

**On the 'Underspecification' of Functional Categories
in Early Grammars**

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Abstract

Children's early linguistic productions are typically characterized by the variable or null use of grammatical function items. These morphologically impoverished productions have frequently been interpreted as evidence for the rudimentary nature of early child grammars. Drawing on evidence from both English and Sesotho, this paper provides a sketch of a Metrical Model of Production that accounts for much of the reported omission and variability in children's early production of functional categories. The paper concludes that variable morphological 'underspecification' is largely a reflection of children's incomplete productive capacities rather than a lack of grammatical competence.

1.0 Introduction

It has long been observed that children tend to omit closed class grammatical function items in early speech (Bloom, 1970; Brown, 1973). These observations have taken on new importance with recent developments in linguistic theory, where determiners, complementizers, subject-verb agreement and auxiliaries are all classified as functional (as opposed to lexical) categories, heading their own projections (Abney, 1987; Fukui and Speas, 1985; Chomsky, 1988). Indeed, functional categories are seen to encapsulate many of the critical aspects of syntactic structure itself. That early stages of language acquisition apparently lack these grammatical function items has led some researchers to propose that children's early grammars are syntactically impoverished, initially being composed of only a VP (e.g. Guilfoyle and Noonan, 1989; Lebeaux, 1988; Radford, 1990). Others suggest that children may fluctuate between two competing structural representations, one with functional projections, the other without (e.g. Lebeaux, 1988). However, still others argue that children's early productions represent an incomplete picture of children's actual grammatical competence (e.g. Lee, Lust, and Whitman, 1990; Whitman, Lee and Lust, 1991; Demuth, 1992a). Although each of these different points of

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view stems from an understanding that Universal Grammar plays a critically important role in the acquisition process, each also offers a fundamentally different perspective on the nature of the acquisition process.

This paper focuses on the acquisition of functional categories, arguing that early child grammars are much richer and more fully developed than early child productions might suggest. It proposes that much of the null and variable occurrence of functional categories in early speech can be more accurately explained by appealing to *phonological* rather than *syntactic* aspects of children's developing grammars. Specifically, it demonstrates that the omission of functional categories such as determiners, subject pronouns and auxiliaries in English and Sesotho (a southern Bantu language) is actually *predicted* by the Metrical Model of Production outlined here. Furthermore, the model accounts for other omissions that purely grammatical accounts are unable to address.

The paper is organized as follows: Section 2. examines data from both English and Sesotho illustrating the gradual and variable acquisition of functional categories. Section 3. then discusses the problems that the acquisition of functional categories presents for maturational and 'simultaneous grammars' approaches to early grammars. Section 4. provides a sketch of the Metrical Model of Production, shows how it accounts for much of the English and Sesotho data, and extends it to account for other language data as well. Section 5. concludes by illustrating how an understanding of children's early production constraints is essential for determining the nature of Universal Grammar and the role it plays in the acquisition of syntactic structure.

2.0 The Variability of Functional Categories in Early Child Language

2.1 English Data

Brown (1973:271) chronicles the acquisition of grammatical morphemes by Adam, Eve, and Sarah, providing a summary of when these children reached the 90% criterion level of morpheme use in obligatory contexts. Adam and Sarah reached this stage at 3;6 years and 4;0 years respectively. Eve arrived much earlier, demonstrating 90% competence by 2;3 years.

There are several observations to be made about these findings. First, there is a 21 month gap in the attainment of the 90% criterion by Eve and Sarah (almost 2 years). A coherent theory of language acquisition that addresses the issue of functional categories must account for this type of individual variation. Secondly, Brown's 90% criterion entailed 90% appropriate use of grammatical function items in each of *three* successive recording sessions. In other words, each

of the children were using grammatical function morphemes to a variable degree *prior* to the achievement of the 90% criterion. This variability in the use of functional categories is reported in many studies of early child English (Bloom, 1970; Brown, 1973; de Villiers and de Villiers, 1973). The following typical examples from the auxiliary/tense domain are reported in Radford, this volume).

