The Acquisition of Swahili Verbal Morphology

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Abstract
Recently, much attention has focused on the so-called Root Infinitive(RI) phenomenon, where children in languages such as German use infinitival verbs in root context, seemingly optionally. English has been argued to be an RI language (Wexler 1994), though English speaking children use bare stems instead of infinitives. Languages such as Italian, however, have been shown not to exhibit RIs in early child language. I present results from a study of Swahili, a Bantu language with rich agglutinative morphology. Swahili is an SVO language in which the verbal clause has the following order of morphemes in an affirmative indicative sentence: Subject Agreement – Tense/Aspect – (Object Agreement) – Verb Root – (derivational suffixes) – Mood Vowel. If we assume that the linear order of morphemes is a reflection of the hierarchical order of heads (Baker's (1985) Mirror Principle), then the morphology of Swahili allows us to test various theories of the dropping of functional morphemes. The speech of four Swahili speaking children ranging in age from 1;8 to 3;1 was recorded in Kenya, transcribed in the CHAT format and coded. The results show that Swahili children do not produce RIs, but do omit Agr and T/A markers. Thus the verb may surface with a Person agreement marker alone, a T/A marker alone, or neither Person nor T/A. In the latter case the verb appears as a bare stem, analogous to what we find in English. These results are discussed in the light of various theoretical analyses of RIs, specifically the Metrical Omission Model (Gerken, 1991), the Small Clause Hypothesis (Radford 1986; Radford 1990), Rizzi's (1994) Truncation hypothesis, Wexler's (1994) underspecification of tense theory, Hoekstra & Hyams' (1998) underspecification of number theory, and Schütze & Wexler's (1996) ATOM model. The basic clause typology is found to be most compatible with ATOM, although ATOM fails to account for many of the details in the data.

1. Introduction

Children acquiring certain European languages go through a stage in which they use infinitival verb forms in root context. This stage, called the Root Infinitive Stage, or the Optional Infinitive Stage, is characterized by the optional use of utterances such as the those in (1). This phenomenon has been heavily studied in several languages, most notably German (1a. and b., from Poeppel & Wexler (1993)), Dutch (1c. and d., from Weverink (1989)), and French (1e. and f., from Ferdinand (1996)).

(1) a. Zahne putzen
teeth brush-inf.
' (Someone) brushes (his) teeth.'

b. Thorstn das haben
Thorstn that have-inf
' Thorstn has that.'

c. Papa schoen wassen
daddy shoes wash-inf.
' Daddy washes (the) shoes.'

d. Ik ook lezen
I also read-inf.
' I also read.'

e. Michel dormir là
Michel sleep-inf there
'Michel sleeps there'

f. 'Tasha ouvrir
Natasha open-inf.
'Natasha is opening/ going to open/wants to open it.'

Wexler (1994) argues that English children also produce RIs, just like their German, Dutch and French counterparts. He shows that although they do not produce *infinitives* per se, they produce bare verbs (2), which are missing all obligatory inflectional affixes. Wexler argues that these forms are the English corollary of RIs.

(2) a. Teddy cry
'Teddy is crying'

b. Eve sit floor
'Eve is sitting on the floor'

Interestingly, children acquiring Italian (or Spanish or Catalan) do not to go through this stage (Grinstead 1998; Guasti 1993/1994). Instead, Italian children, for example, seem to converge on the adult grammar extremely early with respect to this phenomenon. This is surprising since Italian, unlike English, does have a true infinitive. Thus European languages can be classified into two groups: root infinitive languages and non-root infinitive languages. Root infinitive languages can further be divided into true RI languages and bare verb languages. Note that the only well-studied language that fits into the bare verb category is English.

(3)

Root infinitive languages		**Non-root-infinitive languages**
True RIs	Bare Verbs	
German, Dutch, French, Swedish, Russian, etc.	English	Italian, Spanish, Catalan, etc.

