Language development in sub-Saharan Africa

Introduction

The study of language development in sub-Saharan Africa has a variety of motivations. The topic may be of interest for theoretical and/or for applied reasons. Even more than the study of cross-cultural developmental psychology, cross-linguistic studies have the power to identify situation-dependent and -independent aspects of development, a fact which has been realised for some years (Slobin, 1985). In addition, studying children's language is of course highly relevant for other aspects of development, and most researchers in behavioural development would acknowledge the tight link between language development and other aspects of development. Although here we will not examine literacy, and will only review a small proportion of the literature on spoken language in school-age children where it elucidates other points, early spoken language abilities are highly predictive of preschool and school performance in typically developing children, including those at risk and those in poverty (Hoff, 2003; Locke, Ginsborg, & Peers, 2002; Molfese, Molfese, & Modgline, 2001; Noble, Norman, & Farah, 2005; Pan, Rowe, Spier, & Tamis-Lemonda, 2004; Rescorla, Dahlsgaard, & Roberts, 2000), and in a setting where children have limited opportunities for education, it is important to maximise school readiness.

Language development is also arguably one of the most rapid aspects of development, and shows great variability between children (Bates, Dale, & Thal, 1995; Fenson et al., 2000; Fenson, Dale, Reznick, & Bates, 1994), as well as being sensitive to a number of negative factors that are more common in this setting, including HIV infection, cerebral malaria, meningitis, and other causes of brain injury and dysfunction (Baker, Kummer, Schultz, & Ho, 1996; Bates et al., 1997; Brouwers

et al., 2001; Davis et al., 1997; McNeilly, 2005; Wolters, Brouwers, Civitello, & Moss, 1997). Its study therefore has become in recent years an essential part of studies of child development outcomes following exposures and interventions in the prenatal period and infancy (A. Abubakar, Van Baar, Van de Vijver, Holding, & Newton, 2008; Prado et al., 2010; Stoltzfus et al., 2001).

Most studies to date of language development in this region have clearly been motivated by linguistic theory. Many though but have not extended their findings to applied outcomes, or have examined language outcomes in an applied or intervention setting but have failed to take account of language theory or language differences. Other papers (this volume)(Baddeley, Gardner, & Grantham-McGregor, 1995; Greenfield, 1997; Holding et al., 2004; Prado, et al., 2010) have highlighted the dangers of insufficiently adapted or culturally inappropriate test instruments when examining non-verbal cognitive development. These dangers are even greater in the field of language development since the task that children have in learning their native language is radically different depending on the language itself.

Grammatical development appears to be particularly sensitive to differences between languages (Bates & MacWhinney, 1987), but even small lexical differences can also have a great deal of influence on the results of research. For example, mistranslation or failure to consult authorities on children's native language can lead to invalid single test items, which in a small test battery can make a study far less sensitive. Stoltzfus et al. (2001) found that language and motor development were sensitive to iron supplementation and antiparasitic treatments in preschool children in Zanzibar; both aspects of children's development were assessed using short checklists intended for use with a wide range of ages, meaning that each single item in a checklist is crucial. Lack of reference to linguistic authorities, however, appears to

have led to mistranslation of some items, so that one item required children to use all of "the words I, me, and you"; in these children's native language, there is only one word which can be translated into English as either "I" or "me". Such reduced sensitivity may lead to some studies reporting negative findings with respect to the effect on language development of interventions or impacts, or to studies being confined to the file drawer. This effect can only be magnified as studies attempt to examine language development in a more sophisticated manner, in older children, and in more detail.

Given the paucity of research in this area, it is worth briefly discussing what might be priorities in posing research questions, which may also help us to illuminate the motivations of previous studies. Do researchers prioritise aspect of language development in the region that are theoretically "interesting", "rare", or contrast markedly with those aspects of European languages? Is this desirable, or would it be preferable to examine development in the most spoken, or fastest-growing languages? Are we yet at the stage where we can begin to compare similar languages, or provide a general overview of language development in the region, or is development still examined for less systematic motivations, studying a particular aspect of a language for convenience, simply "because it is there", or because it fills in a "collection".

Approaches to reviewing the data on language development in Sub-Saharan Africa

There are a number of possible approaches we could take to a review of the data available on language development in sub-Saharan Africa. Two related approaches would be a geographic approach, treating each sub-region separately, or a language family approach; the latter could be particularly interesting given the number of language families represented in sub-Saharan Africa but nowhere else in

the world. Unfortunately both of these approaches suffer from a lack of data, with high concentrations of data in more wealthy and populous regions; there are also some regions and language families for which there are large numbers of speakers but few or no data. In identifying studies for inclusion in this review, two searches were carried out in the databases PsychInfo and LLBA, including the terms "language development" or "language acquisition" and firstly the names of every sub-Saharan African country, followed by secondly the names of every language spoken in sub-Saharan Africa by more than 3 million people. Some languages, however, for which studies were retrieved from the first search, are not represented in the second group. Likewise, there are no studies of language acquisition published that were carried out in any Central African country, between Zambia in the South and Chad in the North.

Given the more functional approach taken by many researchers in child development in the region, it could also be interesting to classify data according to the purpose for which they were collected – whether theoretical research on language development, as part of larger studies of cognitive development, to examine provision or effectiveness of educational or therapeutic interventions, or in order to conduct studies of health or other influences on language development.

While some studies of language acquisition have been carried out for applied purposes, or as outcome measures in studies of a variety of impacts on children's development, most have been carried out for "pure" theoretical reasons, or in attempts to interlink cognitive and language development. This we feel is a useful distinction; we will first examine studies with a more theoretical motivation, and add to this a brief review of applied studies where language development was a focus and which either specifically examine language delay or impairment, to compare children subject to an impact or intervention on language outcomes, or to advance methods of

assessing language development.