- (1a) We__ been there. We've been there. (Robert - 2;2 yrs.) (ex. 13a)
 (1b) That dress ___ not fit me. That dress doesn't fit me. (Betty - 2;9 yrs.) (ex. 12g)
 (1c) I ___ do it, I can. (Lisa - 2;10 yrs.) (ex. 23a)
 (1d) That ___ making noise, isn't it? (Gary - 3;0 yrs.) (ex. 31b)

The picture that emerges is not an 'all-or-nothing' use of functional categories, but rather one where the production of grammatical function items occurs in some contexts but not others, slowly becoming more systematically realized over time.¹

2.2 Sesotho Data

The variable use of functional categories is found in other languages as well. Bantu nouns are typically composed of a nominal stem, plus a noun class prefix (structurally equivalent to DET - cf. Carstens, 1991; Demuth, 1992a) that provides gender/class and number information (2).

(2)	<i>Noun Class Prefix + Nominal Stem</i>		
	se-	tulo	
	8-	chair	'chair'
	li-	tulo	
	9-	chair	'chairs'

¹ Interestingly, Radford (this volume) suggests that children who demonstrate variable use of tense morphemes have not yet acquired a TP, even though they 1) make productive use of past tense *-d* and present tense *-s* morphemes, complete with overgeneralizations, 2) tense mark auxiliaries (*have/be, do, modals*), and 3) show appropriate subject-aux inversion in questions and have post-auxiliary *not/n't* negation with tensed auxiliaries. Radford therefore assumes that a more consistent realization of functional morphology (90%?) is required to license the building of syntactic structure.

Demuth (1992a) notes that the early null or variable production of noun class prefixes in Sesotho and other southern Bantu languages is very similar to the reported early absence of determiners in English and other languages. A typical example of early variability in the production of noun class prefixes is given in (3), with the adult target in parentheses on the right (Demuth, 1988:309).

- | | | |
|-----|---------------------------|----------------------------------|
| (3) | <i>Child - H 2;1 yrs.</i> | <i>Adult Target form + gloss</i> |
| (a) | phoko | (ma-phóqo) |
| (b) | a-poko | 6-green corn stalks |
| (c) | ma-penke | 'green corn stalks' |

The examples in (3) represent this child's different tokens of the word *ma-phóqo* 'green corn stalks', all produced within the same recording session. The majority of this child's and other children's nouns at this time are prefixless, like that in (3a), only a few occur with shadow vowels (3b), and those with full prefixes (3c) are extremely rare. In other words, the large majority of Sesotho-speaking two-year-olds' nouns are missing the noun class prefix, or DET. Furthermore, this phenomena has been robustly documented in other southern Bantu languages ((Siswati - Kunene, 1979; Sesotho - Connelly, 1984; Demuth, 1988; Setswana - Tsonope, 1987; Zulu - Suzman, 1980, 1982, 1991; cf. Demuth, 1992b, for a review).

Sesotho noun class prefixes become more consistently produced around 2;6 years, and are generally well formed by the age of 3 (Demuth, 1988, 1992b). Interestingly, however, the agreement prefix on demonstratives and possessives shows up much earlier, as seen by the well formed underlined agreement prefixes in (4) (c.f. Connelly, 1984; Demuth, 1988:313).²

- | | | |
|-----|---------------------------|----------------------------------|
| (4) | <i>Child - H 2;1 yrs.</i> | <i>Adult Target form + gloss</i> |
| | kolo <u>sá</u> -ne | (se-kólo <u>sá</u> -ne) |
| | | 7-school 7DEM-that |
| | | 'that school' |

² Glosses are as follows: DEM = demonstrative, FUT = future tense, M = mood, OM = object marker, PERF = perfective aspect, PN = independent pronoun, POSS = possessive marker, PRES = present tense, SM = subject marker, 1 = gender/number class #1 = 3rd person, 1s = 1st person singular, ' = high tone, + = mid tone, low tone = unmarked. A modified version of Lesotho orthography has been used.

