Pulaar verbal extensions and phonologically driven affix order

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1. INTRODUCTION

Pulaar, a West Atlantic language spoken across a wide area of West Africa, has a number of verb suffixes that can occur in combination, offering the linguist an opportunity to examine their relative ordering and the principles governing it. Arnott (1970:333,366) reported that in the Gombe Fula dialect, the order of affixes is largely fixed. In particular, according to Arnott, the first four suffixes to come after the verbal stem are consonantal suffixes ordered according to the formula 'TDNR': all of the /-t/ suffixes precede the /-d/ suffixes, which precede the /-n/ suffix, which in turn precedes the /-r/ suffixes (1970:366). As discussed in this paper, many of the verb suffixes, including several of the 'TDNR' suffixes that are the focus of this paper, enter into semantic scope relations with each other. Therefore, if it is true that their order is fixed, then the behaviour of these suffixes contradicts the claim of Rice (2000) that affixes are ordered according to their relative semantic scope and that templatic (fixed) affix order results only when the affixes in question do not have a scope relationship. In this paper, I present new data from a speaker of a related dialect of Pulaar showing that scope relations do play a crucial role in the ordering of these suffixes, and I then show that such an explanation is also consistent with Arnott's (1970) data and in fact accounts for a larger set of Arnott's examples than did his own claim of fixed ordering. I also discuss implications of this reanalysis of Pulaar affix order for Rice's (2000) claim as well as for the morphological model advanced by McCarthy and Prince (1993a,b).

The structure of the paper is as follows. First, in the remainder of section 1, I discuss Rice's (2000) Scope Hypothesis and other proposals relating the order of affixes to their scope (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998), and then provide background on the Pulaar language. In section 2, I present Arnott's (1970) affix order data from Gombe Fula and discuss Arnott's claim that the order of affixes is fixed. In section 3, I present new data from a speaker of Fuuta Tooro Pulaar and an analysis of these data in terms of scope. I then present in section 4 a reanalysis of Arnott's (1970) Gombe Fula data similar to the one proposed for the Fuuta Tooro dialect discussed in the preceding section. In section 5, I discuss some theoretical implications of this new analysis of Pulaar affix order. section 6 concludes and summarizes the paper.

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1.1. Scope-based affix order and emergent templates

Several researchers have claimed that affix order is related to syntactic/semantic principles (see, for example, Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998, Rice 2000). Specifically, Rice (2000) claims that the relative order of affixes corresponds to their scope (defined in terms of semantic compositionality), such that if morpheme X has scope over morpheme Y, then morpheme X occurs further from the root than morpheme Y. I will refer to this as the Scope Hypothesis, and as we will see, this principle is useful in analysing affix order in Pulaar.

One alternative approach to affix order is the use of fixed or 'templatic' order. Analyses in these terms often propose 'slots' on either side of the root in which specific affixes invariably occur. Templatic analyses are proposed when affix order appears to be arbitrary and does not relate straightforwardly to any external principle (see Bloomfield 1962, Zwicky 1985, Anderson 1986, Simpson and Withgott 1986, Speas 1990, Stump 1992, Inkelas 1993, Hyman and Inkelas 1999, and Good 2003 for examples of template-based analyses of affix order).

Rice (2000) characterizes templates as 'emergent' rather than as playing a fundamental role in morphological systems. Specifically, Rice argues (2000:396) that templatic order can arise only when there are no scope relations among the affixes in question. As I discuss in section 5, this claim may need to be weakened in light of the facts of Pulaar affix order, which reveal that templatic orderings can and do arise even when the affixes involved have clear scope relations. In general, though, the findings reported in this paper will be demonstrated to be consistent with Rice's (2000) Scope Hypothesis.

1.2. The Pulaar language

The Pulaar language is spoken in a wide area of West Africa and comprises a number of dialects that are mutually intelligible to varying degrees. The name 'Fula' is sometimes used as a cover term for all of the Pulaar dialects plus other languages known by names such as Fulfulde, Fulani, and Fulbe. However, the Fula name usually does not include Pulaar, so there is no single good cover term for all of these languages, even though they are very closely related and seem to form a continuum of mutual intelligibility. Since the primary focus of this paper is on a dialect of Pulaar, I use 'Pulaar' to refer to the entire language group including Pulaar proper as well as the Fula languages.

There is a large literature on the Pulaar languages. Of particular relevance to this paper are two works that discuss verbal extensions in different Pulaar dialects. The first is Arnott's (1970) description of the Gombe Fula dialect spoken in northern Nigeria. Arnott (1970) provides the first in-depth description of the verbal extensions and explicitly discusses their relative order. In a series of articles, de Wolf (1985, 1986, 1987, 1991) discusses the verbal extensions as they

are used in Noŋaare Fulani, a dialect spoken in western Niger. de Wolf gives examples of extensions in combination, showing their relative order, though he does not provide an analysis of the order.

The Fuuta Tooro dialect, which I describe in this paper in section 3, is spoken in the Fuuta Tooro region along the border between Senegal and Mauritania. The consultant for the present study is a 42 year-old speaker who moved to the US from a town near Matam, which is in Senegal in the eastern part of the Fuuta Tooro region.

2. GOMBE FULA

In this section I present Gombe Fula data from Arnott (1970) showing the meaning and usage of verb suffixes, focusing on the consonantal suffixes which are the focus of this paper. I give examples from Arnott (1970) in which two or more of these suffixes are combined, then discuss Arnott's interpretation of the relative ordering of the suffixes.

2.1. The verb suffixes of Gombe Fula

Arnott (1970:334) lists nineteen verb 'extensions' in Gombe Fula (1) (examples pp. 340–364)[1]. In each example, the relevant extension appears in bold text.

(1)

Shape	Label	Example
-ɗ	Denominative (DEN)	fur-**ɗ**-a 'be grey'
-t	Reversive (REV)	taar-**t**-a 'untie'
-t	Repetitive (REP)	soor-**t**-o 'sell again'
-t	Reflexive (REF)	ndaar-**t**-o 'look at oneself'
-t	Retaliative (RET)	jal-**t**-o 'laugh at . . . in turn'
-t	Intensive (INT)	yan-**t**-a 'fall heavily'
-d	Associative (ASS)	nast-**id**-a 'enter together'
-d	Comprehensive (COM)	janng-**id**-a 'read, learn all . . . '
-n	Causative (CAU)	woy-**n**-a 'cause to cry'
-r	Modal (MOD)	ɓe mah-**ir**-i ɗi 'they built them with'
-r	Locative (LOC)	'o 'yiw-**r**-ii 'he came from'
-an	Dative	'o wolw-**an**-ii 'he spoke to'
-indir	Reciprocal	ɓe koomn-**indir**-ii 'they greeted e.o.'
-ootir	Reciprocal	ɓe tokk-**ootir**-i 'they followed e.o.'
-kin	Simulative	'o wum-**kin**-o 'pretend to be blind'
-law	Celerative	'o maɓɓ-**ilaw**-ii 'he shut . . . quickly'
-oy	Distantive	yahu wi'-**oy** ɓe 'go and tell them'
RED-n	Iterative	'o wari-**war**-**in**-ii 'he kept coming'
RED-tir	Iterative-Reciprocal	ɓeɗon pii-**pii**-**tir**-a 'they keep hitting e.o'

Arnott lists both -C and -VC forms of the single consonant extensions (where V is usually [i]), but I give only the -C form here. The -VC form of each consonantal suffix occurs in a phonological environment that is consistent but difficult to capture using phonological features: it occurs after consonant clusters and geminates, and after non-implosive obstruents, *'y*, *sh*, and *h* (Arnott 1970:335). The -VC form also occurs variably after some single consonants not included in the set given above; though Arnott does not mention morphological conditioning, it appears that the -VC form occurs when preceded by another extension.

According to Arnott (1970), the suffixes generally occur in the order in which they are presented above. Arnott makes a more specific claim (1970:366) that the order of the consonantal suffixes (the first eleven suffixes listed above) is fixed: 'As far as [the 'TDNR'] extensions are concerned (the purely verbal extensions consisting basically of a single consonant), [the] normal order can be summarized by the formula T-D-N-R'[2]. There are a few minor discrepancies between the order that Arnott lists on page 334 and the order that is revealed in the examples he provides throughout the grammar, so I have adjusted the ordering of items in the list to reflect the ordering found in the examples (none of the changes affects the consonantal suffixes that are of particular interest in this paper). Each of the consonantal suffixes is discussed in more detail below.

2.1.1. The Denominative -ɗ suffix

The Denominative *-ɗ* suffix generally attaches not to verb roots but to adjectival roots. The result is a verb stem to which any number of verbal suffixes may attach. The *-ɗ* suffix invariably occurs immediately after the root, which is unsurprising since the other suffixes to be discussed below attach only to verb stems; the *-ɗ* suffix must therefore attach first to an adjectival root, 'converting' it into a verb stem suitable to host verbal extensions. Some examples of the *-ɗ* suffix are provided below (Arnott 1970:363).

(2)	fur-	'grey'	fur-ɗ-a	'be grey'
	yam-	'healthy'	yam-ɗ-a	'be healthy'
	'ool-	'yellow'	'ool-ɗ-a	'be yellow'
	barka	'blessing'	bark-iɗ-a	'be blessed'
	semmbe	'strength'	semmb-iɗ-a	'be strong'
	meere	'in vain'	meer-iɗ-a	'be worthless'

de Wolf (1987) also discusses this suffix as used in Noŋaare Fulani, referring to it as the Verbaliser since it can attach to adjectives, nouns, and adverbs, converting each to a verb.

2.1.2. The -t suffixes

Arnott lists five different verbal extensions whose basic shape is /-t/. One issue that arises when sets of homophonous extensions are considered is how to determine what constitutes a separate morpheme. Each of the *-t* suffixes has at least a slightly different meaning, though some of their meanings overlap. Arnott's basis for distinguishing these suffixes is not only semantic, but also phonological: three of the *-t* suffixes (Reversive, Repetitive, and Intensive) are reported to have *-ut* allomorphs in addition to *-t* and *-it*, while the Reflexive and Retaliative have only *-t* and *-it*. The same extensions are discussed by de Wolf (1985) for Noŋaare Fulani, where these extensions are also homophonous except for a *-c* allomorph in the Reflexive and Repetitive. Based on the phonological evidence in combination with some generalizations about the type of verb that each suffix will attach to, de Wolf follows Arnott in assuming that there are five distinct *-t* suffixes. In sections 2.1.2.1–2.1.2.5, I describe each of the five *-t* suffixes distinguished by Arnott (1970) for Gombe Fula. For each suffix, examples are provided showing bare verbs and the corresponding extended verbs. Arnott gives these examples in citation form without sentential context or morpheme-by-morpheme glosses; their purpose is simply to illustrate the basic meaning change that applies to the stem when each suffix is attached.

2.1.2.1. The Reversive -t suffix

According to Arnott, the Reversive suffix causes the extended stem to have a meaning 'opposite' that of the root, as shown in the examples below (Arnott 1970:340).

