Early production of the passive in two Eastern Bantu languages

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Abstract

The passive construction is acquired relatively late by children learning to speak many languages, with verbal passives not fully acquired till age 6 in English.  In other languages it appears earlier, around age 3 or before.  Use of passive construction in young children was examined in two Eastern Bantu languages spoken in Kenya (Kiswahili and Kigiriama), both with frequent use of passive.  The passive was used productively very early (2;1) in these languages, regardless of the method used to measure productivity. In addition non-actional passives, particularly rare in English and some other European languages, were seen at these early ages.  The proportion of verbs that were passive varied between individuals, both in children's speech and in the input to children. Pragmatic and grammatical features of the passive in some languages have previously been suggested to drive early passive acquisition, but these features are not found consistently in the two languages studied here.  Findings suggest that the relatively high frequency of input found in these languages is the most plausible reason for early productive use of the passive.

Early production of the passive in two Eastern Bantu languages

Children learning many languages find active sentences such as '*Jack ate the ice-cream*' much easier to understand and produce than passive sentences such as '*The ice-cream was eaten by Jack*'. This construction seems to be learned very late in English, as well as in many other languages, including most European languages and Hebrew (Berman, 1985; Mills, 1985); in some studies not until aged 9 or 11 for some constructions (Horgan, 1978; Maratsos, Kuczaj, Fox, Becker, & Chalkley, 1979).

Even when passives are acquired, they are likely to be truncated (lacking the 'by phrase'; Berman, 1985; Mills, 1985). One traditional explanation for this has been that the cognitive architecture underlying the passive construction matures later than that for other grammatical constructions. For example, Borer and Wexler (1987) suggest that the argument chain underlying verbal passives matures relatively late leading to earlier acquisition of adjectival passives such as '*The chair is broken*' than verbal passives such as '*Jack was chased (by the park keeper)*'.

Children's cognitive development appears in some contexts to be a limiting factor in their language development. For example, Kelly and Dale (1989) found that non-verbal cognitive abilities such as means-end behaviour develop in parallel with language milestones. Trosborg (1982) examined whether children learning Danish needed to have achieved reversibility in cognitive tasks, such as Piagetian conservation tasks, in order to comprehend and use reversible grammatical structures. She concluded

that children were able to comprehend non-reversible passives earlier than they were able to mentally reverse conservation situations, implying that they rely on real-world context to interpret passives. However, the types of passives that are non-reversible are the type that can be interpreted without parsing the grammar of the sentence (e.g., *the car was polished by Mette*) so that we cannot be sure that children are actually comprehending the passive; in any case, it is not clear from these data whether children need to reach a certain cognitive stage before comprehending the passive.

In some languages, however, the passive construction appears to be acquired much earlier than in the largely European languages referred to so far. For example, in Sesotho, a Southern Bantu language, and in Inuktitut, Demuth (1989) and Allen and Crago (1996), respectively, have found that children spontaneously and productively use passives in their speech from the age of three years at the latest. Demuth, Moloi, and Machobane (2010) have also successfully elicited passive use with novel verbs, without priming, from three-year-old children learning Sesotho. Suzman (1985) also found early spontaneous use of the passive in Zulu, another Southern Bantu language. There are several differences between passives in these languages and those in English and other languages (especially European languages and Hebrew) that might explain early acquisition of passives by some children. These differences can be categorised into: 1) High frequency, 2) The presence of obligatory passive constructions and 3) Grammatical features of passive and active constructions.

*Features of the passive in languages where it is used early*

*1) High frequency*

In all of these languages the frequency of passives in the input is much higher than in English or similar languages. Demuth (1989) suggested that higher frequency of passives in Sesotho is crucial in driving their early use, but this has not been tested directly in these languages, where generally longitudinal data from a few children have been collected, rather than cross-sectional data from a larger number of children, which would allow between-child comparisons.

*2) The presence of obligatory passive constructions*

The existence of grammatical contexts in which passive is obligatory, as in Sesotho, might explain the early acquisition of passives in these languages. In Sesotho, the passive is used obligatorily for wh- questions where the agent is queried. The construction in example 1 is not possible, and speakers must use the construction in example 2 instead:

1. *Mang o-pheh-ile     lijo?

   who    SM-cook-PRF  food?

   who cooked the food?

2. Lijo  li-pheh-il-o-e         mang?

   food SM-cook-PRF-PASS-M who?

   the food was cooked by who?[1]

*3) Grammatical features that differ between passive and active constructions*

For Inuktitut, Allen and Crago (1996) argue that in an active construction, where there are two arguments, the verb must agree with both arguments for verb modality, person and number. In the passive the verb must only agree with one argument, hence making the passive potentially easier to produce – and adults may also use passive preferentially for this same reason. This agreement issue is not cited, however, by Demuth (1989) as a feature that may assist children in using passives in Sesotho.

It has also been proposed that other grammatical features of some languages may aid in the early production of passives. For example, German, like other languages, marks nouns for case, and this could potentially aid in early production of passives – since agents and patients are more clearly marked. However, in spontaneous speech this is clearly not the case (Mills, 1985), and while experimental studies show that German-learning children can use case productively in marking novel nouns, they are no more productive with novel verbs in passive than English-learning children (Wittek & Tomasello, 2005). Aschermann, Gülzow and Wendt (2004), however, have some contradictory data that suggest earlier use of passives in German than in English, and relate this to German-speaking children's experiences with topicalisation of the object in active sentences.