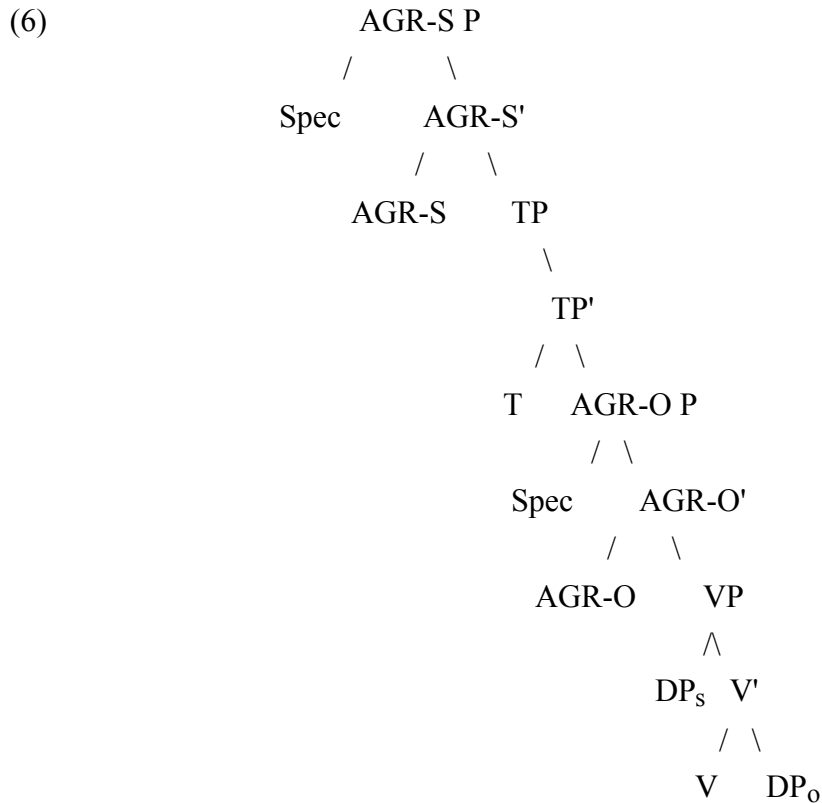
ponko lá-ne (le-phoqo lá-ne)
 5-green corn stalk 5DEM-that
 'that green corn stalk'

Examples like those in (4) show that children know the appropriate noun classes to which nominal stems belong, even when the noun itself surfaces with a null functional element. What remains to be explained is why the noun class prefix/DET is generally dropped, while the prefix on demonstratives is generally present.

Variability in the production of functional heads is also found in Sesotho IPs. Sesotho is an SVO language where both lexical subjects and objects can be dropped. A subject clitic is always obligatory, while an object clitic is obligatory only when the lexical object has been dropped or extraposed (i.e. is not adjacent to the verb) (Demuth, 1992b). The Sesotho IP is therefore composed of the following morphemes:

(5) SUBJ - TENSE - (OBJ) - VERB - MOOD
 bá- tlá- e- rék- a+
 2SM- FUT - 9OM- ask- M
 'They will buy it'

Following Chomsky (1988) and others, we propose that the base structure of Sesotho is that given in (6). The VP internal subject then raises to SPEC-AGR-S P, and the verb raises via head-to-head movement through AGR-O and T to AGR-S:



We propose, following standard assumptions for pro-drop languages, that Sesotho is similar to Italian in that *pro* is licensed in an A-position (SPEC-IP) under SPEC-head agreement with AGR-S. And, like Italian, *pro* is identified by 'rich' AGR.

The early Sesotho IP is typified by the collapsing of pre-verbal functional heads into one or two 'shadow vowels'. This appears to be typical of early stages of acquisition in other Bantu languages as well (Kunene, 1979; Demuth, 1992a, 1992b). Adult target forms appear in parentheses underneath the child's utterances.³

³ All Sesotho data included in this paper come from child H. and constitute part of the Demuth Sesotho corpus (see Demuth, 1992b, for discussion). Recordings were of spontaneous, naturalistic speech, coded with the assistance of the child's mother and grandmother, and incorporating the author's contextual notes.

