

This highlights the importance of assessment tools in, and research into the development of indigenous African languages, such as the present study. Much of the existing research and measurements available are from Western countries (and therefore in those Western/European colonial languages), and the application of such assessments in the drastically different contexts of African countries will result in an iniquitous underestimation of a child's true linguistic capabilities.

2.6.6 Health issues

The general health of a child can greatly affect their overall development across many facets, including physical, cognitive, linguistic and socio-emotional growth. Studies have shown that there is a relation between health and SES. In child development, this relation is found mostly in low SES children, as they are more likely to experience illnesses and diseases even from before birth. Furthermore, when health problems occur in low SES children, they are likely to be more severe than when occurring in children from more affluent backgrounds (Bradley & Corwyn, 2002).

Parent-reported health problems had a negative correlation with vocabulary growth in Mozambican infants, and children who had been reported to have any health problems produced 16% less words and comprehended 9% less words than children without any reported health problems. (Vogt, Mastin, & Aussems, 2015).

Babies born before a full term of pregnancy are generally known to be potentially at risk of developing language impairment (Law & Roy, 2008). The prevalence of low-birth weight infants in developing countries is up to 11%, and this can be indicative of developmental deficits up to three years of age (Walker et al., 2007). Interventions in China

and Jamaica that were aimed at infants born pre-term or with low birthweight, showed that stimulating verbal skills could result in infants scoring higher in cognitive tests than the control groups that did not get intervention (Walker et al., 2007). Furthermore, having a family history of speech and language related difficulties has been identified as a risk factor for 'late talking' (Fenson et al., 1994).

2.7 Conclusion

In summary, receptive vocabulary develops faster than expressive vocabulary. By 10-months-old children show signs of understanding some words, while the production of the first word occurs around 12 months. The earliest types of words that emerge in vocabulary are nouns and adjectives, and these make up more than half of children's total vocabulary before two years of age. This is in comparison to verbs and other word types, which make up a small proportion of early vocabulary.

The onset of gesture production has been linked to lexical development. Diectic gestures, such as pointing, showing, and giving, start to appear between eight and 10 months, which is also when children show signs of starting to understand words. Object-related gestures start to emerge as children start to produce names of objects, at around 12-months-old. Moreover, gesture development can be a predictor of vocabulary development, and has been associated with language delay and language impairment in children with atypical patterns of development.

There are various individual and SES factors that have been shown to have an effect on language development. Some of the internal factors include gender, with females generally developing at a faster rate than males. The general health of the child can also affect language development, and factors such as a premature birth, low-birth weight, and a family history of speech and language difficulties, have all been shown to have a negative correlation with vocabulary growth.

Some of the factors external to the child that affect language development include the level of exposure to other languages. High exposure to another language is a significant factor in bilingual development, which in turn has a negative correlation with vocabulary size. Secondly, the education level of the child's parents can also be significant. Not only can lower levels of maternal education have a negative effect on expressive vocabulary size, they

may also affect the accuracy in parental reports of language development. However, maternal education may not be as significant a variable for children in African settings. Factors such as the number of people living in the home, and the household income and expenditure, should also be taken into account as indicators of SES. Both gestural and lexical development have been shown to be negatively affected by a low SES from as early as 14 months.

CHAPTER 3 – RESEARCH DESIGN

A team of researchers from different institutions are working together to adapt the CDI language assessment tool into several languages spoken in Southern Africa. This study was a pilot of the first phase of this project, which worked on Afrikaans, isiXhosa, Sesotho, Setswana, South African English, and Xitsonga. The research team includes professors, lecturers and postgraduate students from Linguistics, African Languages and Speech Pathology departments in various institutions in Botswana and South Africa (Kgolo, Letsholo-Tafila & Mokgatlhe, 2019; Brookes et.al, forthcoming). This team will henceforth be referred to as the SA-CDI team.

The SA-CDI research team developed a protocol for the different languages to be developed in parallel. It is closely linked to the existing protocols used for adaptations of the CDI into other languages, such as Dutch (Zink & Lejaegere, 2002), Norwegian (Kristoffersen et al., 2012), and KiSwahili (Alcock et al., 2015). This protocol is the scaffolding on which the methodology for this study was built. The development of the language assessment tools has five phases – a construction phase, a pre-pilot phase, and three pilot phases. However, due to the limitations of a master's degree programme, this study only covered the construction, pre-pilot phase, and the pilot one phase.

3.1 Adaptation Guidelines

Carter et al. (2005) have made some suggestions based on their experience developing 'culturally valid' tools for assessments in various aspects, including behavioural, cognitive, motor skills, speech and language, hearing and vision. These methodological suggestions, outlined below, were incorporated into the current study to different extents.

- Mother-tongue speakers of the assessment language, who have preferably also grown up in the local area and are thus familiar with the culture, should be involved at every stage of the development and administration of the tool. The assessor's behaviour and ability to adapt to the needs of the test-taker have been found to be just as important as the assessment itself in cross-cultural testing.
- Piloting of the assessment tool, (including the instructions or prompts, pictures, test setting and response formats) should be done on a large sample representative of the

target population. This should be considered an iterative process with appropriate modifications done as needed at each stage.

- Unfamiliar aspects of the testing situation should be minimised as much as possible. Children should be assessed in their own homes or away from clinical settings. Practice items and prompts should be used where appropriate to ensure proper understanding of the requirements of the assessment.

These are all important considerations to make when developing assessments that are equivalent across different linguistic and cultural groups. The notion of equivalence in a cross-cultural assessment can be used in relation to linguistic, functional, cultural or metric equivalence.

Linguistic equivalence

This refers to the translation of the instrument and its instructions directly from the original language to the target language. For the purposes of validity, the translation can then be back-translated from the target language to the original language, and more than one translator – preferably native-speakers of the target language – are employed for this process (Peña, 2007). However, equivalence in meaning is not ensured by direct translation, and the underlying constructs in the assessment may not be universal across different languages and cultures (Carter et al., 2005). Therefore, linguistic equivalence without concurrent functional, cultural and metric equivalence may still result in bias.

Functional equivalence

This refers to whether or not the target behaviour that the instrument is intended to measure is the same in each language (Peña, 2007). For instance, a factor in face-to-face communication in the UK is eye contact, and so it is measured in many observational assessments (Carter et al., 2005). However, in many African cultures it is seen as disrespectful for a child to make direct eye contact with an adult. Carter et al. (2005) found that children in rural Kenya are taught that the norm when speaking to an adult, especially one in an authoritative position, is to lower their eyes during conversation. Therefore, using eye contact as a measure of pragmatics would not serve the same function as in a UK setting.

Cultural equivalence

The notion of cultural equivalence is related to that of functional equivalence, however it focuses more on how different cultural and linguistic groups would understand or interpret the underlying concept of an item (Peña, 2007).

Metric equivalence

This refers to whether or not the test items have the same level of difficulty in different languages, based on their use and frequency (Peña, 2007). This can occur at phonological, lexical or syntactic levels. Phonologically, for example, the word "comb" in the French language, 'paigne', is a later acquired word as it is difficult to pronounce, thus French children start to produce it after three years old. In contrast, the word "comb" in Sesotho, 'kama' is easier to pronounce and Sesotho children can produce it by two years old (Brookes et al., 2016).

3.2. Initial Translation

The first step of the adaptation was to make a direct translation of the CDI from the American and British English versions into Setswana. This was done for the phrases and lexical items, the gestures, and all instructions. This initial translation was done by myself and a professional speech therapist from the SA-CDI team – both mother-tongue Setswana speakers. Thereafter, two other mother-tongue speakers who are language specialists were consulted for their input and critique of the translations.

The first consultant was a linguist who has done extensive research on Setswana, including the only known study on language acquisition in Setswana speaking children in Botswana (Tsonope, 1987). His input was mainly to correct the spelling and syntax of the translations into standard written Setswana. The second consultant was a speech therapist who works at the government facility that conducts assessments on children with special needs across Botswana. She added words which children are more likely to be using or to be exposed to, as alternatives or synonyms to those in the translation and as additional words which were overlooked or excluded in the initial translation.

During this process, several items were added and removed based on the immediately obvious differences and knowledge of local terms. Some items were added as synonyms, for example, *molora* and *sesepa* which were mentioned earlier, were both added as a translation for the item *soap*. Other terms added include things that are common in, or important to, our culture and lifestyle. For example, *motogo* (soft porridge) and *bogobe* (hard porridge) were both added as they are the two main forms that the staple food sorghum is made into. A few items were completely foreign to Botswana, and so they were either removed entirely, as with *penguin*, or replaced with a more appropriate term, such as *alligator* which was replaced with *crocodile*.

Once this phase was complete, the questionnaire was ready for the pre-pilot phase. At this point, the questionnaire had a column with the Setswana target word, a column for the English translation of the word, and a column for alternative words where the participant adds the different word which their child uses to refer to the target word in question.

3.3 Pre-pilot Phase

The aim of this phase was to consult with parents of infants and toddlers, and professionals who work with young children and may also have a young child of their own. This was done to determine if the tool was user-friendly and to gauge how participants would manage with it in different settings.

The infant form is only inclusive of children up to 18 months, however the targeted age range for children in this pre-pilot phase was from nine months up to three years old. Children at the upper age range (i.e., toddlers aged 18 months and above) were included in order to have an understanding of what kind of language children are using so that we can know what to target in the questionnaire. Parents of older children have retrospective perspective and can compare what their children's language skills were like at different stages, therefore we were able to get a wide range of the lexical items children may know. Some adaptations of the CDI used data from toddlers to determine ceiling effects in individual lexical items and high frequency words in younger toddlers (16 to 20 months) which may have been omitted in the infant form (see Fenson et al., 1994). Thus, the small sample of toddlers in the pre-pilot was useful for individual item analysis and inclusion/exclusion criteria.

3.3.1 Participants

A convenience sampling method was used to find participants for this phase; either I knew them personally or I was directed to them by someone I know. Twelve participants were identified and approached, all of whom agreed to participate and completed the study.

The participants were divided into two groups:

- Group 1 – four professionals who have experience working with young children and three of whom also have a child under 3.5 years old.
- Group 2 – eight parents who have children in this age range or slightly older; four infants (nine to 18 months) and four toddlers (24 to 36 months). All eight parents reported to have typically developing children, as that was an exclusion criterion for this group of participants.

Tables 3.2.a and 3.2.b describe each participant in this pre-pilot phase.

Participant Code	***Child's Age (Months)***	***Child's Gender***	***Description of Occupation***
SETIPP02	11	F	Setswana subject teacher at a primary school
SETIPP04	15	M	Counsellor who does play therapy and grief/trauma counselling with children aged 2-7
SETIPP11	39	F	Speech therapist based at hospitals
SETIPP12	N/A	N/A	Creche teacher of a class of 3-4-year-old children

Table 3.2.a Group 1: Professionals in Pre-pilot

Participant Code	***Child's Age (Months)***	***Child's Gender***
SETIPP01	9	M
SETIPP03	14	M
SETIPP05	16	M
SETIPP06	18	F
SETIPP07	24	M
SETIPP08	32	M
SETIPP09	36	F
SETIPP10	36	F

Table 3.2.b Group 2: Parents in Pre-pilot

3.3.2 Procedure

Once I had identified the participants, I approached them individually and explained the study in detail to them and had them sign a consent form (Appendix A). The participants would complete the first adaptation of the CDI questionnaire either by themselves at home or with me, and then I conducted a short interview with them to ask how they found the questionnaire, as well as more general questions about their child's language development. Out of the 12 participants involved, 11 opted to take the questionnaire home and complete it themselves, under the condition that they return it within three days. However, five of them could not complete it within that time-period and took up to seven days to return the form, while two of them eventually asked for me to complete it for them during the interview session. The interviews took 15 to 20 minutes, with an additional 30 to 60 minutes for the three participants which I completed the CDI form with beforehand.

The questions I asked the participants during the interview were:

1. How did you find the questionnaire? Were the instructions clear and easy to understand and follow? Please indicate where they were not clear.
2. Do you agree with the Setswana translations given for each word? Were there any alternatives that you added?
3. Are there any other words which you feel should be in the questionnaire but are not? Inversely, are there any words in the questionnaire which you feel should not be in there?
4. Do you think this is a fair method of assessing a child, or your child's language?
5. Tell me about the way your child speaks; what cute/funny things do they say, or what do they say that isn't grammatically correct?
6. What were the last 10 words your child said? What words or sentences did they say this morning?
7. What are the three longest sentences your child has said in the last week?
8. What songs or prayers do they know?

The latter half of the questions, about things the child says, are meant to prompt the participant to give a list of words the child can produce. These lists were then matched

with the word list in the CDI to ensure that the form was inclusive of items being used by typical children.

3.3.3 Results

Following the pre-pilot, it seemed clear that doing the CDI in an interview format, with the researcher completing the questionnaire for and with the caregiver, would be more convenient. This was because the recruiting strategy for pilot one (see section 3.4.2) meant that the participants would all be strangers. Unlike in the pre-pilot, they would not be known by the researcher personally and therefore it would have been more difficult to follow up with them were they to take the CDI home for self-completion.

Furthermore, some errors in the tools were identified at this stage and corrected for the pilot. These included spelling mistakes, words that had been repeated, and instructions that were unclear. As mentioned earlier, the questionnaire at this stage had three columns per item – the Setswana term, the English translation, and an open column for alternative translations. This allowed participants to indicate where there were words that had not been translated accurately, and where they had an alternative term. These alternative terms were sometimes a matter of preference, for example, people having different words to refer to private parts.

There were also additional items that were added during the pre-pilot. Following each lexical category on the questionnaire was the instruction "If there are other words in this category which you have heard your child use, but were not included in this list, please write them here". A similar instruction followed at the end of the actions and gestures section. This gave parents the chance to add words and gestures which were not previously on the list.

All the input from this pre-pilot was taken into careful consideration, and the questionnaire was changed and added to accordingly, before being used for pilot one.

3.4 Construction of a Family Background Questionnaire

A Family Background Questionnaire (FBQ) was developed alongside the CDI to capture information about the demographics of the participants (Appendix B). This included information about the health and general development of the child, the home environment,

and other SES factors relating to the child. The FBQ was then implemented into pilot one, and participants completed it as part of the CDI questionnaire.

The FBQ was adapted from that of the UK CDI into the context of southern Africa and of Botswana specifically. This adaptation was done by myself together with the SA-CDI team, then translated into Setswana in consultation with two other first language speakers. The draft of the Setswana FBQ was then sent for review to an economist[5] who has worked with population data in Botswana to verify that the questions were in line with information readily available from, and comparable to, the national census. It was based mainly on the available demographic information and census data, with SES questions being guided by the Botswana national census and demographic reports (Statistics Botswana, 2018)

There are six subsections in the FBQ, namely:

1. All about the child's day
2. The child's health and development
3. The child's family
4. The child's mother
5. The child's father
6. The household

All about the child's day

This section asks about the main caregivers in the child's life – who they are to the child and their age and education – as well as how much time the child spends at pre-primary, if they have started attending (known as 'creche' in Botswana and therefore in the questionnaire), and the languages the child is exposed to.

When asking about the relationship of each caregiver to the child, we added all the kinship terms in Setswana, which are more than those of English. For example, the English term 'aunt' has three variations in Setswana – *mmangwane* is a maternal aunt who is younger than your mother, *mmemogolo* is a maternal aunt who is older than your mother, and *rakgadi* is a paternal aunt who can be older or younger than your father.
There are important distinctions between these terms in the culture of Setswana and each

[5] Special thanks to Gaamangwe Mpenya for her input

'aunt' has a different role to play throughout the child's life, therefore they all need to be acknowledged in the questionnaire.

The child's health and development

The overall health of the child from birth is asked in this section. There are questions about the gestational age and birth weight of the child, a history of illnesses or developmental disabilities, and known language-related difficulties in the child or immediate family members.

Some of these questions had to be reframed to be culturally sensitive while still eliciting the relevant information. For instance, it is somewhat taboo for a woman to speak of her pregnancy in detail to certain people, and when they do, Batswana often speak of pregnancy in terms of months and not weeks. Many clinical terms and health jargon do not have vernacular equivalents, so questions in the UK CDI such as "Has your child had an ear infection / glue ear or another identified hearing problem (e.g., at newborn hearing screening)" were adapted into Setswana as "Has your child been sick in the ears or have a problem with hearing?"

The UK CDI asks "Does your child have a developmental disability (e.g., Cerebral Palsy, ASD, Fragile X syndrome, Muscular dystrophy, DiGeorge syndrome, Down's syndrome, Williams syndrome)?". However, many of these disabilities do not have Setswana terms that are used clinically and known publicly. Furthermore, they can often go undiagnosed in small children, especially those in rural and lower income areas. Even so, the words used colloquially to mean disabled or a specific disability such as Down's syndrome are politically incorrect and can be very offensive. Therefore, the question in Setswana was "Does your child live with a problem with growing or disability?", with space for the informant to elaborate on the name or an explanation thereof.

The child's family

In this section we ask more specifically about the people – adults and children that are both related and unrelated – who the child lives with, their ages, as well as if the child has

any siblings or twins etc. This is relevant as it indicates the amount and quality of language input that the child gets.

While the UK CDI asks, "How many siblings does your child have (include full and half siblings)", Setswana language differentiates between older and younger siblings (*bomogolowe* and *bomonnawe* respectively) and the Setswana culture has no notion of a 'half' sibling. The question was adapted appropriately.

The child's mother and the child's father

This section asks about the parents' age, marital status, education levels and employment status. This information is important both as factors of SES, and possible indicators of language input.

The education system of Botswana is structured differently from that of the UK and even South Africa, so while the UK CDI has options like "GCSE/O level/NVQ level 1 or 2/similar; A level/NVQ level 3/similar; university degree/HND/HNC/NVQ level 4 or 5/similar" for the parents' highest level of education, in the Setswana CDI it was adapted to "primary school/standard 7/PSLE; junior secondary/form 3/JCSE; senior secondary/form 5/BGCSE etc".

The household

The final section is important for determining the SES of the child's family. It asks about the income and expenditure (amount spent on groceries) of the home. The options for amount of money for income were divided into categories that are aligned with the tax brackets recognised in Botswana. These were combined with other variables such as the parents' education levels and the number of rooms in the house, to measure the SES of the family.

3.5 Pilot One Phase

The aim for pilot one was to gather data from 30 participants (see chapter 4 for demographic information) who have children aged eight to 18 months. I looked at the

differences in infants from an urban area (a city) and a semi-urban area (a peri-urban village). Considering the urban-rural variation found in Botswana and the implications this divide has on language acquisition, the sample in this study also allowed us to explore if a similar pattern of urban/rural differences could be found between urban/peri-urban contexts.

3.5.1 Setting

The selected urban area was the capital city of Gaborone, and I selected a clinic in close proximity to my home to conduct the study. The peri-urban area is a village about 30 km north of Gaborone. It was selected out of convenience as I was connected to one of the managing nurses at the local clinic.

I chose to use a clinic setting because the age range for this phase is not school going children and so a pre-school setting would not be suitable. Children in Botswana are entitled to services provided at Child Welfare Clinics (CWCs) across the country, from birth to the age of five years. According to official records, about 80% of Botswana's children go to Child Welfare Clinics, and these services are provided free of charge which means all children are eligible regardless of SES (Govt. of Botswana & UN in Botswana, 2010). For these reasons, a clinic setting would allow me to find a large enough sample within the target age range, from a variety of socio-economic backgrounds, considering the geographic variable.

3.5.2 Ethical approval and recruiting

The SA-CDI team received ethical clearance from the Linguistics Ethics Subcommittee at the University of Cape Town, which covered this Setswana study (Appendix C). As I was going to be based in state clinics, I needed approval from the Ministry of Local Government and Rural Development in Botswana, which I obtained through our collaboration with the University of Botswana (Appendix D). Then, for each clinic, I had to obtain permission from the relevant District Management Health Team (DHMT) (Appendix E and F). I also went to introduce myself to the matron in charge at each clinic and explained the research I was hoping to conduct in their clinic. Although I did not need any formal permission from them,

in the culture of Botswana, the notion of showing *botho*[6], i.e., showing respect in such a manner to elders and authoritative figures, is highly valued, and asking the matron for their blessing to conduct my research in their clinic is a sign of respect which facilitated a welcoming and cooperative environment in which I was able to work.

Once I had gained all these levels of clearance, I could then start collecting data at the clinics. I spent three working days at each clinic and had 15 physical copies of the questionnaire with which to gather data. At the start of each day in the clinic, the nurse in charge of the CWC would introduce me to the parents sitting in the waiting room and give them a summary of my research study. Parents that had a child aged between eight and 18 months and who had an interest in the study would then indicate so, and I'd approach them individually to explain the study in more detail and show them the questionnaire. Thereafter they could decide if they wanted to participate in the study and sign a consent form (Appendix A). Participants would either fill out a questionnaire for themselves, or I would sit with them and fill it out for them in interview format, depending on their preference. Of the 30 participants recruited, 22 opted to complete the form independently (three of whom would later be excluded; see section 4.1) It took between 45 and 90 minutes to complete a questionnaire, and it was done while they were waiting in line to see the nurse or after they were done with the nurses.

Due to the academic calendar, the timeline I had to complete data collection in Botswana was approximately one month. To receive ethical clearance from each DHMT and the two relevant matrons took approximately two and a half weeks. Therefore, I was unable to return to the clinics and recruit more participants after excluding some during data processing.

3.5.3 Data analysis

The CDI tool as it was used in the pilot phase (Appendix H) had four major sections. These were the Phrases, Vocabulary, Gestures, and Family Background Questionnaire. They were compiled into a paper document for data collection, which meant that once it was collected, the data needed to be captured. For this a database was built using Microsoft Access[7], and then a research assistant[8] manually captured each questionnaire into the

[6] Also known as ubuntu: the African philosophy of humanity, literally defined as "a person is a person by other people" or 'motho ke motho ka batho'.

[7] Thanks to Yolandi Ribbens-Klein for the assistance

[8] Thanks to Boitumelo Matlakala for the assistance

database. The responses were coded numerically into the database. These codes were either in binary to represent ‘yes/no’ responses such as in the phrases and gesture sections, or sequentially such as for ‘doesn’t know/understands/understands and says’ responses in the vocabulary section and the options in some questions of the FBQ.

The data was then analysed statistically using Microsoft Excel and IBM SPSS Statistics 27 software. Various types of descriptive statistics were used to measure frequency, central tendency and variation in the data. Inferential statistics were also used, namely Pearson or Spearman correlations, to measure the relationship between the different variables. Qualitative content analysis was also used in some instances where patterns seemingly started to emerge between certain variables, but due to the small sample size a statistical analysis may not have yielded significant findings.

CHAPTER 4 – CHILD AND FAMILY DEMOGRAPHICS

The Family Background Questionnaire (FBQ, described in section 3.4) provided information on the demographics of the participants, including information about the child's parents, their health, and family structure, as well indicators of their SES. This chapter gives the results of the family background questions. It evaluates the success of each question in terms of participants' understanding as well as social and cultural appropriacy making recommendations for future improvements.

4.1 Demographics of Participants

4.1.1 Age, gender and area distribution

Out of the sample of 28 participants, a third of the sample were males (n=9). The youngest male in the sample was 10 months, and the youngest female was eight months, however the mean age of males and females was about the same (14.27 months and 14.16 months respectively).

Furthermore, there were slightly more participants from the peri-urban site (n=15) than there were from the urban site (n=13). The age range of children in the urban area was smaller than the age range of children in the peri-urban area, although the average age of urban children was lower than the average age of peri-urban children (13.46 months and 14.84 months respectively).

Tables 4.1.a and 4.1.b describe these variables.

	Peri-urban	***Urban***	***TOTAL***
Female	10	9	19
Male	5	4	9
TOTAL	15	13	**28**

Table 4.1.a Gender and Area Distribution

	Urban		*Peri-urban*		*Total*	
	Females	Males	Females	Males	Females	Males
Min	9.05	10.52	8.95	10.98	8.95	10.52
Mean	13.89	13.02	14.41	15.27	14.1	14.27
Max	17.9	16.59	18.95	18.23	18.95	18.23

Table 4.1.b Age Distribution in Months

4.1.2 Children's caregivers

Primary caregiver

In the FBQ, participants were asked, "Who is the primary caregiver of the child?" and they could respond with up to two primary caregivers. Primary caregiver was defined as the person(s) with whom the child spends the most time, and whether a caregiver was primary or secondary was at the discretion of the participant as they completed the form. There were five participants who indicated that the child had more than one primary caregiver; specifically, that they had two primary caregivers. Table 4.1.c shows who the primary caregivers were.

Relation to Child	***Primary Caregiver 1***	***Primary Caregiver 2***
Mother	20	0
Father	0	4
Grandmother	3	0
Cousin	1	0
Childminder	3	1
Creche	1	0

Table 4.1.c Primary Caregivers

Having an extended family member as a primary caregiver was slightly more common in the peri-urban area, with two of the three grandmothers and the only cousin being the

primary caregivers in the peri-urban area. The frequency of childminders was split equally, with two in the urban area and two in the peri-urban area, while creche-going children were in the urban area.

Secondary caregiver

The questionnaire also asked, "Does the child have any secondary caregivers?" If the answer was *yes* then they would specify who the secondary caregiver is, for up to three caregivers, and how many hours in a day they spend caring for the child.

Several participants (n=7) indicated that there were between one and three secondary caregivers involved, often from the extended family. In every case, secondary caregivers would care for the child for the whole day (12 hours or more). Table 4.1.d shows the frequency of eachrelation being selected as a primary or secondary caregiver.

Relation to Child	***Primary Caregiver***	***Secondary Caregiver***
Mother	20	0
Father	4	2
Sibling	0	1
Cousin	1	0
Grandmother	3	4
Paternal uncle	0	1
Maternal uncle	0	2
Childminder	4	0
Creche	1	0

Table 4.1.d Relation and Number of Caregivers

Attendance at Creche

In the FBQ, participants were asked if the child goes to creche, and if they answered yes then they were also asked how much time they spent at creche and what language was spoken there.

There were two participants who indicated that their children attended a creche, both of whom were from the urban area. One of them went to a Setswana-speaking creche for eight hours a day, and the creche was indicated to be the primary caregiver. For the other child who

attends creche, there were no details given about the creche, although the primary caregiver was indicated to be the child's mother.

4.1.3 Child's parents

Parents' age

In the FBQ there were sections that asked about the mother and father of the child, including their current age and their age when they had their first-born child.

At the time of the interview, the youngest of the children's mothers was 21 years. However, when asked the mother's age when they had their first born, there were some participants (n=6) who indicated that they were under 20 years of age when they had their first child; five of whom were in the peri-urban area and only one for the urban area.

In Botswana, the national average of peak fertility is 30 years of age. "The age specific fertility rates indicate that, across all strata, births were few at young ages (15-19 years), number of births per woman then increases gradually until they reach a peak at ages at 25-29 years, after which they start to decline." (Botswana Demographic Survey Report 2017, p. 28).

Table 4.1.e describes the ages of the children's parents.

Age Group	***Mother's Age at First Born***	***Mother's Current Age***	***Father's Current Age***
Under 20	6	0	0
21-25	16	10	3
26-30	4	5	7
31-35	1	5	4
36+	1	8	10
Total	28	28	24

Table 4.1.e Parents' Ages

There were four participants who did not provide data on the father's current age. This could be because they did not know or because they simply did not want to respond to the

question, however they were not obliged to give a reason for not responding to any of the questions asked in the FBQ.

Parents' marital status

In the FBQ participants were asked of the marital status of the child's mother and father, and they could respond with either married, unmarried, living with partner (cohabitating), divorced, or widowed. For statistical comparison, these were divided into two categories - married/cohabitating, and unmarried/divorced/widowed.