*Even later use of passives in specific constructions*

While passives in many languages are late-acquired, some types of verbal

passives seem to be acquired even later than others. In particular, full passives (those with a "by" phrase) are harder for children than truncated passives (Harris & Flora, 1982) and non-actional passives are harder than actional passives (Maratsos, Fox, Becker, & Chalkley, 1985). Passives appear to be acquired in a stepwise fashion (Israel, Johnson, & Brooks, 2000).

There is in addition some evidence that this differential difficulty of passive types may also be influenced by the frequency with which children hear these constructions. Demuth et al. (2010) suggest that the high frequency of by-phrases in the language that Sesotho-learning children hear may also enhance children's use of passives containing a by-phrase at an early age, though they admit that this frequent use of the by-phrase is tied up with obligatory use of the passive in some question constructions.

Sudhalter and Braine (1985) suggest that English-learning children may hear fewer non-actional than actional passives, and Gordon and Chafetz (1990) confirm that these differences occur in the input. Even hearing non-actional active verbs during testing in Maratsos et al.'s (1985) study improved children's performance on non-actional passive verbs. Pye and Quixtan Poz (1988) suggested that the use of passives with both actional and non-actional verbs by adults in Quiche Mayan aided children's use of passives in general. Certainly, children learning Quiche Mayan used non-actional passives at the same age as they learned to use actional passives. Likewise, children

learning Inuktitut use passives with experiential verbs at a relatively early age (Allen & Crago, 1996).

*Early passives in experimental situations in languages where the passive is late-appearing*

It has been noted for some time that input patterns and frequency affect the structure and frequency of individual children's language output. Looking at general syntactic complexity, natural and naturalistic studies suggest that influences of both non-parental input and parental input can be found (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002), suggesting that the effect is not due to genetically-influenced language abilities that are shared between parent and child. Vasilyeva, Huttenlocher and Waterfall (2006) simulated naturalistic input in preschool story sessions with four-year-olds and found that those exposed to passives were more likely to produce passives in later describing stories, including productions with verbs they had not previously heard in the passive form, and were also better able to comprehend passives. Marchman, Bates, Burkardt and Good (1991) examined children's use of passives following patient-focussed and agent-focussed questions about actions of characters in a film. No three-year-olds were able to spontaneously produce full passives (with by-phrases) with "be" but some produced passives that fell into one or the other category (full passives but with "get", or truncated passives with "be"), as did similar numbers of four-year-olds and more five-year-olds. Although one four-year-old

(out of 19) produced several full "be" passives, no five year olds were able to produce these either. This backs up the assertion that verbal passives (especially full passives) are vanishingly rare in the speech of English-learning children under the age of about 6 years.

Experimental studies of syntactic priming, including priming of passives, have confirmed these findings. Baker and Nelson (1984) compared recasting of later-acquired syntactic structures – including the passive – with simple modelling of those structures, and found that children's production of these structures increased over baseline when they heard the structures more, with recasting increasing production of the target structures more than simple modelling. The increase with simple modelling, however, suggests that low frequency in the language children are hearing is instrumental in lowering the frequency in children's output.

Tomasello, Brooks, and Stern (1998) taught three-year-olds to use novel verbs in the passive in a discourse setting. Children were able to use the novel verbs with a passive, but only produced full passives when they had heard full passives – they were not able to generalise truncated passive use to full passives. Likewise, Brooks and Tomasello (1999) taught three-year-olds novel verbs in either active or passive constructions and found that children could reproduce the verbs in either the construction in which they were presented, or the other construction, according to the demands of the situation. Syntactic priming studies (Huttenlocher, Vasilyeva, &

Shimpi, 2004; Savage, Lieven, Theakston, & Tomasello, 2003) have also demonstrated that children aged between three and six are more likely to use a particular sentence form – in both of these studies, the passive – if it has been used previously by the experimenter.  Huttenlocher et al. (2004) found that both four- and five-year-olds had representations of the passive that were independent of the specific lexical items used by the experimenter, but Savage et al. (2003) suggested that three- and four-year-olds needed close overlap in function words and grammatical morphemes between the prime sentence and the target sentence for the primed construction to be produced, although six-year-olds' production of passives was more independent of lexical overlap. Most of these studies rely on close temporal proximity between the prime construction and the primed children's speech, but are suggestive of the dependence of children's production of a difficult construction on its presence in a higher frequency in the input than is normally found in English.

As Allen and Crago (1996) note, it is difficult to find spontaneously-produced passives in early child language when the frequency is so low, as it is in English. This means that passive in spontaneous samples are generally only studied from languages with higher frequencies of passive. In contrast, few experimental data are available from languages that have higher frequencies of the passive, partly because of the settings in which children learn these languages.  Demuth et al. (2010) have collected some extremely interesting data showing that three-year-old Sesotho learners can match

reversible passives to pictures, including non-actional passives, and that they can produce passives with novel verbs. However, the large drop-out rate for this study (50% or more of children could not complete the task) highlights the difficulty of carrying out experimental studies with children who are unused to interaction with strangers, as is the case for most children living in poverty in developing countries. As it is primarily European languages that use passives infrequently, and non-European languages that use them frequently, these same children are those that are more likely to be in a situation to learn passives early.

*Features of the languages to be studied*

Here we attempt to investigate whether previous findings of early use of passive in Southern Bantu languages (Demuth, 1989; Suzman, 1985) are replicated in two Eastern Bantu languages spoken in Kenya. It is worthwhile to examine the features of these Eastern Bantu languages and of passives in these languages in order to see if there are similar features to those found in the Southern Bantu languages and in other languages with early passives. This will enable us to assess whether features of the grammar of the languages could explain any early use of the passive in these languages.