- (7) (H - 2;1 yrs.)
- (a) a átá kumba kúmba
(ke-rát-á kumba-kúmba)
1sSM-like-M 9tape-recorder
'I like the 'tape-recorder'
- (b) a lahlíle
(ke-di-láhl-íl-e+)
1sSM-10OM-throw away-PERF-M
'I threw them away'
- (c) ta hâ:na
(ke-a-hán-a+)
1sSM-PRES-refuse-M
'I refuse'
- (d) áy shépa
(ó-a-sháp-a+)
1SM-PRES-lash-M
'S/he is lashing'

Here again we see variability in the production of functional categories: in (7a) the subject marker is reduced to a shadow vowel, while in (7b) both subject marker and object marker are reduced to one shadow vowel. (7c) appears to be a direct coalescence of SM and T, while in (7d) it is not clear whether the vowel+glide sequence that surfaces represents the subject marker or the tense marker or both. In other words, at first glance it is not entirely clear from the examples in (7) as to whether functional categories have been omitted, coalesced, or reduced to a 'shadow vowel', and what the structural implications might be.

Interestingly, however, there is early evidence that AGR-S and T are actually projected. First the perfective tense/aspect suffix *-ile* is productive at the age of 2;1 years (e.g. 7b above), suggesting that children are making a present/past distinction from early on. Note, however, that these occur consistently only as verbal suffixes - i.e. preverbal tense/aspect morphemes are subject to reduction. Second, there is tonal evidence that child H is marking person at 2;1 years: 1st and 2nd person SM's are correctly produced with low tone in 80% of present indicative

constructions, while 3rd person SM's are likewise consistently produced with high tone (Demuth, to appear). Thus, while SM's are morphologically underspecified, they are distinguished tonally from an early age.

As in the case of noun class prefixes, Sesotho AGR-S and T begin to be more consistently identifiable around 2;6 years, and are generally wellformed by the age of 3. This is shown in (8) and (9).

- (8) (H - 2;6 yrs.)
 é-á-tsamay-a koloi yá:ka
 (é-á-tsamay-a kolóí yá:ka)
 9SM-PRES-go-M 9car 9POSS-my
 'It's going, my car'
- (9) (H - 3 yrs.)
 n-ná ke-a-e-batl-a buka yá:-ka
 (n-ná ke-a-e-bátl-a búka yá:-ka)
 1s-PN 1sSM-PRES-9OM-want-M 9book 9POSS-my
 'Me, I want it, my book'

In sum, variability in the production of functional categories is of two sorts: The first is the overlapping and inconsistent null, shadow vowel, and/or full realization of a given functional item in a given structural context (e.g. Sesotho noun class prefixes, subject markers, object markers and tense). The second is the null vs. full realization of a given functional item in different structural contexts (e.g. English auxiliaries, Sesotho noun class prefixes vs. demonstrative agreement prefixes). These are outlined in (10).

- (10) *Variability in the Production of Functional Categories*
- a. In context x , Functional Category f occasionally appears
 - b. Functional Category f appears in context x , but not context y

A theory of acquisition must be able to account for both of these types of variability in the marking of functional categories. Furthermore, it must address the issue of whether the gradual increase in the appearance and wellformedness of functional categories is linked to parallel developments in grammatical structure, or whether it is due to some other, non-syntactic or non-

linguistic phenomena. In the following section we review two grammatical proposals for the early variability in the production of functional categories and show that they are incapable of explaining the types of variation found in (10).

3.0 Grammatical Proposals

3.1 Functional Categories and Maturation

Radford (1990) proposes that early child grammars lack functional categories because Case has not yet matured. Considering evidence from several children, he suggests that functional categories begin to appear at the same time that Case matures, around the age of 2 (give or take 3 months for individual variation). Given this maturational program, Radford is forced to argue that apparent uses of functional categories before 2;0 years are actually 'impostors', or non-productive forms. The variable presence of early functional categories within a given context therefore poses a problem for the maturational account.