Broadly, language development can be characterised as beginning with phonological development within the first year of life, continuing to the acquisition of a larger and larger lexicon as children enter the second year of life, and proceeding to word combinations and syntactic development later in the second year of life and onwards. Clearly, these periods of development overlap, with for example phonological development certainly not being complete by the time children start to grow their vocabulary, but this chronological and linguistic typography is also a helpful classification for examining a very broad field of language development; since some studies of one aspect of development have data from children outside the core age range typically studied for this area of development, we will not strictly apply age boundaries.

Very early development, especially phonological development

Very early speech development

There have been few studies of the onset of speech in the region, but Blount examined the early speech and language development of children acquiring Luo, in Kenya. The children studied displayed babbling at around the same age and following the same pattern recorded in other cultures (Blount, 1971, 1976).

Acquisition of tone

Many languages in the region are tone languages. Researchers have taken advantage of this fact to examine a variety of aspects of tone; tone acquisition in general, but with a wealth of data from the region, is well reviewed in Demuth (1995). Tone is used in languages to indicate lexical or grammatical distinctions – both types of usage are found in African languages.

Research from African languages can therefore elucidate a variety of aspects

of the acquisition of tone. One study looked at the early perception of tone in Yoruba, a Nigerian language with lexical tone, examining head turn preference among infants aged 6-8 months growing up in London, and exposed or not exposed to Yoruba from their parents. At this age infants hearing Yoruba pay more attention to pitch changes within words than infants hearing only English, but only when those pitch changes have lexical meaning. Both infants and adults were more sensitive to some tones than others, the same tones for both age groups (Harrison, 2000).

Children learning Ga, spoken in Ghana, appear to gain control of suprasegmental information, including lexical tone, before fully controlling segmental output (Kirk, 1973), meaning that they can accurately render the tonal changes in an utterance before they can produce all consonants and vowels accurately. Likewise, children learning Chichewa, spoken in Malawi, can produce tonal patterns before some segmental and morphemic patterns are produced accurately (Chimombo & Mtenje, 1989). Lexical tone was also found to be acquired early in Zulu (Suzman, 1991). More salient tones (in this case, the high tone) also appeared to be acquired earlier both in Chichewa and in Sesotho (Demuth, 1989b, 1991; Suzman, 1991).

Some aspects of tone however have been shown to be acquired later or are more problematic in acquisition. These may be aspects that require contextual use of tone. In Chichewa, tone changes occur along with morphosyntactic markers when utterances are negated, and these were not fully acquired by the children aged 2;6 in Chimombo and Mtenje's (1989) study. Suzman (1991) found that children acquired the correct use of tone in grammatical constructions relatively late.

Demuth (1995) looked at tone marking on verbs in Sesotho in children aged 2 to 3 years. In Sesotho verb roots can have High (H), Low (L) or no tone, though H is more frequent. In some contexts verbs with no tone are realised as L and in some

contexts as H. Children used H correctly earlier on verb roots, achieving 75% correct between 2 and 3 years while L increased through this age group starting at 35% correct. However some H were produced as L and there were still some inconsistencies by the age of 3. More consistency was found in verb subject markers (in which persons 1 and 2 are marked with L and person 3 is H) though these are more frequent than individual verb roots, and marking is more consistent. Because of tone sandhi (contextual tone rules) the same verb root is more likely to be heard with different attached tones than are subject markers.

In Sesotho H tone can also "spread" through verb roots and subject markers; children however find these contextual rules particularly difficult, both for verb roots and for verb subject markers, until they reach the age of about 3 years. Demuth (1995) analyses the data in terms of underlying representations, which we will not elaborate here, but from all of the findings from different languages from the region, it seems clear that context-dependent tone is much more difficult for children than non-context-dependent tone, with frequency and consistency across linguistic segments playing a large part as well.

Acquisition of clicks

As click consonants are almost uniquely found in Southern and Eastern African languages, data from the region is necessary to examine their acquisition. Surprisingly, there are very few such data, and some of the data have been collected to examine perception of non-native sounds by children and adults outside the region. Best and McRoberts (2003) found that English-exposed infants and adults were able to distinguish Zulu clicks, but that adults were not able to distinguish non-native non-click sounds, and concluded that the clicks are so different from native English phonemes that they are not assimilated to English phonemes (while the other non-

native phonemes are assimilated), so that as infants and children grow older they do not lose the ability to distinguish the clicks.

Clicks also seem to be slightly later acquired than other native consonants, in languages which have clicks. Naidoo (2003) working on Zulu and Lewis and Roux (1996) working on Xhosa found that clicks were produced accurately later than other consonants. Lewis and Roux noted that children aged 1;6 to 5;5 acquiring Xhosa as their first language substituted clicks for other clicks, simplified clicks to become non-click consonants with the same place of articulation, or reduced clicks by removing an aspect of articulation such as nasalisation. Likewise Demuth (2007) notes that the only click in Sesotho is late acquired, with most children substituting a /k/ until around the age of 3.

General acquisition of phonology

As well as the tones and clicks found in languages in the region but not in all languages of the world, some other less usual aspects of phonology are found in some sub-Saharan African languages and have been the focus of study. Jakobson (1968) originally proposed that phonemes found in more languages will be acquired earlier than those rare phonemes found in few languages. Nwokah (1986) tested this proposal by studying a group of phonemes (especially doubly articulated consonants) found only in a few West African languages, examining their use by children aged two to four years, acquiring Igbo, in Nigeria. The order of acquisition of these "hard" phonemes seemed to be predicted partly by rarity but more closely corresponded to the difficulty of articulating the phonemes, the frequency with which the phoneme occurs in the language, and the presence of parallel (e.g. voiced vs. unvoiced) forms of the phoneme. Likewise in Hausa, also in Nigeria, consonants that had been reported as late-learned in other languages (such as liquids) or those that had difficult

articulation (the glottalised consonants) were also mastered later (Dresel, 1977).