(3)	fiɓa	'tie'	fiɓ-t-a	'untie'
	taara	'wind'	taar-t-a	'unwind'
	ɓila	'hang up'	ɓil-t-a	'take down'
	soma	'become tired'	som-t-a	'lose one's tiredness'
	saɗa	'be difficult'	saɗ-t-a	'be easier'
	jaɓɓo	'welcome'	jaɓɓ-it-o	'take leave of'

The Reversive allomorphs are *-t*, *-it*, and *-ut.*

2.1.2.2. The Repetitive -t suffix

This suffix denotes repetition of an action. Examples are shown below (Arnott 1970: 341).

(4)	'yama	'ask'	'yam-t-o	'ask again'
	rema	'hoe'	rem-t-o	'do a second hoeing'
	soora	'sell'	soor-t-a	'sell again'

wi'a	'say'	wii-t-o	'say again, repeat'
fiya	'hit'	fii-t-o	'hit again'
fuɗ'ɗa	'begin'	fuɗ'ɗ-it-a	'start again'

The Repetitive allomorphs are *-t*, *-it*, and *-ut*. Note that these are the exact same allomorphs as listed for the Reversive above. Furthermore, there is semantic overlap between the two suffixes, so that there are several instances where the identity of the suffix is ambiguous even when the translation of the utterance is known. For example, Arnott cites the following as an example of a Reversive: *feew-t-a* 'cool down (after being hot)', formed from the verb *feewa* 'be cold'. This could also be interpreted as a Repetitive form with the literal meaning 'be cold again,' which would imply that one was hot in between the two instances of being cold.

2.1.2.3. The Reflexive -t suffix

The Reflexive *-t* is an argument structure-changing suffix that reduces the total number of arguments of the verb by one, such that the subject performs the action on him/herself or for his/her own benefit (Arnott 1970:342). Examples are shown below (p. 342).

(5)				
	ndaara	'look at'	ndaar-t-o	'look at oneself'
	wara	'kill'	war-t-o	'commit suicide'
	ta'ya	'cut'	ta'y-it-o	'cut oneself'
	nana	'hear'	nan-it-o	'hear oneself'
	jala	'laugh'	jal-it-o	'laugh at oneself'
	yima	'sing'	yim-t-o	'sing to oneself'

The Reflexive has the allomorphs *-t* and *-it*.

2.1.2.4. The Retaliative -t suffix

When added to a verb stem, this suffix indicates that an action is done to someone else in retaliation, as seen in the examples below (Arnott 1970:342–343).

(6)				
	ndaara	'look at'	ndaar-t-o	'look at . . . in turn'
	jala	'laugh at'	jal-t-o	'laugh at . . . in turn'
	fooɗa	'pull'	fooɗ-t-o	'pull . . . in turn'
	lata	'kick'	lat-it-o	'kick back'
	huɗa	'abuse'	huɗ-t-o	'abuse in turn'
	fiya	'hit'	fii-t-o	'hit . . . back'

The Retaliative has the allomorphs *-t* and *-it*.

A comparison of these examples with those found in the preceding sections indicates that in some cases, the same verb root may have more than one of the *-t* suffixes affixed to it, in some cases resulting in a single phonetic form with multiple possible meanings. For instance, the form *ndaar-t-o* may have the Reflexive meaning 'look at oneself' or the Retaliative meaning 'look at . . . in turn'. Similarly, *fii-t-o* may have the Repetitive meaning 'hit again' or the Retaliative meaning 'hit . . . back'.

2.1.2.5. The Intensive -t suffix

This suffix indicates 'completeness, severity, intensity, etc.,' as shown in the examples below (Arnott 1970:343).

(7)	fooɗa	'pull'	fooɗ-t-a	'pull tight'
	saɗa	'be hard, difficult'	saɗ-t-a	'be very hard, difficult'
	yana	'fall'	yan-t-a	'fall heavily'
	majja	'get lost'	majj-it-a	'get completely lost'
	daro	'stand'	dar-t-o	'stand firm'
	'yama	'ask'	'yam-t-a	'interrogate'

The Intensive has the allomorphs *-t*, *-it*, and *-ut*.

Again, a comparison with previous examples shows that at least some roots are compatible with other *-t* suffixes in addition to the Intensive: *fooɗa* 'pull' also takes the Retaliative suffix, while *'yama* 'ask' takes the Repetitive.

2.1.3. The -d suffixes

Arnott lists another set of homophonous suffixes, the Associative and Comprehensive *-d* suffixes. Since both suffixes have the same set of allomorphs (*-d*, *-id*, *-ud*, *-od*), they cannot be distinguished phonologically. Both suffixes can attach to any verb in Gombe Fula. Arnott distinguishes the Comprehensive from the Associative based on their syntactic context: the Comprehensive occurs with prepositional phrases introduced by *'e* 'with', while the Associative occurs with *fuu* 'all' added to the subject or object (1970:346). Arnott acknowledges that this distinction allows for a significant amount of ambiguity between the two different suffixes, since neither is required to occur in the syntactic environment that distinguishes it. In his description of the same suffixes in Noŋaare Fulani, de Wolf (1991) distinguishes the Associative and Comprehensive (which are also homophonous in that dialect) based on the restriction that the Associative cannot attach to active verbs. The weak evidence for a distinction between these suffixes, in combination with their semantic similarity, suggests that these may really be a single suffix, which I will claim is the case in Fuuta Tooro. Leaving

this issue aside for the moment, below I present descriptions and examples for the Associative and Comprehensive suffixes in Gombe Fula.

2.1.3.1. The Associative -d suffix

According to Arnott, the Associative suffix denotes either 'joint action' or 'action in association with some person or thing' (1970:344). The effect on the arguments of the verb is to require either a plural subject or else any subject plus a second actor introduced by a preposition. Examples are shown below (Arnott 1970:345).

(8)	wara	'come'	war-d-a	'come in company'
	joodʃo	'sit down'	joodʃ-d-o	'sit, settle together'
	yaha	'go'	yaa-d-a	'go together'
	waɗa	'do'	waa-d-a	'do together'
	wolwa	'speak'	wol-d-a	'speak with'
	nasta	'enter'	nasd-id-a	'enter together'

2.1.3.2. The Comprehensive -d suffix

The Comprehensive suffix indicates 'totality or completeness' of the subject or object (Arnott 1970:345). Examples are shown below (Arnott 1970:346).

(9)	nyaama	'eat'	nyaam-d-a	'eat up completely'
	haɓɓa	'tie'	haɓɓ-id-a	'tie up all . . . '
	winnda	'write'	winnd-id-a	'write all . . . '
	yara	'drink'	yar-d-a	'drink up (completely)'
	maɓɓa	'close'	maɓɓ-id-a	'[close] all . . . '

2.1.4. The Causative -n suffix

The causative suffix adds an object to the verb and contributes the meaning 'cause to,' 'arrange for,' or 'make' (Arnott 1970:346–347), as shown in the examples below (p. 347). de Wolf (1986) discusses the use of the same extension in Noŋaare Fulani, where its behaviour and shape seem to be identical to those of the Gombe Fula Causative.

(10)	hula	'fear'	hul-n-a	'frighten'
	jala	'laugh'	jal-n-a	'amuse'
	woya	'cry'	woy-n-a	'cause to cry'
	nyaama	'eat'	nyaam-n-a	'give to eat, feed'
	hoya	'be easy'	hoy-n-a	'make easy'
	wooja	'be red'	wooj-in-a	'redden'
	lugga	'be deep'	lugg-in-a	'deepen'

The Causative has two allomorphs, *-n* and *-in*, distributed according to the principle discussed above for the distribution of -C vs. -VC allomorphs for all of the consonantal extensions.

2.1.5. The -r suffixes

Arnott distinguishes two *-r* suffixes, Modal and Locative. The Modal introduces a noun that is either an instrument or a manner in which an action is done. The Locative introduces a noun that is a location in or near which an action is done. Both suffixes have the same allomorphs (*-r*, *-d*, *-ir*, and *-or*), and both can attach to any verb. Arnott's basis for distinguishing the two is their meaning difference, but it is not clear why the modal and instrumental meanings were deemed similar enough to be represented by a single Modal suffix while the Locative was distinguished. It seems plausible to assume that there is only one *-r* suffix in Gombe Fula, which functions as a modal, instrumental, and locative marker. de Wolf (1991) follows Arnott in proposing two separate *-r* extensions for Noŋaare Fulani, but in that dialect, the suffixes can be distinguished phonologically and by the more restricted distribution of the Locative suffix. Below I provide descriptions and examples of the Modal and Locative in Gombe Fula.

2.1.5.1. The Modal -r suffix

The Modal suffix indicates either the manner in which an action is done, or else an instrument with which an action is done. In each case, the addition of this suffix changes the argument structure of the verb such that it supports an additional object (Arnott 1970:348). Examples of the Modal suffix are shown below (Arnott 1970:348–349).

(11) 'o haɓɓ-ir-ii gujjo ɓoggol
3sg tie-MOD-past thief rope
'he tied up the thief with rope'

'o maɓɓ-ir-ii yolnde semmbe
3sg close-MOD-past door force
'he shut the door with force'

baŋŋgaaro ta'y-ir-i kusel laɓi
butcher cut-MOD-past meat knife
'the butcher cut the meat with a knife'

2.1.5.2. The Locative -r suffix

The Locative suffix indicates a location in or near which an action takes place. Examples are shown below (Arnott 1970:352).

(12) ’yiw-r-ii fuuna
come-LOC-past east
‘came from the east’

to ɓe ŋjooɗ-or-ii
where 3pl sit.down-LOC-past
‘where did they settle?’

’o hoot-ir-ii ta ɗatal ŋgala
3sg return-LOC-past by road that
‘he returned by that road’

Now that the individual consonantal extensions have been introduced, we will proceed in the following section to examine their relative ordering when two or more of them are used in a single verb.

2.2. Order of the consonantal suffixes

Arnott gives examples showing most of the possible combinations of ‘TDNR’ suffixes. An exhaustive list of Arnott’s examples with two or more (non-homophonous) ‘TDNR’ suffixes is given in (13)[3].

(13) T-N-R
’o yam-ɗ-it-in-ir-ii mo lekki gokki kesi
$3sg_i$ healthy-DEN-[REP]-CAU-MOD-past $3sg_j$ medicine other new
‘He_i cured him_j with some new medicine’ (p. 368)

T-D-R
’o jaɓ-t-id-ir-an-ii yam depte ’e semmbe
3sg take-INT-COM-MOD-dative-past 1sg books with force
‘He snatched all my books from me by brute force’ (p. 367)

T-D
’o maɓɓ-it-id-ii joldʼe fuu
3sg close-REV-COM-past doors all
‘He opened all the doors’ (p. 367)

T-R
’o maɓɓ-it-ir-ii yolnde hakkiilo
3sg close-REV-MOD-past door slowly
‘He opened the door slowly’ (p. 367)

T-R
war-t-ir-
come-REV-MOD-
‘bring back’ (p. 367)

D-R
no njoodˀ-od-or-too maɓɓe ’e mi
how sit/live-ASS-MOD-relative.future 3pl with 1sg
‘How shall I sit/live with them?’ (p. 367)

D-R
to njoodˀ-od-or-too maɓɓe ’e mi
where sit/live-ASS-LOC-relative.future 3pl with 1sg
‘Where should I sit with them?’ (p. 367)

Arnott also cites some forms where it appears that the ordering of affixes violates his ‘TDNR’ generalization. All of these ‘exceptional’ forms are given in (14).

