Discontinuous Negation in Hausa

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Abstract

Investigating the morphological and syntactic properties of discontinuous negative marking in Hausa, I shall suggest a constructional approach involving edge inflection, accounting simultaneously for the morphologically bound nature of the initial marker and its interaction with the TAM system, haplology of the final marker, and wide scope over coordination.

1   Data

Hausa, a major Chadic language spoken by around 35 million in Northern Nigeria and neighbouring Niger, exhibits three different ways of expressing VP negation: in the subjunctive, negative force is signalled by an independent "inhibitive marker" *kadà*, in the continuative, it is expressed by long high negative marker *bā*, whereas in all other tense/aspect/mood (TAM) categories, a discontinuous marker *bà ... ba* is used, consisting of initial low *bà/bā̀* and final short high *ba*.[1] Although negation is signalled twice in these cases, only single, not double negation is expressed.

(1)   kadà kì   bā shì kōmē   (*ba) !
      NEG 2.SG.F.SUBJ give him anything NEG

      'Don't you (f.) give him anything.'   (Newman, 2000, 364)

(2)   bā   tà   sōyà kằzā   (*ba).
      NEG.CONT 3.SG.F.CONT fry   chicken NEG

      'She is not frying chicken.'   (Newman, 2000, 360)

(3)   yārinyằ bà   tà   dāwō *(ba).
      girl   NEG 3.SG.F.CPL return NEG

      'The girl didn't return.'   (Newman, 2000, 357)

Word order in Hausa is strictly SVO, with tense/aspect/mood (TAM) markers immediately preceding the lexical verb. With discontinuous VP negation, the initial marker is found strictly left-adjacent to the TAM markers, sometimes undergoing fusion with these markers (see section 1.2).

(4)   mằlàmai bà sù   ji   kōmē   ba
      teachers NEG 3.P.CPL hear anything NEG

      'The teachers did not hear anything.'   (Newman, 2000, p. 357)

In contrast to French *pas*, final *ba* surfaces at the end of the VP, following all core arguments (Newman, 2000; Jaggar, 2001). In this respect, the position

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[1]In Hausa, both tone and vowel length are lexically and grammatically distinctive. Throughout this paper, I mark long vowel with macron, leaving short vowels unmarked. As for tone, a grave accent marks low, circumflex marks falling, whereas vowels not marked for tone are high.

of negative markers is similar to that in Colloquial Brazilian. However, unlike Brazilian, neither initial nor final marking is optional in Hausa.

(5) bà   zā mù   ƙārà cî gàba dà   karàntà wannàn littāfì ba
    NEG FUT.1.P repeat eat ahead with read   this   book NEG
    'We won't continue reading this book.'   (Jaggar, 2001, p. 454)

(6) bà   à   kashḕ shi [dà   bindigà̰] ba
    NEG 4.S.CPL kill   him with gun   NEG
    'He wasn't killed with a gun.'   (Jaggar, 2001, p. 452)

Although VP-final *ba* tends to follow complements in general, heavy, typically sentential, constituents may extrapose: This can be observed with relative clauses (see (7)), sentential complements (see (8)), and indirect questions (see (9)). Despite the possibility for extraposition, in situ realisation is possible in all these cases.

(7) Relative clauses

a. Bà   sù   yi sallàh tằre   dà   mutằnē$_i$ ba   [dà$_i$ sukà
   NEG 3.P.CPL do prayer together with people   NEG REL 3.P.CPL
   zō   masallācī]
   come mosque
   'They didn't pray together with the people who came to the mosque.'
   (Ibrahim & Gusau)

b. Bà   sù   yi sallàh tằre   dà   mutằnē$_i$ [dà$_i$ sukà   zō
   NEG 3.P.CPL do prayer together with people   REL 3.P.CPL come
   masallācī] ba
   mosque   NEG
   'They didn't pray together with the people who came to the mosque.'