We examine data from Kiswahili and Kigiriama, both Eastern Bantu languages spoken in Kenya. Kiswahili data are from two dialects - one spoken in coastal Kenya, henceforth Kiswahili (Coast), and one spoken in Nairobi, the capital, henceforth Kiswahili (Nairobi). Kigiriama is a closely-related language also spoken in coastal

Kenya. The two languages are not mutually intelligible but out of 100 words with common meaning used as part of the Kiswahili and Kigiriama short versions of Communicative Development Inventories for children aged 16-30 months (Alcock, Rimba, Abubakar, & Holding, 2007), 92 are cognate, indicating a high degree of overlap between the two languages.

These languages have in common with the Southern Bantu languages complex grammatical structures with various prefixes and suffixes on the verb root to indicate the passive, agree with arguments, mark tense, and other features. Where examples are given from Kiswahili, unless otherwise indicated, these show grammatical features present in both dialects. In both Kiswahili and Kigiriama, as in previously-studied languages where the passive is produced at an early age, the passive is very frequent in the language a child hears (see Deen, 2002 for data on Kiswahili; there are no published data on Kigiriama but adult native speakers confirm that it is similar to Kiswahili in this respect). However, some of the features discussed above are not found in these languages; we now discuss these.

*The presence of obligatory passive constructions*

Notably, although passives are used in these languages in some cases to query the agent of an action, this use is not obligatory, in contrast to Southern Bantu languages. In both languages there are three possible forms for a question that queries the agent of a sentence. These involve either a straightforward active (‘*Who cooked the*

*food*?'), a relative clause with an active verb ('*Who was it who cooked the food*?'), or a passive, as in Sesotho ('*The food was cooked by who*?').

Children learning both of these Eastern Bantu languages can therefore hear grammatical agent-querying questions using both active and passive verbs. Perusal of the transcriptions used in this study indicates that adults also frequently use non-question passives in their input to children in both languages.

*Grammatical features that differ between passive and active constructions*

In these languages, passives only agree with one argument (the grammatical subject, as in Inuktitut). The active, however, can in some contexts agree with two arguments, but only when the patient is a person. If the patient is inanimate, or is an animal, only one argument is needed. This means that the pervasive necessity to agree active verbs with more than one argument, suggested to be a reason for early passive use in Inuktitut (Allen & Crago, 1996), is not present in these languages. The grammatical differences between active and passive do not make all active sentences more challenging to construct using correct agreement than passive sentences.

Kiswahili:

3. a-na-pend-a chokoleti

   SM1SG-PRES-like-IND chocolate

   He/she likes chocolate

4. a-na-pend-a mbwa

SM1SG-PRES-like-IND dog

He/she likes the dog

5. a-na-m-pend-a Mama

SM1SG-PRES-OM1SG-like-IND Mama

He/she likes Mama

*Further notes on structure of passives*

Passives in both languages are marked by a suffix –*w-a* (for the indicative – this becomes –*w-e* in the subjunctive and *w-i* in present tense negative indicative in Kiswahili only). The passive marker is in the final syllable in the word; the penultimate syllable is always stressed. Examples of passive and active verbs are as follows:

Kiswahili:

6. ni-na-ku-ambi-a

SM1SG-PRES-OM2SG-tell-IND

I tell you.

7. u-na-ambi-w-a

SM2SG-PRES-tell-PASS-IND

You are told.

Kigiriama:

8. u-na-mw-ambir-a

SM2SG-PRES-OM3SG-tell-IND

You tell him/her

9. a-na-ambir-w-a

SM3SG-PRES-tell-PASS-IND

He/she is told

*What the features of the Eastern Bantu languages should mean for passives*

To summarise, in these two Eastern Bantu languages, passives occur with relatively *high frequency*; passives or actives can be used for *all types of questions*; actives must agree with both arguments in a sentence under *some, but not all, circumstances, while passives only agree with one argument*; passives are marked on the final syllable (post-stress) with a consistent marker.

If early use of passives depends on *obligatory use of the passive* in one context (as in Sesotho, when only passive may be used for questions that query the agent of a sentence), then children who are learning to speak Kiswahili and Kigiriama should not produce the passive at a much younger age than children learning to speak English. If early use of passives depends on *a passive construction with fewer agreements than the active*, as is found in Inuktitut, then since in Kiswahili and Kigiriama most contexts with an active verb need only agree with one argument, as do all contexts with the passive verb, this is not likely to lead to early use of the passive.

However, if early use of passives in these languages is dependent on *input frequency*, as in experimental studies of English-learning children where frequency is

boosted artificially (Brooks & Tomasello, 1999; Vasilyeva, et al., 2006), then children's production of passives should be boosted by higher frequency in the language input. Given higher frequency in adult speech to children than in English, children learning to speak these two languages should spontaneously produce the construction earlier than in English. It is also possible that individual differences will be found between children, and that frequency of production may be related to the naturalistic frequency with which a particular child hears the construction. Such a relationship is not observed in languages with low frequency and late acquisition of the passive, and this could be due to very low inter-individual variability of the structure.

Method

*Participants and recording*

Spontaneous speech samples were recorded from children in their own homes, playing as usual, in the presence of caregivers and other interlocutors (both adult and child). A total of 15 children were recorded across the three languages. For the children learning Kiswahili (Nairobi), there were between 1 and 11 data points for each child (these data are from Deen, 2002), while for the children learning Kiswahili (Coast) and Kigiriama, all children were recorded once only. Children ranged in age from 1;9 to 3;4 (1;9 to 2;12 for Kiswahili (Nairobi), 2;1 to 2;11 for Kiswahili (Coast) and 2;4 to 3;4 for Kigiriama). Coastal children were recruited from a census database of all families in the district. In each recording both adult and older child interlocutors were also present.