This typology of languages is a problem in our field. What is the cause of this typology and how do other languages fit into this typology? Part of the problem is that relatively little is known about children acquiring

non-European languages. The goal of this paper is to broaden the inventory of languages that is used in developing acquisition theory, and show that limiting our focus to the well-known European languages leads to conclusions which do not truly reflect the constraints on child language. I will present results from a longitudinal study of four Swahili speaking children. I will first outline some important features of Swahili, and then present results showing how Swahili children use verbal morphology. I will show how Swahili fits into the typology in (3), and discuss the difficulties these data pose for several influential theories of early child language : the Metrical Omission Model, the Small Clause Hypothesis, the Truncation Hypothesis, the Underspecification of Number Hypothesis, the Underspecification of Tense Hypothesis, and ATOM (Agr-Tense Omission Model). I will show that while the data are most compatible with ATOM, the complexity of the Swahili data can not be accounted for by any single theory proposed thus far.

2. Swahili

Swahili is an eastern Bantu language spoken primarily in Tanzania, Kenya, Uganda and neighboring areas. The dialect of Swahili in this study is that spoken in and around Nairobi, the capital of Kenya. It is an SVO language; the subject and the object may be optionally null. The verb occurs in a verbal complex which contains inflectional material as well as grammatical function changing suffixes.

(4)	**Subject -**	**Verbal complex -**	**Object**
	Optionally null	Contains inflectional and derivational material.	Optionally null

Most verb roots in Swahili are monosyllabic and contain a single vowel, but as the table in (5) shows, other verb root structures are not uncommon. The final vowel in the examples in this table are the obligatory final vowel in Swahili, without which the verb cannot surface. Each example has the indicative final vowel.

(5)

C	p-a	to give
VC	iv-a	to become ripe, mature
CVC	pig-a	to hit
CVCC	shind-a	to win
VCVC	azim-a	to borrow, lend
VCC	imb-a	to sing
VCCVC	anguk-a	to fall

The verb is embedded within a verbal complex, the structure of which is given in (6). I will briefly describe each element in this complex, except for the optional derivational suffixes, which are not relevant to this discussion.

(6) Subject – Tense – Object – Verb–suffixes– Mood

Agr.		Agr.		
(SA)	(T)	(OA)	(V)	(M)

Subject agreement marks person and number as shown in (7), and there are several tense/aspect markers, given in the table in (8).

(7) SA Paradigm[1]

(mimi)	**ni**lianguka	1st, Singular	' I fell.'
(wewe)	**u**lianguka	2nd, Singular	' You fell.'
(yeye)	**a**lianguka	3rd, Singular	' He/She fell.'
(sisi)	**tu**lianguka	1st, Plural	' We fell.'
(ninyi)	**mu**lianguka	2nd, Plural	' You all fell.'
(hawa)	**wa**lianguka	3rd, Plural	' They fell.'

(8)

Morpheme	**Meaning**
li	past perfective
na	present on-going/habitual
ta	Future
ka	Narrative
me	present perfect
sha	present perfect completive
ki	habitual, conditional
ng/nga	hypothetical
ku	infinitival

Object agreement also marks person and number, but unlike Subject Agreement, is optional. The optionality of Object Agreement is dependent on the intended interpretation of the direct object – if the direct object is specific, Object Agreement is obligatory, and if the Direct Object is non-specific, Object Agreement is obligatorily absent. Because of this optionality and the complications it poses, I will only discuss Subject Agreement, Tense and Mood in this paper.

Mood is marked as a suffix, and is always the final vowel in the verbal complex. This final vowel alternates three ways between the indicative [a], the subjunctive [e] and the negative [i]. The indicative final vowel occurs with on-going actions/states, present habitual actions, past actions/states, future actions/ states, imperatives, etc. The subjunctive is used to express desires, possibility, necessity, requests, etc. Primary stress in Swahili is on the penultimate syllable of any multisyllabic word (Ashton 1947; Maw and Kelly 1975; Myachina 1981; Vitale 1985). Thus in a

disyllabic verb, the stress falls on the first syllable of the stem, as in (9). Furthermore, secondary stress usually falls on the subject agreement marker.

(9) ni - li-m-fuat-a → nìlimfuáta
SA- T-OA-V – IND
'I followed him'

Examples are given in (10). (10a) is a transitive indicative sentence. The subject is Juma and the object is Mariam, both proper names. The verbal complex shows 3rd person singular subject agreement with Juma, contains the past tense 'li', and 3rd person singular object agreement with Mariam. The verb root 'fuat' is followed by the Indicative final vowel 'a'.