(14) D-T
mi wol-d-it-at-aa ’e maɓɓe
1sg speak-COM-REP-future-negative with 3pl
‘I won’t speak with them again’ (p. 368)

N-D
’o nyaam-n-id-ii ɗi
3sg eat-CAU-COM-past 3pl
‘He fed them all’ (p. 368)

R-D
mi yaa-r-id-ii ɗi
1sg take-MOD-COM-past 3pl
‘I took them all’ (p. 368)

T-R-D
mi war-t-ir-id-an-te ɗi
1sg come-REV-MOD-COM-DAT-future 3pl
‘I’ll bring them all back to you’ (p. 368)

N-T
mi hul-n-it-oo mo
1sg fear-CAU-RET-subjunctive 3sg
‘(If he frightens me,) I’ll frighten him in turn’ (p. 368)

Arnott explains away the exceptional orderings as cases of lexicalised stem-extension combinations: ‘Variation from the usual order seems to be confined to cases where the basic radical and first extension . . . frequently occur together as an extended radical . . . ’ (p. 367). One diagnostic for identifying lexicalised forms is to determine whether the meaning of the form is compositional or idiomatic. Lexicalised forms are more likely to have idiomatic meanings (where the meaning of the root-affix combination is not predictable from the meaning of the root and affix taken separately), yet all of the forms in (14) have compositional meanings; that is, in each case, the meaning of the putative lexicalised

root-extension combination is straightforwardly predictable from the meaning of the root and the extension. For example, Arnott assumes that in the example *mi wol-**d-it**-at-aa 'e maɓɓe* 'I won't speak with them again' cited above, which contains a Comprehensive and a Repetitive (both shown in bold), the first extension is actually part of a separately listed verb stem, *wold* 'speak with', so that the actual morphological structure of the verb is *wold-**it**-at-aa*. This assumption saves the 'TDNR' generalization, since otherwise the *-d-t* order in this form would constitute a counterexample. However, since the meaning of the putative stem *wold* 'speak with' follows straightforwardly from the semantics of the root meaning 'speak' combined with the Comprehensive, which contributes a 'joint action' meaning, the only evidence for this root-suffix combination being lexicalised is Arnott's observation that it is a frequently occurring combination. This evidence is thus somewhat weak and warrants further examination. As will be discussed in section 4, once the 'TDNR' generalization is abandoned in favour of a scope-based analysis, the non-TDNR orderings can be explained without the assumption that they involve lexicalised root-extension combinations.

The Gombe Fula data that have been presented above are all consistent with Rice's (2000) Scope Hypothesis. In no example do we find that adherence to a fixed 'TDNR' ordering schema causes the order of affixes not to correspond to their scope. Furthermore, as was shown, there are some exceptions to the 'TDNR' order, though Arnott claims that all of these exceptions involve lexicalised stems. Thus, the evidence presented by Arnott (1970) is consistent with both a scope-based and a templatic analysis. More data are needed to determine what happens when the Scope Hypothesis and the template make conflicting predictions for the relative order of specific combinations of suffixes. In the following section, I present new data from a Senegalese dialect of Pulaar, and I show how these data support a scope-based analysis of Pulaar affix order.

3. FUUTA TOORO PULAAR

A new study of suffix order in Pulaar was carried out in consultation with a speaker from north-eastern Senegal. His dialect is known as Fuuta Tooro, since the region where it is spoken (northern Senegal and southern Mauritania) was formerly the Fuuta Tooro state (*Ethnologue* 14). Although this area is relatively far from the area where Gombe Fula is spoken, the two dialects are likely to be mutually intelligible, as evidenced by the fact that the Fuuta Tooro speaker was able to understand all of the Gombe Fula examples from Arnott (1970) that were presented to him. In this section, I present the consonantal affixes found in Fuuta Tooro and examine in pairwise fashion each of the possible combinations of the consonantal affixes to determine their relative ordering. I then present an analysis of the order of these suffixes based on semantic scope and a partial templatic ordering.

3.1. The consonantal extensions of Fuuta Tooro Pulaar

The consonantal suffixes of Fuuta Tooro are given in (15).

(15)	Shape	Label	Example
	-ɗ	Denominative (DEN)	mi dom-ɗ-ii[4] 'I became thirsty'
	-t	Separative (SEP)	mi udd-it-ii baafal ŋgal 'I opened the door'
	-t	Repetitive (REP)	o haal-t-ii 'he spoke again'
	-d	Comprehensive (COM)	mi udd-id-ii baafe ɗe 'I closed all the doors'
	-n	Causative (CAU)	mi jaŋŋg-in-ii 'I taught'
	-r	Modal (MOD)	mi dog-r-ii paɗe 'I ran with shoes'

As in Gombe Fula, the consonantal suffixes of Fuuta Tooro each have -C and -VC allomorphs. The -VC allomorph occurs after geminates, consonant clusters, and variably after some single consonants; the -C allomorph occurs elsewhere. I do not find evidence for any more than two allomorphs for each (-C and -*i*C) in Fuuta Tooro, since alternations in the vowel can be accounted for via harmony rules.

Note that I propose only six consonantal suffixes for Fuuta Tooro, in comparison to Arnott's eleven for Gombe Fula. One reason for this was hinted at in my discussion of the Gombe Fula suffixes in section 2.1: in some cases where Arnott distinguished separate suffixes, it seems more appropriate to propose a single suffix. For example, the Comprehensive and Associative *-d* suffixes can reasonably be reduced to a single suffix (I label this 'Comprehensive' above, not to suggest that the Comprehensive meaning is the more basic, but simply as a shorthand). Similarly, Arnott's Modal and Locative *-r* suffixes correspond to a single Modal suffix here, since the shape, distribution, and function of Modal and Locative are basically identical. Another reason for the smaller number of suffixes shown here is that some of the extensions distinguished by Arnott are simply not used very productively in Fuuta Tooro. For instance, in the speech of this particular consultant, I did not observe instances of Reflexives, Intensives, or Retaliatives formed with *-t*.

3.1.1. The -ɗ suffix

The use of the Denominative suffix does not appear to be very robust in Fuuta Tooro, as evidenced by the fact that the consultant volunteered forms without the Denominative when given English sentences meant to elicit Denominative forms (for example, 'He has become well again,' 'We all became poor together,' and 'He got well with medicine'). In one accepted Denominative example, the Denominative is combined with the Causative *-n*, and the Denominative occurs in first position (both extensions appear in bold): *mi dom-**ɗ-in**-ii mo* 'I made him thirsty'. This is as expected, since the Causative attaches to verb stems, so the root would have to be converted to a verb by the Denominative suffix before

accepting the Causative suffix. I will not discuss the Denominative or its ordering properties in further detail since the Denominative suffix is not common and it is not a verbal suffix, strictly speaking.

3.1.2. The -t suffixes

The *-t* suffixes have two primary meanings: Separative and Repetitive. I treat these as two separate suffixes because, as will be discussed, they have different distributions and different ordering properties when combined with other suffixes. The Fuuta Tooro consultant does not volunteer forms with a *-t* suffix to give the Reflexive, Retaliative, or Intensive meanings as found in Gombe Fula.

3.1.2.1. The Separative -t suffix

The Separative suffix corresponds roughly in meaning to Arnott's (1970:340) Reversive suffix. I have relabelled this suffix as Separative because in Fuuta Tooro, the Separative appears only to occur with verbs that involve putting objects together in some way, so that the extended verb has a meaning relating to the separation of objects[5]. Examples are shown below.

(16)

mi	udd-it-ii	baafal	ŋgal
1sg	close-SEPAR-past	door	det.
'I opened the door'			
mi	soom-t-ii	gawri	
1sg	bundle-SEPAR-past	millet	
'I un-bundled millet'			
o	sok-t-ii	baafal	ŋgal
3sg	lock-SEPAR-past	door	det.
'he unlocked the door'			
mi	haɓɓ-it-ii	ɓoggol	ŋgol
1sg	tie-SEPAR-past	rope	det.
'I untied the rope'			

3.1.2.2. The Repetitive -t suffix

The Repetitive suffix is homophonous with the Separative suffix, but is less restricted in its distribution than the Separative suffix. It appears that virtually any verb can have a Repetitive form. Those verb roots that can take the Separative suffix have homophonous forms with Repetitive meanings; for example, *mi haɓɓ-**it**-ii ɓoggol ŋgol* can mean either 'I untied the rope' or 'I tied the rope again'.

(17)
mi	yaa-t-ii		
1sg	go-REPET-past		
'I went again'			
o	haal-t-ii		
3sg	speak-REPET-past		
'he spoke again'			
o	def-t-ii	faataata	
3sg	cook-REPET-past	sweet potato	
'he cooked a sweet potato again'			
min	cok-t-ii	baafal	ŋgal
1pl	lock-REPET-past	door	det.
'we locked the door again'			
mi	udd-it-ii	baafal	ŋgal
1sg	close-REPET-past	door	det.
'I closed the door again'			

3.1.3. The Comprehensive/Associative -d suffix

The *-d* suffix in Fuuta Tooro seems to have the same functions as in Gombe Fula. As was discussed earlier, the Comprehensive and Associative *-d* suffixes distinguished by Arnott (1970:346) on the basis of their syntactic distribution are probably better analyzed as a single suffix with a pluralizing and/or comprehensive meaning. The same is true in Fuuta Tooro, since there is no phonological, morphological, or semantic distinction between Comprehensive and Associative, and since the meanings are similar. Some uses of this suffix are shown in the examples below.

(18)
o	haal-d-ii	e	am
3sg	speak-ASSOC-past	with	1sg
'he spoke with me'			
mi	yaa-d-ii	e	makko
1sg	go-ASSOC-past	with	3sg
'I went with her'			
ɓe	ŋgudd-id-ii	baafal	ŋgal
3pl	close-COMP-past	door	det.
'they all closed the door together'			
min	cok-d-ii	baafal	ŋgal
1pl	lock-COMP-past	door	det.
'we all locked the door together'			

mi	haɓɓ-id-ii	ɓoggi	ɗi
1sg	tie-COMP-past	ropes	det.

'I tied all the ropes'

The English translation of the example *mi haɓɓ-**id**-ii ɓoggi ɗi* 'I tied all the ropes' is consistent with at least two interpretations: one in which all of the ropes are tied in sequence, and one in which all are tied simultaneously. However, only the latter reading occurs in Pulaar. In every example where the Comprehensive applies to plural objects of an action, the action is understood to occur all at once rather than iteratively.

3.1.4. The -n Causative suffix

The *-n* Causative suffix appears to behave identically to the Gombe Fula Causative. Although the Fuuta Tooro consultant often first volunteers a periphrastic construction rather than using *-n* when a Causative is elicited, he uses *-n* productively with a wide range of verb roots when prompted to give a 'shorter' form. The consultant reports that the *-n* suffix is used more commonly in other dialects than in his own, but he nonetheless judges Causative forms using *-n* to be correct and natural. Some examples are shown below.