As is common in sub-Saharan African settings, a high proportion of those present during recording sessions were not parents but rather were older children and non-parent adults. Most interlocutors were, however, regular visitors to children's houses, even if they were not resident, and hence were familiar to the index children, and frequent sources of children's language input. During recording, the individuals present and speaking were noted on a coding sheet, and the other children present were outside the age range of interest, so that their speech was easy to distinguish from the target children. A summary of target children's ages and genders can be seen in Table 1. Ages for target children were confirmed with birth or medical records, but ages for older child interlocutors were not.

[Table 1 about here]

Children and their families were recorded for between one and two hours per sample in both locations, depending in part on whether longer periods of silence were present during recording, when the child was for instance eating or resting. In the case of the coastal children, a minidisk recorder was used, placed in a small back-pack, and the child wore an omnidirectional tie-clip microphone.

*Transcription and analysis*

*Transcription*. Transcription of all child and adult speech was carried out, excluding adult conversations that did not include the child but that were accidentally recorded. For the Coast data set, transcription was carried out by a linguistics graduate

(the second author, or another research assistant) whose first language is Kigiriama and who speaks Kiswahili fluently and on a day-to-day basis. A randomly chosen 10% of these transcripts (calculated by time, rather than by individual transcript, meaning that some proportion of approximately 25% of the recordings was re-transcribed) were checked by a second transcriber. The second transcriber was either one of the linguistics graduates or (for the coastal Kiswahili recordings) another experienced research assistant whose primary language is Kiswahili and who has been working with children of this age for a number of years. Discrepancies were resolved by discussion and this also served to improve transcription technique. For details of the sample, data collection methods, and transcription for the Nairobi data see Deen (2002).

*Coding – verbs and utterances.* From the Coast data set, the number of utterances, the number of verbal utterances, and the number of passives were recorded, for target children and for both adult and older child interlocutors. From the Nairobi data set, the number of utterances and the number of verbal utterances were already available in Deen (2002). For both data sets, verbal utterances were classified as indicative or non-indicative. Coding was therefore identical for both data sets, for both input and output, as the Coast data coding followed the Nairobi data coding pattern.

*Coding – passives.* For the Coast data set, verbs produced by target children or by adults or older child interlocutors were coded as either active or passive. Passives were further coded as actional or non-actional.

For the Nairobi data set, verbs produced by all interlocutors (whether target child or other) had already been previously coded as either active or passive. Again, the numbers of passives produced were coded identically in both data sets, for both input and output.

All productions of passive verbs produced by target children in the Nairobi data set were available and these were also coded as actional or non-actional, again exactly as in the Coast data set. Line-by-line utterances were not available for adult or older child interlocutors for the Nairobi data set. This meant that coding of adult passive verbs as actional or non-actional was not possible, so data on actional versus non-actional verbs in the input represent the Coast data only.

*Coding – proportion of utterances that were in the passive*. From the above data (number of utterances containing an indicative verb, and number of these utterances that contained a passive) for all interlocutors, the proportion of indicative utterances that contained a passive verb was calculated. All *proportional* data reported below shows the proportion of indicative utterances that contained a passive verb. For other measures (for example, productive use of the same passive verb in different constructions) it is relevant to include passives produced in non-indicative utterances. Again, coding is identical for both data sets.

*Coding – repetitions*. For the Coast data set, passives that were a repetition of the same verb in passive by the same or another interlocutor (within five turns, whether

self-repetition or other interlocutor repetition, and whether target child repetition of adult or older child passive, or vice versa) were coded as repetitions. For the Nairobi data set, the same criterion was used for self-repetitions but as stated above line numbers of adult or older child passive productions in the Nairobi data were not available.

For the Nairobi data set, therefore, the number of child or adult repetitions of adult productions was estimated from the proportion of the coastal target children's passive output that had been direct repetitions of adult or older child passives (9%), and the proportion of the coastal adult and older child interlocutor passives that had been either self- or other-repetitions (12%).

Children in the Nairobi group appeared to repeat their own passives less often than children in the Coast group (2% of passives were self-repetitions versus 15%), suggesting that if anything this reduction is over-conservative. To summarise, data for self-repetitions were coded identically for both data sets but data for repetitions of adult/older child passives for the Nairobi data set are estimated, but likely an over-conservative estimate.

*Coding – linguistic maturity.* To examine the effect of children's linguistic maturity on the production of passives, their mean length of utterance (MLU) and verbal ratio (the ratio of verbal utterances to all utterances) were calculated. MLU was available for the Nairobi data in morphemes per utterance, and was calculated for the

coastal data in words per utterance, so these were analysed separately below. Verbal ratio was available for both samples.

*Coding – productive use.* The earliest productive use of passive was also noted for each child. There are no verbs (to the authors' knowledge) in either language that cannot be used in the passive, so over-regularisation cannot be used as an indication of productivity. In spontaneous speech samples it is not possible to assess production or comprehension of the passive with novel verbs or contexts. However, three possible indicators of productivity have been used by different researchers, and are presented here. These are:

1) Bates, Bretherton, and Snyder (1988) defined productive use as production of one verb root in both active and passive forms by the same child. 2) Allen and Crago (1996) used in addition the production of more than one verb in the passive form. The earliest point by which both of these had been observed in a child speaking each language was noted. 3) Brown additionally defined productive use as 90% correct use in obligatory contexts (Brown, 1973). Contexts where the passive would be expected were noted in speech samples.