Table 4.1.f describes the marital status of the child's parents.

Marital Status	***Child's Mother***	***Child's Father***
Married	7	6
Unmarried	7	6
Living with partner	14	14
Divorced	0	0
Widowed	0	0
Not reported	0	2
Total	28	28

Table 4.1.f Marital Status of the Parents

There were two participants who did not give data for the father's marital status. In future studies, it may be more relevant to ask if the mother is married to the father of the child, as this will better identify who lives with the child at home and may explain for instance the participant who indicated that the mother of the child is married yet provided no data on the father of the child.

4.2 Languages Spoken at Home

The FBQ asked what the main language spoken at the child's home is. It also asked if there were any other languages the child was exposed to at home and how many hours in a day they would hear the other languages. Only six of the participants were entirely monolingual, i.e., they had no exposure to any language other than Setswana. The other 22 participants indicated that their child was exposed to one or two other languages besides Setswana. The amount of time these children were exposed to other languages ranged from 30 minutes to 12 hours a day. For analysis, children will be divided into two groups of low exposure (less than three hours) and high exposure (three hours or more). This criterion is based on the distinction made in the UK-CDI, on children hearing another language for more or less than a quarter of their waking hours.

Figure 4.2.a shows what languages were spoken in the participants' home, other than Setswana. Table 4.2.b shows how many hours in a day children heard the other languages.

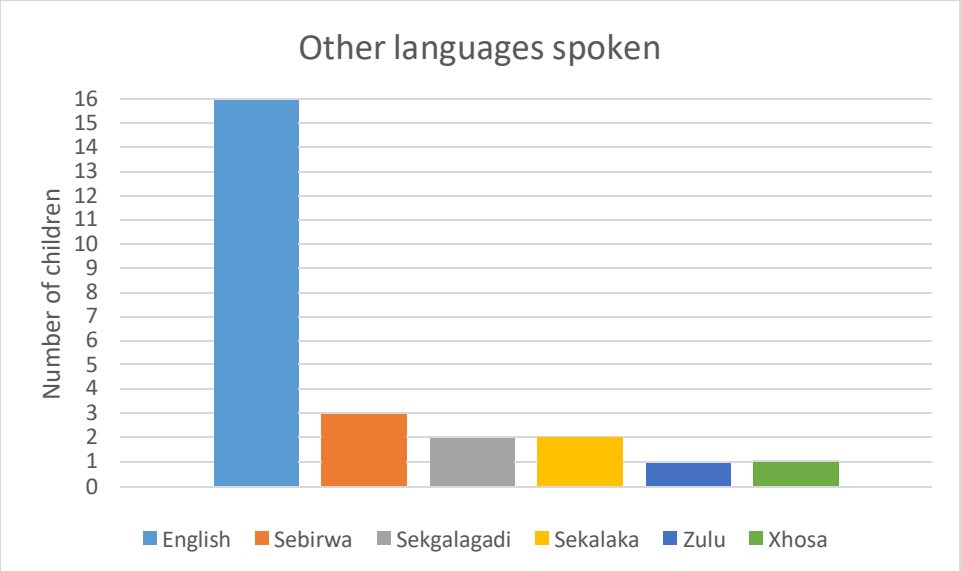

Figure 4.2.a Other Languages Spoken by the Children's Families

No. of Hours	*No. of Participants*
Less than 1	6
2 to 3	1
4 to 5	8
6+	4
Total	19

Table 4.2.b Number of Hours per Day Children Were Exposed to Other Languages

Exposure to other languages was equally distributed between the urban and peri-urban groups, with 11 children from each area being exposed. Furthermore, the language that children were exposed to was also not dependent on area, and being exposed to English or a Bantu language was not related to being from any particular area. In the urban area, nine participants were exposed to English and four were exposed to another Bantu language. In the peri-urban area, seven participants were exposed to English and five were exposed to a Bantu language.

4.3 Child's Health and Development

4.3.1 Birth age and weight

In the sample, there were two children who were born early at eight months of gestation (less than 36 weeks), one child who was born with a low birth weight (less than 2.5kg), and another two children who were born both premature and with low birth weight. Thus, there were a total of four children who were born at eight months or less of pregnancy, and three children who were born weighing under 2.5kg.

4.3.2 Health problems of the child and the child's family

In the FBQ, there were questions that asked about various health aspects of the child, and the child's family. There were three participants (one female and two males, all from the urban area) who indicated that the child had a health problem, specifically an ear infection. However, they did not indicate that it persisted for a long time (over three months) or was recurring.

Four participants indicated that someone in the child's family had a problem relating to speech and language. Three of these four participants were from the peri-urban area, and all four of them had female children. One child had an extended family member that was deaf. Another child had both immediate and extended family that stuttered. The third child had both immediate and extended family that had a lisp, and the last child had a sibling whose speech was delayed.

4.4 Family and Home Structure

4.4.1 Time spent at home in a year

In Botswana it is not unusual for a child to spend a significant amount of time at another home, other than the home of their parents or primary guardians. For example, during the school holidays, children are often taken to their grandparents' home for most of or the full duration of the holiday. The parents or primary caregiver may accompany the child for these visits, especially when they are still as young as they are in this sample.

Bearing this in mind, the participants were asked how much time in a year they spent at home, and how much time they spent at the other home if there was one. There may be a difference in the SES of the two homes, but also it is indicative of the amount and type of language input that the child is exposed to throughout the year.

In this sample there are six participants who indicated that the child lives with their parents and visits their grandparents for a duration ranging from one week to three months out of the year. Another example from this sample is a child who lives with their mother and grandparents and spends one week of the month at the home of their father, along with their mother. Three participants indicated that the child lived with a caregiver who was neither a parent nor a grandparent. All three of these children did however have a second home where their mother and father lived and spent alternating weekends or one month of the year there.

Overall, 12 of the 28 participants were reported to spend some time in a year at another home. Six participants spent less than three months at the other home; four participants spent three to six months at the other home; and two participants spent more than six months at another home.

4.4.2 Number of adults at home

The FBQ asked participants how many adults lived in both of the child's homes, and also how many of these adults were related to the child. The average number of adults in a house nationally is 3.3 (2.9 for cities and towns, 3.5 for urban villages) (Botswana Demographic Survey Report 2017). The majority of the participants (n=20) had two to three adults living at the home (see Table 4.4.a)

No. of Adults	***At Main Home***	***At Other Home***
1	0	1
2	14	3
3	6	0
4+	8	8
Total	28	12

Table 4.4.a Number of Adults in the Child's Home(s).

However, some of the responses indicate that this question may have caused some confusion for participants. The second part asked how many of the adults living at home are related to the child, but it seems some responses reflect the number of adults anywhere that are related to the child as it was sometimes a higher number than the adults living in the home.

For example, one participant from the peri-urban area responded as below:

- How many people over the age of 18 are at home? 5
- Of these adults, how many of them are relatives? 10

Future studies may need to change the phrasing of the questions being asked, as crowded or overpopulated homes can be an indicator of SES. Therefore, accurate data from such a question could be of good value.

4.4.3 Number of children at home

Participants were asked about how many children (excluding the child being asked about in the CDI) there were at both homes and how many siblings the child had. Tables 4.4.b and 4.4.c describe how many children were living in the home and how many siblings each child had.

No. of Children	***In Main Home***	***In Other Home***
0	8	0
1	9	2
2	3	3
3	1	1
4	4	0
5+	3	6

Table 4.4.b Number of Children in the Home(s)

No. of Siblings	***Frequency***
0	4
1	6
2	9
3+	9

Table 4.4.c Number of Siblings Each Child Had

Although there are only four participants who said the child has no older siblings, there were 10 participants who had already indicated that the child is not the first born of their mother. This could be perhaps because they were including siblings who do not share a biological mother with the child, however it is unclear why the question was misunderstood by a number of participants. The child's birth order can be an indicator of language development, therefore future studies should reconsider revising these two questions to yield more accurate data.

4.4.4 Number of bedrooms in the home

In the more urban areas of Botswana, the structure of a house is referred to by the number of rooms. For example, it is common for someone to say they live in a 'two and a half', which means that there are two standard sized rooms, and one room that is about half the size of those. The two rooms can be used as all-inclusive bedroom-cum-kitchen (i.e., as two bachelor pads) or as one bedroom and one living room/kitchen, while the 'half' room is most probably used as a bathroom. In non-urban areas, people often build one-room houses (such as rondavels or round thatched huts) and have multiple individual structures in the yard, with each serving a different function, or even multiple functions in each structure. This makes it difficult to define a 'house' in such homes, and to explain how many rooms there are.

There was a question in the FBQ that asked for the number of rooms in the home, however it did not specify if it was only bedrooms or all the rooms in a house. This may have caused some confusion for the participants – two participants from the peri-urban area left the question blank altogether. Some respondents understood the question to mean the number of rooms including bedrooms, living room, kitchen, bathroom etc, (and would give a response like "two and a half"), while others understood it to be asking for the number of bedrooms (or structures/rooms used for sleeping). Table 4.4.d describes the number of rooms participants indicated they had in their homes.

No. of Rooms	***Frequency in Urban Area***	***Frequency in Peri-urban Area***
No response	0	2
1	0	2
2	5	4
3	3	1
4	1	3
5+	3	4

Table 4.4.d No. of Rooms in the Child's Home.

In future studies, this question should clearly state whether it is asking about all the rooms or just the rooms used for sleeping in the *home* (and not in the 'house').

4.5 SES Factors

4.5.1 Parent's education

In the FBQ sections that asked about the mother and father of the child, there was a question that asked about their highest level of education. In Botswana the education system has a 7-3-2 structure, with primary school, junior secondary school and senior secondary school. There are leaver's exams at the end of the seventh, 10^{th} and 12^{th} years of schooling, namely the Primary School Leaver's Exam (PSLE), the Junior Secondary Examination (JSE) and Botswana General Certificate for Secondary Education (BGCSE).

The categories for responses were divided based on the completion or non-completion of the different schooling levels in the country. These are:

- One to six years, which is incomplete primary school without PSLE certificate
- Seven to nine years, which is completed primary school but without the JSE certificate
- 10 to 11 years, which is completed junior secondary school without BGCSE certificate
- 12 years, which is completed senior secondary school with BGCSE without any tertiary level education
- 13+ years, which is any form of tertiary level education

Table 4.5.a describes the level of education for both parents.

No. of Years Schooling	***Frequency for Child's Mother***	***Frequency for Child's Father***
No response	0	3
0 (no education)	0	0
1 to 6	0	0
7 to 9	6	2
10 to 11	3	5
12	9	7
13+	10	11

Table 4.5.a Education Level of Parents

The national mean in Botswana is 9.3 years of schooling (Botswana Demographic Survey Report, 2017). Of the six mothers who fell below the mean, five of them were from the peri-urban area, and only one was from the urban area. Of the two fathers who fell below the mean, both were from the peri-urban area. There were no parents with less than seven years of education (i.e., all parents had at least completed primary school). Eighteen of the 28 mothers and 14 of the 25 fathers had completed secondary education, and more than a third of the sample have some form of tertiary education. This is not surprising as people who are less educated would most likely be in more rural areas, which were not targeted in this study.

For analysis, these participants will be divided into two categories for statistical comparison – nine years or less (lower education) and more than nine years (higher education), based on the national average.

4.5.2 Parent's employment status

The participants were also asked about the parent's employment status – whether they were unemployed, employed or self-employed. Table 4.5.b describes the employment statuses of both parents.

Employment Status	***Frequency for Child's Mother***	***Frequency for Child's Father***
No response	1	3
Unemployed	14	1
Employed	10	15
Self-employed (without employees)	1	3
Self-employed (with employees)	2	6

Table 4.5.b Employment Status of Child's Parents

Half of the mothers were employed and 24 (86%) of fathers were employed. Most of the mothers who were unemployed (n=10) as well as the one father who was unemployed,

were living in the peri-urban area. For analysis, these participants will be divided into unemployed and employed (including self-employed).

4.5.3 Income and expenditure

Annual income

We asked what the total income in the child's main home was. The possible responses were grouped into five ranges based on the tax brackets of Botswana, with the hope that it would soften the sensitivity of such a question by not asking for a specific amount. Nevertheless, almost a third of the participants (n=9) did not respond to the question. Some participants responded with shock at a young person (the researcher) asking an adult about money matters, something which is not generally an open discussion in African homes, and simply refused to give an answer. Others stated that they did not know what the income was, such as a young mother who was dependent on her parents (the child's grandparents), and a caregiver under the employ of the child's parents.

Annual Income (in Botswana Pula)	***Frequency***
No response	9
BWP 0-36 000	7
BWP 36 001 – 72 000	2
BWP 72 001 – 108 000	4
BWP 108 001 – 144 000	5
BWP 144 001+	1

Table 4.5.c Income of Child's Family

It is interesting to note that the only participant who indicated getting an income in the highest tax bracket was from the peri-urban area. However, this participant had earlier indicated that the child's father was employed as a lecturer, most probably at the local college.

Many of the participants who responded to this question struggled to give an amount for the annual income. Oftentimes they would know the monthly income, and together with the researcher would have to calculate the annual amount. Future research should consider asking for the monthly income, as that information is more readily known by the average person.

The national average income is BWP 78,120.60 (Botswana Demographic Survey Report, 2017), which is in the bottom half of the third category (BWP 72,001 – 108, 000). Thus, forstatistical analysis, responses are divided into two groups, less than BWP 72,000 (the first two categories) and more than BWP 72,000 (categories 3-5)

Monthly expenditure

In the FBQ we also asked the participants how much they spent in the average month on groceries alone to gauge their monthly expenditure. This was an open-ended question and the participant could specify the amount, however responses are reported in Table 4.5.d in groups. Responses ranged from BWP 400-5000, although there were three participants who did not respond.

Average Expenditure (in Botswana Pula)	***Frequency***
No response	3
BWP 0-360	0
BWP 361-720	8
BWP 721-1080	4
BWP 1081-1440	3
BWP 1441+	10

Table 4.5.d Monthly Expenditure on Groceries

There were fewer participants who did not respond to this question, compared to those who did not respond when asked about income. This suggests that asking about how much

money people spend may be less sensitive and a more efficient way of asking about finances than asking about how much money people get.

The national average for monthly expenditure on food is BWP 501.77 (Botswana Demographic Survey Report, 2017). For analysis, it will be divided into two, either below or above the average.

4.6 Conclusion

To summarise the demographic characteristics of this sample, there was a total of 28 participants involved in the study. One third of the participants were male and two thirds were female. There was a similar distribution of participants in the urban and peri-urban areas, although the urban children were, on average, younger than the peri-urban children. For most of the children, their mother was the primary caregiver, however, a quarter of the sample had either a different female relative or an unrelated employee as the primary caregiver. Furthermore, seven children also had a secondary caregiver, and older siblings, grandmothers, cousins and uncles were involved in caregiving.

Health-related issues were not prevalent in this sample. Five of the infants were either born early at eight months of gestation or born with a low birth weight. There were also three children who had had an ear infection, and another four who had a family member with a speech and language difficulty.

The children in this study received language input from a number of different people. Over and above having multiple caregivers, several children also lived in a home with more than four adults and five other children. Furthermore, 12 of the children were reported to live in a second home for up to three months of the year. Previous literature has suggested that type of input is important to language input, and that the home and family structure can be an indicator of SES. Therefore, the FBQ should ask about these factors in a way that will yield the most accurate responses from the participants.

The infants' parents were relatively young, and 26 of the mothers had their first child before 30 years. Three quarters of the parents were married or living with a partner. All of the parents had primary level of education at the least, and more than a third had tertiary level education. However, half of the mothers were unemployed, and most of them were living in the peri-urban area. There were four participants who could not or would not respond to the

questions about the child's father, which was not surprising since Botswana has a significant proportion of female-headed households.

Botswana being a multilingual society, it is not surprising that two thirds of the children were exposed to another language at home besides Setswana. The most common second language was English, with 16 of the children being exposed to it. Three of the other languages that some of the children were exposed to were Bantu languages, namely Sekgalagadi, Sekalaka and Sebirwa, which are spoken by recognised minority groups in Botswana. The other two languages, Zulu and Xhosa, are Nguni languages native to the neighbouring country South Africa.

Many participants indicated that asking about personal finances, especially about their income, is sensitive and can be inappropriate. Nine people were unwilling or unable to answer the question, and even some of those who responded did so with some difficulty. This suggests that household income may not be an appropriate factor to include in this study as a measure of SES, as it seemed far removed from the topic of language development to the participants and does not accurately yield the targeted responses. However, when asked about expenditure in terms of monthly groceries, participants were more willing and able to respond. Future studies should consider this when working with more conservative populations such as that of this study.

CHAPTER 5 – RESULTS

This chapter presents the results of the CDI from the pilot one data collection. It begins with the common phrases that children can comprehend. Then the results of the lexical section are presented, including the comprehension and production of the different semantic categories and different word types. Lastly, the results of the gesture section are presented. The effects of various individual factors as they relate to the lexical and gestural results are also presented.

5.1 Infants' Comprehension of Common Phrases

The first section of the infant CDI consists of a list of common phrases that an infant is likely to hear regularly. This section asks about comprehension only and asks the caregiver if the child comprehends and reacts appropriately when they hear each phrase, not if they can produce the phrase. There are 29 items in the phrases section which are divided into three subcategories, labelled A to C. Section A has three items, section B has 24 items and section C has two items. The first and third are situational, with items such as “Does the baby turn its head when their name is called?”, while the second section contains more general common phrases, such as “Come here”, “Sit down”, “Pass the ball” etc. These are not in the vocabulary section because they often consist of more than one word (in the original US English version, though not necessarily in Setswana), and also because it is unlikely that at this age the child would be able to produce these items (Fenson et al., 1994). Caregivers are required to indicate which phrases their child understands. Figure 5.1.a shows the observed scores for comprehension of phrases for eight to 18 month-old infants.

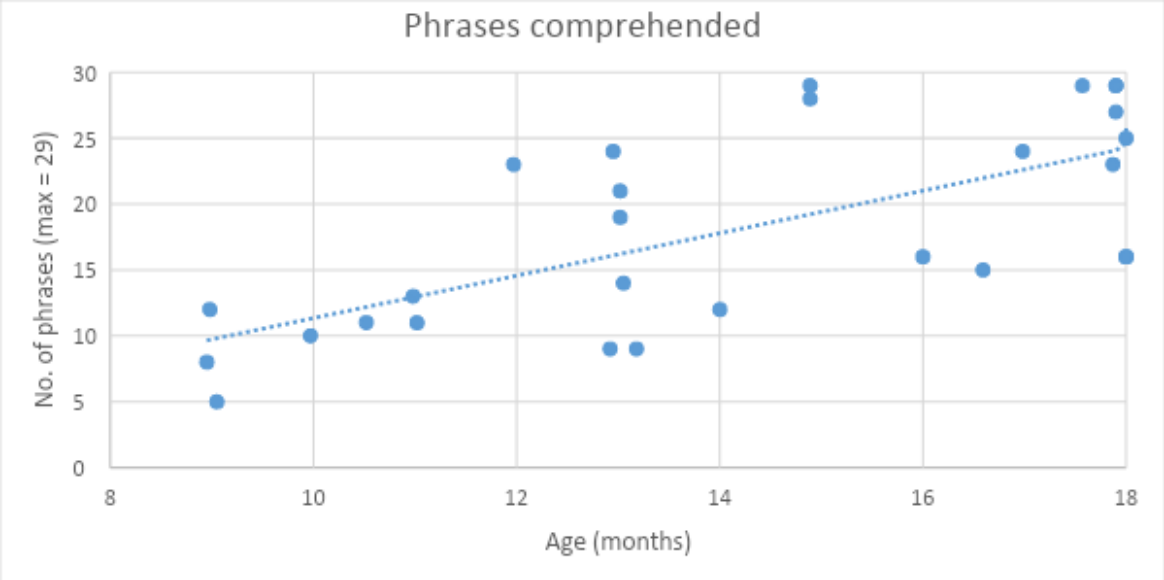

Figure 5.1.a Total Phrases Comprehended By Each Child

The scores indicate a steady growth from a mean of 7.5 phrases at nine months to a mean of 27.4 by 17 months. The correlation between age and the number of phrases is 0.67 ($p < .000$). However, there is wide variability with some children at nine months scoring lower than children at eight months, and children at 18 months scoring lower than children at 17 months. This variability is also evident in the range of scores at each month. For example, the maximum score at eight months is equal to the minimum score at 14 months (see Figure 5.1.b).

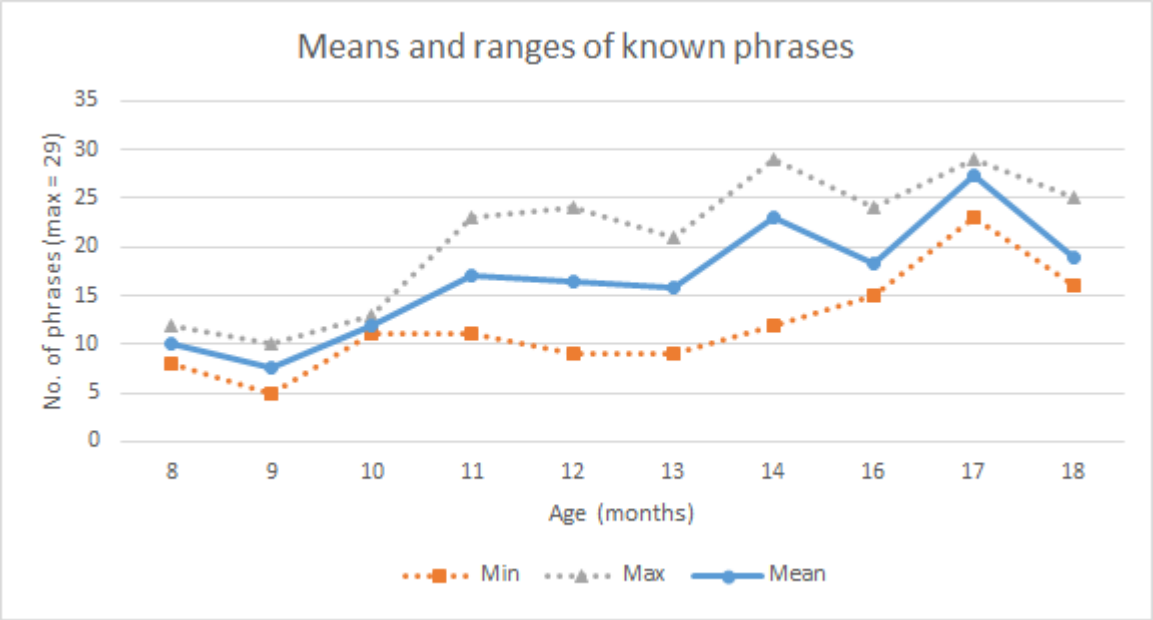

Figure 5.1.b Means and Ranges of Known Phrases.

The total score for phrases was significantly correlated with age (r = 0.677, p = 0.000). Moreover, sections B and C were also significantly correlated with age when considered independently (see Table 5.1.c for details of the correlations). No correlation was found for section A because these items are acquired early; of the three items, all 28 participants could understand the first two items, while 20 of the 28 participants could understand the third item

Phrases	***Correlation With Age***
Section A	r = 0.349, p = 0.069
Section B	r = 0.649, p = 0.000***
Section C	r = 0.508, p = 0.006**
Total	r = 0.677, p = 0.000***
** Correlation is significant at the 0.01 level (two-tailed) *** Correlation is significant at the 0.001 level (two-tailed)	

Table 5.1.c Correlation of Phrases With Age

The phrases that all children knew or could respond to, both from section A, were:

- responds when they hear their name being called
- stops what they are doing when they are told “no no”

Table 5.1.d lists the phrases in order of how many children knew them, as well as the age of the youngest child that knew each phrase.

Section	***Item***	***Percentage of Responses***	***Youngest Age Acquired***
A1	Respond when name is called (e.g., by turning and looking at source)	100	8.95
A2	Respond to "no no" (by stopping what he/she is doing, at least for a moment)	100	8.95

B19	Let's go bye bye	89.3	8.98**
B20	Look/look here	85.7	8.95
B7	Come here/come on	78.6	10.52**
B23	Spit it out	75	10.52**
A3	React to "there's mummy/daddy" by looking around for them	71.4	8.98
B13	Give it to mommy	71.4	8.95
B16	Go get ___	67.9	8.98**
B22	Sit down	67.9	10.52**
B5	Clap your hands	67.9	8.98
B11	Don’t touch	67.9	10.52**
B14	Give me a hug	64.3	12.92**
B8	Daddy/mommy's home	64.3	8.98**
B25	Time to go night night	64.3	10.52**
B15	Give me a kiss	64.3	9.97*
B10	Don’t do that	64.3	10.52**
B21	Open your mouth	60.7	9.97

B3	Be careful	57.1	8.98
B17	Good girl/boy	53.6	8.95
C1	Some children like to parrot or imitate things that they've just heard (including new words that they are just learning, and/or parts of sentences, for example, repeating "work now" after mother says "Mommy's going to work now"). How often does your child imitate words?	53.6	9.05**
B6	Change diaper	50	8.98
C2	Some children like to go around naming or labelling things, as though proud of knowing the names and wanting to show this. How often does your child do this?	50	9.05*
B18	Hold still	42.9	12.95**
B26	Throw the ball	42.9	12.95**
B28	Want to go for a ride?	39.3	9.97**
B2	Are you tired/sleepy?	35.7	13.02*
B1	Are you hungry?	32.1	8.95
B9	Do you want more?	28.6	11.97

*Phrase is significantly correlated with age at the 0.05 level (two-tailed)

** Phrase is significantly correlated with age at the 0.01 level (two-tailed)

Table 5.1.d Phrases by Age of Acquisition

There weren't any phrases in the list that were known by less than 25% of the participants, with the least known item, "do you want more?" being known by 28.6% of the sample

The latest acquired items were:

- "Are you tired/sleepy?" at 13.02 months
- "Throw the ball" at 12.95 months
- "Hold still" at 12.95 months
- "Give me a hug" at 12.92 months

All the other 25 phrases were acquired by at least one child before 12 months of age, including the least known item B9 "Do you want more", which was known by a child at 11.97 months.

The total score for phrases was significantly correlated with each of the other sections in the CDI, i.e., lexical comprehension ($r = 0.659$, $p = 0.000$), lexical production ($r = 0.667$, $p = 0.000$), and the gesture score ($r = 0.682$, $p = 0.000$). However, there was no significant correlation found between the phrases and the demographic variable of sex ($r=-0.043$; $p=0.829$) (see Figure 5.1.e). While there was no significant correlation found between phrases and area ($r=-0.214$; $p=0.274$), there is a slight difference observed in the raw scores between urban and peri-urban children (see Figure 5.1.f). The peri-urban cohort had scores higher than the urban cohort, until about 16 to 18 months when the scores were more equal between the two groups.