The maturational explanation also runs into problems when addressing the variable appearance of tense marking on English verbs and auxiliaries in different contexts (shown in (1) above) between the ages of 2 and 3. Similar problems arise for explaining the early omission of Sesotho noun class prefix vs. the presence of nominal agreement. We saw in (3) and (4) that Sesotho-speaking children have variable production of noun class prefixes, even though in many cases they use appropriate agreement morphology on nominal modifiers. Furthermore, 2-year-old Sesotho-speaking children use tense suffixes, but omit tense prefixes. A maturational account would have nothing to say about this type of variation.

In sum, both the gradual nature of the acquisition of functional categories and the variable appearance of functional categories in different contexts present problems for a maturational approach. First, the 21 month (not 3 month) disparity between Eve and Sarah in the acquisition of inflectional morphology needs to be explained. Secondly, the gradual nature of the acquisition of function categories over time, rather than an abrupt onset, as Radford (1990) claims, must be addressed. Finally, the variable production of functional categories in different contexts, such as English auxiliary/tense morphemes and Sesotho DET, AGR, and T morphemes, requires an explanation.

3.2 The 'Simultaneous Grammars' Approach

Another grammatical account for the variable presence of functional categories in early child language is that children may be operating with two grammars simultaneously (e.g. Lebeaux,

1988). Under the 'simultaneous grammars' approach it is suggested that children might produce some utterances with IP structure, but when under 'duress' they might 'fall back' to using only a more primitive structure, the latter lacking functional morphology. This view, while potentially interesting for explaining variability in overt movement (e.g. wh-movement), faces difficulties when confronted with the types of data presented here. What would the cognitive consequences be, for instance, of having two different 'grammars' operating in one utterance such as *That ___ making noise, isn't it?*

Similarly, why would Sesotho-speaking children use IPs with suffixal tense forms and only VPs with prefixal tense forms? We know little about how bilingual acquisition takes place, but it is often suggested that children start out with one grammar and two lexicons. The 'simultaneous grammars' approach implies that children learning one language would maintain two grammars and code switch between them. Note, however, that such an approach would not be able to make predictions about when a child would use the fully articulated IP/CP grammar, and when they would use the more primitive VP grammar.

In the following sections we show that a Metrical Model of Production makes the appropriate predictions regarding the variable occurrence of functional categories in early acquisition.

4.0 A Metrical Model of Production

In the following sections we provide the outlines of a Metrical Model of Production and show how it accounts for the English and Sesotho data on the variable use of functional categories. First we consider proposals for the importance of stress and feet. Then we extend this to the notion of Minimal Word, and show how this would operate to account for crosslinguistic variation. Finally we show that the Metrical Model of Production is a probabilistic one that makes just the right predictions regarding the variable appearance of functional categories presented in the data above.

It has long been observed that English-speaking children tend to produce *stressed* syllables and are more likely to omit certain *unstressed* syllables. Capitalizing on recent developments in phonological theory, and metrical phonology in particular (e.g. Hayes, 1984), Gerken (1991) and Gerken and McIntosh (1992) find that young English-speaking children are more likely to produce either stressed word units (like monosyllabic verbs) or parts of words that incorporate a trochaic foot (with a strong-weak stress pattern). In contrast, children tend to omit the initial unstressed syllable of iambic feet (weak-strong stress), or unstressed syllables preceding a

trochaic foot. These four conditions are schematized below with corresponding English samples (s=strong, w=weak). The unstressed syllable most likely to be omitted is underlined in each case, and a binary-branching foot is delimited by the square brackets.

(11)	stressed monosyllabic foot	[s]	ball
	trochaic foot	[s w]	dolly
	iambic foot	[<u>w</u> s]	<u>the</u> ball
	trochaic foot + pre-tonic syllable	<u>w</u> [s w]	<u>the</u> dolly

Note the patterns that result: the weak syllables most likely to be omitted fall on determiners, or functional categories. If we subject longer words without functional categories to the same test, we should be able to predict which syllables would be omitted and which preserved. Not surprisingly, child output forms like those on the right in (12) are widely attested.