(19)

o	haɓɓ-in-ii	kam	ɓoggol	ŋgol
3sg	tie-CAUS-past	1sg	rope	det.

'he made me tie the rope'

o	jaŋŋg-in-ii	kam
3sg	learn-CAUS-past	1sg

'he taught me'

min	ñaam-n-ii	mo
1pl	eat-CAUS-past	3sg

'we fed her'

ɓe	njaal-n-ii	mo
3sg	laugh-CAUS-past	3sg

'they made him laugh'

mi	dog-n-ii	ɓe
1sg	run-CAUS-past	3pl

'I made them run'

o	irt-in-ii	kam	supu	o
3sg	stir-CAUS-past	1sg	soup	det.

'he made me stir the soup'

o	ñoot-in-ii	kam	simis	o
3sg	sew-CAUS-past	1sg	shirt	det.

'she made me sew the shirt'

3.1.5. The Modal -r suffix

As discussed with respect to the Gombe Fula *-r* suffixes, the Modal/Instrumental and Locative *-r* suffixes may be best analyzed as a single suffix in Gombe Fula, and the same is true of these suffixes in Fuuta Tooro. Both suffixes introduce a noun phrase, and both indicate something about the way in which an action is done—in what way, using what tool, or in what location. I therefore treat these suffixes as a single Modal suffix. In this dialect, the most common usage of *-r* is the Instrumental. Examples of its use are provided below.

(20)

mi	udd-ir-ii	baafal	ŋgal	sawru	
1sg	close-MODAL-past	door	det.	stick	

'I closed the door with a stick'

mi	haɓɓ-ir-ii	ɓoggol	ŋgol	juudʗe	am
1sg	tie-MODAL-past	rope	det.	hands	1sg

'I tied the rope with my hands'

ɓe	talɠ-ir-ii	ɓoggol	ŋgol	laɓi
3pl	cut-MODAL-past	rope	det.	knife

'they cut the rope with a knife'

mi	irt-ir-ii	supu	o	kuddu
1sg	stir-MODAL-past	soup	det.	spoon

'I stirred the soup with a spoon'

o	sok-r-ii	baafal	ŋgal	coktirgal
3sg	lock-MODAL-past	door	det.	key

'she locked the door with a key'

min	ñoot-ir-ii	simis	o	meselal
1sg	sew-MODAL-past	shirt	det.	needle

'I sewed the shirt with a needle'

o	dog-r-ii	paʗe
3sg	run-MODAL-past	shoes

'he ran with shoes'

Now that the consonantal suffixes have been introduced, in the following section I present data showing the relative order of these suffixes when they occur in combination.

3.2. Order of the consonantal suffixes

This study of suffix ordering was undertaken to test the extent to which the fixed 'TDNR' order proposed by Arnott (1970) is upheld, particularly in cases where adherence to this ordering principle is in conflict with the order predicted by the Scope Hypothesis (Rice 2000) and other proposals relating order to scope (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998), since as discussed earlier, Arnott (1970) does not provide any examples where the order of suffixes does not correspond to their scope. As I will demonstrate in this section, the order of consonantal suffixes in Fuuta Tooro corresponds closely with their scope, and the 'TDNR' generalization plays no role. In this section, I go through each possible pairwise combination of the 'TDNR' suffixes, giving examples of each and discussing the extent to which the ordering of each pair corresponds to their scope[6]. After looking at the Fuuta Tooro data and a theoretical account of affix order in this dialect, we will return in section 4 to Arnott's (1970) Gombe Fula data to determine whether scope may also be a better predictor of affix order in that dialect as well. Note that in the discussion in this section, when I refer to the 'Scope Hypothesis', this is meant to include not only the specific hypothesis by that name advanced by Rice (2000), but also the previous proposals relating affix order to scope (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998).

The relative ordering of the Separative *-t* with the Comprehensive *-d* exhibits an alternation that correlates directly with scope. When the Separative has scope over the Comprehensive, the Comprehensive *-d* is ordered before the Separative *-t* (21). We know that Separative has scope over Comprehensive in these examples because the action is described iteratively. Recall from section 3.1.3 that when the Comprehensive applies to multiple objects, the action is understood to take place on all objects simultaneously. When Separative applies to the result of a Comprehensive action, however, the 'undoing' action does not necessarily take place simultaneously, since Separative does not contribute a simultaneity meaning. Thus, the iterative reading in (21) follows directly from the fact that Separative has scope over Comprehensive, as reflected in the ordering of the Separative outside the Comprehensive.

(21) D-T

mi	udd-id-it-ii	baafe	ɗe	fof
1sg	close-COM-SEP-past	door	det.	all

'I opened all the doors (in sequence)'

D-T

mi	haɓɓ-id-it-ii	ɓoggi	ɗi	fof
1sg	tie-COM-SEP-past	ropes	det.	all

'I untied all the ropes (in sequence)'

D-T
o sok-d-it-ii baafe ɗe fof
3sg lock-COM-SEP-past doors det. all
'he unlocked all the doors (in sequence)'

As predicted by the Scope Hypothesis, when the Comprehensive has scope over the Separative, the Separative *-t* is ordered before the Comprehensive *-d*(22). We know that Comprehensive has scope over Separative in these examples because the 'undoing' action in each example occurs all at once. This meaning of simultaneity is contributed by the Comprehensive, and the only way that the simultaneity can apply to the 'undoing' action (and not just the original action) is if the Comprehensive applies to a stem that already includes the Separative meaning. Thus, the Separative attaches first, and the Comprehensive attaches to the output of Separative affixation, as reflected in the ordering of the Comprehensive outside the Separative.

(22) T-D
mi udd-it-id-ii baafe ɗe fof
1sg close-SEP-COM-past door det. all
'I opened all the doors (at once)'

T-D
mi haɓɓ-it-id-ii ɓoggi ɗi fof
1sg tie-SEP-COM-past ropes det. all
'I untied all the ropes (at once)'

T-D
o sok-t-id-ii baafe ɗe fof
3sg lock-SEP-COM-past doors det. all
'he unlocked all the doors (at once)'

The ordering of the Repetitive with the Comprehensive is also consistent with scope. The Repetitive *-t* is ordered after the Comprehensive *-d* when the Repetitive has scope over the Comprehensive (23)[7]. The fact that Repetitive has scope over Comprehensive is evidenced by the fact that the repetitive meaning in each case applies not only to the verb, but also to the same participants referred to by the Comprehensive. For example, *o haal-**d-it**-ii e am* 'he spoke with me again' means not only that he spoke once before and spoke again, this time with me. It means, more specifically, that he spoke once before with me and spoke again with me. We can understand this if we assume that the Comprehensive applies first to the verb, and then the Repetitive applies to the verb with the Comprehensive already affixed to it. This is reflected in the ordering of the Repetitive *-t* after the Comprehensive *-d*.

(23) D-T
o haal-d-it-ii e am
3sg speak-COM-REP-past with 1sg
'he spoke with me again' (he spoke with me before)

D-T
mi yaa-d-it-ii e makko
1sg go-COM-REP-past with 3sg
'I went with her again' (I went with her before)

D-T
o def-d-it-ii e makko faataata
3sg cook-COM-REP-past with 3sg sweet potato
'he cooked a sweet potato with her again' (he cooked a sweet potato with her before)

When the Comprehensive has scope over the Repetitive (24), the Repetitive *-t* is always ordered first. These examples cannot be produced with the Comprehensive *-d* ordered first, because this produces readings as in (23) above where the same participants were involved in both the original and repeated action. In the examples shown below, the evidence for Comprehensive having scope over Repetitive is that the same participants are not necessarily involved in both the original and repeated actions. The Repetitive applies only to the verb, and then the Comprehensive applies to the output of Repetitive affixation, which is a repeated action. Thus, the subjects/objects referred to by the Comprehensive participate in the repeated action but not necessarily in the original action. The ordering of the Comprehensive *-d* outside the Repetitive *-t* is therefore consistent with the scope of the suffixes.

(24) T-D
ɓe ŋgudd-it-id-ii baafal ŋgal
3pl close-REP-COM-past door det.
'they all closed the door again together' (someone else closed it before)

T-D
ɓe kaɓɓ-it-id-ii ɓoggol ŋgol
3pl tie-REP-COM-past rope det.
'they all tied the rope again together' (someone else tied it before)

T-D
min cok-t-id-ii baafal ŋgal
1pl lock-REP-COM-past door det.
'we all locked the door again together' (someone else locked it before)

Although as mentioned in section 3.1.4 the Causative *-n* is apparently not as commonly used in this dialect as are the other consonantal extensions, the consultant nonetheless has clear intuitions regarding its use and compatibility with other verbal extensions. As shown in (25), the Causative *-n* is ordered after the Separative *-t*. This is consistent with the scope of the suffixes, since the Causative refers not to the original action, but to the 'undoing'. Thus, the Causative applies to a verb that already has the separative meaning, which is consistent with the ordering of the Causative *-n* outside the Separative *-t*.

(25) T-N

o	udd-it-in-ii	kam	baafal	ŋgal	(*o udd-in-it-ii kam)
3sg	close-SEP-CAU-past	1sg	door	det.	

'he made me open the door'

T-N

o	haɓɓ-it-in-ii	kam	ɓoggol	ŋgol	(*o haɓɓ-in-it-ii kam)
3sg	tie-SEP-CAU-past	1sg	rope	det.	

'he made me untie the rope'

If order is scope-based, we predict that the opposite ordering of these affixes should correspond to the opposite scope relation between the two, as was seen in the examples shown above where Separative-Comprehensive and Repetitive-Comprehensive were combined. In the case of Causative-Separative, however, it is impossible to find an ordering alternation corresponding to a meaning change because it is apparently impossible for Separative to have scope over Causative. This can be explained by the fact that Separative generally applies to a verb whose semantics involve putting things together. Thus, in order for Separative to apply to a Causative, the entire Causative verb would have to have a 'putting together' meaning. There are apparently no verbs corresponding to 'make be together' that use the Causative suffix, such that a Separative would be expected to attach to the Causativised stem. Even if the Separative were found to have the less restricted meaning of the Reversive in Gombe Fula and were therefore not limited to verbs with the 'putting together' meaning, we would not necessarily expect to find forms where Reversive had scope over Causative. This is because of the pragmatically marked nature of 'uncausing'. Perhaps the nature of 'causing' in Fuuta Tooro (as in English) is such that it generally cannot be reversed, except perhaps in some very specific and/or uncommon contexts. Given the apparent impossibility of 'uncausing', the fixed order of the Separative before the Comprehensive is predicted by the Scope Hypothesis.

When the Repetitive *-t* combines with the Causative *-n*, both orderings are acceptable, corresponding to scope. When the Repetitive has scope over the Causative, the Causative *-n* precedes the Repetitive *-t* (26). The scope relation

is made clear by the fact that in these examples, it is required that the same agent caused both the original action and the repetition of the action. Thus, the repetitive meaning must apply to the Causativised verb, corresponding to the ordering of the Repetitive suffix outside the Causative suffix. Beneath the English glosses in the examples below, I give a bracketed version of the gloss to show how the wide scope of the repetitive corresponds to the 'same agent' meaning implied in each example sentence.