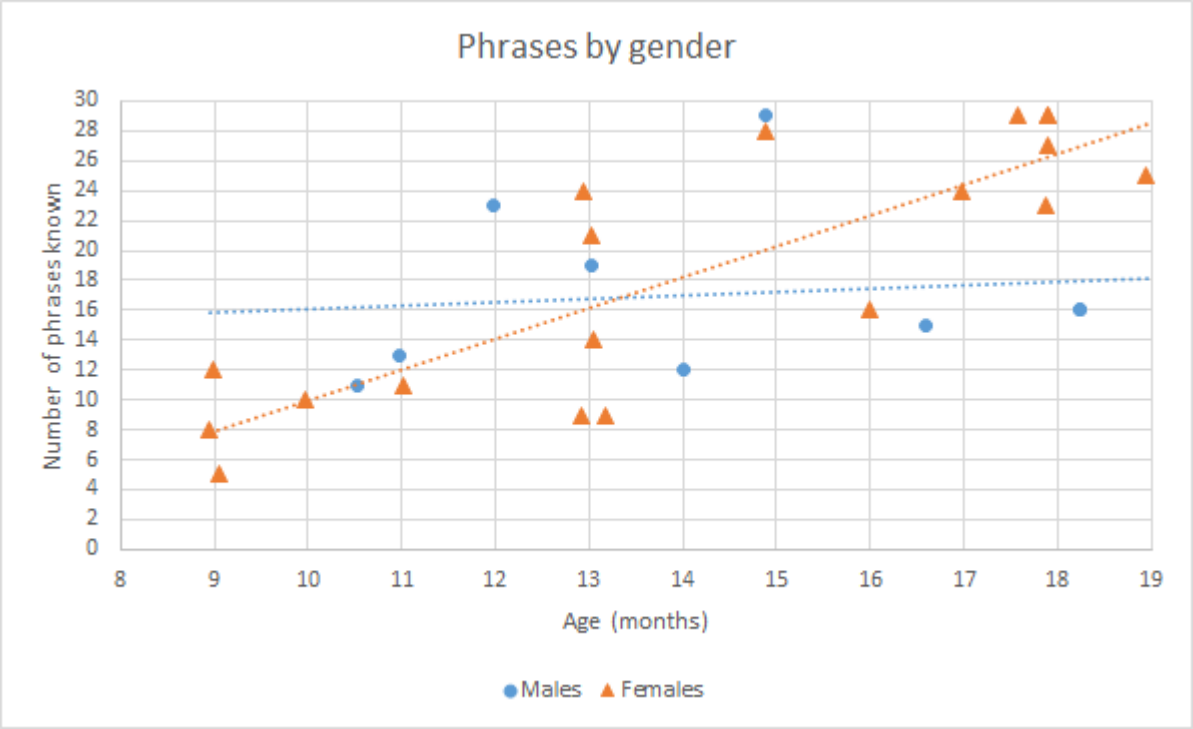

Figure 5.1.e Comprehension of Phrases by Gender

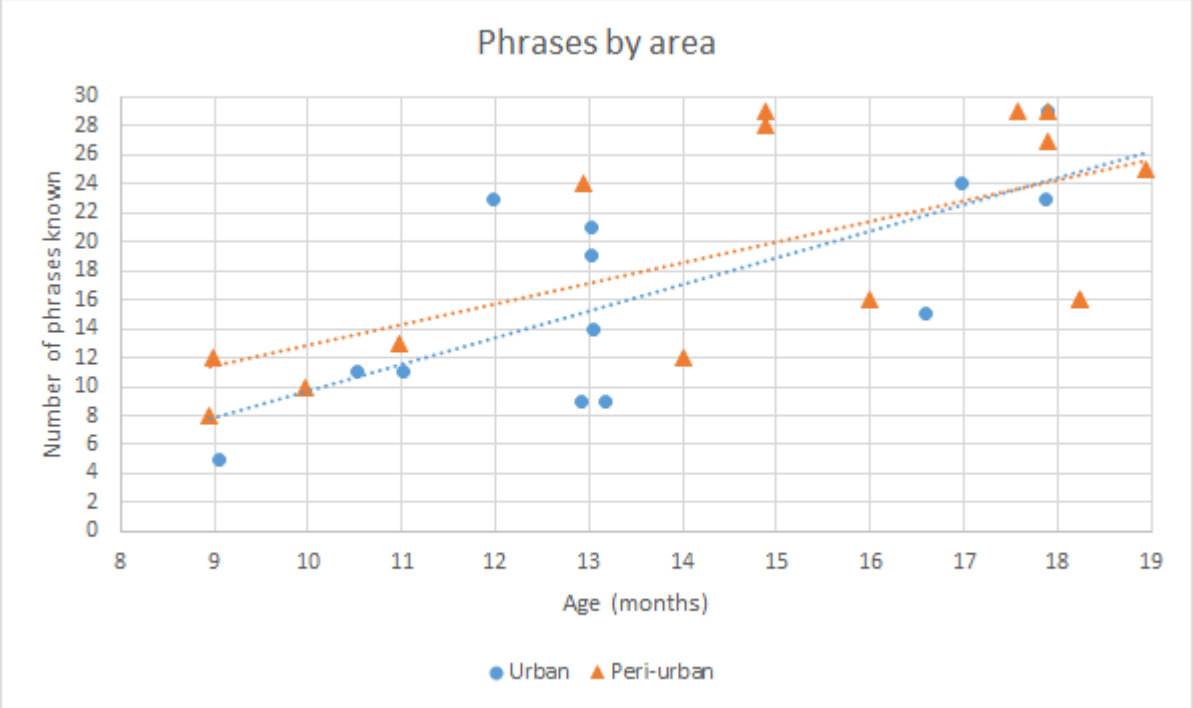

Figure 5.1.f Comprehension of Phrases by Area

5.2 Lexical Comprehension and Production

The child's comprehension score was obtained by summing the number of items across 20 categories which the caregiver marked as "understands". A child's production score was obtained by adding the number of "understands and says" responses indicated by the caregiver across the 20 categories.

5.2.1 Overall scores for comprehension and production

In line with other language acquisition studies, the children in this cohort were able to comprehend more words than they could produce (comprehension of 66.8 words and production of 24.9 words on average). As expected, both the expressive and receptive vocabulary size increased with age (see Figure 5.2.a).

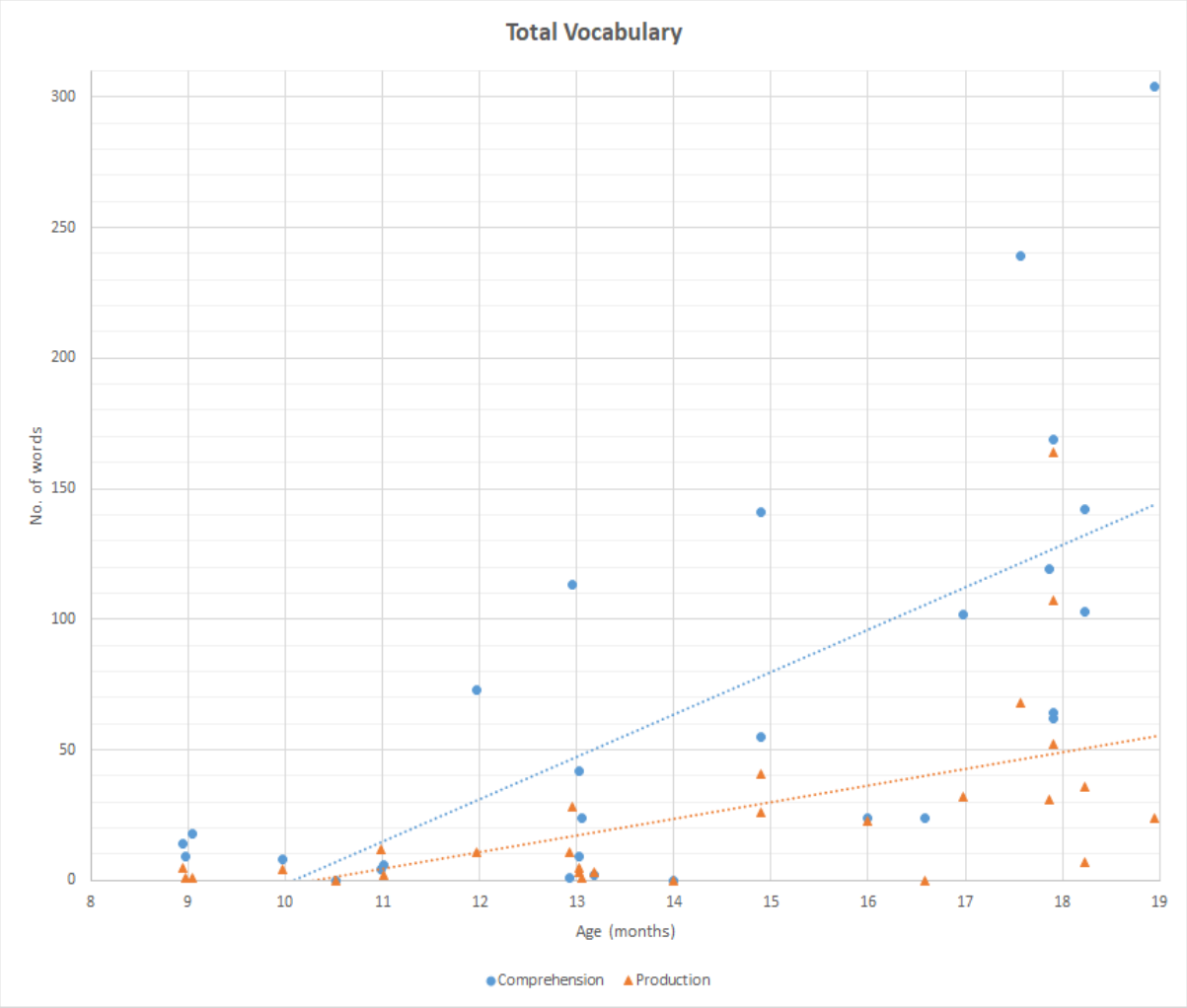

Figure 5.2.a Total Vocabulary Scores of Each Child

The youngest two children with a mean age of 8.96 months comprehended a mean number of 11.5 words and produced three words on average. At the oldest age, children with a mean age of 18.47 months (n=3) comprehended 183 and produced 22.3 words.
There was some variability in the data. There were only two children aged 10 months, one of whom (10.52 months) had a score of zero for both comprehension and production, while the other (10.98 months) had scores of four and 12 respectively. Similarly, one of the three children aged 14 months was also indicated to have a score of zero for both comprehension and production, while another at 14.89 had a comprehension score of 141 and a production score of 26.

Tables 5.2.b and 5.2.c show the average ages that children's words first exceeded certain milestones in their receptive and expressive vocabulary respectively, as well as the number of children who had exceeded each milestone (ranges of scores based on the analyses by Caselli, et. al. (1995). There was often wide variation, indicated in the tables by the sometimes-large age difference between the youngest and oldest individual child to reach a milestone.

No. of Words Comprehended	***No. of Children***	***Age Range (Months)***
0-10	9	8.98 - 14.0
11-20	2	8.95 - 9.05
21-50	5	13.02 - 17.9
51-100	3	11.97 - 17.9
101-150	6	12.95 - 18.23
151 or more	3	17.57 - 18.95

Table 5.2.b Means and Ranges of Ages That Comprehension Milestones Are Reached

No. of Words Produced	*No. of Children*	*Age Range (Months)*
0-10	13	8.95 - 18.23
11-20	3	10.98 - 12.92
21-50	9	12.95 - 18.95
51-100	1	17.57
100 or more	2	17.9

Table 5.2.c Means and Ranges of Ages That Production Milestones Are Reached

5.2.2 Comprehension and production according to semantic categories

The lexical items in the CDI are divided into 20 semantic categories. Figures 5.2.d and 5.2.e show the semantic categories that children are most familiar with in terms of comprehension and production respectively.

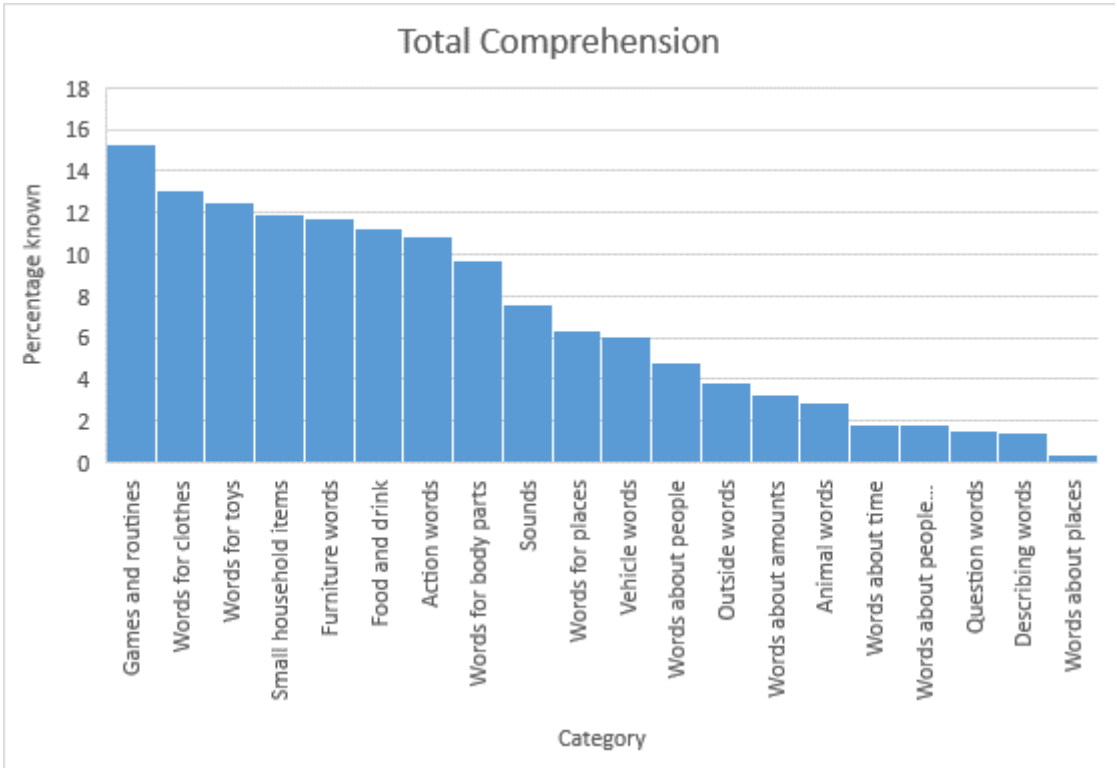

Figure 5.2.d Total Comprehension by Category

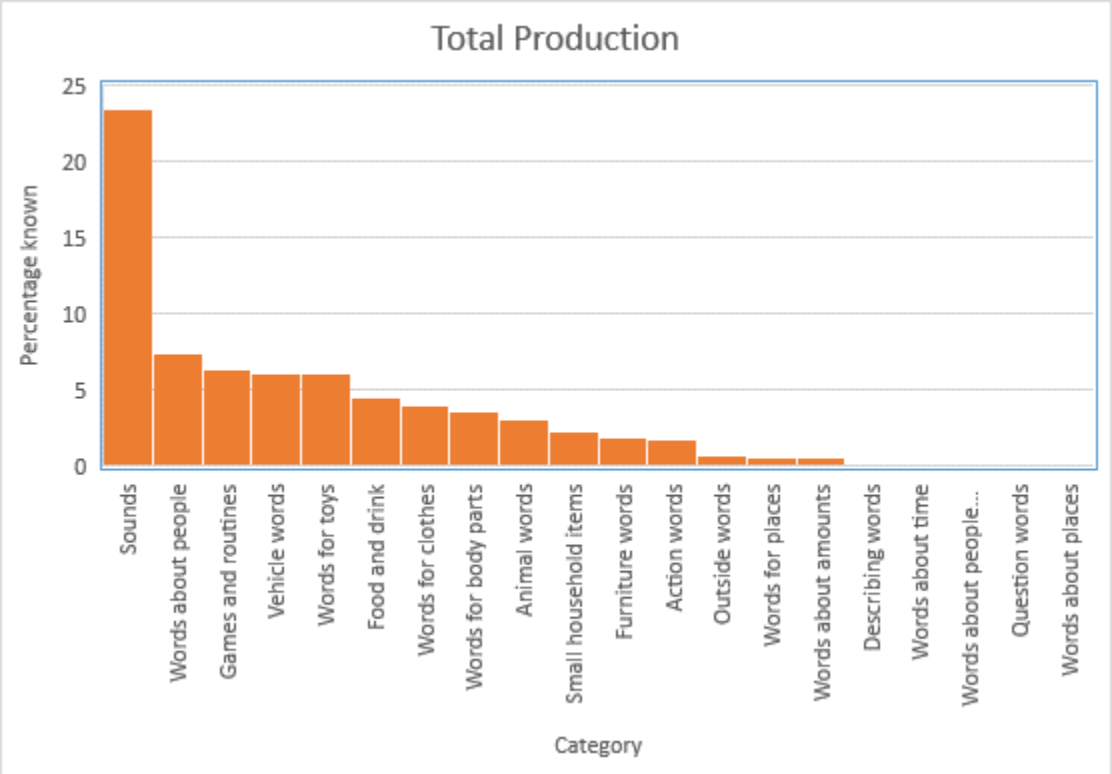

Figure 5.2.e Total Production by Category

The semantic categories which children comprehend the most words from include games and routines, words for clothes and toys, which are items that would occur often in a child's daily life. There are also certain categories where comprehension increased significantly between the youngest ages and the oldest (see Figure 5.2.f) such as words for clothes, small household items, and games and routines. There is some variability in the data with children eight to 12 months having a higher average of the categories sounds, animals, words for body parts, words for places, and words about people and things, as compared to children 13 to 15 months.

With regards to production, the category of sounds is the most produced on average, and it also increases the most from the youngest ages to the oldest. While most of the other categories increase with age, there are four categories that did not increase at all and children at all ages in this sample had a score of zero (see Figure 5.2.g). These categories were words about time, words about people and things, question words, and words about places.

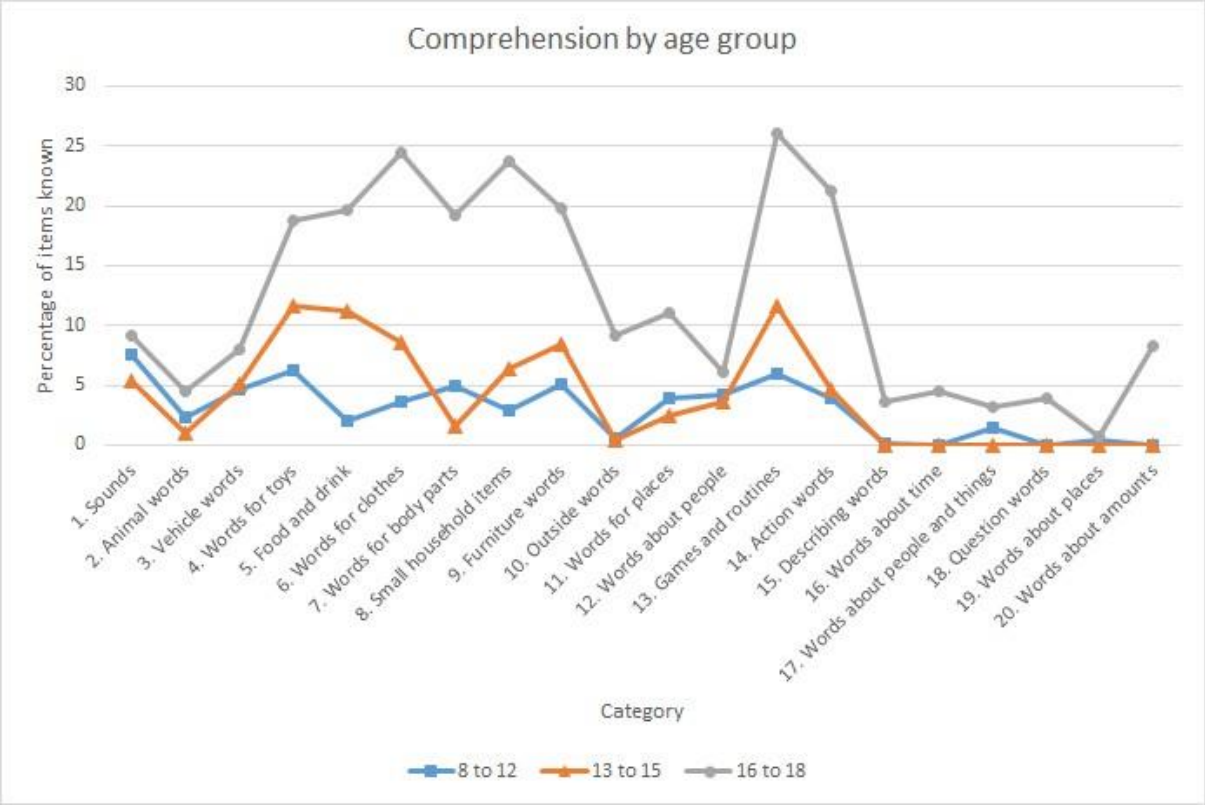

Figure 5.2.f Comprehension by Age Group

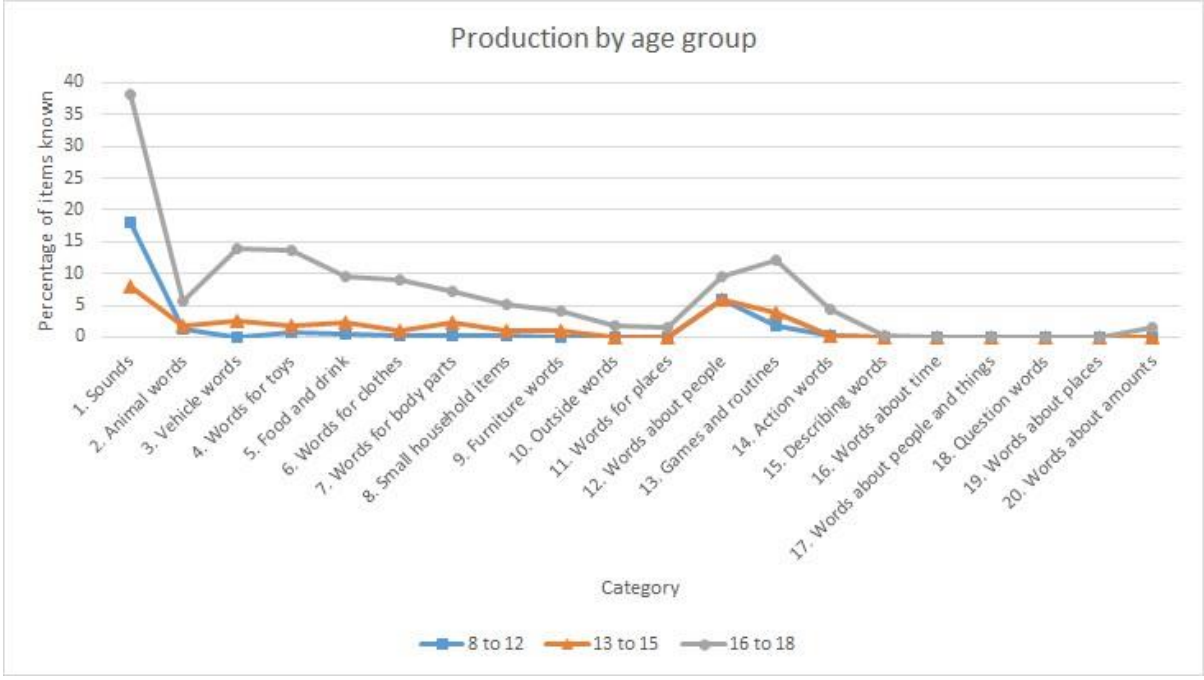

Figure 5.2.g Production by Age Group

5.2.3 Nouns, verbs and other word types

The semantic categories can be combined to represent different word types, i.e., nouns, verbs, and other word types including adjectives, adverbs, ideophones, etc. (see Table 2.4.a). Nouns consist of words from categories two to 12 (animals, vehicles, toys, food and drink, clothes, body parts, small household items, furniture, outside words, places (e.g., school, church), and people (e.g., mom, baby) whilst verbs consist of words from category 14 (actions). All other categories are classified as 'other', and these include sounds, games and routines, describing words, time, people and things (i.e., pronouns), question words, places (i.e., prepositions), and amounts. These are described below as a proportion of the total number of words the children know.

In line with other acquisition studies, most of the children's total vocabulary consists of nouns, and there are very few verbs present before 16 months old. For comprehension, nouns make up an average of 54.9% of the total known vocabulary, and verbs make up 23.1% of children's vocabulary. For production, nouns make up 62.6% while verbs make up 5.4% of the children's expressive vocabulary.

Between eight and 12 months, children comprehended an average of 24.6 words, an average of 57 words between 13 and 15 months, and between 16 and 18 months this had increased to an average of 203.2 words. Figure 5.2.h shows the proportion of the different word types comprehended at each of these age groups.

Between eight and 12 months, children produced an average of 7.5 words, an average of 39.4 words between 13 and 15 months, and between 16 and 18 months this had increased to an average of 127.5 words. Figure 5.2.i shows the proportion of the different word types produced at each of these age groups.

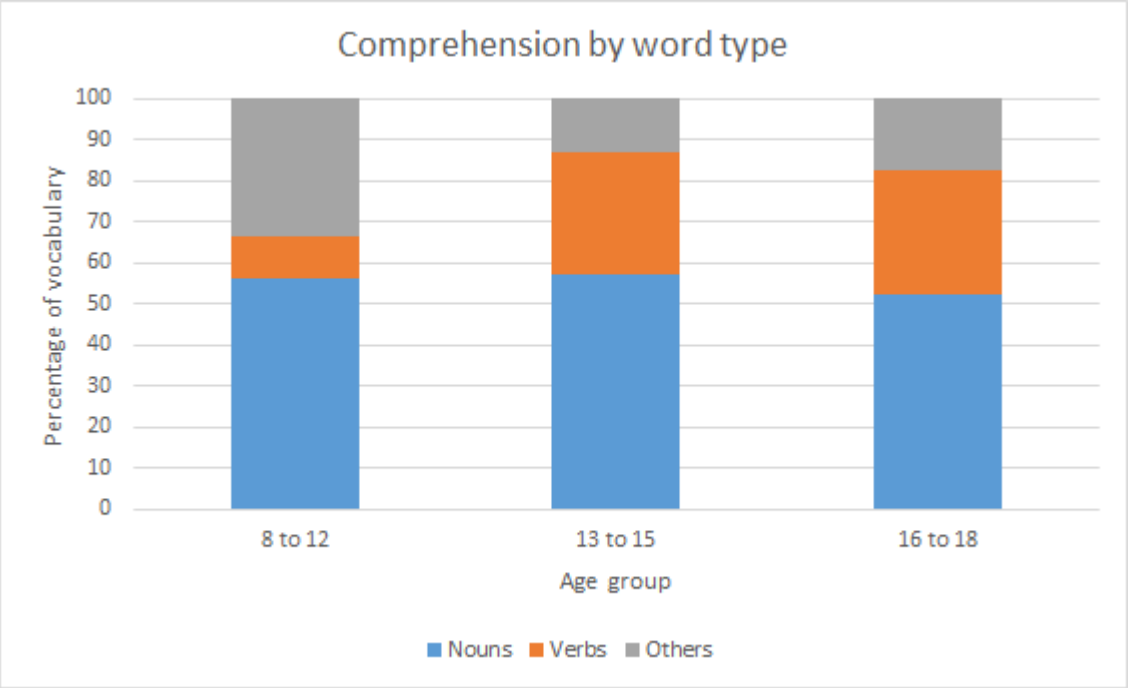

Figure 5.2.h Word Types Comprehended by Each Age Group

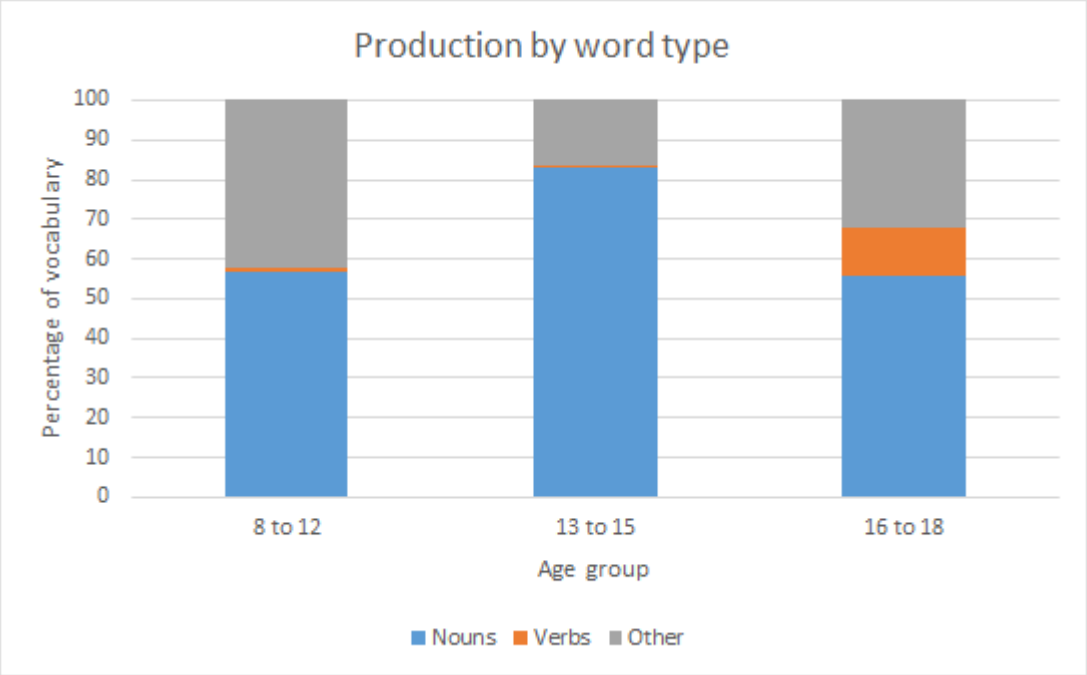

Figure 5.2.i Word Types Produced by Each Age Group

5.2.4 Individual word analyses

Each word was analysed in terms of frequency, i.e., the number of children that knew the word. Common words are identified as words known by 25% or more of the sample.