(12)	trochaic foot + pre-tonic syllable		
		<u>w</u> [s w]	<u>ba</u> nana 'nana'
			<u>pi</u> ano 'nano'

Given (11) and (12), two generalizations can be made. First, English-speaking children's early words contain a stressed syllable. This phenomenon appears to operate crosslinguistically. Certainly this is true for Sesotho (discussed below), and the same is reported for early Maya K'iche', a language with final stress (Pye, 1983).

Secondly, as shown in (12), English-speaking children prefer *initiating* words and utterances with a stressed syllable. The same pattern appears to hold for early stages of Sesotho acquisition, a language with penultimate stress. Such observations led Allen and Hawkins (1980) to propose that children universally begin the language acquisition process with a trochaic foot. While this would appear to account for most of the English and Sesotho-speaking children's early productions, it does not generalize to stress-final languages like French and Maya K'iche'. We propose that children's early productions tend to include feet, rather than only stressed syllables, and that the construction of those feet necessarily interacts with the metrical structure of the language being acquired. Thus, English and Sesotho tend to utilize trochaic feet, and this is reflected in children's early productions. In contrast, Maya K'iche' exhibits word final stress. We would predict that children's first utterances would include final stressed syllables, then graduate to iambic feet, and so forth, and this is exactly what Pye (1983) reports.

We therefore propose that children's early word formation is influenced by a Minimal Word Constraint (13):

(13) **Minimal Word Constraint**: A prosodic word contains a foot

The Minimal Word Constraint is left purposely vague regarding the branching direction (right versus left) and the branching domain (binary, tertiary, unbounded) of feet so as to be maximally applicable across languages. We suggest that children have the correct setting for branching direction relatively early, and that binary-branching feet constitute the maximal setting at early stages of acquisition. We also suggest that syllables falling outside of the foot will be treated as 'extrametrical' and subject to reduction or deletion. Subsequent adjustments in the setting of the branching domain and the incorporation of extrametrical syllables into prosodic words will occur gradually over time, showing both intra- and inter-speaker variation.⁴

Armed with the Minimal Word Constraint, where all words must contain a foot, and feet by definition include a stressed syllable, we return to consider the question of why young children tend to omit functional categories. First, functional categories in English are generally unstressed and thereby candidates for deletion, unless they constitute the second syllable of a trochaic foot. But there are few instances in the structure of English where this scenario is found: Many English verbs, and English-speaking children's early verbs in particular, are monosyllabic stressed syllables (e.g. gave, fix, give, hit, put, ride, go) (Brown, 1973:205). Preverbal auxiliaries are generally unstressed, and are therefore candidates for deletion. Consider again the forms listed in (1) (=14).

- (14a) We__ been there. We've been there.
- (14b) That dress ___ not fit me. That dress doesn't fit me.
- (14c) I ___ do it, I can.
- (14d) That ___ making noise, isn't it?

Note that in all cases, the forms omitted are stressless or contractible forms. In each second utterance, however, the previously omitted forms occur. Note also that these forms are all

⁴ See Dresher & Kaye (1990) for a computational approach to learning stress systems.

stressed, tag questions in (14c) and (14d), and the stressed form of the auxiliary *do* in (14b), where the negative is now stressless and contracts. Only the alternation in (14a) appears to be unaccounted for by the Minimal Word Constraint, though it is possible that this form was contrastively stressed - a situation not generally captured in most transcriptions of child speech.

This approach can also be extended to account for the variable appearance of noun class prefixes in Sesotho. Sesotho does not have stress as such, but employs penultimate lengthening, thereby creating a trochaic foot. We would therefore expect Sesotho-speaking children to produce disyllabic nominal stems, but to do less well on material that precedes the foot - material which often includes the noun class prefix, or DET. As seen in (4) (= 15), the underlined noun class prefix is missing. We hypothesize that it is null because it falls on an unstressed syllable outside the trochaic foot, whereas the stressed agreement morphemes on the disyllabic demonstrative (in bold) are present and well formed.