Mowrer and Burger (1991) examined the mastery of phonemes among Xhosa-speaking children aged two to six years, comparing them to English-speaking children also from South Africa. Xhosa-speaking children made fewer errors at comparable ages to English-speaking children (and this difference was significant when comparing phonemes that exist in both languages), but the same phonemes (largely fricatives and liquids) were errorful for both groups. Naidoo (2003) also found that Zulu-speaking children aged 3 to 6 produced longer and more accurate strings of syllables than their English-speaking peers. Both Xhosa and Zulu have more long, multisyllabic words, but with simpler syllabic structure within the syllables (fewer clusters and fewer closed syllables, ending in a consonant) than English. In line with the data from Xhosa and Zulu, Demuth (2007) found that accuracy for Sesotho segmental production was high at an early age. Similarly, this is attributed to simpler syllabic structure than in European languages. Nevertheless, some segments are commonly replaced with others (for example, trilled /r/ replaced with a non-trilled consonant), consonant harmony has been observed (where articulation of one or more consonant changes so that more consonants in the word are articulated at the same place), and where syllables begin with a complex onset part of this is sometimes deleted. These processes all resemble processes found in young children at the stage where they cannot yet articulate all phonemes correctly, learning to speak other languages.

For the researcher in the developmental neuropsychology of language, it is crucial to understand the typical course of aspects of development - but this is rarely documented within the region. Wolf-Schein, Afako, and Zondo (1995) comment that they developed a phonological assessment for two Zimbabwean languages (Ndebele

and Shona), and suggested its use should be confined to children over seven years, because typically developing children of this age are assumed to have acquired all the phonemes of their language. However, they note that such data have not been collected for these languages, nor for other languages in the region.

Lexical development and language development in middle infancy

The study of lexical development is potentially a very useful tool in, for example, studies of general intellectual ability – examining vocabulary size is an often-used proxy for IQ (Kihara et al., 2009; Marchman & Fernald, 2008). Many applied studies also investigate the rate of lexical development so this is potentially a very useful area of research.

Lexical development is of interest when addressing a variety of theoretical debates too, and this has been the motivation behind the majority of studies of lexical development in the region. Debates in the study of lexical development include the composition of early vocabulary, and the reasons why some types of words might be learned earlier than others, as well as how different underlying cognitive concepts might be expressed differently in different languages.

Early vocabulary and related skills

Two research groups (Alcock, Rimba, Abubakar, & Holding, 2005; Childers, Vaughan, & Burquest, 2007) have examined the composition of early vocabulary among children in the region learning Kiswahili and Kigiriama, and Ngas, spoken in Kenya and Nigeria respectively. Typically nouns predominate in early production vocabulary, and this is true across many languages studied to date (Bornstein et al., 2004). Childers et al. however found that verbs dominated in early vocabulary and suggested that linguistic features or cultural aspects of child-rearing might lead to this finding. In a very similar cultural setting however, we (Alcock, et al., 2005) found

that nouns predominated in production while verb comprehension equalled noun comprehension. We also observed that the vocabulary checklist used by Childers et al. had a composition rather different from that used in previous studies, notably lacking sound effects (a very frequent early type of label for objects, usually counted as nouns by researchers). It is hard therefore to be confident that Childers et al.'s data genuinely show a different pattern of vocabulary acquisition in Ngas to that in other languages.

However, Childers et al. (2007) also found that joint attention behaviours were just as closely linked to lexical development - both noun and verb comprehension and production - as in previous studies in developed regions. Although parent and caregiver joint attention behaviours may be different in this culture, this does not seem to affect the relationship between joint attention and vocabulary. Mastin and Vogt (2011a, 2011b) also examined links between different types of joint attention and vocabulary development, in rural and urban Mozambican families. While children in all families appeared to have similar relationships between joint attention abilities and vocabulary comprehension, relationships appeared to differ between the two settings in the same country for early vocabulary comprehension.

In four different areas of the region a Communicative Development Inventory (CDI) method has been used for assessment of children's vocabulary development (Alcock, et al., 2005; Childers, et al., 2007; Mastin & Vogt, 2011a, 2011b; Prado et al., 2011). We discuss this under the heading of lexical development as this is the main use of this type of assessment but it is also used in studies of gesture and grammatical development. We (Alcock et al., 2010) have used CDIs successfully in more than one developing country setting with illiterate parents as informants, and we have also adapted the CDIs used in Kenya easily for related languages in a

neighbouring country, Malawi (Prado, et al., 2011). The CDIs hold great promise for the assessment of language development in the region.

One criticism of CDIs is that children can only be reported to produce the classes of words that are included on the CDI. If whole classes of words are omitted, no data can be collected relating to these classes of words; this criticism can be levelled at the CDI used by Childers et al. (2007). Although children may not produce a representative sample of the vocabulary they have during a session of recorded or transcribed spontaneous speech, and obviously vocabulary comprehension cannot be tested in this way, spontaneous speech samples are also a very helpful way to analyse children's early vocabulary. Blount (1969) summarised the early words spoken by four children learning Luo, in Kenya. First words seemed to start with caregivers' names, and move on to demands and words for food. Animals, body parts and common household and environmental objects, all represented in most CDIs, were also found in early production vocabulary in Luo. A few verbs and function words were seen, but as in Kiswahili and Kigiriama, in production these were fewer than nouns.

Acquisition of specific classes of vocabulary items

Colour terms. Since Berlin and Kay (1969) noted a hierarchy of colour terms, with some languages representing more basic colour terms than others, researchers have been interested in how children acquire colour terms. In Setswana, spoken in Botswana, borrowed English colour terms were noted to be replacing Bantu-origin colour terms over time; this is notable particularly because Setswana has fewer basic colour terms than English. Setswana roughly follows Berlin and Kay's original hierarchy but with a few exceptions. Older Setswana-speaking children (ages 5 through 10) were asked to name colours and to produce as many colour terms as they

could. Children used English terms for colours but the majority of colour terms used were those within the Setswana repertoire of basic colour terms - even where English colour terms were used these did not fill gaps unavailable in the Setswana colour vocabulary (Davies, Corbett, McGurk, & Jerrett, 1994).