Based on this, there were 68 words commonly understood, and 21 words commonly produced. Table 5.2.j shows how many words in each semantic category were commonly known.

Category	***Total Items***	***Items Comprehended N (%)***	***Items Produced N (%)***
Sounds	16	1 (6.25)	5 (31.25)
Animal words	60	0	3 (5)
Vehicle words	17	1 (5.88)	1 (5.88)
Words for toys	16	2 (12.5)	0
Food and drink	84	8 (9.52)	4 (4.76)
Words for clothes	38	4 (10.53)	0
Words for body parts	36	2 (5.56)	1 (2.78)
Small household items	81	11 (13.58)	0
Furniture words	39	5 (12.82)	0
Outside words	36	0	0
Words for places	23	1 (4.35)	0
Words about people	36	0	3 (8.33)
Games and routines	37	10 (27.03)	3 (8.11)
Action words	148	23 (15.54)	1 (0.66)
Describing words	80	0	0
Words about time	14	0	0
Words about people and things	20	0	0
Question words	7	0	0
Words about places	28	0	0
Words about amounts	12	0	0
TOTAL	828	**68 (8.22)**	**21 (2.54)**

Table 5.2.j Number of Items Commonly Known in Each Semantic Category

When categorised by word types, the 68 most understood words consist of 34 nouns, 23 verbs, and 11 other (10 games and routines and one sound). From the 21 most produced words, there are 12 nouns, one verb, and eight other (five sounds and three games and routines). Tables 5.2.k and 5.2.l show the frequency of each word, i.e., the percentage of the sample that could comprehend and produce each of the commonly known words.

CATEGORY	***WORD***	***English Translation***	***Children who Understand (%)***
Games and routines	hae five	High five	50.0
Action words	opa diatla	Clap hands	46.4
Food and drink	Apole	Apple	42.9
Games and routines	Tlhapa	Bath	39.3
Furniture words	Bolao	Bed	39.3
Action words	Ema	Stand/stop	39.3
Action words	Latlha	Throw	39.3
Vehicle words	Koloi	Car	35.7
Action words	Bona	Look	35.7
Food and drink	Borotho	Bread	35.7
Games and routines	Kea kopa	Please	35.7
Action words	Apola	Remove (clothes)	35.7
Action words	Nwa	Drink	35.7
Furniture words	Sofa	Sofa	35.7
Action words	Tsoga	Wake up	35.7
Small household items	Lefeelo	Broom	32.1
Furniture words	Thelevishene	Television	32.1
Games and routines	Tsoga	Wake up	32.1
Words for body parts	Mpa	Tummy	32.1
Furniture words	Tafole	Table	32.1
Games and routines	Didimala	Keep quiet	32.1

Games and routines	ema pele	Wait	32.1
Action words	Bina	Dance	32.1
Action words	Lela	Cry	32.1
Action words	Loma	Bite	32.1
Action words	Sia	Run away	32.1
Action words	Tsaya	Take	32.1
Action words	Boa	Come back	32.1
Words for body parts	Mabele	Breasts	28.6
Action words	Ja	Eat	28.6
Games and routines	tšhu-tšhu	Hot-hot	28.6
Words for toys	Bolo	Ball	28.6
Words for clothes	Setlhako	Shoe	28.6
Games and routines	sese/ kaka	Pee/poo	28.6
Words for toys	Thoe	Toy	28.6
Words for clothes	Borokgwe	Trousers	28.6
Games and routines	Dumela	Hello	28.6
Small household items	Beisane	Dish	28.6
Small household items	Molemo	Medicine	28.6
Furniture words	Setilo	Chair	28.6
Words for places	Ntlo	House	28.6
Action words	Kuka	Carry	28.6
Small household items	seromamowa/ redio/ welese	Radio	28.6
Action words	Goga	Pull	28.6
Action words	Palama	Climb	28.6
Food and drink	Motogo	Soft porridge	25.0
Food and drink	Nama	Meat	25.0
Small household items	foune/ mogala	Phone	25.0
Food and drink	bogobe jwa mabele	Stiff porridge	25.0
SOUNDS	brr/tshikhi	Brrr	25.0

Food and drink	Koko	Chicken	25.0
Words for clothes	Beke	Bag	25.0
Words for clothes	Mosese	Dress	25.0
Small household items	leso/ leswana	Spoon/teaspoon	25.0
Food and drink	Phaletshe	Maize meal	25.0
Action words	apara/rwala	Put on	25.0
Action words	Betsa	Hit	25.0
Action words	Suna	Kiss	25.0
Food and drink	Lee	Egg	25.0
Small household items	Boratshe	Brush	25.0
Small household items	Emere	Bucket	25.0
Small household items	Lebotlele	Bottle	25.0
Games and routines	tlhapa diatla	Wash hands	25.0
Action words	Tlisa	Bring	25.0
Small household items	Matlakala	rubbish	25.0
Small household items	Sekotlele	Dish	25.0
Action words	Baya	Put	25.0
Action words	Kwala	Write	25.0

Table 5.2.k List of Words Most Commonly Comprehended

CATEGORY	***WORD***	***English Translation***	***Children Who Can Say (%)***
Words about people	mme/mama	Mommy/mother	64.3
Words about people	Nnana	Baby	64.3
Words about people	papa/ ntate	Daddy/father	60.7
SOUNDS	hum hum	Vroom vroom	53.6
SOUNDS	mmmh/ monate	Yummy	46.4
SOUNDS	hou hou	Woof woof	42.9

Vehicle words	belega. pepe	Piggy back	39.3
Food and drink	Metsi	Water	35.7
Animal words	ntša	Dog	35.7
Food and drink	maši	Milk	32.1
Games and routines	Ee	Yes	32.1
SOUNDS	ishi/ itshi/ iyoo	Ouch	32.1
Animal words	tsitsiri/gogo	Bug	32.1
Words for body parts	Mabele	Breast	28.6
Action words	Ja	Eat	28.6
Food and drink	Dijo	Food	28.6
Animal words	Koko	Chicken	28.6
SOUNDS	pip pip	Hoot hoot	28.6
Games and routines	tšhu-tšhu	Hot hot	25.0
Food and drink	Motogo	Soft porridge	25.0
Games and routines	robala/baba	Sleep	25.0

Table 5.2.l List of Words Most Commonly Produced

5.2.5 The effect of individual factors on vocabulary

The demographic factors which were asked about in the FBQ (discussed in chapter 4) have some effect on the vocabulary scores of the child.

Gender and area

The sample in this study was small and not evenly distributed for gender, with nine boys and 21 girls. Thus, it is not surprising that it was not significantly correlated to both receptive and expressive vocabulary (for comprehension, $r = -0.128$, $p = 0.517$; for production, $r = -0.213$, $p = 0.276$). Nevertheless, there was an overall trend found of females progressing faster than boys in both receptive and expressive scores, as with other acquisition studies (Figures 5.2.m and 5.2.n).

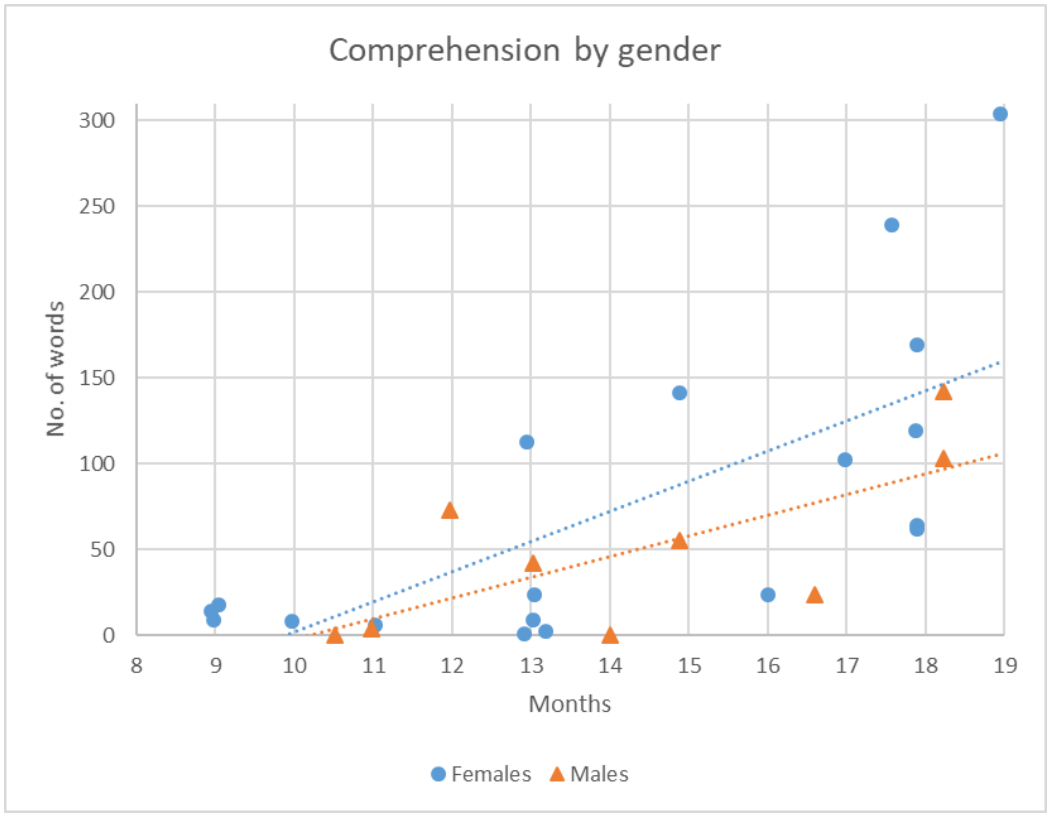

Figure 5.2.m Lexical Comprehension by Gender

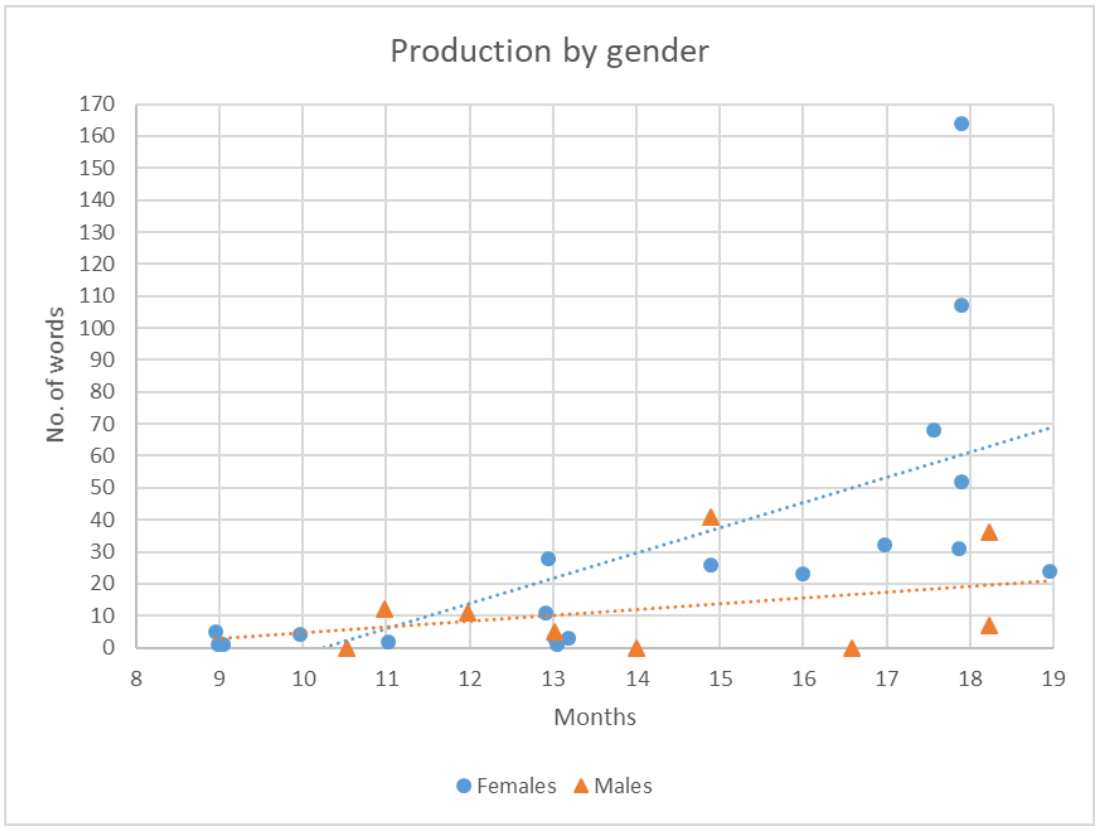

Figure 5.2.n Lexical Production by Gender

It is also worth noting the variability in the earliest ages that the 10-, 20-, 50- and 100-words milestones were reached by each gender. With regards to comprehension, the 50-word milestone was acquired at the earliest by a male aged 11.97 months and a female aged 12.95 months. The 100-word milestone was acquired at the earliest by a female aged 12.95 and a male aged 18.23 months.

For the production scores, the 10-word milestone was acquired earliest by a male aged 10.98 months and a female aged 12.92. The earliest acquisition of the 20-word milestone was a female aged 12.95 and a male aged 14.89 months. The 50- and 100-word milestones were not acquired by any of the males in the sample, however they were acquired by females aged 17.57 and 17.9 months respectively.

The correlations between the vocabulary scores and the area the child was from, i.e., urban or peri-urban, were tending towards significance (for comprehension, $r = 0.363$, $p = 0.058$; for production, $r = 0.342$, $p = 0.075$). The overall trends for both comprehension and production, as shown in Figures 5.2.o and 5.2.p, show that the peri-urban children were acquiring words earlier than their urban counterparts, with some variability.

With regards to the milestones, the earliest ages at which 50 words were comprehended were 11.97 in the urban area and 12.95 in the peri-urban area. The comprehension of 100 words was earliest acquired at 12.95 in the peri-urban area and 16.98 in the urban area.

For the production scores, the 10-word milestone was acquired earliest by a peri-urban child aged 10.98 months and an urban child aged 11.97 months. The earliest acquisition of the 20-word milestone was a peri-urban child aged 12.95 and an urban child aged 14.89 months. The production of 50 words was earliest acquired by a peri-urban child at 17.57 months and at 17.9 months by an urban child. Lastly, the 100-word milestone was reached at 17.9 months by a peri-urban child, but was not reached by any urban children.

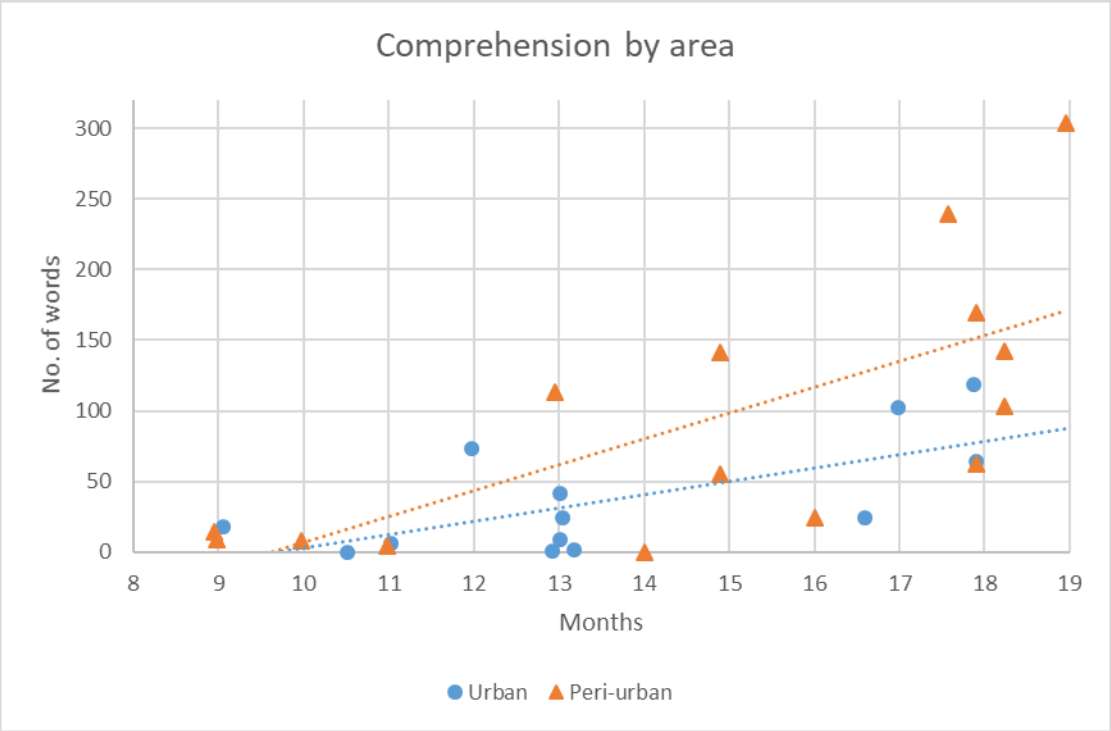

Figure 5.2.o Lexical Comprehension by Area

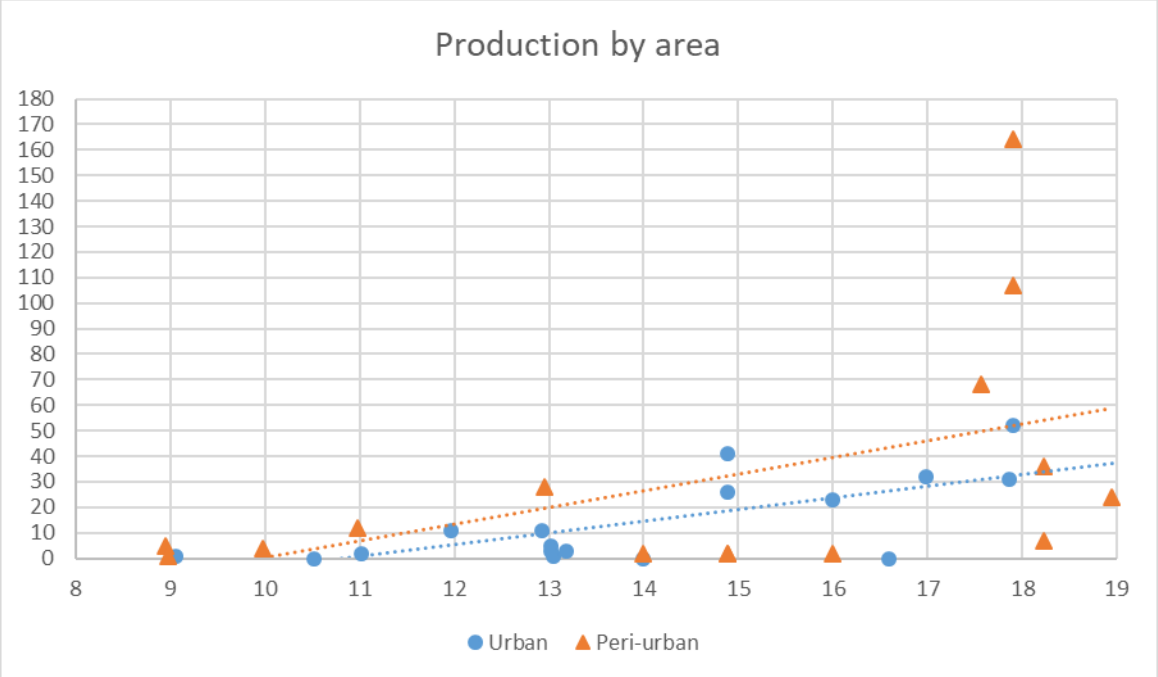

Figure 5.2.p Lexical Production by Area

Exposure to another language

There were 16 participants who indicated that the child was exposed to another language for more than three hours in a day. These participants were identified as having high exposure, while those with three hours or less were identified as low exposure. Figures 5.2.q and 5.2.r compare the comprehension and production scores of children with high levels and low levels of exposure to another language.

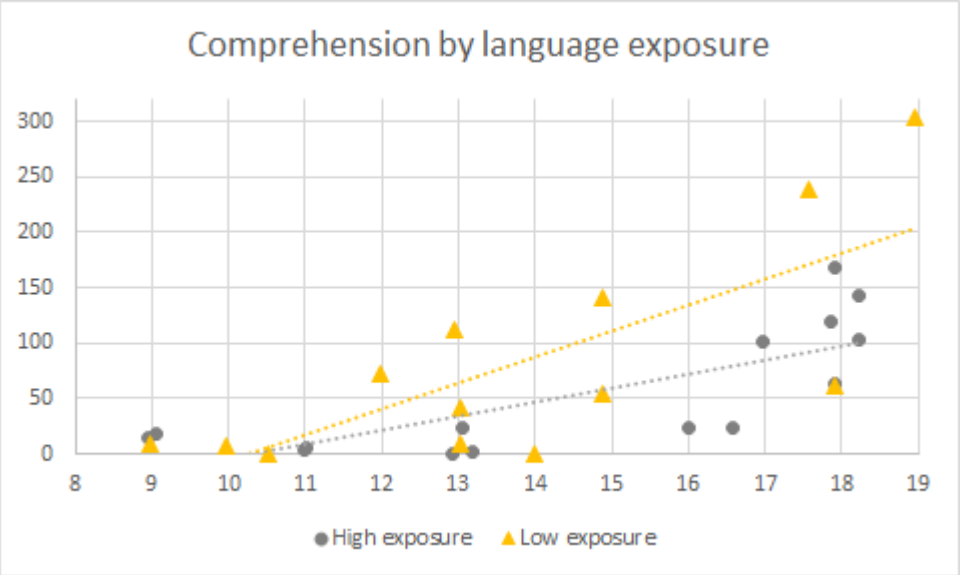

Figure 5.2.q Lexical Comprehension by Level of Exposure to Other Languages

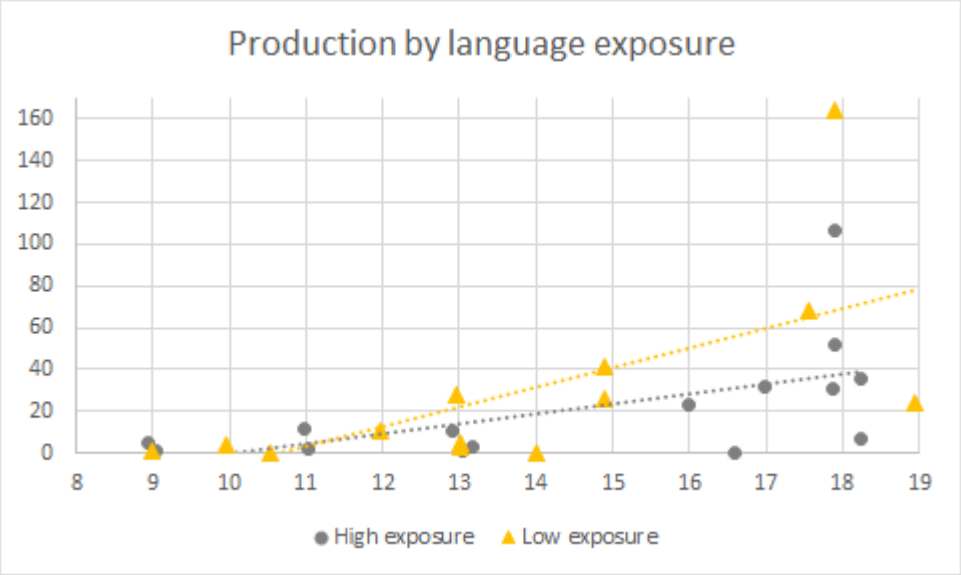

Figure 5.2.r Lexical Production by Level of Exposure to Other Languages

While there is no significant correlation found between the level of exposure and the child's comprehension and production scores, there is evidence that a high level of exposure has an effect on the lexical scores, specifically from 12 months onwards. Figures 5.2.q and 5.2.r show that by 18 months, both the comprehension and production scores of children with little to no exposure of another language, will have increased more than that of children with high exposure.

5.3 Actions and Gestures

As described in section 3.5.3, there were 68 questions on actions and gestures which were divided into six subcategories. These subcategories were:

A. First communicative gestures [13 items]
B. Games and routines [6 items]
C. Actions with objects [18 items]
D. Pretending to be a parent (playing "home") [14 items]
E. Imitating other adult actions (using real objects or toy implements) [16 items]
F. Pretend objects [1 item]

For categories where a caregiver marked 'sometimes' or 'often' the child was given a score of one, while a response of 'not yet' or no response were given a score of zero. The other four gesture subscales were marked either 'yes' or 'no' and were scored with one and zero respectively. Unmarked items were considered as no responses.

5.3.1 Overall results

The children in this sample could produce a range of 10 to 62 actions and gestures, and for each item there were at least three children that could produce it. There was one gesture that was produced by all 28 children, the gesture for greeting – *plays 'high five'/thumbs up*.

A total gesture score was calculated for all six categories, and it is clear from a Pearson's correlation that the number of gestures children know increases with age ($r = .664$, $p = .000$). Children at eight months old know an average of 17.5 actions/gestures, which grows to an average of 46.3 actions/gestures by 18 months old (see Figure 5.3.a).