<div align="center">Results</div>

<div align="center">*Numbers of utterances and verbal utterances produced*</div>

Two children produced fewer than 55 verbal utterances in the time recorded. This was outside the 99% confidence interval for the number of verbal utterances per

sample. Inclusion of very small samples leads to an unrepresentative distribution of data (MacWhinney, 2000). Hence, the data for these two outliers were excluded from analysis. Neither of these children in fact produced any passives. Descriptives for relevant variables are shown in Table 2.

[Table 2 about here]

*Numbers of passives and age of productive use*

The proportion of verbal utterances that were produced in the passive ranged from 0 to 19% by child, and the proportion of verbal utterances directed to each child and containing a passive, by adult/older child interlocutors ranged from 1 to 12%. A mixed 3 (language group: Kiswahili-Nairobi, Kiswahili-Coast, Kigiriama) x 2 (language source: input vs. output) ANOVA revealed that there was no significant difference between languages in the ratio of passive verbs to verbal utterances and no significant interaction between source and language group, though there is a significant difference between input and output in the proportion of verbs that are in the passive; $F$ (2, 12) = .52, p > .05, $\eta^2$ = .08 for language group, $F$ (2, 12) = 1.75, p > .05, $\eta^2$ = .226 for the interaction and $F$ (1, 12) = 7.53, p = .018, $\eta^2$ = .39 for source.

Using the more conservative criteria 1) and 2) above, the youngest age at which passive was used productively was 2;1 at which age one child produced *'I will hit it',* having already produced '*He was hit'* at 1;10 and '*Tafa, you are being called'* at 1;9; Kiswahili (Nairobi) sample. Not all active verbs are available for this sample, so this is

22

likely an overestimate of the first age of productive use – in other words the true first age is likely lower.

Productive use was also observed at the age of 2;1 in the youngest child in the Kiswahili (Coast) language group and as no younger children were recorded this could again be an overestimate. Only the oldest child in the Kigiriama sample (3;4) produced the same verb in both passive and active as well as producing another verb in the passive, while younger children in the Kigiriama sample fulfilled one or the other but not both of these criteria. As all four Kigiriama-speaking children were among the six children for whom the fewest verbal utterances were recorded, this may again be a sampling issue rather than a genuine language difference, since no differences between languages/dialects were found in the proportion of verbal utterances containing a passive in either children or adults. Examples of productive use can be seen in Table 2.

Turning to the third index of productive use, that of Brown (1973), in only one case was a child observed to use an active or any other non-passive form of a verb where the context requires a passive. This verb was not a correctly pronounced active either:

Sidi (3;4 - Kigiriama)

10. *ja-dumb-a

gloss: dz-a-dung-w-a

1SG-PERF-pierce-PASS-IND

'I have been injected'

In the same sample, this child produced four other verbs with correct passive marker, and one of these verbs was also produced in the active form. This single passive omission gives this child a rate of 75% correct use in obligatory contexts, although this could be classified as a phonological error, rather than a morpheme omission. By this third criterion, all children except Sidi were productive in their use of passive.

Using this third criterion, the earliest productive use of passive was at 1;9. However, as correct use of passive in obligatory context occurred at such a high rate, it seems that the more cautious criteria for productive use of passive in these languages are criteria 1 and 2 above. These will be therefore be the main criteria for productive passive use.

*Use of actional and non-actional passives*

Children from all language groups used both actional and non-actional passives in their speech. Examples and proportions of each of these can be seen in Table 2. Appendix 1 also contains a list of all verbs used in the passive by any child, with translations. The ratios of non-actional to actional passives in children's productions and in the input were compared for samples from the Coastal language groups only as not all verbs were available for the Kiswahili (Nairobi) input. There was no significant difference between the proportion of passives that were non-actional in the output and in the input, $t(6) = .95$, p > .05. The proportion of passives produced by the children

that were non-actional was, however, significantly different from zero, $t(10) = 3.24$, p = .009.

*Full versus truncated passives*

Children in all three language groups produced both full and truncated passives. The earliest production of a truncated passive was at 1;9 (in Kiswahili – Nairobi). The earliest production of full passives was shortly following, in the same sample:

11. Tafa u-na-it-w-a

    Tafa SM3S-PRES-call-PASS-IND

    Tafa, you are being called

12. it-w-a na rafiki pesa

    call-PASS-IND by friend money

    ?you are being called by your friend [to take] money

Note that in the second example the tense marker and subject marker are both omitted, but the passive marker is present in both this example and the truncated passive from the same sample. As discussed above, with one questionable exception children never omitted passive markers in contexts where they are obligatory.

*Correlation of passive use by target children with other measures.*

As already discussed, it is also possible that in languages with higher frequencies of passives children and adults may show individual differences in their use of passives. Table 2 shows that the standard deviations of the mean proportion of verbs

that are passives, for both adults and children, are relatively large, indicating that in both the language that children produce and that they hear there are some individual differences in the use of passives, which cannot be seen in languages with very low frequency of passives. It is worth briefly examining whether the variable input frequency relates to a variable output frequency.

Previously (Alcock, Rimba, Tellaie, & Newton, 2005) we reported a significant correlation between the ratio of passive verbs to verbal utterances in input and output. This result was replicated including the entire data set reported here, $r^2(13) = .55$, p = .050. Exclusion of one outlier with an extreme high value of passive verbs in their output (outside the 99% confidence limits; this child produced a larger number of verbal utterances per sample so was not excluded earlier) led to this correlation increasing, $r^2(12) = .72$, p = .008. There was no significant correlation between the proportion of verbs produced in the passive and age, either measure of MLU (i.e. correlation of proportion of verbs in the passive with MLU in words for the Coast sample or MLU in morphemes for the Nairobi sample), or verbal ratio (for all data combined).