(10)
a. Juma alimfuata Mariam
Juma a – li – m – fuat – a Mariam
Juma SA_{3sg}-past-OA_{3sg}-follow-IND Mariam
'Juma followed Mariam'

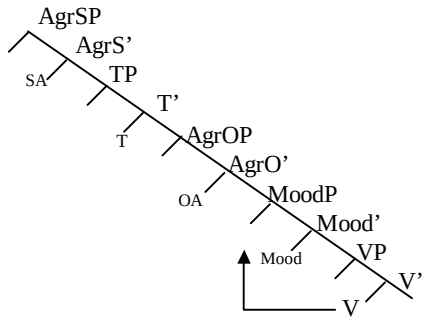
b. Tafadhali nipatie kalamu
Tafadhali ni – pat – i – e kalamu
Please OA_{1sg}-give-applic-SUBJ pen
'Please give me a pen'

c. Anataka kufua dafu
A – na – tak – a ku – fu – a dafu
SA_{3sg}-pres-want-IND INF-husk-IND coconut
'He wants to husk a coconut'

d. Soma!
Som-a
Read-IND
'Read!'

(10)b is a polite request using the subjunctive final vowel. When the subjunctive final vowel is used, quite expectedly, the tense marker is absent. (10)c is an example of a complex sentence, with an embedded infinitive. Note that the Swahili infinitive marker is a prefix which occurs in the same position as other tense markers in tensed clauses. The final example is an imperative form, which is a bare stem, that is, the verb root plus an indicative final vowel.
Following Chomsky (1993) and Pollock (1989), and further following Demuth & Gruber (1995) who analyze Sesotho, a southern Bantu language in a similar manner, I assume a structure for Swahili as in (11). The verb raises to Mood, with all else being base generated in their respective projections[2].

(11)



3. The Data
Turning now to the acquisition data, the data collection was conducted over a period of 11 months in Nairobi, Kenya. Biweekly recordings were made of naturalistic speech in the homes of four children of differing ages. The data were audio recorded and transcribed using CHAT format (MacWhinney & Snow, 1985). Because of various social and economic difficulties, it was not possible for all four children to remain in the study for the duration of the project. The table in (12) provides the basic descriptive facts about each child.

(12)

Child	Age range	No. of recordings	MLU
Haw	2;2 – 2;6	7	1.54–2.46
Mus	2;0 – 2;11	23	1.52–3.57
Fau	1;8 – 2;2	10	2.97–3.93
Has	2;10 – 3;1	5	3.15–4.23

Because of the complexity of the data and because naturalistic data is notorious for showing great fluctuations between individual data points, we pooled the data in order to stage the children relative to each other. We did not want to use age as an indicator of grammatical development as this is unreliable. Similarly MLU by itself has been noted to have several drawbacks (see Valian 1991). Therefore a composite method was used to stage the children, the criteria for which are given in (13).

(13) a. MLU
b. Verbs/Total Utterances (Valian, 1991)
c. Percent of proto-syntactic place holders (Bottari, Cipriani, and Chilosi 1993/1994)

According to these three criteria, four stages were identified, with the files from each child being assigned accordingly, shown in (14). Throughout the rest of this paper, for ease of exposition, I will be using this staged data rather than data from the individual children.

(14)

Stage	Files	No. of Verbal Utterances
1	Haw 1-7, Mus 1-12	693
2	Mus 13-19	535
3	Mus 20-23, Fau 1-10	925
4	Has 1-5	518

Recall that children in other languages such as English omit certain obligatory inflectional elements. Given this, we might expect Swahili children to do the same. Focusing only on the prefixes, and ignoring Object Agreement because of the complications discussed earlier, there are several logically possible clause types that Swahili children might produce. These, along with my terminology for them, are listed in (16).