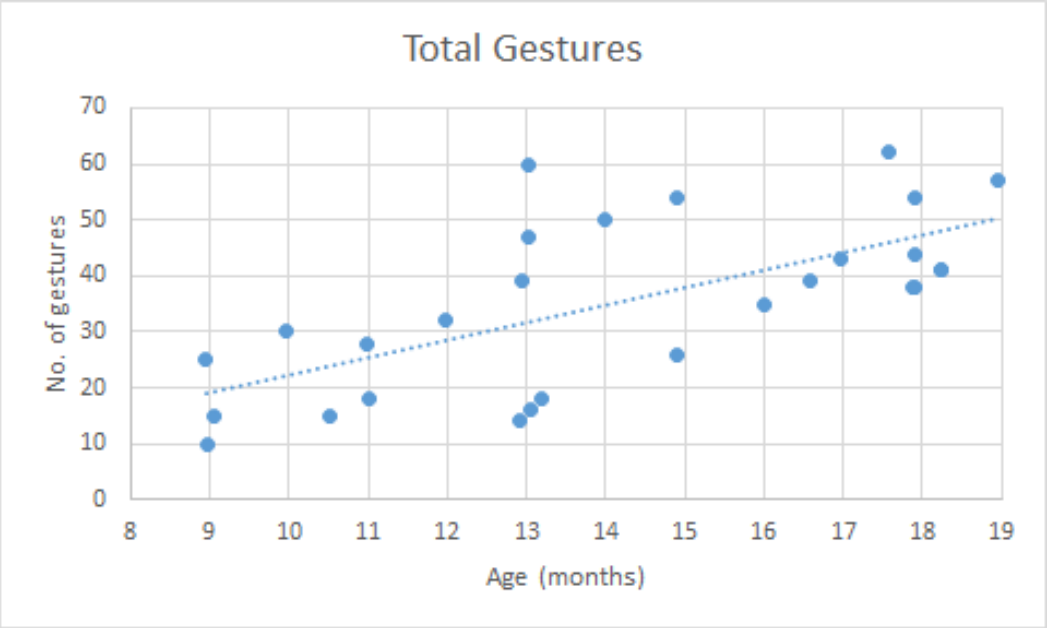

Figure 5.3.a Total Gesture Scores

As with the lexical scores, the gesture scores do not show a significant correlation with gender ($r = 0.024$; $p = 0.905$). This is to be expected, considering the uneven distribution of males and females. Figure 5.3.b shows that there is no distinct pattern of gesture development within the gender groups in this sample, with males having a higher average between eight and 14 months, and females having a higher average from 14 months.

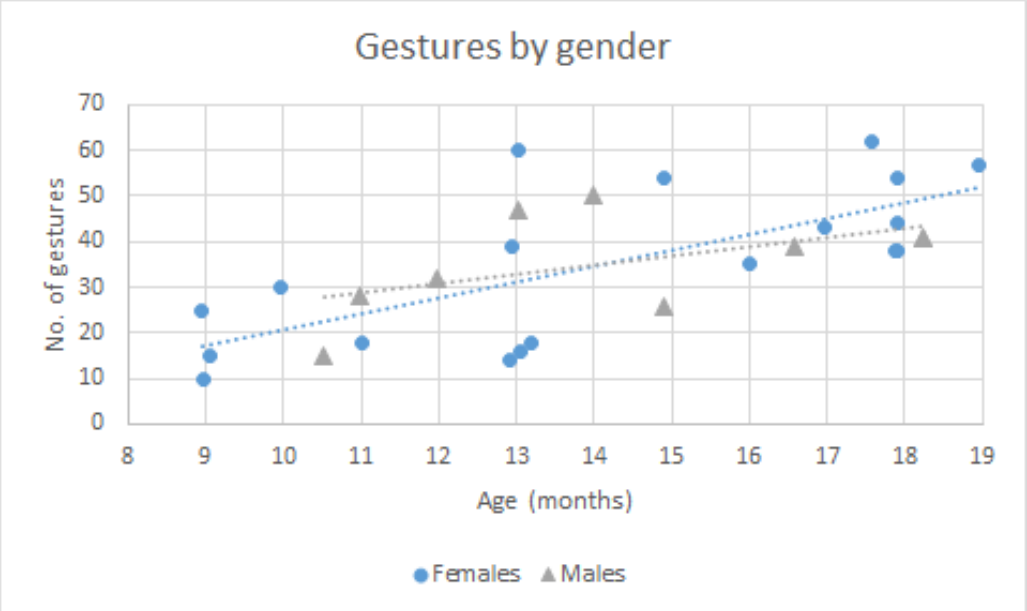

Figure 5.3.b Total Gesture Scores by Gender

With regards to the urban/peri-urban split, the average known gestures of the peri-urban children was slightly higher than that of the urban children, with scores of 14.7 and 13.6 respectively (see Figure 5.3.c). The total gesture score was significantly correlated with area ($r = .438$, $p = .020$). However, there were only two gesture categories where the difference between area was statistically significant. These are category A *First communicative gestures* ($r = .387$, $p = .042$), and category C *Actions with objects* ($r = .375$, $p = .049$). Considering that the relationship is not that strong and that the sample for this study was quite small with an uneven area distribution, future studies should investigate this more to determine if a difference of area is indeed significant within the different gesture categories.

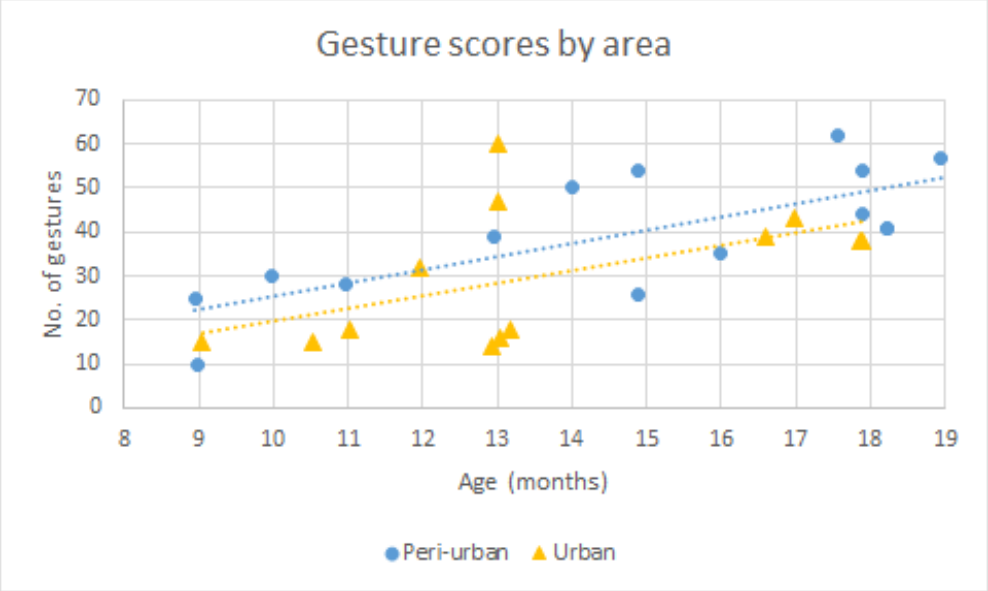

Figure 5.3.c Total Gesture Scores by Area

A Pearson's correlation of 2-tailed significance was done on the total gesture score in comparison to the individual factors of the children. Other than the variables for age and area, the only other variable that had a significant correlation with gesture score was exposure to other languages ($r = -.427$, $p = .023$). Exposure to other languages was measured by number of hours daily, with children divided into two groups: those with less than three hours of exposure i.e., low exposure, and children with three or more hours a day i.e., high exposure. Figure 5.3.d be shows that children with low exposure to other languages have a higher average of gesture scores as compared to children with high exposure to other languages.

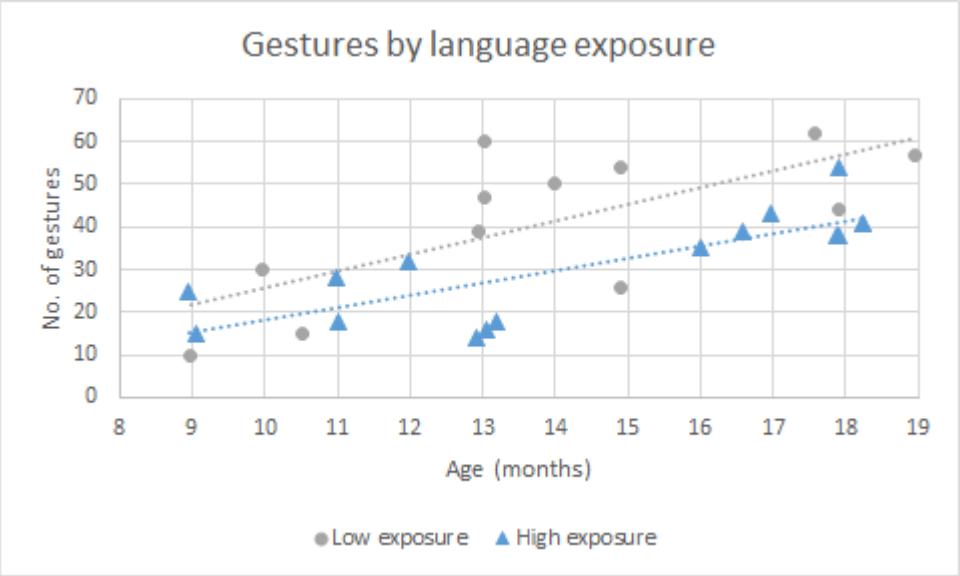

Figure 5.3.d Total Gesture Scores by Level of Language Exposure

With regards to the lexicon, the total gesture score is significantly correlated with the lexical comprehension (r = .626, p = .000) and production scores (r = .450, p = .016). The average gesture score is higher than that of the lexical comprehension and production throughout all ages (see Figure 5.3.e).

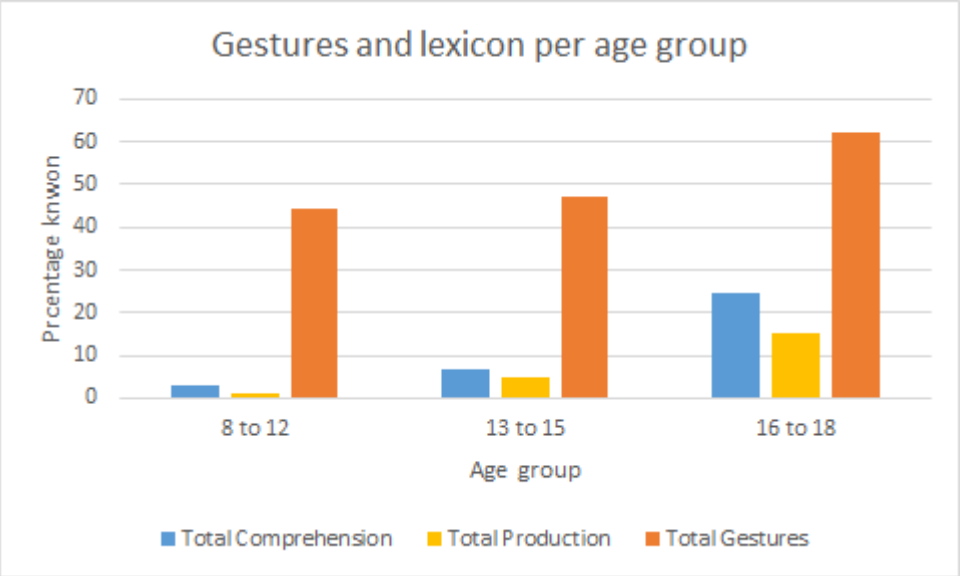

Figure 5.3.e Gestures and Lexicon by Age Group

5.3.2 Results by gesture category

When looking at each gesture category, there are categories where the children did not produce as many items. Specifically, the last three categories D to F: *Pretending to be a parent, Imitating other adult actions* and *Pretend objects*. There are many children who did not produce any actions in these categories (n=11 for category D; n=8 for category E, n=18 for category F), and they ranged across area, gender and age. In fact, none of the items in these three categories were produced by more than half the sample (15 or more children). Table 5.3.f shows the descriptive statistics for each category.

Category	***Total Items***	***Range of Scores***	***Mean Score***
A. First communicative gestures	13	4-12	8.82
B. Games and routines	6	1-6	4.54
C. Actions with objects	19	3-19	12.46
D. Pretending to be a parent	14	0-14	4.29
E. Imitating other adult actions	15	0-14	4.86
F. Pretend objects	1	0-1	0.36

Table 5.3.f Descriptive Statistics Per Gesture Category

Figure 5.3.g shows the average percentage of known gestures in each category, across the three age groups.

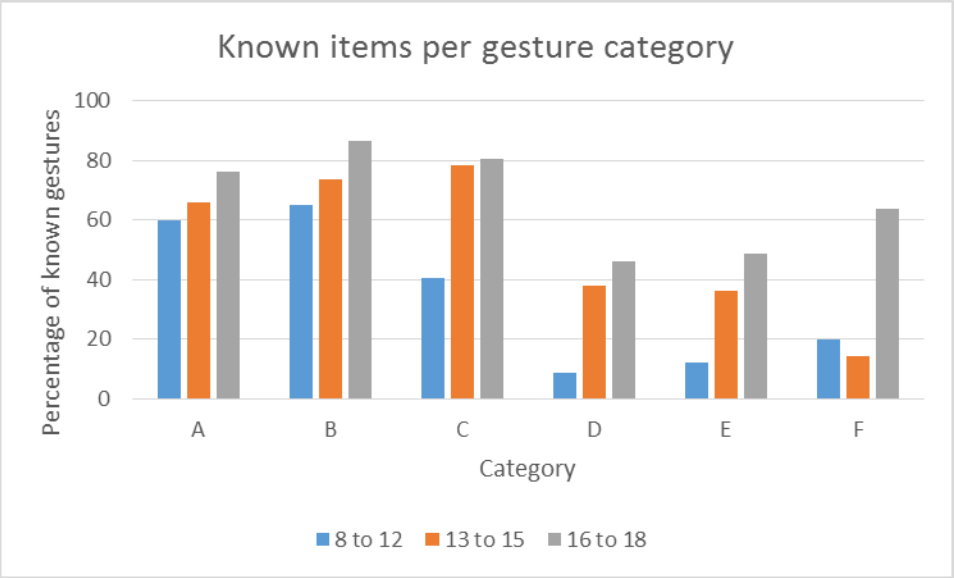

Figure 5.3.g Known Items per Gesture Category

It is interesting to note that at the younger age group of eight to 12 months, the gesture scores of the last three categories were quite low. These younger children knew on average 1.2, 1.8, and 0.2 items in categories D, E and F respectively. However, this increased rapidly, and the oldest age group of 15 to 18 months knew 6.5, 7.2, and 0.6 items respectively.

Within each category there were a few gesture items that when individually statistically analysed, were significantly correlated to age. Table 5.3.h shows how many of these items were in each category, while Table 5.3.i shows what each item was as well as it's score.

Category	***Total no. of Items***	***No. of Items That Correlated With Age***
A First Communicative Gestures	13	4
B Games and routines	6	1
C Actions with objects	19	10
D Pretending to be a parent	14	7
E Imitating other adult actions	15	9
F Pretend objects	1	1
Total	68	32

Table 5.3.h No. of Gesture Items That Correlate With Age

Category	*Gesture Item*	*Gesture Score*
A.	Requests something by extending arm and opening and closing hand.	r = .473, p = .011*
	When you look/point at toy across the room, does your child look at it?	r = -.418, p = .027*
	Points (with arm and index finger extended) at some interesting object or event.	r = .431, p = .022*
	Reaches out and gives you a toy or some object that he/she is holding.	r = .400, p = .035*
B.	Claps hands	r = .622, p = 000***
C.	Put telephone to ear	r = .490, p = .008**
	Stir pretend liquid in a cup or pan with a spoon	r = .401, p = .034*
	Pour pretend liquid from one container to another	r = .392, p = .039*
	Blow to indicate something is hot	r = .727, p = .000***
	Brush teeth	r = .586, p = .001***
	Wipe face or hands with a towel or cloth	r = .436, p = .021*
	Sniff flowers or sniffle	r = .438, p = .020*
	Put on a necklace, bracelet, or watch	r = .661, p = .000***
	Put on a hat or beanie	r = .648, p = .000***
	Put on a shoe or a sock	r = .755, p = .000***
D.	Cover with blanket	r = .601, p = .001***
	Feed with spoon	r = .469, p = .012*
	Brush/comb its hair	r = .516, p = .005**
	Put to bed	r = .638, p = .000***
	Try to put shoe or sock or hat on it	r = .413, p = .029*
	Kiss or hug it	r = .399, p = .036*
	Wipe its face or hands	r = .483, p = .009**
E.	Read (by moving finger, or opens book, turns page)	r = .423, p = .025*
	Sweep with broom or mop or vacuum	r = .397, p = .036*
	Dig or fill up a hole	r = .410, p = .030*
	Type at a computer keyboard or press phone	r = .504, p = .006**
	Water plants	r = .438, p = .020*

	Clean with a cloth	r = .491, p = .008**
	Pretending to cut something	r = .569, p = .002**
	Wash dishes or clothes	r = .493, p = .008**
	Put key in door or lock	r = .509, p = .006**
F.	During play, children sometimes use an object as a replacement for another. […] Have you seen the child doing something of this sort?	r = .426, p = .024*

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

***Correlation is significant at the 0.001 level (2-tailed)

Table 5.3.i List of Gesture Items Significantly Correlated With Age

These results of the development of receptive vocabulary, expressive vocabulary, and gestures will be discussed in the next chapter, as they relate to the existing literature outlined in chapter two. The differences between the results from this study and previous studies are examined, and the implications that these findings may have for future research.

CHAPTER 6 – DISCUSSION

This study aimed to address the following questions:

1. What is the trajectory and nature of lexical comprehension and production in children aged 8-18 months?
2. What is the relationship of gestural acquisition to lexical comprehension and production?
3. What is the impact of specific environmental and social factors on language development?

The results of this study can be summarised as follows:

1. Infants learning Setswana develop receptive vocabulary faster than expressive vocabulary, with nouns making up the majority of known words in both comprehension and production.
2. The development of actions and gestures is correlated with lexical development, and deictic and conventional gestures that are ritualised appear earlier than other types of gestures.
3. Exposure to a second language has an impact on the development of gestures. However, the difference between living in an urban or peri-urban area, and the difference in gender did not have a significant impact on neither gesture nor lexical development.

I will now discuss each of these findings for Setswana speakers in relation to previous studies on other languages in different contexts.

6.1 Development of Receptive Vocabulary

6.1.1 Comprehension of common phrases

The first section of the CDI asks if the child comprehends 29 common phrases. From this list, the children could understand at least five phrases or more, and three children could

understand all the phrases. Also, there were two items that were known by 100% of the sample. All the children could respond when they heard their name being called, and they all responded and stopped what they were doing when they were told “no no”.

The two eight-month-old infants in this sample averaged a comprehension score of 10 phrases: a score at the 75th percentile of the sample in Fenson et. al. (1994). However, at the oldest age of 16 months, the English cohort had a median score of 23 phrases, while the three 16-month-olds in the present study averaged 18.3 phrases.

There is wide variability in the scores of both cohorts. For Fenson et. al., the highest scoring eight-month-old children had similar scores to the 16-month-olds with the lowest scores. We see the same kind of variability in the present sample among 14-month-old children. The youngest child to comprehend 100% of the phrases was 14.89 months, while another 14-month-old had a score of only 12 phrases.

There were four phrases with scores that fell below 40% frequency; that is to say, that fewer than 11 children could comprehend them. These phrases were:

- Want to go for a ride?
- Are you tired/sleepy?
- Are you hungry?
- Do you want more?

These four phrases were the only phrases from this section that are posed to the child as questions. I posit two possible explanations as to how the least commonly understood phrases were also the only phrases that were not commands or statements. The first is that many children could not respond to the question, as they were too young to have begun producing speech. However, these four phrases were yes or no questions. Were this the case, the infants would still be able to respond by nodding or shaking their head, both of which are early acquired gestures (see discussion on gestures in section 6.3).

A different explanation lies with the type of language interactions that occur in this setting. During a 9-month stay in a village in Botswana, Geiger & Alant (2005) made observations on the interaction style of mothers and their young children. One such observation was that “most of the verbal communication between caregivers and children was instructional, with very little verbal response encouraged or expected from the child” (p.

186). Therefore, the children in the present study being more familiar with commands than with questions may not be surprising.

6.1.2. Lexical comprehension

The average score for comprehension across the cohort was 66.8 words. This grew from an average of 11.5 at eight months to 183 at 18 months. However, there was wide variability in the sample, which is evidenced by the divergent scores of children who had the lowest and highest comprehension scores and the other children at the same age.

The two children with the lowest scores were a 10.52 month and a 14-month-old who both had a comprehension score of zero words. There was one other 10-month-old (10.98 months) who had a comprehension score of four words, while the two other 14-month-olds (both 14.89 months) had an average comprehension score of 98 words. The two highest scoring children for comprehension were a 17.57-month-old with a score of 239, and an 18.95- month-old with a score of 304. The four other children aged 17 months averaged a comprehension score of 103.5, with one child aged 17.9 having a score of 62. The other two 18-month-old children had an average score of 122.5, and both had a score of less than half that of the highest scoring child.

This variability is also found in other studies, as in Fenson et. al. (1994) where the children aged 10 months had scores ranging from 11 to 154 words, and their oldest children aged 16 months had scores ranging from 92 to 321 words. It is interesting to note that these scores of the American norms were closer to this cohort's than that of a sample in Mozambique (Vogt, Mastin & Aussem, 2015), which has a more similar context and closer related languages to those in the current study. In their study, the youngest in their cohort, aged 12 months, had a score of 45 words which is slightly less than the 12-month-olds in this study who had an average of 57 words. However, by 18 months the Mozambican cohort reached an average of 66.5 words, which is considerably lower than the average score of 183 in this study. Furthermore, the oldest children in the Mozambican cohort, who were 25 months, reached a score of 80 words.

There are some comprehension milestones that children reach at different ages. In this study, the youngest child aged 8.95 months had exceeded a score of 10 words. The youngest child to exceed 20 words was 11.97 months and had a comprehension score of 73 words. This

is similar to the norms in Fenson et. al. (1994) where the median score first exceeds 50 words at 11 months. However, the oldest children in this cohort to first exceed these same 20-word and 50-word milestones were both 17.9 months, which speaks to the variability found in the data. The youngest child to exceed a score of 100 words was 12.95 months, which is also similar to Fenson et. al. (1994) where the median score reached 100 words at 13 months.

However, for the cohort in Mozambique, the average score first exceeds 50 words at an older age of 14 months and does not reach an average of 100 words by the oldest age in the range of 25 months (Vogt, Mastin & Aussem, 2015). An important difference in these two studies is that the Mozambican study had a sample from an urban and a rural area, whilst the sample in this study did not include more deeply rural areas. Furthermore, the scores from the Mozambican study are a composite score from the CDIs of three different languages; Changana, for the CDI of the rural population, and a bilingual Ronga and Portuguese CDI for the urban population. Lastly, the CDI they used was a direct translation from US English, and not a cultural adaptation. This methodology, as well as the general differences between monolingual and bilingual development, needs to be taken into consideration when comparing the results of these two studies.

6.1.3 Lexical comprehension of semantic categories

The lexical component of the CDI is divided into 20 semantic categories (see Table 2.4.a). In this cohort, the categories that the children had averaged the highest comprehension scores in, as shown in Figure 5.2.d, were:

- Games and routines (15.3%)
- Words for clothes (13.1%)
- Words for toys (12.5%)
- Small household items (11.9%)
- Furniture words (11.7%)
- Food and drink (11.3%)
- Action words (10.9%)

Of these categories with the highest comprehension scores, five of them also had the largest increase between the youngest age group of eight to 12 months and the oldest age

group of 16 to 18 months (see Figure 5.2.f). These were, in order of largest difference in scores:

- Small household items (from 2.8% to 23.7%)
- Words for clothes (from 3.7% to 24.4%)
- Games and routines (from 5.9% to 26.0%)
- Food and drink (from 2.0% to 19.7%)
- Action words (from 3.9% to 21.3%)

These categories reflect words for highly familiar objects and activities in a small child's life. They are also similar to the categories that are the most frequent contributors to the early vocabulary of the cohort found in Fenson et. al. (1994). Games and routines was also their most known category, with small household items, toys and clothes also being part of the earliest appearing categories in their cohort.

The categories of people, animals and body parts were also part of the top seven categories that the earliest words in the American cohort were found in. However, they were not in the top categories in this cohort. Conversely the categories furniture words, food and drink, and action words are among the top seven categories in this cohort but not for the American cohort. This may be due to the cultural differences found between these two populations. An analysis of the type of linguistic input and language experiences that the children in each of these populations receives may explain this difference. For instance, if they are exposed to television and books, they may encounter labels for items such as animals that are not in their immediate environment.

The categories that the children had the lowest comprehension scores for were:

- Words about places (0.4%)
- Describing words (1.5%)
- Question words (1.5%)
- Words about people and things (1.8%)
- Words about time (1.8%)

There are also only three categories whereby the youngest age groups of eight to 12 months and 13 to 15 months had scores of zero words comprehended. For the categories, words about time, question words, and words about amounts, the only children who comprehended any of the items were 16 to 18 months old. In these same three categories, the

sample from Fenson et. al. reached a median score of 50% at 16 months old or later, which means the items in these categories are late acquired words in both languages. However, a score of 50% at 16 months means that the children in the Fenson et. al. study started acquiring the words in these categories before 16 months, while in the present study 16 months was the youngest age that any child knew these words. This may be as a result of the difference in linguistic input that children in this environment receive. Non-Western communities, both rural and urban, have been shown to receive less linguistic input for items such as questions and declaratives, as compared to most Western communities (Vogt, Mastin & Aussems, 2015).

6.1.4 Lexical comprehension by word types

In the comparative study by Caselli et. al. (1995) of infants learning English[9] and Italian, they found that in both groups, nouns dominate the receptive vocabulary and there are very few verbs found before the vocabulary exceeds 100 words. A comparison between the English and Italian cohorts and the Setswana cohort in this study will be made below, with children matched by vocabulary size.

For the sample in the current study, the eight to 12 months age group had an average comprehension score of 24.6 words, and those 13 to 15 months averaged 39 words comprehended. Their vocabulary consisted of an average of 56.5% and 57.1% nouns respectively. This is comparable to a word-matched subgroup of Caselli et al.'s (1995) English/Italian children who had a receptive vocabulary score of 21-50 words. The English cohort had an average of 51.2% nouns, and the Italian cohort averaged 59.3% nouns in their vocabulary.

The oldest age group in the present study of 16 to 18 months had a comprehension score of 122.9 words, which is comparable to the English/Italian subgroup that had a comprehension score of 101-150 words. At this range of vocabulary scores, nouns made up 52.4% of vocabulary for the Setswana cohort, 54% for the English cohort, and 55.6% for the Italian cohort.

[9] English data from the norming study by Fenson, et. al. (1993, 1994)

With regards to the proportion of verbs, the English cohort averaged 10% verbs and the Italian cohort averaged 10.8% verbs in their vocabulary (with a vocabulary size of 21-50 words). While the youngest Setswana subgroup had an average of 10.1% verbs, at 13 to 15 months (vocabulary size of 39 words) this had increased to a proportion of 29.7% verbs in the vocabulary. At 16 to 18 months (vocabulary size of 122.9 words) there were 30.1% verbs in the vocabulary, and for the English and Italian cohorts (at 101-150 words vocabulary size) there were 15% and 17.7% verbs respectively.

What this implies is that the proportion of nouns in receptive vocabulary is similar across these three languages throughout infancy and is in fact in line with other acquisition studies that showed a higher proportion of nouns in the lexicon. There is some variance, in that before the first year of life Setswana-speaking children seem to have more nouns than English-speaking children, and after 12 months both English- and Italian-speaking children have more nouns in their vocabulary than Setswana-speaking children. This variance may be an effect of the difference in sample size.