Thus, there are significant positive correlations between passive production in production and input, and between production of all passives and input, across the three language groups. These data can be seen in Figure 1, which combines data from all three groups.

[Figure 1 about here]

Discussion

From these data we can see that productive use of the passive occurs early in both of these languages, including both dialects of Kiswahili. No differences were found between the languages and dialects in the frequency of passives in children's speech, confirming the similar structure of the languages and dialects, and validating our decision to pool these data for analyses. The crucial data for the main analyses – the types of passives used by children, their frequency in children's language, and the ages at which they start to use these passives – are all available from both data sets, again validating this decision.

The structure and frequency of the passive in these languages is similar to that of Southern Bantu languages, despite some differences in usage. It seems that, as hypothesised by Demuth (1989), a high frequency in the input is crucial in promoting early productive use of the passive, and the extremely low frequency (zero examples from a total of 2139 parental utterances sampled by Brown, 1973, p. 358) in English may explain its late acquisition. Although some argue that constructions can be learned without evidence in the input (Lidz, Waxman, & Freedman, 2003), other researchers examining the construction referred to by Lidz et al. (anaphoric "one") have suggested that there is in fact sufficient evidence to learn this construction (Regier & Gahl, 2004). Perhaps there is no such evidence for the passive in English.

Some children learning to speak English have been shown to produce passives at

an early age when they are simply exposed to an increased frequency of passives in either a natural or a laboratory setting (Bencini & Valian, 2008; Brooks & Tomasello, 1999; Huttenlocher, et al., 2002; Huttenlocher, et al., 2004; Savage, et al., 2003). The children in such studies have been older than the Bantu-language speaking children in our study, however. In other languages with high frequencies of passives in child-directed speech, children have been observed to use the passive spontaneously or productively from 2;8 (Sesotho - Demuth, 1989), 2;5 (Zulu - Suzman, 1987), and even as early as 2;1 (Inuktitut - Allen & Crago, 1996; Quiche Mayan - Pye & Quixtan Poz, 1988).

In our data, we see productive use of the passive in children at the earliest previously-reported age – 2;1 – and this may be an overestimate (in other words older than the true age at which children may produce passives), given our limited speech samples available from younger children learning these languages. This age is also likely to be an overestimate since it is taken from the two more conservative measures of productive use, rather than from Brown's (1973) measure of use in obligatory context. Apart from one doubtful phonological error, made by an older child (where a younger child already was seen to use passives productively), no child failed to use passive correctly where the context required it.

Other features of the passive in languages in which it is acquired early have been cited as reasons for early acquisition. Suzman (1987) suggested that concrete, actional

verbs coding situations in which the patient is physically affected, as in Zulu, may drive acquisition of the passive. In our data set we find that in both input and children's production a significant proportion of passives are not actional. The verb *itwa/ifwa* ("be called" in Kiswahili/Kigiriama) is very common in both input and output, and it is also used in the active in the sample (suggesting it is not just a formulaic passive).

Other non-actional verbs were also produced by both young children and their interlocutors, including *ambiwa* ("be told") and *hukanwa* ("be told off"). Also observed was *andikwa* ("be written"); Pye and Quixtan Poz (1988) suggest "write" is non-actional.

Demuth (1989) examines structural features of Sesotho which may lead to early acquisition of passives, but some of these (for example, the ungrammaticality of question words in subject position) do not apply to Eastern Bantu languages. Allen and Crago (1996) appeal both to frequency in the input and to the sometimes more complex nature of the active construction in Inuktitut to explain early acquisition of the passive. Again, the agreement features found in Inuktitut passives and actives cannot fully explain early use of the passive in the Eastern Bantu languages.

Our data suggest that it is indeed the high frequency of passives in input that young children hear which is important in determining whether or not they produce such verbs, and that the input to individual children is also relevant. We found individual differences in the proportion of verbs that were passive in both adult and

child usage. Interestingly, within this group of languages we found some significant positive correlations between the proportion of verbal utterances children hear containing a passive and the proportion that they produce. However, the sample size is small, the same data collection methods were not used on all language samples, and full data for every passive and active verb in the input are not available from the Nairobi sample, so this finding remains merely indicative rather than conclusive for the moment.

It is still possible, however, that aspects of the structure of the passive in the Eastern Bantu languages also help children to learn to produce the passive. It is difficult to quantify how relatively "difficult" particular constructions are in different languages. Allen and Crago (1996) compare the numbers of agreements required for different constructions. Brown (1973) suggested that the phonological realisation of a construction is not important in determining rate of acquisition, since constructions with the same phonological realisation can be acquired at different rates. However, other authors (Demuth, 2001; Leonard, 2001) have subsequently hypothesised that the phonological realisation of morphemes also plays a genuine role in the ease of their acquisition. It may therefore be possible that phonological aspects of the passive in these languages also aid in their acquisition.

Alternatively, one might attempt to quantify the transformations needed to change an active sentence to a passive sentence. Arguably the grammatical

transformations in forming passive from active should be the same in these languages and English (Demuth, 1989). In fact, since in Bantu languages there are no adjectival passives, very early production of passives cannot be due to use of a grammatical mechanism other than argument chain formation, the reason previously suggested for late appearance of verbal passives as opposed to adjectival passives by Borer and Wexler (1987).