(15) a. SA-T-V-IND Full Clause
b. Ø-T-V-IND [-SA] Clause
c. SA-Ø-V-IND [-T] Clause
d. Ø-Ø-V-IND Bare Stem
e. INF-V-IND RI

(15)a. is a full clause, which contains both Subject Agreement and T. (15)b. is a [-SA] clause, containing tense, but missing subject agreement. (15)c. is a [-T] clause containing Subject Agreement but missing tense, and (15)d. is a bare stem, which is missing all prefixes. Let me be clear here on a terminological point: the term 'bare stem' is used to refer to a verb root plus an indicative final vowel. Other prefix-less verbs also occur in child (and adult) Swahili, namely subjunctive clauses. These are not discussed in this paper[3], although see Deen & Hyams (2001) for details on subjunctive use in Swahili child language. Additionally, it should be noted that bare stems in Swahili are different from bare verbs in English, the latter showing a total absence of inflection, while the former show mood marking. Returning to the possible clause types in (15), putting aside theories of agreement, root infinitives, and theories of infinitives for the moment, and given that Swahili has an infinitive morpheme, root infinitives should be possible in child Swahili.

The verbal utterances in the Swahili corpora were examined using COMBO commands from CLAN (MacWhinney & Snow, 1985), excluding imperatives, imitations, repetitions and non-indicative utterances. The results are presented in (16). Interestingly, all five possible clause types are attested, although in varying proportions.

(16)

Stage	1	2	3	4
Full Clause	18% (39)	20% (58)	51% (235)	60% (225)
[-SA] Clause	29% (60)	52% (154)	36% (166)	28% (104)
[-T] Clause	20% (42)	8% (25)	5% (21)	7% (26)
Bare Stem	32% (67)	19% (55)	7% (34)	4% (15)
RI	0.9% (2)	1% (3)	0.9% (4)	1.8% (7)
Total	210	295	460	377

Examples of each clause type are given in (17). Example (a) is a full clause which is adult-like and fully grammatical. Example (b) is a [-SA] clause, that is, it is missing the subject agreement marker, but has a tense marker, in this case a future tense marker. Example (c) is a [-T] clause, that is, it is missing a tense marker, but has subject agreement. Example (d) is a bare stem missing all prefixes, and example (e) is an RI.

(17)

(a) u-na-shik-a taa (Fau, 1;9)
SA_{2S}-T- V -IND light Full Form
adult form: u-na-shik-a taa
'you are holding a light.'

(b) ta- tap-a (Mus, 2;1)
Ø – T – V – IND [-SA]
adult form: ni-ta-chap-a
'I will slap (you).'

(c) a - timam-a hapa (Mus, 2;1)
SA_{3S}-Ø –V – IND here [-T]
adult form a-me-simam-a hapa
'He has stood up here.'

(d) lal-a tini (Mus, 2;4)
Ø-Ø-V-IND down Bare Stem
adult form: ni–na–lal–a chini
'I am lying down (here)'

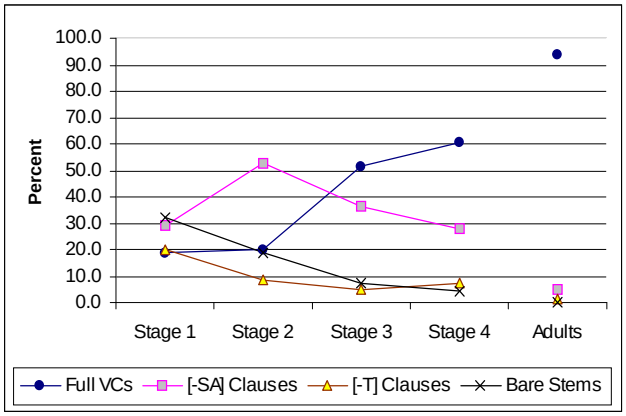
(e) ku-chez-a (Has, 2;11)
INF- V – IND RI
adult form: ni-ta-chez-a
'I'm going to play.'
(although, the child could have intended 'I want to play'…)

Note that while RIs are attested, they are exceedingly rare (16/1342 = 1%). In fact, the rate of RIs in Swahili is even lower than that reported for languages such as

Italian (for which some report rates as high as 16%, e.g., Guasti (1993/1994); see Sano (1995) for a review of proportions of nonfinite clauses in various languages). This lack of use of the infinitive cannot be attributed to the fact that the Swahili infinitive is a prefix (as opposed to a suffix) because other inflectional prefixes are used. Thus, with respect to the typology of languages in (3), Swahili falls into the same category as English: it is a bare verb language, not a true RI language. Swahili provides us with another example of a bare verb language, making English no longer unique in this respect. As for the remaining four clause types, I have plotted their various proportions in a line graph, given in (18).