However, with regards to verbs, after the first year of life Setswana children comprehend about double the amount of verbs that English and Italian children do. It is clear that for Setswana-speaking children, there is not a "virtual absence of verbs up to the point where vocabulary exceeds 100 words" (Caselli et. al., 1995, p. 161). This conjecture is based on studies that are primarily focused on English-speaking children in Western communities. Some studies in sub-Saharan Africa have found a higher prevalence of verbs in the vocabulary. Childers, Vaughan & Burquest (2007) found that for the Afro-Asiatic language of Ngas, spoken in Nigeria, verbs were dominant in early vocabulary. In a similar cultural setting, Alcock, et. al (2005) found that in the Bantu languages of Kigiriama and Kiswahili, both spoken in Kenya, verbs and nouns were equal in comprehension. Whilst verbs were not equal to or more than nouns in this Setswana cohort, this study supports evidence that verbs are more prevalent in the early receptive vocabulary of African children, contrary to what studies on Western languages have previously suggested.

6.2 Development of Expressive Vocabulary

6.2.1 Lexical production

The average production score for this cohort was 24.9 words, which increased from an average of three words at eight months, to 61.1 words at 17-18 months. By 11 months, the average production score in this cohort had exceeded 10 words, however in the study done in Mozambique, children reached 10 words in their expressive vocabulary around 12 months (Vogt, Mastin, Aussems, 2015). In the study by Fenson et. al., expressive vocabulary scores were less than 10 words at 12 months. Fenson et. al. noted that before 12 months expressive vocabulary is limited and there is very little variation. However, variation in expressive vocabulary is evident in this cohort from as early as 10 months.

In this cohort, there were two children each in the age months 10, 11 and 12. The 10-month-old children scored zero and 12 words each, the 11-month-old children scored two and 11 words each, and the 12-month-old children scored 11 and 28 words each. Therefore, not only did expressive vocabulary first exceed 10 words earlier than both the American and Mozambican cohorts, the wide range in the data also occurs earlier.

There were two other children who had production scores of zero. One child was aged 14 months, and the other two children aged 14 months averaged 33.5 words produced. The other child who scored zero was aged 16.6 months, and the other two children aged 16 months averaged 27.5 words, which interestingly was lower than the average score of 14-months-old. The two children with the highest production score were both 17.9 months and had scores of 119 and 169 words. They were the only children whose scores had exceeded 100 words, and were significantly higher than the next highest score which was a 17.5-month-old with a score of 68 words.

While it seems like production begins earlier for Setswana-speaking children than English-speaking children, the development pattern becomes more similar by the second year of life. Three of the five children aged 17 months in this cohort had exceeded 50 words in their expressive vocabulary, and at least half the sample from Fenson et. al. exceeded 50 words at 17 months as well.

6.2.2 Lexical production of semantic categories

From the 20 semantic categories in the CDI, the categories that the children in this cohort had averaged the highest production scores in (as in Figure 5.2.e), were:

- Sounds (23.4%)
- Words about people (7.3%)
- Games and routines (6.4%)
- Vehicle words (6.1%)
- Words for toys (6.0%)

Four of these categories had the largest increase between the youngest ages of eight to 12 months to the oldest ages of 15 to 18 months (see Figure 5.2.g). These were, in order of largest difference in scores:

- Sounds (from 18.1% to 38.0%)
- Vehicle words (from 0% to 13.9%)
- Words for toys (from 0.6% to 13.6%)
- Games and routines (from 1.9% to 12.0%)

The semantic categories from this list that also appeared most frequently in the expressive vocabulary of the cohort from Fenson et. al. (1994), were sounds, games and routines, people, and toys. The categories of animals, and food and drink also appeared amongst the most frequent categories for English but were not amongst the most frequent for Setswana. On the other hand, the category for vehicles was amongst the most frequent for this cohort but not for English.

There were four other categories that had a score of zero up until the age of 16 to18 months. These are listed below, with the score that each category reached at 16 to 18 months:

- Outside words (1.8%)
- Words for places (1.6%)
- Words about amounts (1.5%)
- Describing words (0.1%)

Unlike lexical comprehension, there were four categories that had production scores of zero throughout the cohort. None of the children in this sample throughout the age range knew any words from these categories:

- Words about time
- Words about people and things (i.e., pronouns)
- Question words
- Words about places (i.e., locatives)

This is to be expected, as other studies have found that words such as function words, adjectives and question words appear later in life after the second year of life, and the oldest children in this sample were 18 months.

6.2.3 Lexical production by word types

In the English and Italian cohorts compared by Caselli et.al. (1995), nouns dominate the expressive vocabulary and verbs make up a very small proportion of the expressive vocabulary. The overall means were 2.06% and 2.27% verbs for English and Italian respectively. Once again, the children can be matched by vocabulary size to draw a comparison with the cohort in this study.

The youngest age group in this sample of eight to 12 months had an average production score of 7.5 words. This is comparable to the English/Italian subgroup who had a vocabulary size of 6-10 words. At this range of vocabulary scores, the Setswana cohort had an average of 56.9% nouns and 0.7% verbs in their expressive vocabulary. The English cohort averaged 47.7% nouns and 1.1% verbs, while the Italian cohort had an average of 63.5% nouns and 0.7% verbs. As with comprehension, the Setswana cohort had a slightly higher proportion of nouns than the English cohort, and a slightly lower proportion of nouns than the Italian cohort. However, verbs consistently make up a tiny part of the overall vocabulary.

At 13 to 15 months, the Setswana-speaking children averaged 11.3 words produced, which is comparable to the English- and Italian-speaking children who had 11-20 words in their expressive vocabulary. At this vocabulary score range, nouns dominated the vocabulary of the Setswana-speaking children, making up 82.8% of their vocabulary. This is considerably more than that of both the English and Italian cohorts, who averaged 49.4% and 51% nouns respectively. However, there are still very few verbs in the Setswana cohort, making up 0.8% of the vocabulary, while the verbs have grown to 2.1% in English and 2.8% in Italian.

The oldest age group of 16 to 18 months had 49.5 words in their expressive vocabulary, which can be compared to the English- and Italian-speaking children with a vocabulary size of 21-50 words. The proportion of nouns at this range was 55.6%, which was more similar to that of English and Italian, which had 55.2% and 53.4% nouns respectively. With regards to verbs however, Setswana-speaking children had a significantly higher proportion than their English and Italian counterparts. Verbs comprised 12.3% of vocabulary in Setswana-speaking children in contrast to 2.1% and 2.8% for English- and Italian-speaking children respectively.

As with comprehension, the linguistic and cultural differences between these samples may explain this prevalence of verbs in production. For instance, Gopnik & Choi (1995), found that in Korean, children had a higher proportion of verbs than English-speaking children. The Korean language, like Setswana, has a higher salience of verbs than English and Italian. Both English and Italian are SVO (subject-verb-object) languages, while Korean is an SOV language. Setswana is mainly SVO but allows for SOV order in the passive voice. Furthermore, both Korean and Setswana are agglutinating languages and utilise subject and object omission, which means that often verbs are the only content word found in a sentence.

6.2.4 Most commonly produced words

Caselli et. al. ranked the first 50 words produced by English- and Italian-speaking infants. Table 6.2.a compares the words most commonly produced by Setswana-speaking infants in this cohort (as in Table 5.2.l), and the same word's ranking for English- and Italian-speaking children, if ranked. Of the top 21 Setswana words, nine are also found in the top English words and 13 in the top Italian words.

Setswana Words Ranked	***English Rank***	***Italian Rank***
mommy/mother	2	1
Baby	12	23
daddy/father	1	2
vroom vroom	16	6
yummy	13	4*
woof woof	11	3
piggyback	-	-
water	-	7
dog	8	40
milk	-	43
yes	45	30
ouch	36	35
bug	-	-
breast	-	-
eat	-	-
food	-	4*
chicken	-	-
hoot hoot	-	-
hot hot	-	-
soft porridge	-	-
sleep	-	9
*The 4th highest Italian word is '*pappa'*, translated as 'food/mealtime'.		

Table 6.2.a Rankings of First Words

The word *ee,* 'yes', was ranked much higher in Setswana than in English and Italian, while the word *nnya,* 'no', was ranked 9th and 10th for English and Italian respectively but did not appear in the top Setswana words. This may have been as a result of the emphasis and reinforcement of politeness in the culture of Setswana.

The Setswana word for 'breast' (which is *lebele,* but the variation used for and by children is *nyanya*) can also be used as a noun but also as a verb meaning to breastfeed. This explains why it was prevalent in the vocabulary of infants, as most mothers in Botswana breastfeed for more than 18 months. While 'breast' was not in the American CDI, the word 'bottle' was, and ranked at number 10 in the top English words.

There were four words in the top 21 Setswana items that were not in the top 50 English words, but were in the top 50 Italian words. These were *maši,* 'milk'; *metsi, '*water'; *dijo, '*food'; and *robala,* 'sleep'.

Five of the top 21 Setswana words were not found in the English and Italian top words because the item was not included in the American and Italian CDIs, and was added during the construction of this CDI. These words are: *nyanya,* 'breast'; *pip pip,* 'hoot hoot'; *pepe,* 'piggyback'; *motogo,* 'soft porridge'; and *tšhu-tšhu,* 'hot hot'. This is a manifestation of the importance of adaptation over translation. In many African cultures it is more common for small children to be carried on the back than in a pram or carry cot, and the closest English translation for this activity is 'piggyback'. The main ingredient in soft porridge, sorghum, is the staple food of Botswana and is consumed almost daily by infants still adjusting to solid foods. Finally, the ideophone *tšhu-tšhu,* which can be directly translated into English as 'hot hot', is used in many ways. One of which is to name hot items such as a stove, iron or a cup of tea, and it also serves as a warning to the child for example, to refrain from touching the stove. It can also be used as an exclamation when one is burnt on a hot surface, similar to the use of the English "ouch". Thus, while *tšhu-tšhu* is commonly said to, and used by, Setswana-speaking children, the same concept does not exist for English.

Had the CDI tool not been adapted but merely translated directly from English to Setswana, almost a quarter of the words that first appear in expressive vocabulary would have been omitted from the CDI. Considering that the Mozambican CDIs used by Vogt and colleagues were translations and not adaptations, they may have underestimated vocabulary, which would explain why the lexical scores from their sample were much lower than those of the children from this study.

6.3 Development of Actions and Gestures

From eight months old, infants already have a repertoire of expressive gestures, and as they get older, they develop even more gestures. At eight months old, children knew an average of 17.5 gestures, which grew to an average of 46.3 by 18 months (see Figure 5.3.a). Within this sample, the child with the smallest gesture repertoire (aged 8.9 months) knew 10 gestures, whilst the largest repertoire (of a child aged 17.6 months) was 62 gestures. This is similar to the findings in Fenson et. al. (1994) who noted that "gesture scores were well above zero at the earliest age surveyed (8 months)" (p. 40).

The variable of area was significantly correlated to the total gesture score, with children in the peri-urban area scoring slightly higher than children in the urban area (as shown in Figure 5.3.c). However, only categories A and C were statistically significant, which could suggest that a difference in area is more salient for gestures that emerge earlier in life, and later emerging gestures develop in a similar pattern regardless of the area the child lives in. As mentioned before however, the significance is slight and future studies should consider using a larger sample to determine the effect that area would have on gesture development within the categories.

A study by Germain, Gonzalez-Barrero & Byers-Heinlein (2021) found that infants exposed to a second language for less than 25% of their day (three hours in a 12-hour waking period) did not pattern differently from both their monolingual and bilingual counterparts in gesture scores. However, the results of this cohort show that infants with less than three hours of exposure (comparative to monolinguals in the previous study) had higher gesture scores than children with more exposure (see Figure 5.3.d). Their lexical scores also seemed to have a negative correlation with high exposure, and although it was not statistically significant, children with high exposure had lower comprehension and production scores. The sample in the study by Germain and colleagues patterned similarly with the lexical scores. The monolingual children had higher scores for receptive and expressive vocabulary (142 and 18 respectively) than the bilingual children (129 and 13 respectively). This could suggest that gesture is indeed integral to speech, and they are part of learning to speak.

As discussed above, there are six subcategories of actions and gestures, namely:

A. First communicative gestures
B. Games and routines
C. Actions with objects
D. Pretending to be a parent (playing "home")
E. Imitating other adult actions (using real objects or toy implements)
F. Pretend objects

The gesture subcategories patterned differently when age was considered. When looking at the different age cohorts of eight to 12 months, 13 to 15 months and 16 to 18 months, the youngest age group especially had a much lower score for the last three subcategories (see Figure 5.3.g). This is in line with previous literature, as Fenson et. al (1994) indicated that while the gestures in categories A and B emerge well before the end of the first year of life, the earliest gestures in categories C and E emerge before the end of the first year, while others emerge late in the first year or early in the second year. Gestures in category D are the latest to emerge, developing a few months after categories C and E in the second year (Fenson, et. al. 1994).

Interestingly, the proportion of gestures significantly correlated with age in the overall scores of each subcategory, and was higher for subcategories C, D, E and F than for subcategories A and B (see Table 5.3.h). This is because many of the items in categories A and B are known by a large proportion of the children and are reaching a ceiling effect. This provides further evidence to support the claim that these First Communicative Gestures and Games & Routines are early acquired gestures, even across cultures.

From the 68 actions and gestures, there were 32 items that significantly correlated with age. The remaining 36 items may not have correlated with age because of one of the following reasons:

- The item may have a ceiling effect and be acquired earlier, including by the youngest children in the cohort.
- It may be a late acquired item and known by children beyond the age range of this sample, thus having a floor effect

- The item may not be suitable because it is a culturally foreign concept, or it is biased towards a certain demographic, or because it is phrased in a way that would not apply in this context
- It may be an unreliable result due to the small sample size of this study, and the item may need more testing with a larger sample to confirm any correlations. In some cases, the item may have had a better statistical result in another pilot of a CDI in the South African variety of Setswana, which had a larger more diverse sample size (O. Mahura & M. White, personal communication, 26 May 2021).

The items that did not correlate with age are discussed below within each gesture subcategory (see Table 5.3.i for the list of items that did have a significant correlation with age).

6.3.1 First communicative gestures

Of the 14 items in the first gesture subcategory, only four items were significantly correlated with age. Some of the first communicative gestures appear quite early in the first year of life, and are likely to not be correlated with age as most children in the sample would have already acquired them. These include:

- Nodding their head ‘yes’
- Shaking their head ‘no’
- Waving bye bye
- Lifting their arms to show they want to be picked up

Although they did not correlate, I recommend that these items be kept in the CDI, as future studies with larger more varied samples may yield results that can better explain these items.

A few of the other gestures may not be culturally appropriate as they may be western concepts still foreign to a large portion of the population. For example:

- Putting their finger on their mouth to say hush
- Licking their lips to indicate that food is nice

A more common way to hush a child is by using the ideophone “shh” or other cooing sounds while rocking them, or by using a hand to tap on the child’s mouth. When expressing that food is nice, while it may be reflexive to lick one’s lips, it is more likely that the sentiment would be communicated vocally with the ideophone “mmm” or a variation of the word for nice, *monate*. In fact, this is included in the vocabulary section, under the first category of sounds, and was in the top five most produced items with 46.4% of the sample being able to produce it (see Table 5.2.k). For these reasons I would recommend that these items be rephrased in future studies before being considered for elimination.

The remaining items below may need to be retested with a larger sample size, as the statistical analysis was not conclusive. Also, these items have been shown to be significant in a pilot with a larger sample size. These items are:

- When you look/point at something across the room, does your child look at it?
- Extends arm to show you something he/she is holding
- Shrugs to indicate “all gone” or “I don’t know”
- Blows kisses

6.3.2 Games and routines

Only one of the six items in this subcategory, ‘claps hands’, was correlated with age. The item ‘plays high five’ was not statistically significant as a gesture item, however it was one of the most comprehended items from the lexical list (see Table 5.2.k). This may be because there are some other gestures, similar in concept to the high five, that children would perform spontaneously and without prompting. In the context of this population, gestures such as a ‘fist bump’, ‘thumbs up’ or ‘thumb touch’ may be more common (Brookes, 2004). These could be alternatives that are added to this gesture item in future studies.

The item ‘Plays ‘peekaboo’/hide and seek’ may not be culturally appropriate in this context. ‘Peekaboo’ is a foreign concept which does not have an equivalent word in Setswana, and the alternative option of hide and seek is most probably known and played by older children. A more general description of a hiding game should be used, like hiding their face or body behind something such as their hands or a blanket.

The remaining items should be kept as they may need to be retested with larger sample size for more conclusive results:

- dances
- sings
- plays chasing game

6.3.3 Actions with objects

There were 19 items in this category, of which nine were not correlated with age. Some of these items are more complex and are most probably used by older children, such as:

- Put on a belt in his/her trousers
- Lay head on hands and squeeze eyes shut as if sleeping

Some of the items may be biased towards a demographic with a higher SES and access to more resources, such as some toys. These items include:

- Hold plane and make it “fly”
- Push toy car
- Throw a ball

Children from a more rural setting would not have encountered a toy or paper plane before. Toys such as cars and balls may be rare, and not every child will have one of their own to play with. For future studies, these could be rephrased to be more inclusive of make-believe and substitute play items. For example, asking if they can push a toy car or something such as a shoe or a rock as if it is a toy car; and throwing an object, such as a ball or a sock.

The remaining items below may need to be retested with a larger sample in order to verify the results:

- Comb or brush own hair
- Pretend to ‘drink’ from an empty cup
- Eat with a spoon or fork, holding or helping to hold the spoon or fork.
- Drink from an open cup containing liquid

6.3.4 Pretending to be a parent

As mentioned before, children from a lower SES background may not have access to some toys, including dolls and teddy bears. Moreover, in a more conservative country such as Botswana there are things which are seen as feminine and not acceptable for males to do, and vice versa. This means that male children may not be allowed to play with dolls, or if they do their parents may not like to admit it. For these reasons, the items in this entire subcategory may be biased against some demographics, thus half of the items not being correlated with age. These items are:

- Feed with bottle or at the breast
- Put clothes on it
- Try to put diaper on it
- Talk to it
- Pat on the back (to quieten) or burp it
- Push in stroller/buggy/pram
- Rock it

Some participants wanted to skip over the entire subcategory without looking at any of the items upon realising that they were about playing with dolls, either because their child did not have a doll or did not play with dolls. They were encouraged to read through the items regardless and see if their child did any of the actions with a substitute item. In some cases, parents indicated that the child used a folded towel or small blanket as their 'baby' in lieu of a doll. One participant said their child did some of the actions, such as patting on the back, covering with a blanket, kissing, hugging and talking to a child younger than them who lives in the same home. Future studies could rephrase the instructions for this subcategory to reflect these conditions.

6.3.5 Imitating other adult actions

There are 15 items in this subcategory, and six of them did not correlate with age. Some items are foreign cultural concepts and should be removed, including:

- Pound with hammer or mallet
- Vacuum/hoover

One item, “play musical instrument e.g., guitar, trumpet” is biased towards a higher SES. Future studies should rephrase this to include substitute or play items, as well as to include instruments more commonly found across Botswana, such as drums instead of trumpet.

The other items are most likely developed by older children, including:

- Drive a car (by turning steering wheel)
- Write with pen or pencil
- Put on glasses

6.3.6 Pretend objects

The last subcategory consisted of one yes/no question:

> “During play, children sometimes use an object as a replacement for another. For example, a child wishing to feed a teddy bear might pretend that a stick is a spoon. A child might put a bowl on their head like it’s a hat. Have you seen the child doing something of this sort?”

Following this question, participants were asked to describe some examples of this that they may have observed, and some participants may have selected ‘no’ simply because they could not think of any examples, not necessarily because the child did not engage in this type of act. This could be changed in future studies, by giving an option that allows participants to select ‘yes’ even if they cannot think of any particular examples. Within the sample from this study, there were two participants who did just that, and selected ‘yes’ without providing any examples.

6.3.7 Other actions and gestures

At the end of the gesture section, participants were asked to add in any extra actions and gestures they may have observed their child doing, which were not included in the questionnaire. The responses from this section should be considered as possible additions for future studies. In this sample the extra actions and gestures suggested more than once were:

- To ‘butjila’: a type of greeting action specific to the Kalanga culture, which can be added to Category A as part of a general item for greeting, as there is an item for saying farewell but not for any type of greeting.
- To snap their fingers when they hear a song: this can be added to Category B with the item for dancing
- To put clothes in water pretending to wash them: this can be added to Category E with the item for washing dishes
- To pour water or sand into a container and stir pretending to cook: this can be added to Category E of pretending to be an adult

6.4 The Effect of SES and Individual Factors

6.4.1 Area

The population in this study was from an urban area, the capital city of Gaborone, and from a peri-urban area, a village 30km outside of Gaborone. The results of this study showed that there was no significant difference in the language scores of the children from the two groups. However, there was a trend of children in the peri-urban area having higher language scores than children from the urban area, for lexical comprehension, lexical production and gestures (as shown in Figures 5.2.o, 5.2.p and 5.3.c respectively). This may be as a result of over-estimation on the part of the parents and caregivers - as found by Bavin et.al. (2008), parents from a lower SES background tend to overestimate their child’s language skills, especially for children around one-year-old.

Evidence suggests that children from a lower SES background tend to have lower language skills, especially vocabulary size, as compared to children from higher SES (Fernald, Marchman, & Weisleder, 2013). The demographics of the participants also showed that it is not that simple to identify SES by the area you live in, especially for peri-urban areas.

Many people in peri-urban areas lead urban lifestyles. This means that because of the proximity to a town or city, they are able to work, attend school and engage in social activities in the town/city, and commute back and forth to their home. People living in urban villages are from different SES backgrounds, which is also reflected in this sample. For example, there were eight parents who had an education level below the national average of

9.3 years, i.e., they have completed primary school but have not completed the Junior Secondary Examination. Of these eight parents, seven of them were from the peri-urban group. On the other hand, there were six participants who indicated that they had an income within the top two tax brackets i.e., more than BWP 108, 001.00. Four of these six participants were from the peri-urban group, including the only participant within the highest tax bracket. Therefore, most of the participants with the lowest education levels as well as most of the participants with the highest income were both from the peri-urban group.

This means that to get a better idea of the impact that the urban/peri-urban/rural divide has on language development, future studies need to include populations from rural areas deeper in the country. Other SES indicators are compounded by living in a deep rural area, such as a lack of access to higher quality education and higher paying jobs.

6.4.2 Gender

There was an unbalanced distribution of males and females in the sample. Therefore, it was not surprising that there was no statistically significant difference found between the language scores of boys and girls. However, for both lexical comprehension and production (see Figures 5.2.m and 5.2.n respectively), there was a trend found of females progressing faster than males. Although it is generally believed that females mature faster than males, studies on language abilities are inconclusive on there being such a difference. With regards to gestures, Fenson et. al. (1994) found that the category with the most significant gender difference was ‘pretending to be a parent’, with females having the advantage. During the data collection of this study, caregivers of male children would often get to this category and insist that, based on the instructions, they cannot complete the section. This attitude is based on the cultural beliefs and notions of gender roles in society. Women are the caregivers and men do not nurture small children, therefore female children would emulate this behaviour and not boys.

6.4.3 Maternal education

Only five of the 28 mothers in this sample had a low level of education, i.e., below the national average of 9.3 years. Therefore, it is not surprising that there was not a significant

difference found based on maternal education. A recent study in South Africa by Southwood et. al. (2021) also found no correlation between maternal education and lexical ability in children below three years. Some studies have used maternal education as a sole proxy for SES because it is more stable than variables such as income, and because it is less controversial to measure (see Dollaghan et. al., 1999). However, this did not prove as successful in the setting of the present study.

Southwood and colleagues suggested that one of the reasons maternal education did not correlate with vocabulary, is because in many African households, childcare is often a responsibility shared amongst older female relatives and not just the child's mother alone. In the present study, about a third of the children were being taken care of by someone other than their mother. Grandmothers, an older female cousin, childminders and a creche were the main caregivers of nine of the children in this study. As Southwood et. al. (2021) points out, "In cases where a female other than the mother provides the majority of the childcare, maternal level of education might be less relevant than primary caregiver level of education." (p. 12)

Nevertheless, maternal education is an important indicator of SES (Hauser, 1994). In this sample, four of the five mothers with lower levels of education were also living in the peri-urban area, and they all had an income below the national average and in the lowest tax bracket. Furthermore, nine of the 10 participants who indicated that the mother had tertiary level education, also indicated that they had an income above the national average and more than half of them lived within the city. Thus, future studies should incorporate maternal education as a variable of SES, bearing in mind the difference in education levels of Western and non-Western populations. For instance, Fernald, Marchman, & Weisleder (2013), had an average maternal education of 13.7 years for their group with a low SES, whereas only 28.8% of Botswana's population has tertiary level education or more than 12 years of schooling, and they are most probably not from a low SES background. In Sub-Saharan Africa, a correlation was found only with mothers who had a primary level of education (Vogt, Mastin, & Aussems, 2015), thus this may be a better distinction to follow for future studies in a similar socio-cultural setting.

6.4.4 Health issues

With regards to health-related issues, there were six children in the sample who were born before 36 weeks and/or weighing under 2.5kg. There were also three children who were indicated to have had an ear infection. Finally, there were four infants who had one or more family members with a speech-hearing difficulty. None of these health factors were shown to have a statistically significant correlation to vocabulary or gesture scores.

Bradley & Corwyn (2002) found that the relation of health and child development is more prevalent in children from low SES backgrounds. However, as discussed earlier, there was great variation of SES markers of participants in this study, and it was not well balanced between low and mid-SES. Thus, it may be that there was not a difference in scores for children with health issues because their health issues were not compounded by a low SES background.

6.4.5 Exposure to other languages

In a recent study, Germain, Gonzalez-Barrero & Byers-Heinlein (2020) compared the gesture acquisition of 14-month-old infants in three language groups. The first group was monolingual French or English infants, the second was infants exposed to a second language, and lastly bilingual French and English infants who heard both languages for more than 25% of the time. They found that there was no statistically significant difference between the three groups. However, there were slight differences in the raw gesture scores of the three groups. The monolingual group had the lowest gesture scores for the subcategory A - First Communicative Gestures, while the bilingual group had the lowest gesture scores for the combination of subcategories C, D and E[10].

In the present study, the infants that were exposed to a second language for more than 25% of the day had lower scores than the monolingual group across the gesture section (see Figure 5.3.d). This group is comparable to the bilingual group in the study by Germain and

[10] Germain and colleagues did not compare scores for subcategory B - Games and routines, due to the major differences between the items in the two languages.

colleagues, and these results are similar to those they found for the subcategory First Communicative Gestures.

Germain et al. suggest reasons why their original hypothesis, that bilingual infants would gesture more than their monolingual counterparts, was not reflected in their results, which may be applicable to the present study. One suggestion was that infants with richer expressive vocabularies in more than one language, experience a higher cognitive load than their monolingual counterparts. Relative to monolinguals, they may be experiencing more language competition and thus not be producing as many gestures.

Another possibility is that the development of gestures is intrinsically related to the development of vocabulary. Although it was not statistically significant, the vocabulary scores of the monolingual children in this cohort were also higher than that of the children with high exposure to other languages (see Figures 5.2.q and 5.2.r for receptive and expressive vocabulary respectively). It is generally believed that children acquiring more than one language develop vocabulary at a slower rate than monolingual children (Bialystok, Luk, Peets & Sujin, 2010), which these findings seem to support. If the development of gesture is inherently linked to that of vocabulary, then it would follow that a slower rate of acquisition in one mode of language means the same for the other mode. Exploring this link between gesture and vocabulary could be an important direction for future research, as well as the development patterns of gesture in children exposed to or acquiring a second language.