- (15) w [s w] [s w] [ponko] [**lá**-ne] (le-phoqo lá-ne)
'that green corn stalk'
- [kolo] [**sá**-ne] (se-kólo sá-ne)
'that school'

Interestingly, and as Gerken (1991) has noted, a similar solution may provide an account of children's variable production of English subject pronouns. English subject pronouns can be either stressed or unstressed: when they are topical, old information, they tend to be unstressed, having the *phonological* status of stressless clitics. However, English subject pronouns can also be stressed: in such cases contrastive focus is on the subject. Possible stress patterns and foot structures for English subject pronouns are provided below:

- (16a) 2 stressed monosyllabic feet [s] [s] *I know*
- (16b) iambic foot [w s] *I know*
- (16c) trochaic foot + pre-tonic syllable w [s w] *I know him*

As shown in (16), non-contrastive English subject pronouns, like English determiners, generally fall either on the first syllable of an iambic foot, or on a pre-tonic syllable, and are therefore subject to deletion. This might help explain why lexical subjects in English, which are always stressed, are present from the beginnings of children's early speech, while pronominal subjects

are often null. Furthermore, the Minimal Word Constraint would predict that when subject pronouns are contrastive, or stressed, they will constitute a minimal word and will surface in children's speech. Interestingly, however, Selkirk (1986) notes that even when stressed, English subject pronouns are rhythmically grouped with the following verb. This suggests that stress and foot structure themselves may not be a sufficiently strong diagnostic for predicting when and where which syllables/morphemes will be omitted, but rather that a prosodic approach that incorporates larger units, such as intonational phrases, will ultimately be required.

The stressed pronoun/unstressed agreement marker distinction is morphologically transparent in languages like Sesotho. Interestingly, children's stressed pronouns (e.g. *n-ná* 'me') are wellformed long before unstressed subject markers are consistently realized, the preverbal morphology often disappearing when the stressed pronoun is present. Brackets are used to designate each prosodic word, while underlined portions indicate the final trochaic foot in (17) (= (27) from Demuth, to appear).

- (17) (H - 2;6 yrs.)
 ná bidíkisa
 ([n-ná] [ke-a-bídíkis-a])
 1s-PN 1sSM-PRES-turn-M
 'I'm revolving (it)'

Most Sesotho verb stems used by two-year-old children are disyllabic and constitute a trochaic foot. This means that IP heads (AGR-S, T, and AGR-O) should be subject to reduction, and this is exactly what happens. Consider again examples (7c & d)(=18a & b).

- (18) (H - 2;1 yrs.)
 (a) ta há:na
 ([ke-a-hán-a+])
 1sSM-PRES-refuse-M
 'I refuse'
- (b) áy shépa
 ([ó-a-sháp-a+])
 1SM-PRES-lash-M
 'S/he is lashing'

Notice that the foot remains constant, while the preverbal extrametrical syllables, including object markers, are reduced or null. The large majority of Sesotho-speaking children's utterance at this stage of development show a similar pattern. Note that object markers in Sesotho are found in 'extrametrical' syllables, while English *he/she/it* can be either stressed or unstressed, but even in their unstressed form they fall within the foot (16c) and are therefore candidates for retention.

We propose, then, that the Minimal Word Constraint is operative in children's early productions. Given the Minimal Word Constraint, the Metrical Model of Production makes certain predictions about which syllables will be retained and which omitted or reduced in early child speech.

(19) **Metrical Model of Production**

- a. Stressed syllables of a word are most likely to be retained
- b. Unstressed syllables of a prosodic word are most likely to be omitted or reduced
- c. Unstressed syllables that fall within a foot are more likely to be retained than extrametrical syllables

The Metrical Model of Production make probabilistic, rather than absolute predictions about which functional categories will be missing in early child speech. As such, it is able goes a long way toward being able to account for the pervasive variation found in children's early production of function categories. Furthermore, it provides a unified account for the fact that other syllables other than functional categories are also missing in early child speech.