Odour terms. Mouele (1997) examined acquisition of olfactory terms by children learning the Wanzi language, a Bantu language spoken in Gabon. He suggests that, like Berlin and Kay's hierarchy of colour terms - basic colour terms that do not refer to objects, with higher-order terms that use an object name to indicate its colour - there is also a hierarchy of odour terms. He notes that the odour terms he defines as "basic" can be heard in children's speech and songs.

Deixis. A. T. Abubakar (1986) examined the acquisition of deixis terms (terms that indicate directionality) among children aged 4 through 7 learning Hausa. In Hausa, the preferred adult deixis terms for objects along an axis oriented in the direction speakers and listeners are facing are equivalent to objects further away being termed "in front" while those closer to the speaker being termed "in back"; this is the opposite to situations in English where an object further away, but concealed by another object, is termed "in back". A greater proportion of Hausa speaking children were observed to use mature deixis terms at a younger age than English speaking children. It is suggested that the Hausa deixis system may be simpler to acquire than the English system as it is consistent and does not require speakers to take into account interrelationships between objects - only the positioning of an object with respect to a speaker.

Syntactic development

The study of syntactic development is highly divisive and theoretically polarised. Here we make no attempt to explain nuances of the various theories but

will try to paint broad strokes and describe the results that have been found. It is rare in the study of child syntax in the region either that one language has been studied by more than one research group. This pattern of data collection, together with differing aims and theoretical starting points, makes it hard to compare existing data from within the region. Nevertheless, the majority of studies have examined acquisition of Bantu languages, so we will also briefly address some relevant aspects of Bantu syntax. In addition, a small amount of comparable data from different research groups but the same language is becoming available (notably from Zulu, Sesotho and Kiswahili).

Acquisition of noun morphology

Several studies have examined the acquisition of Bantu noun morphology. In addition, Blount (1988) examined the development of plural morphology in Luo, the only non-Bantu language to be studied under this heading.

Bantu nouns largely carry morphology as prefixes, and in these languages nouns are marked for noun class (a system related to grammatical gender, but with more possible categories. There are at least 10 classes in most languages and there can be more than 20. In this system, this number could be seen as inflated because singular and plural are counted separately, but some noun classes have no plural or the corresponding plural class varies between nouns or between languages). In most Bantu languages, there are at least one or two noun classes that have null prefixes on the noun. Typically, there are some semantic as well as phonological commonalities between members of a noun class (Contini-Morava, 1996).

In early speech children learning Bantu languages tend to omit noun class markers (Alcock, Prado, et al., 2010; Demuth & Ellis, 2009). It is very rare for children to substitute an incorrect noun class marker, but in some contexts in some

Bantu languages omission from a noun that can take a marker, can be grammatically correct. Demuth and Ellis (2009) found that children learning Sesotho (where prefix omission is allowed in some contexts) were more likely to omit noun class prefixes correctly than incorrectly (taking into account phonology and grammatical agreement), once they had reached the stage of mostly articulating the prefixes. They however also had a stronger tendency to omit prefixes when they were using nouns on which their caregiver also omitted prefixes.

Both Demuth and Ellis (2009) and Suzman (1996) found that phonological characteristics of words were important in predicting whether children would produce noun class prefixes or not. Demuth noted that children were more likely to produce prefixes preceding a monosyllabic noun root (few Bantu words are monosyllabic), while Suzman examined acquisition in a variety of related languages and noted that in Zulu and other Ngoni languages prefixes always include an initial vowel, and are multisyllabic, while in the Sotho languages they do not. Zulu-learning children include more noun class prefixes at an earlier age, possibly because the initial vowels are easier to pronounce, but also because in sentence-medial positions a word-initial vowel tends to be articulated while the word-final vowel of the previous word is dropped. Suzman contrasts 50% use of noun class prefixes at age 2 with Demuth's (1988) observation that noun class prefix use only starts at this age. Suzman and other writers on Zulu also observe use of partial prefixes (such as articulation of the initial vowel of a VCV prefix).

Blount's (1988) study of noun morphology acquisition in Luo also examines the role of phonology. Noun morphology is expressed in suffixes in this language; contextual phonological processes accompany these suffixes. Blount tested children aged 3 to 6 with novel nouns and found that only by age 6 were children able to add

suffixes with some degree of success to these novel nouns. He concluded that children seemed to be using a method of analogy to do this, and that at younger ages they had not analysed the relationship between the noun and its plural or possessive.

Of course, input patterns are important in examining children's learning of morphology and Ziesler and Demuth (1995) examined the pattern of noun class prefixes in child-directed Sesotho. It was found that prefixes were dropped in child-directed speech, and although many nouns are unprefixed due to being in a noun class that has zero prefixes, most nouns whose prefixes were genuinely omitted were not in contexts where this was grammatical. Older child and adult caregivers all dropped prefixes, although as the sample size was just two children so it is difficult to draw conclusions about differences between children's output based on their input.

Acquisition of verb morphology

Although there has been great interest in many areas of acquisition of syntax and morphology of verbs, probably the area that has seen most debate is the acquisition of tense and agreement markers on verbs. Children in many languages are observed to omit these markers and to produce a non-finite verb form in place of finite, marked verbs. A variety of theoretical models seek to explain these omissions, and most relevant to data from the region is the Agreement/Tense Omission Model (Schutze & Wexler, 1996) in which children are hypothesised to consider verb agreements to be optional in their productions.