We see from (18) that in stage 1, all four clause types are produced at or above 18%. [-SA] clauses and bare stems are more frequent than [-T] or full clauses, but not significantly so. In stage 2, [-SA] clauses increase, as do full clauses, but bare stems and [-T] clauses decrease significantly. In fact, by stage 2, [-T] clauses occur at a rate of less than 10%. By stage 3, full clauses become the most prevalent form, followed by [-SA] clauses. Bare stems fall below the 10% mark, as [-T] clauses drop to 5%. This trend continues in stage 4, with the relevant proportions approaching adult norms. The only significant difference between adults and children in stage 4 is the proportion of [-SA] clauses, which is almost 30%. This points to a very clear difference in the grammar of Swahili children between [-SA] clauses on the one hand and [-T] and bare stems on the other. The latter clause types cease to be a possibility relatively early and fade out rather rapidly, while [-SA] clauses remain a possibility even into stage 4.

(18)



It should be noted that while subject agreement and tense are used optionally, when they are used errors are extremely rare. In all the verbal utterances included in (16), there were a total of 9/1342 errors: less than 1%.

So the errors that we see in child Swahili are errors of omission, not errors of commission. This is entirely in line with what we know of other languages.

4. Discussion

These results are intriguing in many respects. They show a clear developmental trend in the use of the inflectional prefixes in Swahili, the likes of which we have not seen in any language studied thus far. There have been several theories accounting for children's omission of inflectional material and use of RIs, mostly based on languages which lack independent marking of SA and T. I will now use this Swahili data to evaluate several of the more prominent theories.

The first is a metrical model of omission, first proposed by Gerken (1991), and later developed in Gerken & McIntosh (1993) and adapted for Sesotho by Demuth (1994). Gerken found that English children are more likely to omit weak unstressed syllables in iambic feet as in (19), or weak unstressed syllables preceding trochaic feet (as in 20), but not the weak unstressed syllables within trochaic feet (as in 21).

(19) Within Iambic foot: [W S]
↑
Subject to drop

(20) Pre-Trochaic: W [S W]
↑
Subject to drop

(21) Within Trochaic: [S W]
↑
Not subject to drop

This, she claims, accounts for the omission of determiners and other unstressed functional material in English. Demuth (1994) applies this theory to the omission of noun class marking in Sesotho, and suggests that it may also explain the omission of verbal prefixes. However, the Swahili data are incompatible with a simple metrical model. Recall that stress in the Swahili verbal complex is always on the penultimate syllable, and secondary stress in the verbal complex usually falls on the subject agreement marker. Taking as an example (22),

(22)	u-me-fik-a	[ù-me][fí-ka]
	SA_{2S}-T-V-IND	[S-W] [S-W]
	'you have arrived.'	

a leftward parsing of the string produces a trochaic foot on the right edge containing the verb and the mood final vowel. Since most verb stems in Swahili are disyllabic, this is the most common pattern. Furthermore, the Subject Agreement and Tense prefixes are analyzed

together as a trochaic foot , yielding two trochaic feet. According to the Metrical Model, in cases such as (22) when the verb stem is disyllabic there should be no omission. If we now consider trisyllabic verb stems such as in (17)c, repeated as (23):

(23) a-me-simam-a [à-me]-si-[má-ma]
SA_{3S}-T-V-IND loc [S-W]-W -[S-W]
'He has stood up here.'

we see that the rightmost trochaic foot includes the second syllable of the verb stem and the mood final vowel. The first syllable on the verb stem forms extrametrical information, and so should be subject to omission. However, crucially, the subject agreement and tense markers form a trochaic foot, and should not be subject to omission[4].

The vast majority of verbs produced by the children in this corpus were disyllabic or trisyllabic, and so a metrical account falls short of explaining the omissions. Furthermore, children tend to center on the verb stem and produce the verb stem correctly, irrespective of syllabic structure[5]. What they seem to have problems with more than anything are the inflectional prefixes. Metrical theory cannot account for this specific inflectional deficit.