CHAPTER 7: CONCLUSION

7.1 Summary of Main Findings

The aim of this study was to carry out the initial adaptation and first pilot of the MB-CDI for Setswana speaking infants in Botswana, and to conduct an initial exploration of the development of gesture and lexicon in children acquiring Setswana between the ages of eight months and 18 months. In order to do so, the following questions were posed:

1. What is the trajectory of lexical comprehension in children aged 8-18 months?
2. What is the trajectory of lexical production in children aged 8-18 months?
3. What is the relationship of gestural acquisition to lexical comprehension and production?
4. What is the impact of specific environmental and social factors on language development?

As outlined at the beginning of this study, we know very little about early acquisition in Setswana and Bantu languages in general. Therefore, the development of a CDI for Setswana that would provide more detailed and representative data on early development was an important step in addressing this dearth.

As outlined in chapter 3, I followed a protocol developed by the SA-CDI team to adapt and pilot the CDI. After three mother-tongue Setswana speakers translated the US English CDI, we consulted with parents and language/childcare professionals to refine the CDI for piloting.

Thirty caregivers of children between eight and 18 months were recruited from two clinics, one in the urban city and one in the peri-urban village just outside the same city. From these, 28 participants successfully completed the CDI. The participants were caregivers of 19 girls and nine boys. Furthermore, 22 of these participants had children who were exposed to a second or third language at home, other than Setswana.

The findings of this study show that infants' receptive vocabulary, expressive vocabulary, and gestures all increase with age. Gender and area did not have a statistically significant effect on language development. Several individual and SES factors were statistically analysed for correlations with these three aspects of language development. The only factor that was shown to have a significant effect was that of exposure to other languages. This variable had a negative correlation with gesture scores. In other words,

exposure to another language was related to lower gesture scores. While it was not statistically significant, the same effect was found with the expressive and receptive vocabulary scores in relation to exposure to another language.

The study also showed that, as expected, infants learning Setswana develop receptive vocabulary faster than expressive vocabulary. Nouns make up the majority of known words in both comprehension and production, as has been found in many other studies. Verbs make up a small percentage of the children's total vocabulary. However, verbs made up about a quarter of receptive vocabulary, which is a higher proportion than has been found in Indo-European language studies. The development of actions and gestures is correlated with lexical development. Deictic and conventional gestures that are ritualised appear earlier than other types of gestures. These are some of the many interesting findings from this pilot that warrant further investigation.

7.2 Limitations

There are some limitations to this study. The first is the small sample size. Although intended to be a pilot study, the sample size involved was too small to draw any definitive conclusions. Secondly, the gender distribution was not balanced within the sample, thus we cannot confidently rely on the findings that gender does not have an effect on language development in this population. A small sample also meant that we could not conduct a more extensive statistical analysis on the data. The analysis in the present study involved correlation analyses between language scores and a single variable. A more in-depth analysis, such as a multiple regression analysis which can only be done with a larger data set, may better explain how some of the individual and SES variables interact with language scores.

The participants in this study were recruited from an urban and peri-urban area. According to the demographics of the participants, their SES differences cannot be attributed solely to a difference in the area they live in. A great disparity in SES has been evidenced between urban and rural populations in Botswana, yet the results suggest that this disparity may not be as prominent between urban and peri-urban populations. Future studies should recruit participants who live in rural areas deeper in the country to determine if this factor translates into differences in language development.

Finally, the version of the CDI that was used in this pilot was very long for many of the participants to get through, particularly the vocabulary section. The official CDIs of other languages have an average of around 350 lexical items, compared to over 800 items in the version used in this study. While this was scientifically necessary for the adaptation process, it proved to be tedious for caregivers, especially those of the youngest children under one-year-old, who would end up responding affirmatively to maybe 1% of the total words in the tool.

7.3 Implications and Directions For Further Studies

This study illustrates that children acquiring Setswana do so in a similar pattern to other languages. There are however some findings that contrast what has been evidenced in previous language studies, which need to be explored further. For instance, gender differences may be more salient to some cultures than others. Also, the word types that comprise early vocabulary may be dependent on the language in question. Setswana-speaking children have more verbs in their receptive vocabulary than has been estimated in previous studies. This may be due to the fact that Setswana has more of an emphasis on verbs than Romance languages.

Botswana has a particular socio-economic and linguistic-cultural profile that from observation suggests that there may be differences between urban, peri-urban and rural areas. Particularly in urban villages around the cities, there is a wide disparity in income and education reflected, meaning one may have neighbours living in vastly different circumstances. The potential of a child to be exposed to another language, and indeed which language they are exposed to, may be aligned to regional differences. More work needs to be done on understanding regional differences in Botswana. Further work with larger and more diverse samples may show the extent to which these areas may have an impact on language development.

It is clear from these findings that creating a fair tool, that is appropriate for use in socio-cultural settings such as Botswana, involves more than just a direct translation of the tool. Some of the earliest acquired and most common words known to the children in this cohort were added to the Setswana CDI following observations of young children's language and consultations with parents and language professionals. These words were not in the

original English version of the CDI. Several items in the gesture section of the Setswana CDI did not work with this cohort because they involved concepts that were unfamiliar to the children and were generally unknown in the context of this population. Therefore, future endeavours to create CDI adaptations should be careful to ensure the tools are not only linguistic adaptations but also cultural adaptations.

This study contributes to the body of knowledge on early language development in that it starts to describe the development of gesture and vocabulary in infants learning Setswana in Botswana, a language which has hardly any empirical evidence on the subject. It is part of an on-going study to adapt and develop the CDI into multiple languages spoken across southern Africa. The limitations of this pilot, specifically the sample size, gender and area distribution, as well as other findings from this pilot study, are being considered in further pilots in Botswana and South Africa (Kgolo, Letsholo-Tafila & Mokgatlhe, 2019; Southwood et. al., 2021; Brookes et.al., forthcoming). These will produce data that is more reliable, and eventually yield assessment tools that can be used by child speech and language practitioners and academics, as well as to establish norms for children in southern Africa.

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APPENDICES

Appendix A – Consent Form for Participants

Please read the statements below before giving consent to take part in the study.

I have been given a written explanation of the study. It includes sufficient information about the study and I have been given the opportunity to ask questions.
I have been informed that the purpose of this study is to explore children's language development.
I am aware that I will be asked to fill in a questionnaire about my child's language and other communication skills.
I am aware that if I have any questions about how to fill in the questionnaire, I can ask for information at any stage, or for a researcher to talk me through this. I am also aware that if I am uncomfortable with any of the questions, I do not need to answer them.
I understand that I will be asked to answer some additional questions in one week's time.
I understand that I can withdraw at any stage without having to offer a reason.
Any questions I have asked have been answered to my satisfaction and I am aware that any future questions will be answered as fully as possible.
I have read and understood the above information and agree to take part in the language research as described. I have had sufficient time to think about the study and to decide, without pressure, to take part.

Please provide the following details before starting the survey.

Parent Name: _____

Child's name: _____

Child's date of birth (dd-mm-yyyy): _____

Is your child a girl or a boy?
Girl
Boy

Postal address: _____

Email address (optional): _____

Phone number (optional): _____

Appendix B – Family Background Questionnaire

Dipotso go ba Lelwapa

Boitekanelo jwa ngwana le botshelo jwa lelapa bo na le seabe sê se tona thata mo mekgweng ê bana ba ithuthang mafoko le diketso ka gone. Dipotso tse di latelang di remeletse mo go sê. O kopiwa go araba dipotso tse mme ga o lopiwe go araba dipotse tse o leng sebete se molangwana ka tsone.

Go tsweledisa go baya tshedimosetswe ya gago sephiri, o kopiwa gore **o seka wa kwala maina le aterese ya gago gope mo fomong e. O gakololwa gore dikarabo tse o di kwalang mo mo fomong e, di lebagane le ngwana o o tlaabong o araba ka ene mo fomong e e patagantsweng le yone e.**

Tshedimosetso ka wena le ngwana wa gago

Letsatsi la gompieno: _____

Botsalano jwa gago le ngwana (motsadi, nkuku): _____

Kgaolo e le nnang mo go yone: _____

Toropo/ motse le kgotla e le nnang mo go yone: _____

A. DITIRAGALO TSA NGWANA WA GAGO, LETSATSI LE LETSATSI

Taelo: O kopiwa go tshwaya karabo ya gago ka (√).

1. Ke mang o o tlhokomelang ngwana wa gago letsatsi le letsatsi? O ka tlhopa tsotlhe tse di go amang.					
Mmagwe ngwana	O	Rragwe ngwana	O	Motlhokomedi o mongwe wa ngwana	O
1a. Fa ngwana a na le batlhokomedi ba bangwe, supa gore o tlhokomelwa ke mang ka go tlhopha mo go tse di latelang:					
Lelapa	O	Mmamane yo o tlhokomelang ngwana	O	Dingwaga tsa ga mmamane yo o tlhokomelang ngwana	Kheretšhe O
1b. Fa go na le batlhokomedi ba bangwe kwa ntle ga b aba o ba tlhophileng fa godimo; ba tlhokomela ngwana wa gago diura tse kae mo bekeng?					
Diura tse 1-20	O	Diura tse 21-35	O	Diura tse 36 kgotsa go feta	O

1c. Ke mang gape o o tlhokomelang ngwana kwa ntle ga mmaagwe le rraagwe?

Fa ba le teng, sekela tlhopho ya gago o bo o kwala dingwaga le thutego ya mongwe le mogwe wa bone

Motlhokomedi	Botsalano le ngwana (tlhopa ê e go amang)	Dingwaga le tshedimosetso mabapi le thuto ya motlhokomedi
i.	Kgaitsedi; mogoloe; monnawe; nkuku; rre; mmangwane; mmamogolo; rakgadi; malome; rrangwane; rramogolo; mmamane o o tlhokomelang	
ii. (fa go tlhokafala)	Kgaitsedi; mogoloe; monnawe; nkuku; rre; mmangwane; mmamogolo; rakgadi; malome; rrangwane; rramogolo; mmamane o o tlhokomelang	
iii. (fa go tlhokafala)	Kgaitsedi; mogoloe; monnawe; nkuku; rre; mmangwane; mmamogolo; rakgadi; malome; rrangwane; rramogolo; mmamane o o tlhokomelang	
iv. (fa go tlhokafala)	Kgaitsedi; mogoloe; monnawe; nkuku; rre; mmangwane; mmamogolo; rakgadi; malome; rrangwane; rramogolo; mmamane o o tlhokomelang	

2. Ke puo efe e e buiwang ko lapeng?
_____

3. A ngwana wa gago o utlwa dipuo tse dingwe tse di buiwang gape ko lapeng?	Ee	O	Nnya	O

3a. Fa ngwana wa gago a utlwa dipuo tse dingwe gape ko lapeng, o di utlwa diura di le kae mo letsatsing?

_____

3b. Fa a utlwa dipuo tse dingwe gape, ke puo kgotsa dipuo dife?

4. A ngwana wa gago o tsena kheretšhe?	Ee	O	Nnya	O

4a. Fa ngwana a tsena kheretšhe, go buiwa puo kgotsa dipuo dife teng?

4b. Ngwana wa gago o tsena kheretšhe diura di le kae mo letsatsing? _____

B. BOITEKANELO LE KGOLO YA NGWANA

1. Ngwana wa gago o tshotswe ka dikgwedi tse kae tsa boimana? _____						
2. Ngwana wa gago o tshotswe a le bokete bo le kae?	Ko tlase ga 2.5kg	O	2.5kg go fitlha 4.5kg	O	Go feta 4.5kg	O
3. A ngwana wa gago o kile a lwala ditsebe?			Ee	O	Nnya	O
Fa karabo ya gago fa godimo e le ee , o kopiwa go fa tlhaloso .						
4. A go na le mongwe mo lwapeng la gago yo o nang le mathata a go bua (mokgwa o re bitsang mafoko ka gone le mokgwa o re dirisang puo ka gone)?			Ee	O	Nnya	O
Fa go na le mongwe, o kopiwa go tlhalosa ka botlalo.						
5. A ngwana wa gago o tshela le bogole bope?			Ee	O	Nnya	O
Fa karabo ya gago fa godimo e le ee , o kopiwa go fa tlhaloso.						
6. A ngwana wa gago o na le mathata a go utlwa?			Ee	O	Nnya	O
Fa karabo ya gago fa godimo e le ee , o kopiwa go fa tlhaloso.						
7. A ngwana wa gago o na le mathata a go bona?			Ee	O	Nnya	O
Fa karabo ya gago fa godimo e le ee , o kopiwa go fa tlhaloso.						
8. A wena kana mongwe o kile a nna le ngongorego ka puo ya ngwana yo?			Ee	O	Nnya	O
Fa karabo ya gago fa godimo e le ee , o kopiwa go fa tlhaloso.						

C. LOLWAPA LA NGWANA

1. Ngwana wa gago o na le bo mogolwe le bo monnawe ba le kae?					
0 O	1 O	2 O	3 O	4 le go feta O	
2. A ngwana yo ke wa ntlha mo go mmaagwe?		Ee	O	Nnya	O
2a. Fa o arabile o re 'nnya', o na le bomogolowe ba le kae ko go mmaagwe?			1 O	2 O	3 le go feta O
3. A ngwana wa gago ke lefatlha?		Ee	O	Nnya	O
4. Mo ngwageng, ngwana wa gago o nna nako e kae mo lwapeng la gago? _____					
5. Batho ba ba fetang dingwaga tse boferabobedi (18) ba kae mo lwapeng? _____					
5a. Mo bagolong ba, ba e leng masika le ngwana ba kae? _____					
5b. Ka tswee tswee, supa gore ba sikana jang le ngwana ka go tlhopha mo go tse di latelang.					
mama O	papa O	Ntatemogolo/ nkuku O	ba bangwe O		
6. Go na le bana ba le kae ba ba nnang le ngwana wa gago mo lwapeng? Araba ka go tlhopha palo ya bone o ba kgaoganya ka dingwaga tse di latelang					
Bana ba ba dikgwedi tse 0 go fitlha 18		0 O	1 O	2 O	3 O go fetisa O
Bana ba ba dikgwedi tse lesome le boroba bongwe (19) go fitlha Dingwaga tse tharo le dikgwedi tse di lesome le bongwe (3;11)		0 O	1 O	2 O	3 O go fetisa O
Bana ba ba dingwaga tse nne (4) go fitlha dingwaga tse di lesome le bongwe (11)		0 O	1 O	2 O	3 O go fetisa O
Bana ba ba dingwaga tse lesome le bobedi (12) go fitlha lesome le bosupa (17)		0 O	1 O	2 O	3 O go fetisa O
7. Go na le dikamore di le kae mo lwapeng?					
0 O	1 O	2 O	3 O	4 O	5+ O

<u>Tswee tswee, araba dipotso go tswa 8 go fitlha 11 fa e le gore ngwana wa gago o nna mo lwapeng le sele fa gare ga ngwaga</u>

8. Ngwana o nna lebaka le le kae ko lwapeng le lengwe?	Ko tlase ga kgwedi tse 6 O	bokgwedi tse 6 O	Go fetisa kgwedi tse 6 O

9. Go na le bagolo ba le kae ba ba fetang dingwaga tse 18 ba ba nnang le ngwana ko lwapeng le lengwe?		Mama O	papa O	ntatemogolo/nkuku O	
9a. Bagolo ba ba sikanang le ngwana (ba kae ka palo?)	0 O	1 O	2 O	3 O	go fetisa O
9b. Bagolo ba ba sa sikaneng le ngwana (ba kae ka palo?)	0 O	1 O	2 O	3 O	go fetisa O
10. Go na le bana ba le kae ba ba nnang mo lwapeng le lengwe? Kaya palo ya bone go tsamaya ka dingwaga tse di latelang:					
Bana ba ba dikgwedi tse 0 go fitlha 18	0 O	1 O	2 O	3 O	go fetisa O
Bana ba ba dikgwedi tse lesome le boroba bongwe (19) go fitlha Dingwaga tse tharo le dikgwedi tse di lesome le bongwe (3;11)	0 O	1 O	2 O	3 O	go fetisa O
Bana ba ba dingwaga tse nne (4) go fitlha dingwaga tse di lesome le bongwe (11)	0 O	1 O	2 O	3 O	go fetisa O
Bana ba ba dingwaga tse lesome le bobedi (12) go fitlha lesome le bosupa (17)	0 O	1 O	2 O	3 O	go fetisa O
11. Lelwapa le lengwe le, le na le dikamore tse kae?					
0 O	1 O	2 O	3 O	4 O	5+ O

D. KA MMAAGWE NGWANA

1. Dingwaga tsa mmaagwe ngwana dikae?		Ko tlase ga dingwaga tse 20	O	Dingwaga tse 21 go fitlha 25	O
Dingwaga tse 26 go fitlha tse 30	O	Dingwaga tse 31 go fitlha 35	O	dingwaga tse 36 le go feta	O
2. Mmaagwe ngwana o ne a le kae fa ngwana wa gagwe wa ntlha a tsholwa?		Ko tlase ga dingwaga tse 20	O	Dingwaga tse 21 go fitlha 25	O
Dingwaga tse 26 go fitlha tse 30	O	Dingwaga tse 31 go fitlha 35	O	dingwaga tse 36 le go feta	O
3. Seemo sa mmaagwe ngwana		o nyetswe	O	o nna le mopati wa gagwe	O

Ga a nyalwa	O	o kgaogane le mogatse	O	motlholagadi	O
4. Mmaagwe ngwana o feletse fa kae ka sekolo?				ga a kwala PSLE/std 7	O
o feditse sekolo sa primary/std 7	O	ga a kwala JCSE/form 3	O	o feditse form 3/ JCSE	O
ga a kwala form 5/BGCSE/IGCSE	O	o feditse form 5/BGCSE/IGCSE	O	Mmadikolo (yunibesithi, brigade, jalo jalo)	O
5. Ko mme a berekang teng (kana tiro ya gagwe ya bofelo)				ga a ise a bone tiro sale a fetsa sekolo	O
o hirilwe	O	o iphirile ebile o a hira	O	o iphirile mme ga a hire	O
6. Maemo a mmaagwe ngwana ko tirong (fa tlhaloso):					

E. KA RRAAGWE NGWANA

1. Dingwaga tsa rraagwe ngwana dikae?		Ko tlase ga dingwaga tse 20	O	Dingwaga tse 21 go fitlha 25	O
Dingwaga tse 26 go fitlha tse 30	O	Dingwaga tse 31 go fitlha 35	O	dingwaga tse 36 le go feta	O
2. Rraagwe ngwana o ne a le kae fa ngwana wa gagwe wa ntlha a tsholwa?		Ko tlase ga dingwaga tse 20	O	Dingwaga tse 21 go fitlha 25	O
Dingwaga tse 26 go fitlha tse 30	O	Dingwaga tse 31 go fitlha 35	O	dingwaga tse 36 le go feta	O
3. Seemo sa rraagwe ngwana		o nyetse	O	o nna le mopati wa gagwe	O
Ga a nyala	O	o kgaogane le mogatse	O	motlholega	O
4. Rraagwe ngwana o feletse fa kae ka sekolo?				ga a kwala PSLE/std 7	O
o feditse sekolo sa primary/std 7	O	ga a kwala JCSE/form 3	O	o feditse form 3/ JCSE	O
ga a kwala form 5/BGCSE/IGCSE	O	o feditse form 5/BGCSE/IGCSE	O	Mmadikolo (yunibesithi, brigade, jalo jalo)	O

5. Ko ntate a berekang teng (kana tiro ya gagwe ya bofelo)				ga a ise a bone tiro sale a fetsa sekolo	O
o hirilwe	O	o iphirile ebile o a hira	O	o iphirile mme ga a hire	O
6. Maemo a rraagwe ngwana ko tirong (fa tlhaloso):					

F. TSA MO LWAPENG

1. Tlhopha e e tlhalosang gore lelwapa le bona bokae mo ngwageng (o balela le a a tswang ko go bo mmaboipelego, penshene, jalo jalo fa a le teng)									
P0-P36 000	O	P36 001 -P72 000	O	P72 001 - P108 000	O	P108 001 - P144 000	O	P144 001 le go fetisa	O
2. Le reka dijo ka bokae mo kgweding? _____									

O feditse!

O thusitse fela thata mo dipatlisisong tsa ntlha mo Botswana ka puo ya bana.

Re lebogela karolo ya gago mo go se, le nako ya gago.

Appendix C – UCT Ethics Clearance

LINGUISTICS SECTION
SCHOOL OF AFRICAN & GENDER STUDIES, ANTHROPOLOGY & LINGUISTICS (AXL)

Mr Sean Bowerman
Room 13, Arts Building, University of Cape Town, Private Bag X3, Rondebosch, 7701, South Africa
Tel: 021 650 3137/2847 Email: Sean.Bowerman@uct.ac.za
Fax: 086 512 8036 Website: www.uct.ac.za

28 November 2016

Dear Sir / Madam

Ethics Clearance: Assoc. Prof Heather Brookes

Adaptation of the MacArthur Bates Communicative Developmental Inventory (MB-CDI) Infants' and Toddlers' Form: 'Gestures and Words' and 'Words and Sentences' to SeTswana, SeSotho, isiXhosa, Afrikaans and South African English.

This is to confirm that the Ethics Subcommittee of the Linguistics Section has scrutinised Prof. Heather Brookes's research proposal and methodology, and finds that it conforms to the guidelines and principles laid down by the Linguistics Section and the Faculty of Humanities.

Yours faithfully

Sean Bowerman
Chair: Linguistics Ethics Subcommittee, University of Cape Town

Appendix D – Ministry of Local Government and Rural Development Approval

TELEGRAMS: MERAFE

Telephone: 3658400
Fax: 3902263/1559

Ministry of Local Government

& Rural Development
Private Bag 006
Gaborone
BOTSWANA

REPUBLIC OF BOTSWANA

Ref Number CLG 14/14/3/1 II (126)

March 14, 2018.

Dr. Naledi N. Kgolo
Prof. Rose Letsholo-Tafila
Dr. Lucky L. Mokgatlhe
Mr. Kenabetsho Bainame

University of Botswana
Private Bag UB0022
Gaborone

Dear Naledi N. Kgolo,

RE: RESEARCH PERMIT

This serves to acknowledge your application for a research permit in order to carry out a study entitled **"Creating a Setswana Communicative Development Inventory (CDI)."**

We are pleased to grant you a permit. This permit is valid for a total period of thirty (30) months commencing on **March 14, 2018** to **October 14, 2020** – and it is granted subject to the following conditions:

1. Copies of the final product of the study are to be directly deposited with the Ministry of Local Government, National Archives and Record Services and University of Botswana Library.
2. The permit does not give you authority to enter any premises, private establishment or protected areas. Permission for such entry should be negotiated with those concerned.
3. You conduct your study according to particulars furnished in application you submitted taking into account the above conditions.
4. Failure to comply with any of the above stipulated conditions will result in the immediate cancellation of the permit.

Yours Faithfully,

MINISTRY OF LOCAL GOVERNMENT
14 MAR 2018
LIBRARY

.....
K. Septhufhe
/For Permanent Secretary- MLGRD

BOTSWANA
Our pride, your destination

MLG – A centre of excellence in local governance & social service provision for improved quality of life

Appendix E – DHMT Approval (South-East District)

TELEPHONE: 390 5792
FAX: 31 88012
TELEGRAMS: RABONGAKA
TELEX: 2818 CARE BD

Republic of Botswana

DISTRICT HEALTH MANAGEMENT TEAM
PRIVATE BAG RW 004
GREATER GABORONE

REFERENCE NO: GGDHMT 2/27 III (41) **13th April 2018**

Sefela Garekwe
Gaborone

Dear Madam

RE: RESEARCH PERMIT

This serves to let you know that permission is granted for you to conduct research entitled **"Creating a Setswana Communicative Development Inventory (CDI)".**

This permits you to go into Juliah Molefhe Clinic in Block 9 commencing on 16th April to 16th November 2020, for a period of thirty (30) months. You need to ask for respondents for their participation. It should also not disturb provision of services or patient care in any manner during your course of visit.

By copy of this letter the Nurse In-Charges for Juliah Molefhe Clinic is informed to provide you access and support in during your research.

MINISTRY OF HEALTH
RMU
2018 -04- 16
P.O. BOX 258 GABORONE
GABORONE DHMT

Yours faithfully

.....
Dr. G.M. Simoonga
HEAD – GREATER GABORONE DISTRICT HEALTH MANAGEMENT TEAM

Cc: Nurse In-Charge - Juliah Molefhe Clinic

Vision: *A Model of Excellence in Quality Health Services.*
Values: *Botho, Equity, Timeliness, Customer Focus, Teamwork.*

BOTSWANA
Our pride, your destination

GMS/gm

Appendix F – DHMT Approval (Kgatleng District)

TELEPHONE: 5777828
FAX : 5777346

Republic of Botswana

KGATLENG DHMT
PRIVATE BAG 13
MOCHUDI
BOTSWANA

REF: DRM 1/2/6

26th April 2018

Faculty of Humanities
Department of English
University of Botswana
Gaborone

Dear Sir/ Madam

RESEARCH STUDENT – MS SEFELA GAREKWE

Reference is made to your letter dated 18th April 2018.

Please be informed that, Kgatleng District Health Management Team (Kgatleng/DHMT) has granted permission to your student studying towards a masters degree in Linguistics to research in our department. The DHMT is grateful to be of assistance in facilitating students competencies. However during the research the student will be expected to abide by the Ministry of Health, Public Services Rules and Regulations and Policies. These include; time keeping, dress code, confidentiality and others.

You are, further informed that the DHMT will not be providing you with accommodation, allowances, and or insurance cover. You are therefore advised to make arrangements on how to cater for the above needs or any other related need.

Please be advised to bring a copy of this letter, have your national identification and student identification card at all times.

Should you need any further clarification do not hesitate to contact the DHMT.

Thank you

Yours faithfully

E.M. Rannoba
For/ DHMT Head

Appendix G – The CDI Form

Communicative Development Inventory - SETSWANA

INFANT FORM – FOROMO YA MASEA

WORDS AND GESTURES – MAFOKO LE DIKETSO

KGAOLO 1 – Dikarolo tsa diele le Mafoko

A. Ditshupo tsa ntlha go kaya tlhaloganyo		
Pele fa bana ba simolola go bua, ba supa tlhaloganyo ya puo ka go fetola fa ba utlwa mafoko a itsegeng thata. Fa tlase ke dikae tse di tlwaelesegileng. A ngwana wa gago o setse a dira dingwe tsa dilo tse?		
	Ee	Nnya
1. Go fetola fa a bitswa ka leina (jaaka ka go leba sebui ka tlhogo)	O	O
2. Go fetola fa a kgalemelwa "ah eh" (a emisa se a se dirang le fa e le motsotsonyana)	O	O
3. Go fetola fa a utlwa "mama/papa ke o" ka go mo senka	O	O

B. Dikarolo tsa diele					
Ka tswee tswee, tlhopha di tse o ka reng ngwana wa gago o a ditlhaloganya mo go tse di fa tlase					
	tlhaloganya		tlhaloganya		tlhaloganya
a go tsaya ___	O	lesa go suta/tshikhinyega	O	o batla go palama?	O
a re ye/ buh bye	O	mama/papa o tsile	O	o botlhale!	O
bona ko!	O	nako ya go robala/baba	O	O tshwerwe ke tlala?	O
bula molomo/o re Ah!	O	nna fatshe	O	opa diatla/matsogo	O
fa/neela mama	O	ntsha motseto	O	se dire jalo	O
kgwa/kga kga	O	ntshune	O	se tshware/o seka wa kgoma	O
kopa/mphe hugy	O	O a otsela/o lapile/o batla baba?	O	tika bolo	O
leba kwano	O	o batla gape?	O	tla kwano	O

C. Tshimologo ya puo			
1. Bana ba bangwe ba rata go boeletsa kana go etsa se ba ntseng ba se utlwa (jaaka mafoko a maswa kana karolo ya seele, sekai a boeletsa "ko tirong" fa mmaagwe a re "ke ya ko tirong"). Ngwana wa gago o ete a dire jalo?	Nako tse dingwe O	Gantsi O	Nako tsotlhe O
2. Bana ba bangwe ba tsamaya ba ntse ba nankola maina a dilo, ekare ba ikgantsha gore	O	O	O

ba itse maina a tsone. A ngwana wa gago o dira jalo?