Deen (2003) examined the acquisition of Nairobi Kiswahili. In Kiswahili verb subject and tense morphemes are marked on verbs by prefixes (in that order). Deen suggests that initially children produce bare verb stems, followed by subject agreements without tense, then tense without subject, and finally full verb forms with both subject and tense agreements. It is not clear whether the two middle stages

(subject without tense, and tense without subject) are really distinct. Although Deen states that the reduction in production of verbs with subject but without tense is significant across stages but it is not clear whether it is genuinely a statistically significant decline (Deen, 2001). Deen concludes that the data from acquisition of Nairobi Kiswahili cannot be explained by adult patterns or by prosodic features of verbs but are compatible with the Agreement/Tense Omission Model. Additional data however from Coastal Kiswahili and a related language also spoken in Kenya, Kigiriama, combined with the Nairobi data, show that individual adults vary as do the dialects of Kiswahili in how frequently they omit the subject and tense markers. We found that children's production of zero, one or two markers was significantly correlated with both linguistic maturity and the proportion of verbs they heard in the input that had a missing subject or tense marker. Children learning Nairobi Kiswahili heard more verbs with tense but no subject than children learning Coastal Kiswahili or Kigiriama, and they also produced more verbs with tense but no subject, while children learning Coastal Kiswahili or Kigiriama tended rather to produce verbs with subject but no tense (Alcock, Rimba, & Newton, 2004); the latter are rare in these languages/dialects but might be produced by children based on metrical stress within the word (Demuth, 1994), where a word with a strong-weak-strong-weak syllable pattern is reproduced as strong-strong-weak.

Gxilishe, de Villiers, and de Villiers (2007) also examined the acquisition of subject agreement in Xhosa, also a Bantu language with similar verb structure, in South Africa. As in other such languages, not only must verbs carry a subject marker but this must agree with the noun class of its referent. Use of subject markers increased between the ages of 12 to 39 months and as in other languages (Connelly, 1986; Demuth, 1999) omissions rather than substitutions were responsible for the

overwhelming majority of errors. Children's use of noun class markers on nouns was compared with their use of subject markers on verbs, and it was suggested that the differential word order found in combinations of noun and verb whether neither, both, or one is marked, is significant and points to a generative explanation. It is difficult to be sure if this is the case as no data on adult use of prefixes or of word order are published in the paper.

Chimombo (1989) examined the parallel development of tone and morphosyntax in Chichewa negatives. Children tended to overgeneralise a lexical negative ("I don't want", which is not appropriate in many contexts) in the same way that English-learning children use "no" in contexts such as "no Daddy" meaning "I don't want Daddy to do that". The three children studied varied in the order in which they acquired different types of negative markers and constructions, but as with acquisition of noun morphology in the Bantu languages, negative verb markers are prefixes and are largely omitted or reduced in immature language.

Acquisition of verb aspect, voice and argument structure

The acquisition of the passive voice, like the acquisition of verb tense, has been of intense interest to researchers examining cross-linguistic differences in language acquisition. Children's use of the passive is restricted in some languages, notably English, German and Hebrew, before the age of about six years, and this late use has been attributed to a selective maturation of some types of passive structure (Borer & Wexler, 1987).

Data from the region, from Sesotho (Demuth, 1989a) and Kiswahili and Kigiriama (Alcock, Rimba, & Newton, in press) suggest that full passives, including those with non-actional verbs, can be acquired much earlier in situations where the passive is heard frequently by children. Demuth (1989a) and Suzman (1987) have

previously suggested that some additional features of passive use in Sesotho and Zulu respectively might also increase the likelihood of children using the passive early. For example, in Sesotho all questions that interrogate a patient are expressed using the passive, and in Zulu passives mainly occur in perceptually salient events where a physical action affects the patient. However, in Sesotho and in Kiswahili and Kigiriama early use of the passive in non-actional contexts is widely seen - suggesting directly observable actions are not necessary for the early acquisition of the passive - and in Kiswahili and Kigiriama these types of questions can appear in either active or passive. The common feature of passive Sesotho, Zulu, Kiswahili and Kigiriama is that it is highly frequent in the input.

Crawford (2005) suggests that Sesotho passives are not truly productive passives, but may be lexicalised, and hence it is still possible to analyse the acquisition of Sesotho passives in terms of late maturation of productive passives. Alternatively, she analyses Sesotho passives not as true passives but as applicatives or adversity constructions (neither of which would be subject to the maturational constraints she hypothesises apply to passives). To test this, Crawford (2009) examined comprehension of passives in Sesotho speaking children aged 5 to 6, looking at both "long" (similar to passives with a by-phrase) and "short" passives and found that children's comprehension of long passives was not as good as their comprehension of actives or short passives. However, Demuth, Moloi, and Machobane, (2010) tested three year old Sesotho speaking children on comprehension of actional and non-actional long passives and active sentences, and found that comprehension of all types of sentences was equivalent, leaving the poor performance of older children in Crawford (2009) somewhat hard to explain.

Another marker of voice found in Bantu language verbs is the applicative.

Applicative suffixes in Bantu languages work to change the argument structure of a verb either from transitive to ditransitive (for example, changing the meaning from "Mama cooks food" to "Mama cooks food for the children") or from intransitive to a meaning similar to a locative or goal (from "The rain is falling" to "The rain is falling on the crops"). There are word order constraints on the applicative in Bantu languages (which vary between languages), and there are also argument structure implications (the number of arguments required by a verb being roughly equivalent to the number of nouns in the sentence). Demuth, Machobane, and Moloi (2003) examined children's learning of these constructions, finding that at three years children produced correct word order at above-chance levels but that even by eight years of age children were not performing at adult levels. Analysis of adult speech found that these constructions are relatively rare in Sesotho, and Demuth et al. suggest that children may also be showing lexical construction effects in their learning of this construction.