(8) Sentential complements

a. Bài   kàmātà   ba [Tankò yà   biyā hàrājḭ̀]
   NEG.3.S.M.CPL be.appropriate NEG Tanko 3.S.M.SBJ pay tax
   'It's not appropriate that Tanko pay tax.'   (Newman, 2000, p. 359)

b. Bài   kàmātà   [Tankò yà   biyā hàrājḭ̀] ba
   NEG.3.S.M.CPL be.appropriate Tanko 3.S.M.SBJ pay tax   NEG
   'It's not appropriate that Tanko pay tax.'   (Newman, 2000, p. 359)

(9) Indirect questions

a. bàn   san [kō wằ ya   zō] ba
   NEG.1.S.CPL know who   3.S.M.CPL come NEG
   'I don't know who came.'   (Jaggar, 2001, p. 454)

   b. bàn   sanī̀ ba [kō wā̀   ya   zō]
      NEG.1.S.CPL know NEG who 3.S.M.CPL come

      'I don't know who came.'   (Jaggar, 2001, p. 454)

The most fundamental question concerning discontinuous negative marking is: which of the two parts carries inherent negative force, and which one should better be conceived in terms of agreement? In principle, there are four logical possibilities:

Initial: Only initial *bà* carries negative force. Marking of the TAM marker's VP complement by final *ba* is a subcategorisation requirement of certain negative TAM markers.

Final: Final free form *ba* is inherently negative, whereas bound initial *bà* is not.

Joint: Initial and final exponents are part of a single but discontinuous lexical item, separated in surface syntax, e.g., along the lines of Crysmann (2003).

Neither: Neither the initial nor the final part of discontinuous negative marking carries negative force per se. Instead negation is introduced constructionally (Fokkens et al., 2009), with presence of negation being signalled by initial and final edge inflection.

Investigating the morphological and syntactic properties of discontinuous negative marking, I shall conclude that a constructional approach involving edge inflection is the only viable option to account, simultaneously, for the morphologically bound nature of the initial marker and its interaction with the TAM system (§1.2), haplology of the final marker (§1.1), and wide scope over coordination (§1.3).

1.1 Haplology

The first piece of evidence regarding the question as to which marker carries negative force comes haplology, which applies to final, not initial markers of negation: If the right edge of an outer negation coincides with that of an inner negation, only a single final exponent of negation is found, i.e., one of the two adjacent exponents is obligatorily suppressed.

(10) a. bàn   ga yāròn dà   bài   tàimàki Lādì ba
        NEG.1.SG.CPL see boy REL NEG.3.SG.CPL help   L.   NEG
        (*ba)
        NEG

        'I didn't see the boy who didn't help Ladi.'   (Newman, 2000)

    b. bàn   cê̂ [bài   cikà àlkawàrin-sà ba] (*ba)
       NEG.1.S.CPL say NEG.3.S.M.CPL fill   promise-his NEG NEG

       'I didn't say he didn't keep his promise.'   (Jaggar, 2001, p. 455)

As pointed out by Newman (2000), this haplology only ever applies among final markers of negation. It does not apply, if final negative *ba* is followed by the sentence-final question tag *bā/bâ*, nor does it apply, if final *ba* appears adjacent to the initial *bà* of a following negated VP.

(11) shī nè̌ dìrēbàn dà bài   zō ba bâ
      him FOC driver   REL NEG.3.S.M.CPL come NEG Q

      'Is he (not) the driver that didn't come?'   (Newman, 2000, p. 360)

(12) yārinyàr [dà bà tà   hanà̃ mu barcī   ba] bà tà
      girl   REL NEG.3.S.F.CPL prevent us sleeping NEG NEG.3.S.F.CPL

      zō ba
      come NEG

      'The girl who did not prevent us from sleeping did not come.'   (Newman, 2000, p. 359)

More importantly, negative haplology never applies to the initial marker. There is one construction in Hausa that meets the appropriate structural conditions, yet fails to exhibit haplology of the initial marker: negative equational constructions are marked by a discontinuous pair *bà̃ ... ba* which, inter alia, can be used to negate an already negated sentence.

(13) bà̃ bà zā mù   tàfi ba (*ba) nè:
      NEG NEG FUT.1.PL go NEG NEG COP

      'It is not that we are not going.'   (Newman, 2000)

While haplology obligatorily applies to final *ba*, it fails to target adjacent initial markers of negation.

The haplology facts provide us with the first important piece of evidence to choose among the analytic alternatives listed above: given that the distinction between single and double negation is neutralised under final negative haplology, we have direct evidence against any approach that localises negative force with the final part of the discontinuous marker.

The particular tree-configurations involved in negative haplology enable us to discard yet another option: while it is possible, in principle for domain-based analyses to collapse identical elements into a single domain object, an analysis along such lines needs to presuppose that relative clauses do not compact, an assumption which is hardly defensible, in the general case, and even less so for a configurational language such as Hausa. Percolation of edge features across relative clause boundaries, however, is a well attested phenomenon (cf. Zwicky, 1987; Miller and Halpern, 1993).