Recent data (Hirsch & Wexler, 2004) continue to suggest that action passives may differ from non-action passives in the timing of acquisition.  Again, our data disconfirm this hypothesis, showing in contrast, and in agreement with subsequent work (Gagarina, 2007), that the proportion of a construction in children's first productions is in line with the proportion that they hear, and can also explain differences between children learning the same language (Bohnacker, 2007). Children are producing non-action verbs in passive form at an early age, also, and this is backed up by further data suggesting this can be mirrored in comprehension (O'Brien, Grolla, & Lillo-Martin, 2005).

*Conclusion*

We found that two- and three-year-old children were able to use passive verbs productively in appreciable quantities, when they heard those verbs in the input. Any maturational account of the production of passives cannot predict this; instead we must turn to frequency-dependent accounts.   Frequency is not *per se* a mechanism by which

children acquire features of their language, and does not explain all aspects of its acquisition; however, increased frequency of hearing a construction makes that construction more likely to be acquired, and more likely to be acquired early.

Children could be simply repeating the verbs they hear immediately prior to their own production. However, not all the passives produced were simply repetitions of input – only 12% of passives were repetitions of adult productions of the same verb where the same morphology was attempted or produced. In fact, 24% of adult or older child passives were repetitions, many of them repetitions of the target child's productions – though it is often assumed that repetitions artificially inflate the productions of child language learners, here we see that adults and older children can rely heavily on repetitions when interacting with young language learners.

Here we looked at production of passives. Comprehension of the passive is also challenging for young, English-speaking children, as well as for some adult native English speakers (Dabrowska & Street, 2006). In the case of children, comprehension can also be improved experimentally if children's exposure is enhanced at an age when ordinarily children would not have good passive comprehension, as has been shown by Whitehurst, Ironsmith, and Goldfein (1974) with four- and five-year-olds, and Vasilyeva et al. (2006) with four-year-olds. In the case of adults, comprehension seems to depend on exposure to written materials using passives, or on direct instruction.

Further research is called for into both comprehension and production of

passives by younger children learning a variety of languages, and by adults with a variety of language experience. However, it seems likely that our findings from these two languages will be replicated – that high frequency in child-directed speech is a necessary, and likely sufficient, condition for early learning of the passive.

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Table 1

Ages and genders of children in each language group. Mean, minimum and maximum

age are shown in years;completed months; s.d. is shown in decimal form.

| Group | Mean age | Minimum age | Maximum age | s.d. | Number of girls, boys |
|---|---|---|---|---|---|
| Kigiriama | 2;9 | 2;4 | 3;4 | .42 | 2, 2 |
| Kiswahili (Coast) | 2;7 | 2;1 | 2;11 | .28 | 2, 5 |
| Kiswahili (Nairobi) | 2;5 | 1;11 | 2;11 | .42 | 2, 2 |

Table 2

Descriptives for passives produced by children [adults] from each language group.

Figures show mean (s.d.) for children, [mean, s.d. for adults]

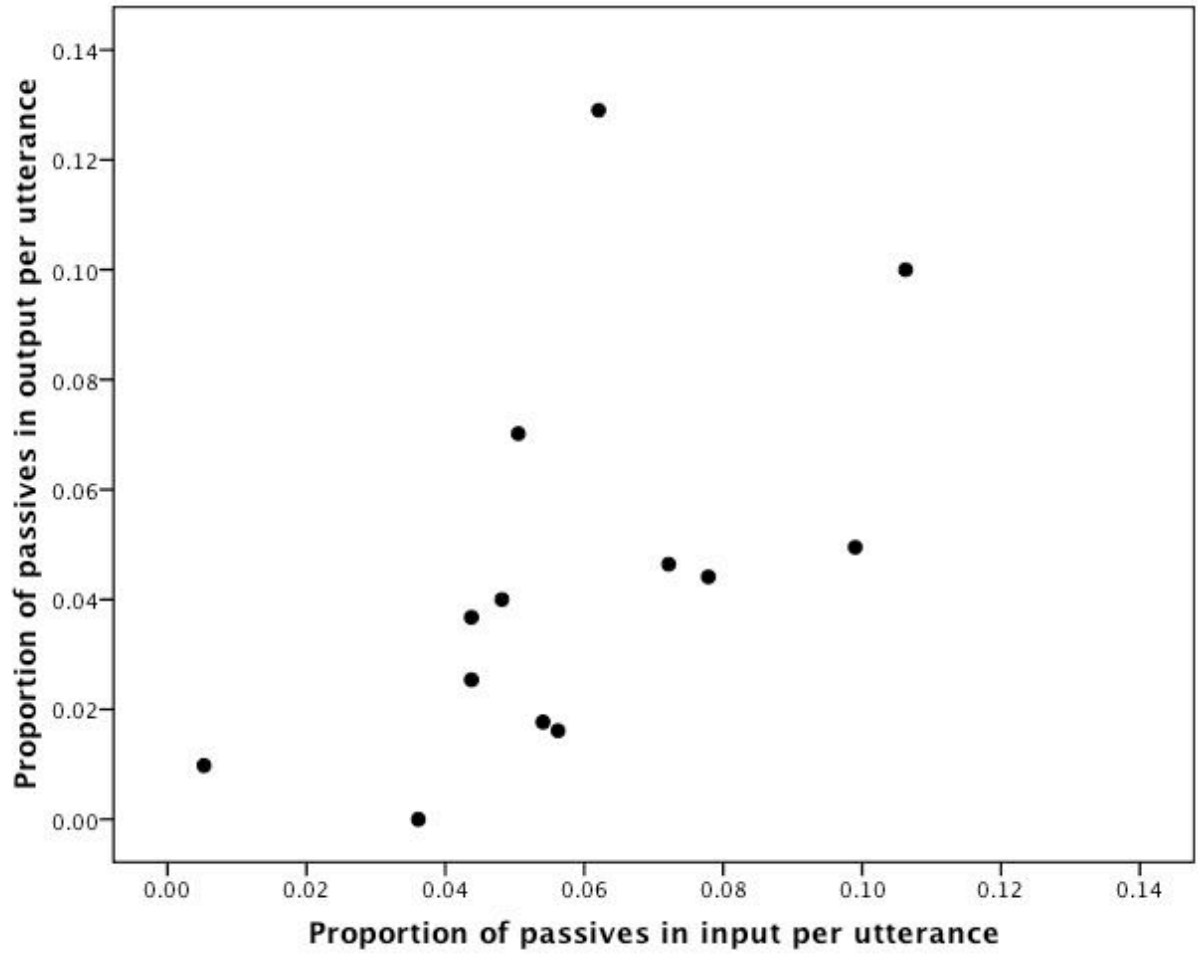| Measure | Kigiriama | Kiswahili (Coast) | Kiswahili (Nairobi) | All data |
|---|---|---|---|---|
| Proportion of indicative utterances containing a passive | .048 (.050) [.073, .035] | .054 (.042) [.062, .019] | .030 (.016) [.041, .027] | .045 (.037) [.058, .027] |
| Proportion of indicative utterances containing a non-repetitive passive | .061 (.085) | .074 (.054) | .078 (.089) | .072 (.064) |
| Earliest occurrence of a passive | 2;10 | 2;1 | 1;9 | 1;9 |
| Earliest productive occurrence of a passive (by any single criterion) | 2;10 | 2;1 | 2;1 | 2;1 |