(26) N-T
o jaŋŋg-in-it-ii kam
3sg learn-CAU-REP-past 1sg
'he taught me again' (he taught me before)
[[he taught me] again]

N-T
min ñaam-n-it-ii mo
1pl eat-CAU-REP-past 3sg
'we fed her again' (we fed her before)
[[we fed her] again]

N-T
o ɗaan-in-it-ii kam
3sg sleep-CAU-REP-past 1sg
'she put me to sleep again' (she put me to sleep before)
[[she put me to sleep] again]

N-T
o sood-in-it-ii een deftere nde
3sg buy-CAU-REP-past 1pl book det.
'she made us buy the book again' (she made us buy the book before)
[[she made us buy the book] again]

As predicted by the Scope Hypothesis, the opposite order of the Causative and Repetitive suffixes corresponds to the opposite scope relation from that seen in the examples given above. When the Causative has scope over the Repetitive (27), the Repetitive *-t* suffix precedes the Causative *-n*. The scope relation is evidenced by the fact that in each of these sentences, the original action is understood to have been done voluntarily rather than being caused by the same agent who causes the repeated action. Thus, the Repetitive applies to the bare verb, and the Causative applies to the Repetitive verb, meaning that the causation applies to the repeated action (and not necessarily to the original action). As in the examples above, I provide bracketed glosses under the English glosses in each example below to illustrate the narrow scope of the Repetitive.

(27) T-N
o jaŋŋg-it-in-ii kam
3sg learn-REP-CAU-past 1sg
'he made me learn again' (I learned before voluntarily)
[he made me [learn again]]

T-N
min ñaam-t-in-ii mo
1pl eat-REP-CAU-past 3sg
'we made her eat again' (she ate before voluntarily)
[we made her [eat again]]

T-N
o ñaam-t-in-ii kam
3pl eat-REP-CAU-past 1sg
'he made me eat it again' (I ate it before voluntarily)
[he made me [eat it again]]

T-N
o sood-it-in-ii een deftere nde
3sg buy-REP-CAU-past 1pl book det.
'she made us buy the book again' (we bought the book before voluntarily)
[she made us [buy the book again]]

The relative order of the Separative *-t* and Modal *-r* corresponds to their scope. In the examples below in (28), the Modal has scope over the Separative, as indicated by the fact that the instrument in each example is used to undo the action and not necessarily to do the original action. For example, in 'I opened the door with a stick,' it is understood that the stick is used to open the door, not that the stick is used to close the door, as would be the case if the Separative had scope over the Modal. Thus, the scope of the two suffixes in these examples corresponds to the ordering of the Modal *-r* outside the Separative *-t*.

(28) T-R
mi udd-it-ir-ii baafal ŋgal sawru (*mi udd-ir-it-ii)
1sg close-SEP-MOD-past door det. stick
'I opened the door with a stick

T-R
o haɓɓ-it-ir-ii ɓoggol ŋgol juŋŋgo makko (*o haɓɓ-ir-it-ii)
3sg tie-SEP-MOD-past rope det. hands 3sg
'he untied the rope with his hands'

T-R
a sok-t-ir-ii baafal ŋgal coktirgal (*a sok-r-it-ii)
2sg lock-SEP-MOD-past door det. key
'you (sg.) unlocked the door with a key'

It is apparently impossible to produce a single verb form where Separative has scope over Modal. When asked to produce such a form corresponding to, e.g., 'we un-sewed the shirts with a needle,' ([we un-[sewed the shirts with a needle]]) where the needle was used to do the sewing but not the unsewing, the speaker is unable to express this in Pulaar with a single verb. The forms **min ñoot-**ir-it**-ii* and **min ñoot-**it-ir**-ii* are unequivocally rejected. Therefore, we are unable to test the prediction of the Scope Hypothesis that the Separative suffix should occur after the Modal suffix when Separative has scope over Modal.

When Modal has scope over Repetitive, as in the examples shown in (29) below, the Modal *-r* suffix is ordered after the Repetitive *-t* suffix. This is as predicted by the Scope Hypothesis. It is clear in these examples that Modal has scope over Repetitive because in each example, it is specified that a different instrument is used to do the original vs. the repeated action. This reading follows if the Repetitive applies to the verb first, and then the Modal applies to the Repetitive stem, such that the use of the instrument introduced by the Modal applies to the repeated action, but not necessarily to the original action.

(29) T-R

o	udd-it-ir-ii	baafal	ŋgal	sawru	woɗndu	(*o udd-ir-it-ii)
3sg	close-REP-MOD-past	door	det.	stick	different	

'he closed the door again with a different stick'

T-R

mi	irt-it-ir-ii	supu	o	kuddu	goɗɗo	(*mi irt-ir-it-ii)
1sg	stir-REP-MOD-past	soup	det.	spoon	different	

'I stirred the soup again with a different spoon'

T-R

o	sok-t-ir-ii	baafal	ŋgal	coktirgal	goɗŋgal	(*o sok-r-it-ii)
3sg	lock-REP-MOD-past	door	det.	key	different	

'she locked the door again with a different key'

R

mi	udd-ir-ii	baafal	ŋgal	juuɗe	am
1sg	close-MOD-past	door	det.	hands	1sg

'I closed the door with my hands . . .

T-R

mi	udd-it-ir-ii	baafal	ŋgal	sawru	(*mi udd-ir-it-ii)
1sg	close-REP-MOD-past	door	det.	stick	

then I closed the door again with a stick'

When Repetitive has scope over Modal, the Modal *-r* suffix is ordered after the Repetitive *-t* suffix, as shown in the examples below in (30).

(30) T-R

mi	udd-it-ir-ii	baafal	ŋgal	sawru	(*mi udd-ir-it-ii)
1sg	close-REP-MOD-past	door	det.	stick	

'I closed the door with a stick again' (the same stick)

T-R

mi	haɓɓ-it-ir-ii	ɓoggol	ŋgol	juuɗe	am	(*mi haɓɓ-ir-it-ii)
1sg	tie-REP-MOD-past	rope	det.	hands	1sg	

'I tied the rope with my hands again'

T-R

o	sok-t-ir-ii	baafal	ŋgal	coktirgal	(*o sok-r-it-ii)
3sg	lock-REP-MOD-past	door	det.	key	

'she locked the door with a key again' (the same key)

This is the first example we have seen in which the order of suffixes does not correspond to their scope. Based on the Scope Hypothesis, we would have expected the Repetitive *-t* to be ordered after the Modal *-r* in these examples. We know that Repetitive has scope over Modal in these examples because it is understood in each example that the same instrument is used to do both the original and repeated actions. This corresponds to the application of the Modal to the verb root, and then application of the Repetitive to the verb that already has an instrument, such that the repetition of the action involves the use of the same instrument. Since this ordering is fixed and inviolable with no apparent semantic explanation for the rejection of the **-r-t* order, I assume the *-t-r* order is fixed as part of the morphological template. This will be accounted for in the analysis to be presented in section 3.3.

The ordering of the Causative *-n* with the Comprehensive *-d* depends upon their relative scope. When the Comprehensive has scope over the Causative, the Causative *-n* precedes the Causative *-d* (31), and forms with the order *-d-n* are not compatible with this reading. Below each English gloss in the examples below, I give a bracketed gloss indicating that Comprehensive has wide scope, so that the 'joint action' meaning applies to the Causativised verb, not just to the bare verb root. As can be seen, the order of the suffixes corresponds to their scope.

(31) N-D

ɓe	jaŋŋg-in-id-ii	mo
3pl	learn-CAU-COM-past	3sg

'they taught him together'
[[they taught him] together]

N-D

ɓe	ñaam-n-id-ii	rawaandu	ndu
3pl	eat-CAU-COM-past	dog	det.

'they fed the dog together'
[[they fed the dog] together]

N-D
ɓe njal-n-id-ii mo
3pl laugh-CAU-COM-past 3sg
'we all made him laugh together'
[[we all made him laugh] together]

When Causative has scope over Comprehensive, the Causative *-n* is ordered after the Comprehensive *-d*, as predicted by the Scope Hypothesis. However, there is an added complication that the opposite ordering, *-n-d*, is also apparently compatible with this reading, as seen in the examples below in (32).

(32) D-N N-D
mi woy-d-in-ii ɓe ∼ mi woy-n-id-ii ɓe
1sg cry-COM-CAU-past 3pl 1sg cry-CAU-COM-past 3pl
'I made them cry together'

D-N N-D
a dog-d-in-ii min ∼ a dog-n-id-ii min
2sg run-COM-CAU-past 1pl 2sg run-CAU-COM-past 1pl
'you (sg.) made us run together'

D-N N-D
mi jaŋŋg-id-in-ii ɓe ∼ mi jaŋŋg-in-id-ii ɓe
1sg learn-COM-CAU-past 3pl 1sg learn-CAU-COM-past 3pl
'I made them learn together'

This may be due simply to the difficulty of constructing an English stimulus where Causative unambiguously has scope over Comprehensive. For example, in 'I made them learn together,' where the intended meaning is that the causees are made to learn with each other, there is another possible interpretation where the causees are each made separately to learn; e.g., they were taught simultaneously to do two different things. Thus, when the speaker is presented with English sentences such as these, he may interpret them such that the Comprehensive has over the Causative in these examples, and this would explain why the ordering *-n-d* is accepted in these examples. The meaning difference is too subtle and context-dependent to elicit, so I leave this issue for further investigation in conversational and narrative situations. The Scope Hypothesis predicts that if a context can be found for these verbs in which Causative has unambiguous Scope over Comprehensive, then the order of the suffixes will be *-d-n*, and *-n-d* will be disallowed.

When the Comprehensive combines with the Modal so that Comprehensive has scope over Modal, the Comprehensive *-d* is ordered after the Modal *-r*, as seen in the examples in (33). The scope relation is indicated by the fact that in

these examples, a different instrument is used to perform the action on each object.

(33) R-D

mi	sok-r-id-ii	baafe	ɗe	coktirgal	goɗŋgal
1sg	lock-MOD-COM-past	doors	det.	key	different

'I locked each of the doors with a different key'

R-D

o	udd-ir-id-ii	baafe	ɗe	sawru	woɗndu
3sg	close-REP-MOD-past	doors	det.	stick	different

'he closed each of the doors with a different stick'

When the Modal has scope over the Comprehensive, as in the examples in (34), the Modal *-r* is ordered after the Comprehensive *-d*. The fact that the Modal has scope over the Comprehensive in these examples is evidenced by the fact that the same instrument is used to perform the action on each object. This is consistent with the application of the Modal (introducing the instrument) to a verb stem that already has the comprehensive meaning, such that the instrument applies to all of the objects referred to by the Comprehensive.