1.2 Morphological integration

The discontinuous marker of VP negation shares some striking similarity with the equally discontinuous marker of sentential negation *bà̃ ... ba*, the main phonological

difference being the length of the vowel of the initial marker. Concerning the marker of VP negation, Newman (2000) observes that there is some variability as to the length of the initial *bà(a)* While the initial marker of sentential negation is obligatorily long, the initial marker of VP negation is equally obligatorily short in the completive aspect. Other TAM categories are found both with long and short initial markers of negation, with a preference for short *bà* in the case of future TAM, and preference for long *b̀a* with potential and habitual TAM categories. In order to account for the variability, Newman (2000) further suggests that the alternation should be understood as that between a free form and a clitic.

Although an analysis of the bound initial VP-negation marker *bà* as a clitic variant of the marker *b̀a* might indeed be tempting, there are nevertheless both phonological and morphological arguments against such an analysis, at least as far as completive aspect is concerned.

First, the obligatory selection of short form *bà* in the completive does not follow from any general phonological processes of the language: despite the fact that the exponents of person/number agreement in the negative completive are literally identical to those found in the future paradigm (cf. Table 2), they combine with short *bà* in the negative completive, yet long *zā* in the future. Thus, the fact that the exponents of person/number agreement in the negative completive display a particular selection for the shape of the initial marker of negation suggests that we are confronted with a morphological, rather than a surface-phonological property.

Second, the morphological perspective on negative TAM markers in Hausa is further supported by the fact that the exponents of TAM and subject agreement found in the negative paradigms may systematically differ from the forms attested in the corresponding affirmative paradigms (absolute and relative), cf. table 1.

		Absolute		Relative		Negative	
1		nā	mun	na	mukà	bàn / (bà nì)	bà mù
2	m	kā	kun	ka	kukà	bà kà	bà kù
	f	kin		kikà		bà kì	
3	m	yā	sun	ya	sukà	bài / bà yà	bà sù
	f	tā		ta		bà tà	
4		an	—	akà	—	bà à	—

Table 1: Completive paradigms

Conversely, a cliticisation account of short form *bà* begs the question why prosodic attachment should trigger not only deletion of non-adjacent segmental material on the host, but also what factors could be made responsible for the suprasegmental changes in grammatical tone. Likewise, the change in vowel quality from *nā/na* to *nì* in the first singular cannot be derived on the basis of general phonological processes of the language. Note further that the application

Third, since the negative completive neutralises the contrast between relative and absolute completive marking, a cliticisation account needs to provide two distinct

sets of reduction rules, one for each set of markers. Besides the fact that the exact nature of these reduction rules is highly stipulative, providing two such rule sets makes the entire approach quite baroque, thereby sacrificing much of the initial parsimony.

An alternative analysis that dispenses with uncontrolled deletion is to assume that initial *bà* cliticises not to forms of the affirmative completive paradigm, but rather to TAM markers from a different paradigm. A candidate paradigm whose forms also occur independently is the neutral TAM marker (or "Grundaspekt"). While most of the forms in this paradigm are segmentally and suprasegmentally identical to those found in the negative completive, the first singular is not.

		Neutral/Subjunctive		Future		Negative Completive	
		sg	*pl*	*sg*	*pl*	*sg*	*pl*
1		'ǹ/nà	mù	zân/zā nì	zā mù	bàn / (bà nì)	bà mù
2	m	kà	kù	zā kà	zā kù	bà kà	bà kù
	f	kì		zā kì		bà kì	
3	m	yà	sù	zâi/zā yà	zā sù	bài / bà yà	bà sù
	f	tà		zā tà		bà tà	
4		à	—	zā à	—	bà à	—

Table 2: "Grundaspekt", Future, and Negative Completive

However, apart from the idiosyncrasy in the first singular, there are also syntactic reasons to doubt the viability of such an approach: first, the neutral TAM, which is used in infinitive contexts and in sequences of events, does not combine with negation (Newman, 2000). The homophonous subjunctive does, but as stated above, the marker of negation used in the subjunctive is the (continuous) inhibitive marker *kadà*, not *bà*. Second, if the TAM marker itself does not carry aspectual force, how is completive aspect introduced? If the TAM marker is indeed the neutral or subjunctive, completive aspect cannot be associated with it. However, the relevant aspectual force cannot be associated with the initial marker of negation either: if it were, we would have to concede that there is a completive *bà* distinct, from, e.g., future *bà*. a move, which ultimately undermines the initial motivation for the cliticisation hypothesis.

To summarise, the lack of syntactic compositionality and the morphophonological properties of negative completive TAM markers militate strongly against a cliticisation apporach. Instead, I shall suggest that the selection of exponents in the negative paradigms is best understood in purely morphological terms.