D. Mafoko

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

1. Medumo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
brr/tshikhi	O	O	kokorokokoo	O	O	pip pip	O	O
grr	O	O	kuchu kuchu / chuku chuku	O	O	tsiring tsiring	O	O
hou hou	O	O	mbee	O	O	tswii tswii tswii	O	O
hum hum	O	O	mbuu	O	O	wiu wiu wiu	O	O
ijoo/ hehehe	O	O	miao	O	O			
ishi/ itshi/ iyoo	O	O	mmmh/ monate	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

2. Diphologolo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bera	O	O	mokgatutswane / mantsiane	O	O	pitse	O	O
katsana	O	O	mokoko	O	O	pitse ya naga	O	O
katse	O	O	monang	O	O	podi	O	O
kgomo	O	O	morubisi	O	O	seboko/chon gololo	O	O
kgopa	O	O	mpopi	O	O	segogwane	O	O
kgorola	O	O	namane	O	O	segokgo	O	O
khudu	O	O	nare	O	O	serurubele	O	O
khukwane	O	O	nku	O	O	setlhora	O	O
koko	O	O	noga	O	O	tau	O	O
kolobe	O	O	nonyane	O	O	thutlwa	O	O
konyana	O	O	notshi	O	O	tlhapi	O	O
kwena	O	O	ntsa	O	O	tlou	O	O
lefele	O	O	ntsanyana	O	O	tonki	O	O
lekakaua/ kalakuma	O	O	ntsi	O	O	tshephe	O	O
lengau	O	O	peba	O	O	tshoswane	O	O
lengau	O	O	peba	O	O	tshupa	O	O
lengodi	O	O	petsana	O	O	tshwene	O	O
lephoi	O	O	phepheng/leshokgwa	O	O	tsie	O	O
mamanthwane	O	O	phokoje/ phiri	O	O	tsitsiri/gogo	O	O

mmantshe	O	O	phologolo	O	O			
mmutla	O	O	pidipidi	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

3. Ditsamaisa	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
ambulense	O	O	mokoro/ sekepe	O	O	setimamolelo	O	O
baesekele	O	O	porema	O	O	teraka	O	O
baselapa	O	O	sefofane	O	O	terekere	O	O
belega/ pepe	O	O	sefofane sa thotomo	O	O	terena	O	O
khombi	O	O	sekotsokara	O	O	vene	O	O
koloi	O	O	sekuta	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

4. Dilo tse di tshamekang	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
balune	O	O	motako	O	O	polelo/ setori	O	O
bete	O	O	motshameko	O	O	sengaparetsi	O	O
bolo	O	O	mpho	O	O	thoe	O	O
buka	O	O	pene	O	O	tshoko	O	O
dipudula/ dibabolose	O	O	pensele	O	O			
mmopa	O	O	phazele	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

5. Dijo le dino	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
aesekherime	O	O	jeli	O	O	morogo	O	O
aesepopo	O	O	jeme	O	O	motlapiso	O	O
apole	O	O	juse	O	O	motogo	O	O
beghara	O	O	khabetshe	O	O	motogo	O	O
bogobe jwa mabele	O	O	khonefoleikise	O	O	nama	O	O
boroso	O	O	kofi	O	O	namune/ naraki	O	O
borotho	O	O	koko	O	O	panana	O	O
borotho	O	O	kuku/ kheikhi	O	O	perekise	O	O

botoro/ majarine	O	O	kwii/eie/anyanese	O	O	phaletshe	O	O
chisi	O	O	lebelebele	O	O	phaphatha	O	O
chokolete	O	O	lee	O	O	phiza	O	O
chunkama/ chapisi	O	O	legapu/ lerotse	O	O	pinatebatha	O	O
coke	O	O	legwinya	O	O	polone	O	O
custard	O	O	lehata/dikgobe	O	O	sechuu	O	O
dibesikitsi	O	O	lephutshe	O	O	setokosubitse	O	O
dichipisi	O	O	letswai	O	O	setorooberi	O	O
dichipisi	O	O	madila/mageu/inkomazi	O	O	sukiri	O	O
dijo	O	O	madombi	O	O	supu/ moro	O	O
dikherotse/ digwete	O	O	makharoni	O	O	suteiti	O	O
dikotla	O	O	makibikibi	O	O	tamatisoso	O	O
dikwakwala	O	O	manoko	O	O	tapole	O	O
dinawa	O	O	maši	O	O	tee	O	O
dinawa	O	O	metsi	O	O	tirinki	O	O
dinawa	O	O	metsi a a letlapa	O	O	tlhapi	O	O
disubitse/ dilekere	O	O	mmafini/ kuku	O	O	tlhapi	O	O
divejitheibole	O	O	mmenku	O	O	vanila	O	O
feiye	O	O	mmidi	O	O	yokate	O	O
guruntu	O	O	moretlwa	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

6. Diaparo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bebe	O	O	hempe	O	O	reinekhoutu	O	O
beke	O	O	hutshe/thoro	O	O	reng	O	O
bene, blumara	O	O	jakete	O	O	sebaga	O	O
bokata	O	O	jase	O	O	sekafo	O	O
borokgwe	O	O	jesi	O	O	sekausu	O	O
borokgwe jo bokhutshwane	O	O	kapi	O	O	sekete	O	O
diatlana	O	O	konopo	O	O	sekhukhu	O	O
dibaga	O	O	lebante	O	O	sekipa	O	O
dibutshe	O	O	lelengana/lenyena	O	O	setlhako	O	O
dileghinse	O	O	mmese	O	O	swetara	O	O
dipejama	O	O	mosese	O	O	teki	O	O
diselepara	O	O	motseto/ leiri	O	O	zipi	O	O
dithaetse	O	O	phathaphatha	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

7. Dikarolo tsa mmele	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bonna (kana lefoko la tiriso mo gae)	O	O	letsogo	O	O	moriri	O	O
bosadi/ kuku (kana lefoko la tiriso mo gae)	O	O	loleme	O	O	mpa	O	O
dinao	O	O	mabele	O	O	nko	O	O
dingware	O	O	madi	O	O	pelo	O	O
legetla	O	O	marago	O	O	seatla	O	O
legwejana	O	O	mohubu/ khubu	O	O	sefatlhego	O	O
leino	O	O	molala	O	O	sefuba	O	O
leitlho	O	O	molomo	O	O	seledu	O	O
lenala	O	O	molomo/dipounama	O	O	serope	O	O
lengolo	O	O	mometso	O	O	tlhogo	O	O
leoto	O	O	monwana	O	O	tsebe	O	O
lerama	O	O	monwana wa leoto	O	O	tshutshu, ishi	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

8. Dilwana tse di tshesane tsa ntlo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
aene	O	O	lefeelo	O	O	sekotlele	O	O
alamo	O	O	lemao	O	O	sekurufo	O	O
baselapa	O	O	lesedi	O	O	selindara	O	O
beisane	O	O	leso/ leswana	O	O	selotleli	O	O
boratshe	O	O	madi	O	O	senepe	O	O
boratshe jwa meno	O	O	madi a tshipi	O	O	sepatshe	O	O
CD	O	O	matlakala	O	O	sepekere	O	O
digalase	O	O	matlakala	O	O	sepontshe	O	O
dilotlolo	O	O	mmanki	O	O	seromamowa / redio/ welese	O	O
dipilisi	O	O	mmetshisi	O	O	sesupa nako/ watshe ya lebota	O	O
DVD	O	O	mmopo	O	O	setlhare	O	O
emere	O	O	molemo	O	O	setshwantsho	O	O

fatukwi	O	O	molora/sesepa	O	O	tanka ya matlakala	O	O
foroko	O	O	mosamo	O	O	terei	O	O
foune/ mogala	O	O	motshini yo o gopang matlakala	O	O	theipi	O	O
galase	O	O	pampiri	O	O	thini	O	O
hamole	O	O	pitsa	O	O	thini	O	O
jeke	O	O	polaseteke	O	O	thipa	O	O
kerese	O	O	poleiti	O	O	thishu	O	O
ketlele	O	O	pompo	O	O	thobolo	O	O
khamera	O	O	pula	O	O	totshe	O	O
kobo	O	O	rimoutu	O	O	toulo	O	O
kopi	O	O	roloone	O	O	tshuthekese	O	O
laetara	O	O	sakatukwi	O	O	watshe	O	O
lebokoso	O	O	sekamo	O	O	wokhara	O	O
lebone	O	O	sekere	O	O	zambakha/ lipiaese	O	O
lebotlele	O	O	sekhukhu	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

9. Dilwana tse di tona tsa ntlo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bata	O	O	khethene	O	O	setilo sa bana	O	O
bentshe/ setilo	O	O	khitshini/ kitsi/ ntlo ya boapeelo	O	O	setilo se se manobonobo	O	O
beso	O	O	khomputara	O	O	setofo	O	O
bolao	O	O	lae	O	O	setupu	O	O
diseteposi	O	O	lebati	O	O	setupu	O	O
fene	O	O	leterase	O	O	shawara	O	O
fenstere/ seokomelabagwe/setlhabaphefo	O		maekhoroweive	O	O	sinki	O	O
foriji/ setsidifatsi	O	O	maringfose	O	O	sithing rumo	O	O
gheiti	O	O	motshini yo o tlhatswang diaparo	O	O	sofa	O	O
hitara	O	O	ntlwana ya boethomelo/ thoelete	O	O	tafole	O	O
kamore	O	O	ovene	O	O	thelevishene	O	O
kamore	O	O	phate/ bolao jwa ngwana	O	O	wardrobe	O	O
kamore e tlhapelang	O	O	setilo	O	O	zinki	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

10. Dilo tse di kontle ga ntlo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bodilo	O	O	lere	O	O	naledi	O	O
bojang	O	O	leru	O	O	ngwedi	O	O
boreledisane	O	O	lethombo	O	O	phefo	O	O
diroboto	O	O	letlapa	O	O	phulu	O	O
folaga	O	O	letlhare	O	O	pula	O	O
garawe	O	O	letsatsi	O	O	senosetsi	O	O
kala (ya setlhare)	O	O	loapi	O	O	sethunya	O	O
kapoko	O	O	marulelo	O	O	setlhare	O	O
kiriba	O	O	metsi	O	O	sunki	O	O
ko morago ga ntlo/ motsheo	O	O	motlhaba	O	O	thaba	O	O
legong	O	O	motlho	O	O	tsela	O	O
lentswe	O	O	motshini yo o tlhagolang bojang	O	O	tshimo	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

11. Mafelo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
diserekisi	O	O	lebala	O	O	phathi	O	O
filimi	O	O	lefatshe	O	O	pikiniki	O	O
filing seteishene	O	O	lefelo	O	O	sekolo	O	O
gae/ lelwapa	O	O	lewatle	O	O	tiro	O	O
jarata/ lelwapa	O	O	marekisetso/ shopo	O	O	toropo	O	O
kampa	O	O	naga	O	O	tshimo	O	O
kereke	O	O	ntlo	O	O	tshingwana	O	O
kontle	O	O	phaka	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

12. Batho	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
batho	O	O	mmemogolo	O	O	nkuku	O	O
kgaitsadi	O	O	monna	O	O	nnana	O	O

kgaitsadi	O	O	monna wa setimamolelo	O	O	nnake	O	O
leina la ga mmamane	O	O	morutabana	O	O	nnana	O	O
leina la ngwana	O	O	mosadi	O	O	nnese	O	O
leina la seruiwa sa mo lapeng	O	O	mosimane	O	O	ntatemogolo	O	O
lekgoa	O	O	motho	O	O	papa/ ntate	O	O
lepodisi	O	O	ngaka	O	O	rakgadi	O	O
malome	O	O	ngwana	O	O	rrangwane	O	O
mmamane	O	O	ngwanyana/ mosetsana	O	O	rraposo	O	O
mmangwane	O	O	nkgonne	O	O	rremogolo	O	O
mme/mama	O	O	nkgonne	O	O	tsala	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

13. Dilo tse di dirwang ka tlwaelo	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
ach!	O	O	ema pele	O	O	robala/baba	O	O
ao/shem	O	O	ga go kgatlhe	O	O	selalelo	O	O
blaki	O	O	go reka	O	O	sese/ kaka	O	O
didimala	O	O	gosiame	O	O	shapo	O	O
dijo tsa maphakela	O	O	hae five	O	O	sho	O	O
dijo tsa motshegare	O	O	ke tla go kapa	O	O	tanki/ ke a leboga	O	O
dijonyana	O	O	kea kopa	O	O	tlhapa	O	O
diketo	O	O	kheiki	O	O	tlhapa diatla	O	O
dikologa	O	O	koi	O	O	tšhu-tšhu	O	O
dumela	O	O	letsa	O	O	tsoga	O	O
dumela	O	O	mantlwane	O	O	ya go dira sisi	O	O
e tonatona	O	O	nnyaa	O	O			
ee	O	O	robala sentle/boroko	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

14. Madiri	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
adima	O	O	iketsisa	O	O	reka	O	O
aga	O	O	inama	O	O	relela	O	O
aka	O	O	iphitlha	O	O	robala	O	O
akanya	O	O	itlhaganela	O	O	sala/ nna	O	O

amogana	O	O	itse	O	O	sega/kgaola	O	O
amusa/anyisa	O	O	ja	O	O	segelela	O	O
apara/rwala	O	O	jesa	O	O	sela	O	O
apaya	O	O	kapa	O	O	sia	O	O
apola	O	O	kgagola	O	O	simolola	O	O
atla	O	O	kgagola	O	O	simolola	O	O
baakanya	O	O	kgaoganya	O	O	suna	O	O
baba	O	O	kgarametsa	O	O	sunka	O	O
bala	O	O	kgodisa	O	O	sutlha	O	O
baya	O	O	kgokologa	O	O	taboga	O	O
belega/pepe	O	O	kgoma	O	O	taka	O	O
bereka	O	O	kgotlokgotsa/tshikhinya	O	O	thuba/roba	O	O
besa	O	O	kgweetsa	O	O	thula	O	O
betsa	O	O	khurumela	O	O	thuma/tunka	O	O
bina	O	O	kokometsa	O	O	thusa	O	O
bitsa	O	O	kokota	O	O	tika	O	O
boa	O	O	kuka	O	O	tlaya	O	O
bolela	O	O	kwala	O	O	tlhakatlhakanya	O	O
bona	O	O	latela	O	O	tlhatsa	O	O
bona	O	O	latlha	O	O	tlhatswa	O	O
bona/fitlhela	O	O	latlhela	O	O	tlhopha	O	O
bontsha/ supegetsa	O	O	lebelela	O	O	tlhowa	O	O
bua/ tlotla	O	O	lekana	O	O	tlisa	O	O
bula	O	O	lela	O	O	tobetsa	O	O
diga	O	O	leleka	O	O	tola	O	O
dira	O	O	leta	O	O	tsamaya	O	O
eletsa	O	O	letsa	O	O	tsamaya	O	O
ema	O	O	loma	O	O	tsaya	O	O
emisa	O	O	lotlela	O	O	tsaya/ amogela	O	O
eta	O	O	nna	O	O	tsena	O	O
feela	O	O	nota	O	O	tshameka	O	O
fenya	O	O	ntsha	O	O	tshasa	O	O
fetsa	O	O	nwa	O	O	tshega	O	O
fitlha	O	O	nyenya	O	O	tshela	O	O
gadima	O	O	omisa	O	O	tsholetsa	O	O
gasa/phatsha!	O	O	opa diatla	O	O	tshuba	O	O
go fa/neela	O	O	opela	O	O	tshwantsha	O	O
go nna le	O	O	palama	O	O	tshwara	O	O
go utlwa (tatswa)	O	O	palama	O	O	tsikitla	O	O
goga	O	O	phephafatsa	O	O	tsoga	O	O
gogoba	O	O	phutha	O	O	tsosa	O	O
gora/latswa	O	O	raga	O	O	tswa	O	O
gore	O	O	rata	O	O	tswala	O	O
goroga	O	O	rata	O	O	utlwa	O	O
hutswella	O	O	reetsa	O	O	wa	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

15. Mafoko a nako	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bosigo	O	O	kgantele	O	O	morago ga	O	O
bosigong jo	O	O	la ntlha	O	O	motshegare/ sethoboloko	O	O
gompieno	O	O	letsatsi	O	O	nako	O	O
gone jaanong	O	O	maabane	O	O	pele ga	O	O
kamoso	O	O	maphakela	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

16. Matlhalosi	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
bo setlha	O	O	khibidu	O	O	ntsho	O	O
bofelo	O	O	khumanego	O	O	nyenyane	O	O
bokete	O	O	ko godimo	O	O	omeletse	O	O
bolete	O	O	ko godimo (modumo)	O	O	otsela	O	O
bonako	O	O	kolobile	O	O	pelo ntle	O	O
bonolo	O	O	lapile	O	O	phephafatsa	O	O
bonya	O	O	leele	O	O	pinki	O	O
bothitho	O	O	lefifi	O	O	robegile	O	O
botlhoko	O	O	lenyora	O	O	sa ntlha	O	O
botoka	O	O	lephutshe	O	O	setoutu	O	O
di nnye	O	O	lesedi	O	O	shemisa/sies	O	O
diphefo	O	O	leswe	O	O	siameng	O	O
ela tlhoko	O	O	lwala	O	O	sukiri/ botshe	O	O
fa godimo	O	O	maswe	O	O	tala jwa bojang	O	O
ga gona sepe	O	O	maswe	O	O	tala jwa loapi	O	O
ga se gone	O	O	modumo	O	O	tenega	O	O
gaufi	O	O	moja	O	O	thantse	O	O
gaufi	O	O	molelo	O	O	thata	O	O
go fedile	O	O	monate	O	O	thulametse	O	O
go siame	O	O	montle	O	O	tidimalo	O	O
go tshwarwa ke tlala	O	O	namune	O	O	tletse	O	O
golafala/ bolaisega	O	O	ngabarela	O	O	tona	O	O
hutsafala	O	O	ngaparetse	O	O	tshoga	O	O
itumetse	O	O	nnye	O	O	tshuba	O	O

kgakala	O	O	nnye	O	O	tshweu	O	O
kgologolo/ tsofetse	O	O	ntlenyane	O	O	tsididi	O	O
kgotsa/kampa	O	O	ntšha	O	O			

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.								
17. Maemedi	tlhalog anya	tlhalog anya + bua		tlhalog anya	tlhalo ganya + bua		tlhalog anya	tlhalo ganya + bua
bone	O	O	nna	O	O	ya gago	O	O
ene	O	O	rona	O	O	ya gagwe	O	O
ka boene	O	O	sele/mole	O	O	ya me	O	O
ka bonna	O	O	sena/tsena	O	O	ya rona	O	O
ka borona	O	O	tsele	O	O	yone	O	O
lona	O	O	wena	O	O		O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.								
18. Mafoko a botsang	tlhalog anya	tlhalog anya + bua		tlhalog anya	tlhalo ganya + bua		tlhalog anya	tlhalo ganya + bua
efe	O	O	ka goreng	O	O	leng	O	O
eng	O	O	kae	O	O	mang	O	O
jang	O	O						

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.								
19. Mafoko a go kaya lefelo	tlhalog anya	tlhalog anya + bua		tlhalog anya	tlhalo ganya + bua		tlhalog anya	tlhalo ganya + bua
fa	O	O	ko godimo	O	O	le	O	O
go bapa le	O	O	ko godimo ga	O	O	lebaka la	O	O
go potologa	O	O	ko morago	O	O	moteng	O	O
godimo	O	O	ko morago ga	O	O	moteng ga	O	O
ka fa tlase	O	O	ko tlase	O	O	timile	O	O
ka, mabapi	O	O	kontle	O	O	tshuba	O	O
kgatlhanong	O	O	kopele ga	O	O	tswa, ya kontle	O	O
ko	O	O	kwa	O	O	ya	O	O

Ka tswee tswee, tshwaya mafoko a fa tlase ka (√) fa e le gore ngwana wa gago o a le **tlhaloganya**, kgotsa a le **tlhaloganya ebile a le bua**. Gakologelwa gore mafoko a ke a buiwang ke bana ka bontsi le ka go farologanya ka dingwaga, go fitlhela bana ba ba dingwaga tse tharo. O seka wa tshwenyega fa e le gore ngwana wa gago ga a ise a itse mafoko a mangwe.

20. Mafoko a dilekantsho	tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua		tlhaloganya	tlhaloganya + bua
botlhe	O	O	go tshwana	O	O	tse di ntsi	O	O
e sele	O	O	le e nngwe	O	O	tsotlhe	O	O
e seng	O	O	mmogo le	O	O	tsotlhe/ gotlhe	O	O
gape	O	O	nngwe le nngwe	O	O	yotlhe	O	O

KGAOLO 2 - DITIRO LE DIKETSO

A. Didirwa tsa ntlha go fetisa molaetsa			
Fa masea a santse a ithuta go buisana, a kgona go bua ka matsogo kana ka tlhogo go itlhalosa. Tswee tswee, tshwaya ditiro tse o kileng wa bona ngwana wa gago a di dira fa tlase.			
	Ga a ise	Ga gongwe	Gantsi
1. Go atarela a kopa sengwe kana a amogela se a se fiwang	O	O	O
2. Go didimatsa ka go baya monwana mo molomong	O	O	O
3. Go dumela ka tlhogo a kaya gore "ee"	O	O	O
4. Go fa ditshuno o le kgakala le ene	O	O	O
5. Go itatswa melomo go supa gore dijo di monate	O	O	O
6. Go laela ka seatla	O	O	O
7. Go retologa a leba sengwe se o se supileng kana se o se lebileng	O	O	O
8. Go supa ka letsogo kana ka monwana	O	O	O
9. Go tlhapolola matsogo a go bontsha se a se tshwereng	O	O	O
10. Go tlhapolola matsogo a go neela sengwe se a se tshwereng	O	O	O
11. Go tshikhinya magetla a kaya gore "ga ke itse" kana "ga gona"	O	O	O
12. Go tshikhinya tlhogo go kaya "nnyaa"	O	O	O
13. Go tsholetsa matsogo a kaya gore o batla go kukiwa	O	O	O

B. Metshameko		
A ngwana wa gago o setse a dira dingwe tsa tse di latelang?		
	Ee	Nnya
1. Go bina	O	O
2. Go lelekana	O	O
3. Go opa diatla	O	O
4. Go opela	O	O
5. Go tshameka "boleki"	O	O
6. Go tshameka "mpha five"	O	O

C. Go dirisa didirisiwa		
A ngwana wa gago o setse a dira kana a lekeletsa dingwe tsa tse di latelang?		
	Ee	Nnya
1. Go baya mogala mo tsebeng	O	O
2. Go baya tlhogo mo matsogong a itira okare o robetse	O	O
3. Go dira okare o fuduwa metsi ka leswana	O	O
4. Go dira okare o nwa ka kopi e e senang sepe	O	O
5. Go dira okare o tshela metsi mo koping	O	O
6. Go fofisa sefofane se se tshamekang kana sa pampiri	O	O
7. Go futswela kana go fodisa ka molomo	O	O
8. Go ikama	O	O
9. Go ikgotlha meno	O	O
10. Go itshutlha sefatlhego ka matsogo kana letsela	O	O

11. Go ja ka leswana kana ka foroko, a itshwaretse kana a tshwarisa	O	O
12. Go kgarametsa koloi e tshamekang	O	O
13. Go nkga kana go sunyetsa	O	O
14. Go nwela mo koping e sa khurumelwang	O	O
15. Go rwala dibaga tsa molala kana letsogo, kana watshe	O	O
16. Go rwala hutshe kana mmese	O	O
17. Go rwala setlhako kana sekausu	O	O
18. Go tika bolo	O	O
19. Go tsenya lebante mo borokgweng	O	O

D. Go etsa motsadi (go tshameka mantlwane)		
Bana ba kgona go tshameka "mantlwane", ba itirile motsadi ka mempopi. Ka tswee tswee, tshwaya dilo tse ngwana wa gago a di dirang kana a di lekeletsa.	Ee	Nnya
1. Go mo amusa ka lebele kana ka tami	O	O
2. Go mo apesa diaparo	O	O
3. Go mo apesa kobo	O	O
4. Go mo apesa motseto	O	O
5. Go mo buisa	O	O
6. Go mo jesa ka leswana	O	O
7. Go mo kama moriri	O	O
8. Go mo kgobodisa kana go mo didimatsa	O	O
9. Go mo kgorometsa mo prameng	O	O
10. Go mo kunkuretsa ka matsogo a gagwe	O	O
11. Go mo robatsa	O	O
12. Go mo rwesa sengwe jaaka setlhako, sekausu kana hutshe	O	O
13. Go mo suna kana go mo atla	O	O
14. Go mo sutlha sefatlhego kana matsogo	O	O

E. Go etsa mogolo (ka didirsiwa kana ka mo go tshamekang)		
A ngwana wa gago o setse a dira kana a lekeletsa dingwe tsa tse di latelang?	Ee	Nnya
1. Go bala (a tsamaisa monwana, kana a bula buka kana tsebe)	O	O
2. Go feela kana go koropa	O	O
3. Go katela/katolola ka garawe	O	O
4. Go kgweetsa (a dikolosa lebidi)	O	O
5. Go kokotela ka hamole	O	O
6. Go kwala mo khompyutareng kana mogala	O	O
7. Go kwala ka pene kana pensele	O	O
8. Go nosetsa ditlhare	O	O
9. Go phephafatsa a sutlha ka letsela	O	O
10. Go phephafatsa ka vacuum cleaner	O	O
11. Go rwala digalase tsa matlho	O	O
12. Go sega ka thipa	O	O
13. Go tlhatswa dijana	O	O
14. Go tsenya selotleli mo lebating	O	O
15. Go tshameka seletso, jaaka katara kana trompeta	O	O

F. Didirisiwa tse di tshamekisiwang		
Fa ngwana a tshameka, o kgona go dirisa sengwe sebakeng sa selo se sele. Go fa sekai, fa a jesa nnana wa mpopi, o kgona go dira okare logong ke leswana. Ngwana o kgona go rwala sekotlele mo tlhogong okare ke hutshe. A o kile wa bona ngwana wa gago a dira sengwe sa mofuta o?	Ee O	Nnya O
Fa o tshwaile "ee" fa godimo, ka tswee tswee kwala dikai ka bontsi:		

G. Fa go na le ditiro le diketso tse dingwe gape tse o kileng wa di bona mo ngwaneng wa gago mme re sa di nankola mo, ka tswee tswee dikwale fa tlase:

O feditse CDI ya Setswana

Ka tswee tswee, ya ko tsebeng e latelang go araba dipotso go ba lelwapa