Several researchers (such as Radford (1986), Lebeaux (1988); Guilfoyle & Noonan (1988), etc.) looking mostly at English speaking children's bare verbs and omission of determiners have proposed that very young children lack functional structure entirely. Given the Swahili structure in (11),we expect Swahili speaking children to produce no prefixes and no mood final vowel. However, interestingly, Swahili children never omit the final mood vowel. Furthermore, from the earliest stages they use the final vowel appropriately. This dichotomy between Subject Agreement and Tense on the one hand and Mood on the other is evidence which a No Functional Structure Hypothesis simply cannot accommodate. Furthermore, such a hypothesis does not account for the differential omissions of the various prefixes as shown in (18).

Similarly, a theory that claims a single functional projection above VP, such as that proposed by Clahsen *et al.*(1996) in which there is a single unitary inflectional projection which later splits into two or more projections, predicts that Swahili children should use one and only one prefix at any one time. However, as we saw in (18), Swahili children produce full clauses which contain both Subject Agreement and T. Furthermore, they produce bare stems, which contain neither Subject Agreement nor T. This is not predicted by such a theory.

Let us turn now to a Truncation-type hypothesis such as that proposed by Rizzi (1994), and subsequently by others. Such a hypothesis claims that the adult axiom of CP=root has not developed in young children, and so they can optionally choose to specify the root as some lower projection in the tree. When AgrOP, for example, is specified as the root, then everything above AgrOP is omitted, and if TP is specified as the root, everything above TP is omitted. This theory predicts that nothing from the middle portion of the tree will be omitted. For Swahili it predicts that children may produce full clauses (that is, no truncation because the root is CP or AgrSP), they may produce [-SA] clauses (when the root is TP), they may produce Bare stems (when the root is either AgrOP or MoodP), or they may produce Bare Verb Roots (when the root is VP).

(24) Predictions of Truncation for Swahili:
a) Full Clauses Root = CP or AgrSP
b) [-SA] clauses Root=TP
c) Bare Stems Root=AgrOP or MoodP
d) Bare Verb roots Root=VP

As mentioned earlier, verbs missing the final mood vowel are unattested in child Swahili, and so (24) d is problematic for truncation. This *could* be accounted for by postulating a lower limit to truncation, although no such proposal exists for any other language that I am aware of. However, a much more serious problem for truncation is the [-T] clauses. These are problematic because they contain material from low in the tree and material from high in the tree, but are missing material from the middle portion of the tree – precisely what Truncation rules out.

In addition to these theories, there have been several theories of underspecification which attempt to account for RIs. One such theory was proposed by Hoekstra & Hyams (1998), in which they propose that only number is optionally underspecified in the grammars of young children. With number underspecified, children acquiring number-marking languages such as Dutch or English use an infinitival form or a bare stem respectively. Languages such as Italian are person marking languages, and so do not exhibit RIs or bare verbs. According to their definitions, Swahili is a person marking language, and so an underspecification of Number theory predicts that Swahili children should not omit any functional elements. This is clearly not borne out in the data.

A second underspecification theory is that proposed by Wexler (1994), in which tense is underspecified. However, such a theory predicts that only tense should be omitted, while we see that in Swahili agreement is also omitted.

The final underspecification theory I will consider is proposed by Schütze & Wexler(1996) and in more detail in Schütze (1997). They claim that children can

optionally omit either Agr, tense, both or neither. This model, called ATOM (Agr-Tense Omission Model) predicts that Swahili children may produce full clauses, [-SA] clauses, [-T] clauses and bare stems, as shown in (25).

(25)

ATOM possibilities		Swahili Result
[+Agr, +T]	→	full clause
[-Agr, +T]	→	[-SA] clause
[+Agr, -T]	→	[-T] clause
[-Agr, -T]	→	Bare stem

ATOM appears to make the correct predictions with respect to the various possible clause types, but several questions remain. For example, how does this model account for the differing proportions of the four clause types? Specifically, what accounts for the difference between [-SA] clauses on the one hand and [-T] clauses and bare stems on the other? Secondly, Swahili children have shown that they *do* underspecify Agr and T, and Swahili does have an infinitive marker, but why do Swahili children produce bare verbs like English children and not root infinitives like German children? Finally, since Swahili is a null subject language which has rich person agreement, why does it not pattern like Italian? ATOM does not answer these questions, and so while the basic range in clause types is predicted, the details in the data remain unexplained.