As we suggested at the beginning of this section, the acquisition of syntax is a highly controversial area with many hotly-defended viewpoints. It is fortunate that researchers from various theoretical positions are starting to research different but related languages (or in some cases the same language) although it would be good to see some more research in this area on non-Bantu languages.

Language socialisation

Schieffelin and Ochs (1986) define language socialisation as both socialisation of children through the use of language, and socialisation of children to use language. Under this category, researchers have been especially interested in how child-directed speech (CDS) differs from adult-directed speech, and whether either the level of simplicity or the affective characteristics of CDS differ from the adult language. Sub-Saharan Africa, like many developing regions, has particular interest for those

studying socialisation partly due to widespread traditional child-rearing practices and beliefs, and their difference from those in Europe and North America, where the majority of research in child development takes place, but also due to the higher number of daily caregivers which children can have.

Researchers have taken advantage of caregiving both by paid caregivers and by older children to examine intra-cultural variation in language socialisation. Nwokah (1987) examined the difference in child-directed speech by "maids" (older children aged 8-12; around 2/3 are female, they are not children of the family, and they care for the infant for around half of each day, for their keep and a small amount of pay) versus mothers, to 12-month-old infants in Igbo-speaking families in Nigeria. Both affective and linguistic characteristics of mother versus older child speech were different. Mothers spoke more, had longer MLUs, and used more declaratives and yes/no questions while older children used more imperatives and Wh- questions. Affective characteristics differed less but mothers used more teasing and older children more warnings and prohibitions, but several other categories of positive affect did not differ between caregivers. Mothers described children's activities and behaviour more, but in a neutral way.

Rabain-Jamin (2001) also examined mothers' and older children's speech in Wolof-speaking families, here with two-year-old infants and older siblings (3-10 years old), in Senegal. Mothers' speech directed towards infants was predominantly either assertions or directives, and the younger group of siblings (3-4 years) used a high proportion of directives in conversation with the infants also.

These two studies examined interactions with children of different ages, as well as from different language and cultural backgrounds. Blount (1971) examined longitudinally the progression of child-directed speech as infants get older, in two

Luo-speaking families in Kenya, with infants who were initially 6 months old and continuing till the infants were 14 months. As the infants grew older, child-directed speech grew more frequent, with the biggest difference seen between the 6-11 month and the 12-14 month periods. Also in this latter period adults changed their speech prosody from that of adult-directed speech more often than they did when the infants were younger. However, adults frequently used one-word utterances in their child-directed speech (percentages of utterances that were a single word ranging from 59% to 85% by child and age). Luo does not have many polysyllabic words and generally does not have single-word sentences in the way that Bantu languages tend to - and the mean number of syllables per child-directed utterance (range 1.5-2.2) also suggest that adults are directing incomplete sentences to infants, although Blount does not give the MLU of child-directed utterances.

Geiger and Alant (2005) also examined qualitative differences in adults' speech to infants and young children, and how it changed as children grew older, in a village in Botswana. They concluded that much of the interaction and practice in prespeech skills came from infants' interactions with older children, rather than adults, and that older children were also likely to be the ones to attempt to elicit speech from verbal infants through prompts and games. Interaction with pre-verbal infants was seen as eccentric.

Demuth (1986) however observed that Sesotho-speaking adults frequently used prompts to teach children linguistic and social routines, and found that parents held a very wide variety of views on the usefulness of verbal interactions with children and young infants. Some of the adults felt speaking to young infants was helpful, and learning to speak well was a valued part of learning Sesotho. Likewise, Rabain-Jamin (1998) also examined prompting and reported speech in mothers of

Wolof-learning infants aged 16-28 months. Not only did mothers frequently use these language socialisation strategies but they adapted their speech to the linguistic maturity of their child. Geiger and Alant (2005) warn researchers against applying findings from non-African settings to "African culture" but the differences between these studies highlight the fact that there is no one "African" set of parenting beliefs on language socialisation.

Applied studies of language development

If the study of typical language acquisition in sub-Saharan Africa is patchy, then the study of language impairment is almost non-existent, as is provision for children with language impairments. We will arrange this section thematically, starting by examining child language assessments that have been developed for the region, and continuing by describing characterisation and intervention for developmental language impairment, followed by a brief description of the situation on the ground for practicing speech and language therapists in East Africa.

Language assessments

Direct assessment of language abilities in children in developing country situations is challenging, even with slightly older children with some experience of school or preschool, partly because children are not accustomed to any kind of testing situation. Demuth et al. (2010) tested Sesotho speaking 3 year old children's comprehension and production of passives, and overall found that 44% of children either would not speak in an experimental situation, or could not identify pictures during a warm-up task, even though all of the children were attending formal preschool. This finding highlights the need for language assessments that take into account children's unfamiliarity with the testing setting.

The Communicative Development Inventories (CDIs; Fenson, et al., 1994) are

one alternative means of assessing children's language development, that do not rely on children's cooperation. These are parent-completed checklists which ask parents to report which of a list of gestures, words and grammatical forms are most like what their child produces and/or understands at that moment in time. They rely on parent knowledge of their child's current and emerging language and communication skills but do not rely on long-term memory of the child's behaviour. There are reports of CDIs for three language groups in the region - for Kiswahili and Kigiriama, related Bantu languages spoken in Kenya (Alcock, Rimba, Abubakar, & Holding, 2007), for Chichewa and Chiyao, Bantu languages related to each other (and also moderately closely related to Kiswahili and Kigiriama) spoken in Malawi (Prado, et al., 2011), and for Ngas, spoken in Nigeria (Childers, et al., 2007), as well as a report of CDI use for unspecified language(s) in Mozambique (Mastin & Vogt, 2011a, 2011b). Although neither Childers et al. nor Mastin and Vogt specify the administration method, in both Kenya and Malawi we used an interview method to obtain data from largely illiterate parents. This method was found to be valid in Kenya and has also been used in other settings where many parents cannot read (Alcock, Prado, et al., 2010; Hamadani et al., 2010).