5.0 Implications for the Nature of Early Grammars

This paper has examined the variable use of functional categories in early English and Sesotho. It has demonstrated that the variable presence of functional categories in early child language poses serious problems for grammatical explanations such as maturational and 'simultaneous-grammars' accounts. Rather than attributing this variability to the maturation of Case or switching between two grammars - one with functional categories and the other without, this paper argues that prosodic factors such as stress and foot structure not only explain much of the variation found, but also make correct predictions about which functional categories will occur and which are most likely to be null or reduced. The paper then demonstrates that the omission of auxiliaries, determiners, tense markers, and even pronominal subjects, is part of a much larger

phenomena that characterizes closed class items in general, and unstressed, extrametrical syllables in particular. It then provides a Metrical Model of Production that accounts for this phenomena, where early child grammars are subject to the Minimal Word Constraint. The model is presented as a probabilistic one which predicts that certain (stressed) syllables will be retained in early productions, while other (unstressed) syllables will be subject to deletion, especially if they fall outside of the prosodic foot.

The Metrical Model of Production incorporates several conceptual advantages over previous proposals of this type. First, rather than making the strong prediction that all children's first utterances will contain trochaic feet (Allen and Hawkins, 1980), the Metrical Model of Production provides room for the language specific construction of feet as realized by the Minimal Word Constraint. Secondly, it extends Gerken (1991) and Gerken and McIntosh's (1992) proposals for the importance of stressed syllables and feet in English to other English constructions (e.g. auxiliaries) and applies it to function categories in other languages (e.g. Sesotho). Finally, it presents a model of production in probabilistic terms, i.e. one which can account for that which children will be most likely to retain, and predicts those syllables/morphemes which children will be most likely to omit or reduce. In other words, this model allows for the observed inter- and intra-speaker variation (e.g. Peters and Menn 1992; Peters, forthcoming) by incorporating the notion of a constraint (rather than, say, a 'parameter') - one which is gradually relaxed over time.

While the Metrical Model of Production goes a long way toward handling the problematic data outlined here, it also raises several questions. Some might wonder if some functional categories are being omitted for perceptual rather than production reasons. It is possible that at earlier stages of acquisition perception would be a relevant factor, but the very type of data examined here, where children *know* the noun class of Sesotho nouns (as evidenced by the correct agreement form on modifiers), and the form of the English auxiliary (as evidenced they the use of the correct form in the tag questions), should put the issue of perception to rest. Others might wonder if, instead of a production model, the phenomena described here might more appropriately be thought of as principles of Universal Grammar at work, i.e. evidence for the universal organization of prosodic structure. We have tended to think of UG as constraining and directing children's acquisition of syntactic structure: why should UG not also constrain the form and shape of children's possible phonological and prosodic structures. It is indeed possible that the Metrical Model of Production outlined here, and more particularly the notion of a Minimal Word Constraint, is more appropriately articulated as evidence of UG and cognitive

organization of Prosodic structure, rather than simply mechanistic production constraints. Such an approach is developed further in Demuth (1992c).

In conclusion, the Metrical Model of Production is offered not as a competitor to syntactic theory, but as a necessary complement to it. Much of the study of language acquisition is necessarily based on children's productions. Yet children do not produce only syntactic trees, they produce utterances that are part of a linguistic system, one that incorporates both phonological and syntactic elements. The Metrical Model of Production makes a strong, testable statement about the role of stress and feet in the prosodic organization of young children's utterances. If it is applied carefully, with a sophisticated phonological understanding of the prosodic properties of the language at hand, it will prove a useful tool in addressing the acquisition of syntax. If prosodic or other phonological phenomena, such as phonotactic constraints, can be ruled out as possible constraints on the production of functional categories, the possibility that the phenomena exhibited is a syntactic one is all the more likely.

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