(34) D-R

mi	sok-d-ir-ii	baafe	ɗe	coktirgal
1sg	lock-COM-MOD-past	doors	det.	key

'I locked all of the doors with a key' (the same key)

D-R

mi	ñoot-id-ir-ii	simisaaji	meselal
1sg	sew-COM-MOD-past	shirts	needle

'I sewed all the shirts with a needle' (the same needle)

D-R

o	talʃ-id-ir-ii	ɓoggi	ɗi	laɓi
3sg	cut-COM-MOD-past	ropes	det.	knife

'she cut all the ropes with a knife' (the same knife)

The final possible pairwise combination of consonantal suffixes exhibits some interesting variation that does not follow from the Scope Hypothesis. When the Causative has scope over the Modal, we expect the Causative *-n* to be ordered outside the Modal *-r*. We do find this order corresponding to this scope reading. However, as shown in (35), the opposite ordering of these suffixes can also yield the same scope reading. That is, for each example, either order of these suffixes is permitted with no apparent meaning difference corresponding to the two orderings.

(35) R-N

o	irt-ir-in-ii	kam	supu	o	kuddu	∼
3sg	stir-MOD-CAU-past	1sg	soup	det.	spoon	

N-R

o	irt-in-ir-ii	kam	supu	o	kuddu
3sg	stir-CAU-MOD-past	1sg	soup	det.	spoon

'he made me stir the soup with a spoon' (I used a spoon)

R-N

o	ñoot-ir-in-ii	kam	simis	o	meselal	∼
3sg	sew-MOD-CAU-past	1sg	shirt	det.	needle	

N-R

o	ñoot-in-ir-ii	kam	simis	o	meselal
3sg	sew-CAU-MOD-past	1sg	shirt	det.	needle

'she made me sew the shirt with a needle' (I used a needle)

This variable order is problematic with respect to the Scope Hypothesis. Since there is a clear scope relation between the Causative and Modal in these examples, the Scope Hypothesis predicts that we should find only the scope-based order.

We find the same pattern of variability when the Modal has scope over the Causative, as in (36). Here, we expect that the Modal *-r* should be ordered after the Causative *-n*, but we find that the opposite order can also be used with the same meaning.

(36) N-R

o	irt-in-ir-ii	kam	supu	o	laɓi	∼
3sg	stir-CAU-MOD-past	1sg	soup	det.	knife	

R-N

o	irt-ir-in-ii	kam	supu	o	laɓi
3sg	stir-MOD-CAU-past	1sg	soup	det.	knife

'he made me stir the soup with a knife' (he used a knife)

Again, since there is a clear scope relation between the Causative and Modal, the Scope Hypothesis predicts that we should find only the scope-based order. The fact that the opposite order is also allowed here as well as in (35) will need to be accounted for via a mechanism other than that used to generate scope-based order.

We have now seen examples of each possible pairwise combinations of the consonantal extensions. Based on the above combinations, the generalizations regarding the ordering of consonantal verb suffixes in Fuuta Tooro Pulaar are given in (37).

(37) a. Repetitive *-t* precedes Modal *-r* regardless of scope

b. Causative *-n* and Modal *-r* are freely ordered regardless of scope

c. Otherwise, order is determined by scope

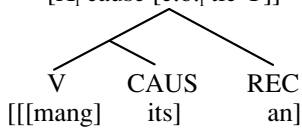
In section section 3.3 below, I provide an analysis of affix order in Fuuta Tooro that accounts for these generalizations.

3.3. A scope/template analysis of Fuuta Tooro affix order

Given the above generalizations, the order of consonantal suffixes in Fuuta Tooro can be analyzed as a mixed Scope-Template system similar to Mirror-Template system in Chichewa described by Hyman (2003), where affix order is determined via the interaction of constraints representing the Mirror Principle (Baker 1985) and a language-specific morphological template. In the case of Fuuta Tooro, the templatic constraints outrank SCOPE, since while scope determines most orderings, some specific templatic orderings apply regardless of the intended scope reading (as in the examples in (30) where the Repetitive *-t* is ordered before Modal *-r* in contradiction to the scope relation between the suffixes).

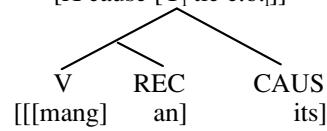
Hyman's (2003) analysis of Chichewa involves argument structure-changing affixes whose scope relations are generally very clear and whose order follows in part from the Mirror Principle, so that the order of affixation 'mirrors' the order of syntactic operations. For example, in combinations of the Causative *-its* suffix and the Reciprocal *-an* suffix, the outer suffix has scope over the inner suffix, as shown in (38) (p. 247).

(38) a. Reciprocalized Causative
[X_i cause [e.o.$_i$ tie Y]]



'cause each other to tie'

b. Causativized Reciprocal
[X cause [Y_i tie e.o.$_i$]]



'cause to tie each other'

A 'CARP' template (where the order of affixes is **C**ausative-**A**pplicative-**R**eciprocal-**P**assive) exerts a different pressure, and it is the interaction of this template with the Mirror Principle that determines Chichewa affix order. The situation is complicated by some forms where orderings obeying the CARP template can have two different scope readings (which Hyman accounts for via variable constraint ranking), but the different forms in (38a) and (38b) are selected when MIRROR(R,C) ('The morphosyntactic input [[[. . .] REC] CAUS] is

realized Verb-an-its') is ranked above TEMPLATE ('A morphosyntactic input is realized according to CARP'). Sample tableaux are given in (39) (modified from Hyman's tableaux on pp. 251–252).

(39) a. mang-its-an- 'cause each other to tie'
CAUS-REC

	[[[mang] C] R]	MIRROR(R,C)	TEMPLATE
☞	mang-its-an-		
	mang-an-its-	*!	*

b. mang-an-its- 'cause to tie each other'
REC-CAUS

	[[[mang] R] C]	MIRROR(R,C)	TEMPLATE
	mang-its-an-	*!	
☞	mang-an-its-		*

Note that Hyman (2003) collapses the CARP template into a single constraint. An alternative would be to give separate constraints for each pairwise combination, such that Causative precedes Applicative, Causative precedes Reciprocal, etc. As we will see, an analysis of Fuuta Tooro Pulaar along these lines requires breaking down the TEMPLATE constraint. The three TEMPLATE constraints for Fuuta Tooro are given in (40).

(40) T_{REP} > R: Repetitive *-t* precedes Modal *-r*.
N > R: Causative *-n* precedes Modal *-r*.
R > N: Modal *-r* precedes Causative *-n*.

As will be shown, the ordering of the Repetitive *-t* before Modal *-r* can be enforced by the constraint T_{REP} > R above. The variable ordering of Causative *-n* and Modal *-r* is selected by the constraints N > R and R > N shown above; as we will see, variable ranking of these two constraints with respect to the scope constraint allows us to select forms with either order, regardless of scope.

Hyman's Chichewa examples have affixes that add or change arguments, such that the order of syntactic operations can be deduced. Therefore, the Mirror

Principle and the corresponding MIRROR constraint are appropriate to account for the patterns observed in Chichewa. For Fuuta Tooro, semantic scope-based ordering (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998, Rice 2000) seems to be a more appropriate concept to use since many of the affixes we are considering have no effect on argument structure (e.g., the Repetitive) and therefore the order of 'syntactic operations' is not obvious. In this analysis, therefore, I will use Condoravdi and Kiparsky's (1998) SCOPE constraint (41) rather than Hyman's MIRROR as the constraint that interacts with the templatic constraints.

(41) SCOPE: Morphological constituency reflects scope.

In this analysis, forms involving multiple verbal suffixes will be selected by ranking templatic constraints ahead of SCOPE, such that scope determines the ordering as long as the template is not violated. The tableau in (42) shows the need for the ranking $T_{REP} > R \gg$ SCOPE. In this example, the Repetitive has scope over the Modal, as evidenced by the fact that the same instrument is used for both the original and repeated action. Thus, the SCOPE constraint will be satisfied here by the order *-r-t* (Modal precedes Repetitive). However, the optimal output corresponding to this meaning has the opposite order, *-t-r*. This is modelled by ranking $T_{REP} > R$ ahead of SCOPE, so that in examples such as this, satisfaction of the template forces a violation of SCOPE.

(42) mi udd-it-ir-ii baafal ŋgal sawru 'I closed the door with a stick again'
REP-MOD (same stick)

	/udd, -t, -r/	$T_{REP} > R$	SCOPE
☞	udd-it-ir-		*
	udd-ir-it-	*!	

As shown in the tableau in (43), the ranking $T_{REP} > R \gg$ SCOPE also successfully selects forms where the template and scope agree. In this example, the use of a different instrument to do the original vs. repeated action indicates that Modal has scope over Repetitive. Thus, the SCOPE constraint is satisfied by forms with the *-t-r* ordering (i.e., where the Modal is ordered outside the Repetitive). The candidate that satisfies SCOPE also satisfies $T_{REP} > R$, so in this case the winning candidate satisfies both constraints.

(43) mi irt-it-ir-ii supu o kuddu goɗɗo 'I stirred the soup again with a different spoon'
REP-MOD

	/irt, -t, -r/	$T_{REP} > R$	SCOPE
☞	irt-it-ir-		
	irt-ir-it-	*!	*

For completeness, I demonstrate below that this constraint ranking also correctly selects forms in which the template underdetermines the order, allowing SCOPE to select the optimal candidate (44). In this example, the two suffixes that are being combined are Comprehensive and Separative. The TEMPLATE constraint $T_{REP} > R$ has no bearing on the relative order of these two suffixes, so this constraint is satisfied by either order. Thus, the selection of the output is left to SCOPE. Here, Separative has scope over Comprehensive (evidenced by the iterative rather than simultaneous reading; see examples (21) and (22) and surrounding discussion). Thus, SCOPE is satisfied by a form with the Separative ordered outside the Comprehensive (*-d-t*), so the optimal candidate has this ordering.

(44) mi haɓɓ-id-it-ii ɓoggi ɗi 'I untied all the ropes (in sequence)'
COM-SEP

	/haɓɓ, -t, -d/	$T_{REP} > R$	SCOPE
	haɓɓ-it-id-		*!
☞	haɓɓ-id-it-		

The ranking of the constraints N > R and R > N is somewhat more complex since these constraints need to produce variable affix order (recall from the examples in (35) and (36) and relevant discussion in section 3.2 that *-n* and *-r* exhibit free ordering regardless of their scope relation). I analyse this phenomenon via two different constraint rankings. In the first ranking, the constraint N > R outranks R > N and SCOPE. This selects forms in which the Causative *-n* is ordered before Modal *-r*, regardless of whether this ordering agrees with the scope of the suffixes. In (45), SCOPE is satisfied by the order *-r-n* since the Causative has scope over the Modal (indicated by the fact that the causee, not the causer, uses the instrument). However, because N > R outranks SCOPE, the form with the opposite order, *-n-r*, is selected.

(45) o irt-in-ir-ii kam supu o kuddu 'he made me stir the soup with a spoon'
CAU-MOD (I used a spoon)

	/irt, -r, -n/	N > R	R > N	SCOPE
☞	irt-in-ir-		*	*
	irt-ir-in-	*!		

In (46), the SCOPE constraint is satisfied by the order *-n-r* since Modal has scope over Causative (indicated by the fact that it is the causer, not the causee, who uses the instrument). Since the candidate with the *-n-r* order also satisfies the highly ranked N > R, this candidate is selected.