In a multilingual clinic setting, and in particular in a setting where the majority of children seen have additional disabilities and moderate to severe impairments, a functional checklist of communicative behaviours may be helpful. Tuckley and Shah (2005) report on a checklist which combines assessment with locally available materials, observation, and parent report, that they have used successfully in Kenya.

For slightly older children, directly administered language assessments which avoid asking the child to speak may be possible to use with children unfamiliar with the testing setting. Picture Vocabulary Tests (PVTs) are widely used in Western

settings (Dunn, 1965, 1997), and children need only respond by pointing to one picture of a selection of target and distractor pictures. Successful adaptations have been made into some African languages. Holding et al. (2004) constructed a PVT suitable for children aged 5 to 7 speaking a small number of related languages in coastal Kenya and Nampijja et al. (2010) further adapted this assessment for Luganda-speaking children aged 5. In both cases not only must the vocabulary items be adapted but also the picture stimuli must be locally appropriate - Kenyan coastal stimuli proved not to be suitable for Ugandan lakeside communities. Alternative approaches to testing vocabulary suitable for primary school age children (usually, in this setting, aged 7 at minimum) include an odd-one-out task (Roller, 1988) and a matching task (Alcock, Jukes, Ngorosho, & Deus, 2010). Both of these require a verbal response on the part of the child but generally it is only a one-word response, and they may be more suitable for assessment of complex, hard-to-depict, vocabulary.

Wolf-Schein, et al. (1995) developed a phonological assessment for children aged 7 and older speaking Shona or Ndebele in Zimbabwe. Naudé, Louw, and Weideman (2007) suggest using elicited conversation to examine language development of children learning English in multilingual settings in preschools in South Africa, since they have observed that children's spontaneous conversations with each other are rarely in just one language. A highly targeted and comprehensive assessment of language abilities for children aged 8-9 years was developed by Carter and colleagues (Carter, Murira, Ross, Mung'ala-Odera, & Newton, 2003; Carter et al., 2005) for Kigiriama-speaking children in coastal Kenya. The assessment includes syntax, phonology, comprehension and higher-level language.

Studies of language impairment in the region

We will not extensively review studies examining effects on cognitive

development of various biological insults, such as infection, brain injury, or malnutrition, that as part of a larger battery studied language development. However, some researchers have examined language impairment as a primary outcome measure, or as an idiopathic condition.

Carter et al. (2003; 2005) found that children who were hospitalized for severe malaria, on assessment between 2 and 6 years after discharge, were significantly poorer than controls on tests of most aspects of language ability - comprehension, syntax, semantics, and higher level language (metalinguistic ability) - with the exception of pragmatic ability and phonology. Children with a history of infection were two standard deviations poorer than control children on language comprehension, syntax, and higher level language.

Law (2000) examined risk factors for language impairment among West African families living in London, where children of these families are at higher risk of referral for language impairment services. Parents and professionals had differing opinions and expectations on best parenting practice, and many parents were unsure of the value of talking to their preverbal baby, and thought that they would disadvantage their child by speaking to them in their native language. Parents also were stressed by work and money pressures and felt strongly a lack of the informal child care structures that they would be accustomed to using in their countries of origin.

Demuth and Suzman (1997) analysed the language development of a child learning Zulu who had been referred for delayed speech and found to have no hearing difficulties and no other reason for developmental language impairment. He was compared to a control child and found to have impairments in phonology, morphology and syntax, presenting a fairly common pattern for a child diagnosed

with Specific Language Impairment. He used far fewer noun and verb agreements, with his morphology not resembling use at a younger age by the control child.

Rehabilitation and special education settings

Children in need of language rehabilitation and specialist spoken language input in the region are not just those with diagnosed speech and language difficulties. Many children who are affected by HIV or AIDS, either themselves or through the loss of parents, are also in need of intervention. Levin and Haines (2007) examined the language input to children in a multilingual orphanage in Johannesburg, South Africa. In contrast to parental input in traditional settings in the region, as examined in the studies of language socialisation referenced above, paid caregivers in the orphanage did not initiate or respond verbally to children except occasionally to use a child's name or give an instruction, and they did not respond verbally to children's vocalisations. In this setting, because of the ages of the children in the institution, there were no older children who could participate in language socialisation.

One major issue in therapy settings in the region is the multilingual nature of many sub-Saharan African societies. Jordaan and Yelland (2003) surveyed speech and language therapists in South Africa where commonly either children are hearing multiple languages or the therapist and child do not share a common language, or both. The most common home language in their sample was Zulu and the majority of children studied in English in preschool or primary school. They found that most therapists failed to deliver services in children's first language, mainly because parents requested therapy in English, despite current recommendations being that therapy should be provided in a child's L1 first. Parents appeared to wish to maintain children's bilingualism but were not provided with advice on this from speech therapists, either. The authors note that some children are labelled as language

impaired or delayed when their only language difference is poorer L2 (English) development than monolingual English-speaking peers - a not very surprising finding in young bilinguals whose main exposure to English is at school. Naudé, et al. (2007)'s recommendation of assessing L2 performance are slightly worrying in this context, since as Jordaan and Yelland note, delay in L2 alone is not a language delay in the general sense in which that diagnosis is understood.

Issues of resources loom large in rehabilitation and therapy in the region. Researchers from outside the region may not have a clear view of exactly how these issues impact, and what the picture is like for speech and language therapists in sub-Saharan Africa. It is for this reason that we now present an overview of Paediatric Speech and Language Therapy services in Kenya and more broadly, in East Africa, contributed by the second author, who is a practicing Speech and Language Therapist in this area.

The Speech and Language Therapy Service. The Speech and Language Therapy service has existed in Kenya since the late 1960's. The country depends on expatriate therapists or Kenyans who have received training in Europe or the USA. Professional sustainability is a major issue in this context (Marshall, 2005).