| | | | | |
|---|---|---|---|---|
| Proportion of passives that are non-actional | .83 (.24) | .13 (.21) | .49 (.25) | .36 (.35) |
| Example of productive passive with same verb in active form produced by same child | *Japewa mukoba* I have been given a bag *Mpe amarigize* Give her so she finishes up | *Angalia yule Ibrahim yuapigwa.* Look at him Ibrahim he is being hit *Akupiga wapi?* Where did he hit you? | *Ye lipigwa* He was hit *Taipiga* I will hit it | |
| Example of actional passive | *Jadumba* I have been injected | *Haya ona baba andikwa* OK look daddy it is written | *Navaalishwa* I am being dressed | |

| Example of non-actional passive | *Faambiywa ni ho fushiupige* We are being told by Grandma we shouldn't kick it | *Yuaitwa na mamake basi.* She is being called by her mother, OK | *Tafa unaitwa* Tafa you are being called |
|---|---|---|---|

Figure captions
*Figure 1* – Scatter plot of passives in input and output

Figure 1

Appendix 1

All non-repetitive verbs produced in passive by children. Verbs are given in root form with indicative (-a) suffix.

| Language | Verb | English translation | Number of utterances with verb | Coded as actional or non-actional |
|---|---|---|---|---|
| Kiswahili (both locations) | *pigwa (picha)* | to be beaten/hit (but *pigwa picha* = "to be photographed") | 9 (4) | Actional |
| | *zaliwa* | to be born | 1 | |
| | *kimbiliwa* | to be chased | 5 | |
| | *tafunwa* | to be chewed | 2 | |
| | *fungwa* | to be closed (in) | 2 | |
| | *katwa* | to be cut | 1 | |
| | *valishwa* | to be dressed | 1 | |
| | *pewa* | to be given | 2 | |
| | *shikwa* | to be grabbed | 2 | |
| | *umwa* | to be hurt | 3 | |

| Language | Verb | English translation | Number of utterances with verb | Coded as actional or non-actional |
|---|---|---|---|---|
| | *funguliwa* | to be opened/let out | 1 | |
| | *dungwa* | to be pierced or injected | 5 | |
| | *wekwa* | to be put | 1 | |
| | *pandishwa* | to be put up | 1 | |
| | *ibwa* | to be stolen | 1 | |
| | *ibiwa* | to be stolen from | 2 | |
| | *kanyagwa* | to be stepped on | 2 | |
| | *pelekwa* | to be taken (somewhere) | 2 | |
| | *tunguliwa* | to be taken apart | 1 | |
| | *jiwa* | to be visited | 1 | |
| | *andikwa*\* | to be written | 4 | |
| | *itwa* | to be called | 27 | Non-actional |

| Language | Verb | English translation | Number of utterances with verb | Coded as actional or non-actional |
|---|---|---|---|---|
| | *ambiwa* | to be told | 2 | |
| Kigiriama | *pewa* | to be given | 3 | Actional |
| | *dungwa* | to be pierced or injected | 2 | |
| | *ambirwa* | to be told | 1 | Non-actional |
| | *hukanwa* | to be told off | 1 | |

*Although Pye and Quixtan Poz (1988) suggests "write" is non-actional, and it is included above in the list of possible non-actional verbs, for all other purposes it has been included in the "actional" category.

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Endnote

1 This example taken from Demuth (1989). In the Bantu examples in this paper:

SM indicates subject marker, with numbers following indicating noun class or person agreement

PRF indicates perfect tense marker, PAST simple past tense marker

OM indicates object marker, with numbers following indicating noun class or person agreement

PASS passive marker, APPL applicative marker

M final tense marker, IND final indicative marker