(46) o irt-in-ir-ii kam supu o laɓi 'he made me stir the soup with a knife'
CAU-MOD (he used a knife)

	/irt, -n, -r/	N > R	R > N	SCOPE
☞	irt-in-ir-		*	
	irt-ir-in-	*!	*	

In order to select forms where Modal *-r* is ordered before Causative *-n*, we need a second constraint ranking where R > N outranks N > R and SCOPE. This ranking selects forms with the ordering *-r-n* whether this order agrees with scope or not. In the example in (47), the SCOPE constraint is satisfied by a form with the order *-n-r* since the Modal has scope over the Causative (indicated by the fact that the causer, not the causee, uses the instrument). However, the highly ranked R > N constraint is satisfied here at the expense of a violation of SCOPE, and the *-r-n* order is selected even though this does not correspond to the scope of the suffixes.

(47) o irt-ir-in-ii kam supu o laɓi 'he made me stir the soup with a knife'
MOD-CAU (he used a knife)

	/irt, -n, -r/	R > N	N > R	SCOPE
	irt-in-ir-	*!		
☞	irt-ir-in-		*	*

In (48), the winning candidate satisfies both R > N and SCOPE. Here, SCOPE is satisfied by a form with the *-r-n* order since Causative has scope over Modal (indicated by the fact that the causee, not the causer, uses the instrument). Since this order also satisfies the highly ranked R > N, the winning candidate satisfies both constraints.

(48) o irt-ir-in-ii kam supu o kuddu 'he made me stir the soup with a spoon'
MOD-CAU (I used a spoon)

	/irt, -r, -n/	R > N	N > R	SCOPE
	irt-in-ir-	*!		*
☞	irt-ir-in-		*	

There is no conflict of T_{REP} > R with R > N and N > R. We are thus left with the two constraint rankings shown below.

(49) Ranking A: T_{REP} > R, N > R ≫ R > N, SCOPE
Ranking B: T_{REP} > R, R > N ≫ N > R, SCOPE

I assume that both rankings coexist in the speaker's grammar, and the choice between which ranking to apply for a given form is freely variable, since there appears to be no principle (semantic, pragmatic, social, or otherwise) behind the variable order of the Causative and Modal suffixes. The above analysis is not meant as an endorsement of variable ranking as the best way of modelling variation in OT; I have used variable ranking here simply because it is a relatively uncomplicated way of representing the observed variation.

In this section, I have proposed a straightforward OT account for the ordering of the consonantal suffixes in Fuuta Tooro. In this account, scope is the primary determiner of affix order, but in some specific combinations of affixes, a fixed ordering can override the scope principle. A full analysis of the order of all affixes in the language may require more morpheme-specific template constraints in addition to the three posited here, but I am claiming that the general scope-driven nature of affix ordering holds throughout the language. Since I have shown how scope drives affix order in Fuuta Tooro, in the next section I revisit Arnott's (1970) Gombe Fula examples and show that the scope generalization can replace the 'TDNR' generalization as a predictor of affix order in that dialect as well.

4. GOMBE FULA REVISITED

The results of the study of Fuuta Tooro Pulaar described above revealed that the Scope Hypothesis is very useful in accounting for the order of consonantal suffixes in that dialect. This raises the question of whether Gombe Fula may also yield to this type of analysis. In this section, I demonstrate that a scope-based analysis is not only consistent with Arnott's (1970) Gombe Fula data, but it also accounts for more of the data than did Arnott's own account involving fixed ordering.

Though the majority of Arnott's (1970) examples do obey the 'TDNR' generalization on the surface, they are all also consistent with the Scope Hypothesis. For instance, the example in (50) below obeys the 'TDNR' generalization, since the order of affixes is *-t-r*. However, this example also conforms to the Scope Hypothesis, since the adverb 'slowly,' which is introduced by the Modal suffix, applies to the Reversive action (opening), not to the original action (closing) which is being reversed. The Modal suffix applies to a verb to which Reversive has already applied, corresponding to the ordering of the Modal *-r* outside the Reversive *-t*.

(50) T-R

'o	maɓɓ-it-ir-ii	yolnde	hakkiilo
3sg	close-REV-MOD-past	door	slowly

'He opened the door slowly' (p. 367)

The suffix order exhibited in (51) below also conforms to the Scope Hypothesis in addition to the 'TDNR' generalization. In this example, the order of suffixes corresponds directly to the order of logical operations performed on the root. First, the Denominative *-ɗ* suffix attaches to the adjectival root, converting it into a verb stem meaning 'be healthy'. Then, the Repetitive *-t* suffix applies to this verb stem, yielding a new verb stem with the meaning 'be healthy again' (='be cured'). Next, the Causative *-n* suffix applies to this verb stem, resulting in a verb stem meaning 'make be cured' (='cure'). Finally, the Modal *-r* suffix attaches to this verb stem, introducing an instrument, giving the final meaning 'cure with (some new medicine)'. The order of attachment of the affixes is reflected directly in the order of the consonantal suffixes in this example: *-t-n-r* (Repetitive-Causative-Modal).

(51) T-N-R

'o	yam-ɗ-it-in-ir-ii	mo	lekki	gokki	kesi
$3sg_i$	healthy-DEN-[REP]-CAU-MOD-past	$3sg_j$	medicine	other	new

'He_i cured him_j with some new medicine' (p. 368)

Thus, the ordering generalization that Arnott (1970) accounts for using the 'TDNR' generalization can also be accounted for via the Scope Hypothesis. The two examples shown above are perhaps the clearest examples of this, but none of the other examples of the 'TDNR' order provided by Arnott (1970) contradicts the Scope Hypothesis.

Not only does the Scope Hypothesis account for Arnott's (1970) examples obeying the 'TDNR' generalization, but it also accounts for the forms that disobey the 'TDNR' generalization, which Arnott explained away as having lexicalised stems including the first extension. Recall that Arnott provides five exceptional example types. Of these, three can be explained straightforwardly based on the scope relations between affixes. First, in the form in (52), presumably the intended meaning is for the Repetitive *-t* to have scope over the Comitative *-d*.

(52) D-T

mi	wol-d-it-at-aa	'e	maɓɓe
1sg	speak-COM-REP-future-negative	with	3pl

'I won't speak with them again' (p. 368)

Ignoring the Negative for simplicity, the hypothetical form *mi-wol-**d**-**it**-ii 'e maɓɓe* 'I spoke with them again' would mean that the subject 'I' had spoken with the indirect objects 'them' and did so again. This can be schematised as [[speak with] again]. The alternative, probably unintended reading, schematised as [[speak again] with], would be that the subject 'I' and the indirect objects 'they' have previously performed the act of speaking separately and will do it again together. Thus, in this example, the order of the affixes corresponds to their scope.

Similarly, in (53), the Comitative *-d* most likely has scope over Causative *-n*, since the word 'fed' is used in the English translation; the alternative translation would have meant something more like, 'He made it so that they all ate'.

(53) N-D

'o	ñaam-n-id-ii	ɗi
3sg	eat-CAU-COM-past	3pl

'He fed them all' (p. 368)

Therefore, once again, this apparent exceptional form is explained straightforwardly based on the scope of the suffixes.

Finally, in (54), the Retaliative *-t* must have scope over the Causative *-n*, since the term 'frighten' in the English gloss means 'cause to fear'. Thus, the interpretation of this sentence is [[cause to fear] in turn], which corresponds directly to the ordering of the Retaliative outside the Causative, in violation of the 'TDNR' generalization.

(54) N-T

mi	hul-n-it-oo	mo
1sg	fear-CAU-RET-future	3sg

'I'll frighten him in turn' (p. 368)

The remaining two exceptional forms, *mi yaa-**r-id**-ii dì* 'I took them all' (p. 368) and *mi war-**t-ir-id**-an-te dì* 'I'll bring them all back to you' (p. 368) are difficult to interpret since in each case, the specific function of the Modal *-r* is unclear. However, given that three of Arnott's exceptional forms can be explained based on scope, and that neither the two remaining exceptional forms nor any of the 'TDNR' forms contain orderings that violate the Scope Hypothesis, then at the very least, we can say that Arnott did not provide evidence in favour of any principle other than scope for determining the order of consonantal extensions. The scope-based reanalysis allows us to explain the 'exceptional' forms, which Arnott chose to ignore. It also avoids the problem that Arnott's lexicalised stems did not behave like true lexicalised stems, since their meaning was straightforwardly derivable from their component parts rather than being idiomatic as 'frozen' forms often are.

We have seen in this section that the principle of scope-based ordering (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998, Rice 2000) allows a more complete account of the order of consonantal suffixes in Gombe Fula than did Arnott's (1970) 'TDNR' generalization. As we saw in the previous section, this is also true of the Fuuta Tooro dialect. In the following section, I discuss some theoretical implications of the scope-based analysis of Pulaar affix order that has been presented in this paper.

5. IMPLICATIONS

The analysis that I have presented has important consequences for at least two claims that have been advanced in the theoretical morphology literature. The first is a claim made by Rice (2000) relating to the Scope Hypothesis introduced in section 1.1, and the second is McCarthy and Prince's (1993a,b) proposed model of the phonology-morphology interface. As I discuss in this section, the facts of Pulaar affix order suggest that aspects of both of these proposals be reconsidered.

5.1. Implications for the Scope Hypothesis

Rice's (2000) Scope Hypothesis predicts that affix order corresponds to semantic scope. As we have seen in this paper, the facts of Gombe Fula and Fuuta Tooro Pulaar provide support for this prediction, since scope is an excellent predictor of affix order in both dialects. However, based on our analysis of Fuuta Tooro, it

appears that Rice's (2000:395) claim that templates have 'no theoretical status' is too strong. Rice claims that templates will only emerge when there is no scope relation between the affixes in question, but as was seen in section 3.2, there are examples in Fuuta Tooro where a fixed ordering between two suffixes blatantly contradicts the order expected based on their scope relation. In particular, recall that the Repetitive *-t* suffix always precedes the Modal *-r*, even in examples such as (30), where the Repetitive has scope over the Modal and therefore the opposite order is predicted. Examples such as this contradict Rice's claim that templatic ordering occurs only when there is no scope relation between the affixes in question, since in examples such as the one mentioned above, there is a clear scope relation between the affixes and yet their order is fixed.

The priority of scope-based analyses over templates therefore needs to be weakened. It may be better characterized as a methodological imperative for the linguist: look first for a semantic principle to account for affix order; failing this, make use of a template. In a sense, this follows from a more general strategy in descriptive linguistics: when a researcher first encounters a pattern, he/she first looks for a general explanation for it, and if no general explanation is readily available, then (and only then) the researcher proposes a specific mechanism in the grammar to account for the pattern. It does not follow from this strategy that there is 'no theoretical status' for arbitrary statements in grammar.

5.2. Implications for an OT model of phonology-morphology

In addition to the implications for Rice's (2000) Scope Hypothesis, Pulaar affix order also has implications for a particular Optimality Theory model of the phonology-morphology interface advanced by McCarthy and Prince (1993a,b). In this section, I discuss this model and how Pulaar *might* have provided an example of a phenomenon predicted by McCarthy and Prince's model. I then show that under the present analysis of affix order in Pulaar, this language does not actually exemplify the predicted phenomenon. This negative result is problematic for McCarthy and Prince's model since, as discussed by Paster (in press), there are no other known examples of this particular phenomenon.