5. Conclusion

Unlike other European languages which either mark just one inflectional property, or conflate several properties into a single head, Swahili marks Subject Agreement and Tense individually on independent morphological heads. Because of this characteristic, Swahili offers us a new window into child language, revealing several interesting facts. First, we see that children may optionally and independently omit Subject Agreement and Tense. Secondly, when inflectional material is used, it is overwhelmingly used correctly. This is not surprising, as this is a hallmark of child language. Third, RIs are unattested. This is somewhat surprising since Swahili does have an infinitive marker. One possible reason for this is that Swahili, like English, marks the infinitive as a prefix, and perhaps the position of the infinitive leads to a dropping of the infinitive prefix. However, since other inflectional prefixes are used in varying proportions, why would the infinitive be completely absent if Swahili were indeed an RI language?

Furthermore, despite Swahili being a pro-drop language with rich person agreement, bare verbal stems still occur. This is surprising given what we know about Italian and Spanish, where such verb forms do not occur. Finally, the mood final vowel is used correctly without omission from the earliest stages, a marked difference from other inflectional heads. This interesting fact will be the focus of Deen & Hyams (2001).

One conclusion we can draw from this study is that our previous understanding of the typologies in child language were overly simplistic and based on languages that confounded various inflectional properties. Languages like Swahili that mark inflectional heads distinctly can be enormously useful in our understanding of the development of child grammar and how inflection is used in their grammars.

Acknowledgments

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Notes:

[1] The paradigm given in the text is for animate (usually of classes 1 and 2) nouns. SA in Standard Swahili is somewhat more complicated in that it has a distinct SA system for each noun class. Nairobi Swahili, on the other hand, has a reduced SA marking system for inanimate nouns. The simplified view I have presented in the text is to avoid this complication, as it has no bearing on the issues in this paper. See Deen (forthcoming) for details.

[2] This is the structure and analysis that Demuth & Gruber (1995) propose for Sesotho. While such an analysis raises certain problems with the licensing of inflectional elements, I will continue to assume it for the purposes of this paper. For a more detailed analysis of Swahili, see Deen (1999) and Deen (forthcoming), chapter 2. See also Ngonyani (1996) for evidence of verb raising and the positioning of Mood in Swahili.

[3] The subjunctive occurs with a SA marker, but does not occur with T. Therefore, these clauses differ from [-T] clauses only in the final vowel. Methodologically, these pose a problem if we are trying to ascertain the nature of [-T] clauses, since it is possible that children are producing subjunctive forms with an incorrect final vowel. Apart from the fact that such errors of commission are extremely rare in child language in general, these clause types are very clearly distinguishable on the basis of context. Subjunctives very clearly indicate an irrealis-type meaning, while presumably, the [-T] forms should not since they are marked indicative. This interpretive difference was used as a criterion in counting, with all those utterances that could possibly be considered a subjunctive (due to their irrealis interpretation) excluded from these counts.

[4] A possible objection is that other parses are possible. However, there are two conditions which rule out other significantly different parses. First, every foot must contain one and only one strong syllable, limiting the string in (23) to

two feet. The first strong syllable (left-most) can only be parsed as trochaic, while the second foot can be parsed as either trochaic or iambic. However, the second principle rules out an iambic parse: as Gerken points out, children have a preference for the metrical pattern exhibited in the ambient language. So English children prefer trochaic feet (and will parse an ambiguous string as trochaic, not iambic) because adult English is a trochaic language. French children, on the other hand, prefer iambic feet because adult French is an iambic language. Adult Swahili is a trochaic language, hence children prefer trochaic feet. Therefore, the only possible parse is as shown in (23)

[5] One notable exception is the verb *anguka* meaning 'to fall'. More than one child produced on several occasions utterances with the verb in the form *ŋguka*. This not only is a bare stem, but the verb stem itself has been reduced. Such cases, I believe, allow for a metrical explanation.

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