There are currently nine SLTs who see children with communication disorders. They are located in the biggest cities of Nairobi and Mombasa. Access to the services is limited to the people living in the city or its outskirts. Sometimes wealthier East Africans who can afford travel and accommodation costs will travel from neighbouring towns and countries to access the service.

Service Locations. The majority of the therapists are based in private hospitals, rehabilitation centres, mainstream and special educational settings, including preschools, as well as domiciliary settings. Two of the nine therapists are Voluntary

Service Overseas volunteers from the UK. These therapists are based in non-governmental organisations and work predominantly alongside Community Based Rehabilitation or Educational Assessment Resource Centre workers. Most of the services in Kenya are private and users have to pay consultation fees.

Heads of population. In Mombasa, an average of 84 children are treated in a year by each therapist. However, in a busier hospital setting, such as the one at Mulago Hospital (Uganda) approximately 200 children are seen between one SLT and one assistant (Jochmann, 2005).

Referrals. The majority of the referrals in Mombasa are self-referrals, or from Paediatricians, GPs, special needs teachers, class–teachers, audiologists or other SLTs. There seems to be an increasing awareness of the service and its provisions - in Mombasa, there is a 6 month waiting list. There is a need to generate awareness about the field but that must go hand in hand with developing the services available to cater for the need.

Types of clients. There is a wide range of clients seen including those with medical conditions associated with communication disorders - AIDS, cerebral malaria, epilepsy, encephalitis, infections with febrile convulsions, meningitis, otitis media and pneumonia.

The children who have been diagnosed with a chromosomal syndrome associated with communication disorders include those with Down Syndrome and fragile X syndrome. Other conditions include cerebral palsy, ADHD, Autistic Spectrum Disorder, hearing impairment, cleft lip/palate and velopharyngeal anomalies, delayed speech and/or language development, speech and/or language disorders, voice disorders, stammering, traumatic head injury, general learning disabilities, dyslexia and other literacy disorders, and feeding and swallowing

problems.

Types of Services. Most of the therapy provided by therapists to children with communication disorders is on an individual basis working closely with the parent or carer. A significant part of therapists' time is taken up with training other professionals (medical but mostly educational) with skills to enable them to facilitate the development of communication skills in the children they work with. There are forums where SLTs meet with other professionals on a regular basis to provide knowledge and skills. SLTs also run parent support groups.

The recently formed ASLTEA (Association of Speech and Language Therapy, East Africa) holds a conference every two years. The conference's primary aim is to provide continuing education for East African SLTs by guest lecturers.

Challenges. Working as a SLT in East Africa is a challenging yet rewarding experience. SLTs face the following challenges:

- Lack of research in the area of speech and language development, either in the Kenyan context or in local languages (e.g. Kiswahili).
- Lack of assessments and therapy tools (modified or otherwise) suitable to this context (there is an Articulation Test in Kiswahili being developed at the moment).
- Lack of awareness of the profession and what SLTs do.
- Lack of opportunities for SLT training locally. In 2008, VSO partnered with Makerere University in Uganda and established the first degree program in SLT in East Africa. Jochmann (2006) summarises the very similar issues facing SLTs in Uganda.
- Lack of opportunities for continuing professional development. The courses available are difficult to access because of costs of travel. SLTs have to rely

on internet sources, journals and the occasional visiting lecturer.

Future directions

This review of typical language development and applied studies of language development and disorders in the region leads to a number of conclusions about areas of research that are lacking. Geographically, the majority of research has been carried out in Southern Africa, concentrating in addition on a few of the Bantu languages spoken in that region. Research from elsewhere in Africa (primarily East Africa) also concentrates on Bantu languages; a small body of research from West Africa represents very poorly the large population and widely-spoken languages of that sub-region. Within the regions that are well represented, non-Bantu languages are poorly studied; a small amount of data are available from Luo in Kenya, a Nilo-Saharan language, but there are no data from the southern African Khoisan languages or the East African Semitic or Cushitic languages, some of which have a few millions of speakers.

Another area of research that could be potentially very fruitful, and has to some extent begun in a modest way (Alcock, et al., 2005; Alcock, et al., in press; Suzman, 1996) is the comparison between related but subtly different languages in the region. Languages of completely different classes have so many differences that comparisons can sometimes not be made in a valid way, but very closely-related languages can have subtle differences that affect, or do not, the course of acquisition, and can therefore teach us much about what influences the rate at which children acquire certain aspects of their native language.

Although some work has started in this area (Alcock, Prado, et al., 2010; Carter, et al., 2003; Holding, et al., 2004; Tuckley & Shah, 2005), development of low-cost, appropriate, easy-to-administer language assessments for the region is

crucial. Some of the assessments may be more suitable for research settings and some for clinical settings, but key features are adaptability and the existence of some kind of norms. Where two languages are closely related, we have found that it is not necessarily a great challenge to adapt an assessment from one language to another - initial adaptation to a new language family is the larger step (Alcock, et al., 2007; Prado, et al., 2011). Norming is another issue and unfortunately highly resource-intensive; in clinical settings a less sensitive screening tool may have to be a compromise. Recent work on assessment of children in the region in a variety of more general areas of ability (A. Abubakar, Holding, Van Baar, Newton, & Van de Vijver, 2008; A. Abubakar et al., 2007; Alcock, Holding, Mung'ala-Odera, & Newton, 2008; Holding, et al., 2004; Jukes & Grigorenko, 2010; Nampijja, et al., 2010) can also now be expanded to language assessments.

Finally and crucially what we know about typical language development in the region needs to feed into speech-language therapy and educational services. Many of the publications in the field are conference proceedings, degree dissertations, or are otherwise difficult to obtain. We hope that this review will bring together some of the research and be a useful summary for applied practitioners in the region.

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