McCarthy and Prince (1993a,b) propose modelling phonological effects in morphology by ranking phonological (P) constraints over morphological (M) constraints in OT, yielding the ranking schema 'P $\gg$ M'. This P $\gg$ M schema accounts for a wide range of phonological effects in morphology, including phonologically conditioned suppletive allomorphy (Mester 1994, Dolbey 1997, Kager 1996), mobile affixes (Noyer 1994; McCarthy and Prince (1993a) suggest a P $\gg$ M analysis), phonologically induced morphological gaps (Prince and Smolensky 1993, but see Orgun and Sprouse 1999), and infix placement (McCarthy and Prince 1993a,b, but see McCarthy 2003, Yu 2003). The P $\gg$ M schema is also claimed to account for phonologically conditioned affix order, and is used for

this purpose by Hargus and Tuttle (1997) to account for the placement of the *s*-Negative prefix in Witsuwit'en, an Athapaskan language of British Columbia.

In the domain of phonologically conditioned affix order, the P ≫ M model predicts not only that the placement of an individual affix can be phonologically determined, but that all morphemes in a word made up of several morphemes can line up along some phonological scale. The P ≫ M model denies morphological constituency, so the input to each tableau is the set of all morphemes in the word, unordered and with no bracketing or internal structure. Therefore, a highly ranked phonological constraint can be wholly or largely responsible for the order of all morphemes in the word. This is an empirical question: Do we find languages in which a series of several morphemes is ordered along some phonological scale?

A survey of phonologically conditioned affix order reveals a few cases where phonological considerations may affect the placement of a single affix, though all of them are consistent with phonological metathesis or some other explanation that does not require the use of the P ≫ M ranking (Paster in press). However, the survey reveals only one case where a *series* of affixes may be claimed to be phonologically ordered: Gombe Fula (Arnott 1970). If Arnott were correct in his claim that the consonantal extensions in Gombe Fula are ordered according to the 'TDNR' generalization, then this could be interpreted as a case of phonologically driven affix order (as suggested by Paster 2001), since the 'TDNR' order corresponds to increasing sonority along the sonority scale (see, for example, Ladefoged 1982), schematised below.

(55)

t	d	n	r
voiceless stops	voiced stops	nasals	liquids

→ sonority

Imagine for the sake of the argument that the 'TDNR' ordering is fixed in Gombe Fula as claimed by Arnott (1970). In this case, we can account for the ordering using a P ≫ M analysis. First, we need a phonological (P) constraint preventing sonority from decreasing across morphemes from left to right in the word (56).

(56) *FallingSonority C+C: When a consonant C_1 is followed by a consonant C_2 across a morpheme boundary, C_2 may not be less sonorous than C_1.

This sonority constraint outranks the M constraint Scope (Condoravdi and Kiparsky 1998) discussed in section 3.3 and reproduced below, which requires affix ordering to correspond to scope relations among affixes.

(57) Scope: Morphological constituency reflects scope.

In order to ensure that this constraint affects only the order of consonantal suffixes, we also need to assume some undominated constraints to prevent non-consonantal suffixes from being reordered, and to prevent violations of the *FallingSonority C+C constraint from being repaired by consonant feature changes rather than reordering (I will not formulate these here, since the analysis being proposed here is hypothetical and is not the analysis that I endorse).

Under this analysis, the ranking of the markedness (P) constraint over the scope (M) constraint selects forms with orderings corresponding to the 'TDNR' generalization, even when the morpheme order violates Scope. For example, in (58), the order preferred by the Scope constraint is *-r-n* since Causative has scope over Modal (the causee, not the causer, uses the instrument). But since *FallingSonority C+C is satisfied by the opposite order and since this constraint outranks Scope, the *-n-r* order is selected.

(58) o-irt-in-ir-ii kam supu o kuddu 'He made me stir the soup with a spoon'
CAU-MOD (I used a spoon)

	/irt, -r, -n/	*FallingSonority C+C	Scope
	irt-ir-in-	*!	
☞	irt-in-ir		*

It is important to note that in this example, *o irt-in-ir-ii* 'he made me stir…' is not an attested form, but a hypothetical form constructed for the sake of the argument based on Arnott's 'TDNR' generalization. This was necessary because, as mentioned earlier, none of Arnott's examples violates Scope. In every example provided in the grammar, the order of affixes is consistent with the scope generalization; though some examples are ambiguous, none clearly contradicts what we expect based on scope.

The above ranking still allows for Arnott's exceptional forms, since in these cases, the first extension that has been lexicalised as part of a frozen stem; that is, it is not evaluated by *FallingSonority because it is no longer analyzed as a suffix. The surface form follows straightforwardly once the existence of the lexicalised stem has been accepted, but for completeness, I show below how the surface form of the 'exceptional' example *'o nyaamnidii* 'He fed all (of them)' is selected rather than **'o nyaamdinii*. Since Scope is not relevant when only one suffix attaches to the verb, the output is selected by Contiguity (McCarthy and Prince 1995), paraphrased in (59), which disallows insertion between segments of a single morpheme.

(59) Contiguity: Elements that are adjacent in the input must be adjacent in the output.

A sample derivation of an exceptional form is provided in (60).

(60) 'o nyaam-n-id-ii 'He fed all (of them)'
CAU-COM

	/nyaamn, -d/	*FallingSonority C+C	Scope	Contiguity
☞	nyaamn-id-			
	nyaam,di,n-			*!

Both candidates satisfy *FallingSonority C+C because there is only one extension in the input, so there is no consonant sequence to evaluate. Similarly, neither candidate violates Scope since this constraint evaluates the scope of multiple extensions with respect to one another, and so cannot be violated when there is only a single extension in the input. The losing candidate violates Contiguity because [di] is inserted between the segments [m] and [n], which were adjacent in the input. The winning candidate does not violate Contiguity.

In this section, I have presented a P ≫ M analysis of extension order in Gombe Fula based on Arnott's 'TDNR' generalization. The use of the P ≫ M mechanism for this purpose, while it does capture the pattern, is problematic for at least two reasons. First, the ranking P ≫ M is not obviously necessary, since although Arnott claims that the order of suffixes is always 'TDNR', he does not provide any examples where this requirement 'wins out' over the expected scope-based order. Second, and more importantly, there are counterexamples to the 'TDNR' order in Arnott's (1970) data. Arnott explained these as lexicalised forms, but as discussed in section 4, the scope-based analysis is able to handle these forms without having to assume that they involve any lexicalised root-suffix combinations.

The fact that this putative example of the type of comprehensive phonological affix reordering predicted by P ≫ M turns out not to be an example of this has an important consequence for the P ≫ M model. As mentioned above, Gombe Fula was the only known possible example of this phenomenon, so the fact that this language does not actually exhibit phonological affix order is a devastating negative result for the P ≫ M model. Since this major class of effects predicted by the model is not attested, we are led to conclude that the P ≫ M model is too powerful and should be abandoned (see Paster (in press) for further discussion). This conclusion converges with other findings such as those of Yu (2003) and Paster (forthcoming), which show that the P ≫ M model is not necessary or sufficient to account for infix placement or phonologically conditioned suppletive allomorphy, respectively. Future research will reveal the extent to which the other phenomena accounted for by the P ≫ M model may also be better analyzed using alternative mechanisms.

6. CONCLUSION

In this paper, I have described affix order in Fuuta Tooro Pulaar and demonstrated how it follows from semantic scope in combination with a partial morphological template. I have shown that the same scope ordering principle applies also to the Gombe Fula dialect described by Arnott (1970) and that Arnott's proposed fixed 'TDNR' ordering template is not a determining factor in affix order in either Gombe Fula or Fuuta Tooro Pulaar. I have discussed how these findings provide support for Rice's (2000) Scope Hypothesis and other previous proposals relating affix order to semantic scope (Baker 1985, Bybee 1985, Condoravdi and Kiparsky 1998); I have also shown that a specific claim made by Rice (2000) in connection with the Scope Hypothesis is too strong: namely, the claim that templates have no formal status in grammar and emerge only in cases where scope principles cannot apply. As was demonstrated in the analysis of suffix order in Fuuta Tooro, fixed or templatic ordering of affixes needs to be able to outrank or override scope-based ordering in some cases; this indicates that there is a place in the grammar for templatic ordering. Finally, I discussed implications of the reanalysis of Gombe Fula affix order for McCarthy and Prince's (1993a,b) 'P $\gg$ M' model of the phonology-morphology interface, showing how Gombe Fula is a putative case of a phenomenon predicted by the P $\gg$ M model that nonetheless does not turn out to exemplify this particular phenomenon. As was discussed, this is problematic for the P $\gg$ M model because Gombe Fula was the only known possible example of this phenomenon; without it, the model predicts an apparently unattested class of phonological effects in morphology and should therefore be reconsidered in favour of a more restrictive model.

NOTES

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[1] In Arnott's (1970) orthography, <'> represents glottal stop, <'y> is a palatal implosive, <sh> is a palatal fricative, and <c> and <j> are voiceless and voiced palatal affricates, respectively. The other symbols correspond to their standard values, except that <n> before <g> is pronounced [ŋ]. I have normalized Arnott's transcriptions by using spaces where Arnott used hyphens between subject/object clitics and the verb.

[2] The Denominative *d* invariably occurs immediately next to the root in all of Arnott's examples, though Arnott omits it from the 'TDNR' formula.

[3] I have omitted examples where the verb root and consonantal extensions are identical to or subsumed by another form that is already listed.

[4] In this and the examples to follow, I use the official Senegalese Pulaar orthography (Hartell 1993:250), which differs from the orthography used by Arnott (1970) in the following ways.

First, while Arnott uses the glottal stop symbol < ' > before word-initial vowels, the Senegalese orthography omits these since the presence of glottal stop in this environment is predictable. Second, where Arnott transcribes the palatal nasal with <ny>, this orthography uses <ñ>. Finally, where Arnott uses <'y> for the palatal implosive, the Senegalese orthography uses a 'hooked *y*', which I replace with <ƴ> here since the hooked *y* is not available in standard linguistics font sets.

[5] Thanks to Stefan Elders for pointing this out.

[6] Combinations of three or more of these suffixes, though occurring occasionally, are generally dispreferred. Therefore, a thorough systematic study of the order of these suffixes is possible only in pairwise combinations.

[7] The opposite ordering, with *-t* preceding *-d*, is also possible with this general meaning, but with an added idiosyncratic semantic nuance: namely, that the action has taken place so many times that the speaker or the subject has grown tired of it. Since this meaning difference is idiosyncratic and could not have been predicted from the meanings of the component morphemes, I assume the T-D ordering in this particular construction is idiomatic and can be factored out of the scope analysis of the Comprehensive-Repetitive ordering. It is also possible that the *-t* is understood as Intensive in these utterances, though I was unable to elicit the same 'tired of it' meaning in forms using *-t* without *-d*.

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