1.3 Wide scope over coordinate structures

The third set of data we are going to present relates to negative marking in coordinate structures (cf. Newman, 2000): If a coordination of VPs is negated, discontinuous markers of negation wrap around both conjuncts, i.e., the first conjunct is marked with the initial marker of negation, whereas the last conjunct is marked with the final

marker. Non-initial TAM markers appear in the affirmative, rather than negative form.

(14) bà mù   ci mun   shā ba
NEG.1.PL.CPL eat 1.PL.ABS.CPL drink NEG

'We didn't eat and drink.   (Newman, 2000, 360)'

(15) bà tà   shārè ɗākì: tā   yi wankā
NEG.3.SG.F.CPL sweep hut   3.SG.F.ABS.CPL do bathing

tā   tàfi makarantā ba
3.SG.F.ABS.CPL go   school   NEG

'She didn't sweep the hut, bathe and go to school.'   (Newman, 2000, 360)

What is particularly interesting here is that the alternation between relative and absolute TAM markers[2] is only neutralised on the conjunct bearing an overt initial marker of negation. Non-initial conjuncts, however, fully maintain the contrast.

(16) a. bà   tà tāshì   **tā** zō ba
NEG.3.S.F.CPL get up 3.S.F.ABS.CPL come NEG

'She hasn't got up and come.'   (Jaggar, 2001, p. 166)

b. Mammàn nē bài   zō aj̄ĩ **ya**   ɗàuki
Mamman FOC NEG.3.S.M.CPL come class 3.S.M.REL.CPL take

jarràbâwā ba
exam   NEG

'It was *Mamman* who didn't come to class and take the exam.' (Jaggar, 2001, p. 166)

The coordination facts just reviewed present us with an analytic paradox: while the morphology suggests that the initial marker of negation is essentially contained within a conjunct, syntactic diustribution of markers on peripheral conjunctions, as well as the semantic scope suggest that negation is actually outside the coordinate structure.

1.4 Synopsis

Before we procede towards our (formal) analysis of discontinuous negative marking in Hausa, let us briefly come back to our initial question regarding the locus of negative force. On the basis of the evidence just reviewed, we are now in a position to eliminate all but the constructional approach.

Initial: The hypothesis of the initial marker as the locus of negative force shares some initial plausibility based on the parallelism to continuous negative marking. However, while the morphological integration with the TAM markers

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[2]In essence, forms from the relative set are used in clauses involving a filler, as witnessed by focus movement, wh-extraction and relativisation. Otherwise forms from the absolute set are used. See Jaggar (2001, 2006); Newman (2000) and Wolff (1993) for an overview.

suggests that initial *bà/bằ* is contained within the first conjunct, wide scope over coordinated VPs suggests the opposite.

Final: Associating negative force with final *ba* not only introduces an undesirable asymmetry into the description of Hausa, between initial negation in the subjunctive and continuative vs. final negation elsewhere, but also fails to explain why the true locus of negative force may undergo haplology whereas the concording initial markers do not.

Joint: The idea of postulating a discontinuous lexical item attacks the issue of where to locate negation head on. However, this approach is plagued by a number of empirical problems. First, in order to capture the haplology facts, a special proviso is needed to conflate adjacent identical final markers in surface syntax, but to block conflation of initial markers. Second, wide scope over coordination militates against an analysis wich locates both negative force within individual conjuncts.

Neither: The constructional approach (Fokkens et al., 2009) dissociates the introduction of negative force from its exponence. This dissociation is indeed a necessary prerequisite for solving the paradox that negative force may be located outside coordinate structures, whereas negative marking is truly contained within peripheral conjuncts. Furthermore, an edge inflection approach to negative marking is not only empirically supported by the clearly peripheral realisation of final markers, but also independently motivated by the existence of other edge marking phenomena in the language, most notably definiteness marking at the right edge of relative clauses.

In the remainder of this paper I shall develop a formal treatment of discontinuous negative marking in Hausa in terms of edge feature percolation that reconciles the morphologically bound nature of the initial marker with the scope facts.

2   Analysis

2.1   Two approaches to edge inflection

Current approaches to edge inflection can be assigned to one oif two traditions: pharsal affixation approaches, pioneered by Anderson (1992, 2005), where morphological rules attach affixes directly to non-terminal phrase markers, and edge feature percolation approaches, which crucially distribute morphosyntactic features at the periphery of phrasal constituents. Morphological realisation of these features, however, is effected by standard morphological rules operating in the lexicon. This latter approach has a firm tradition in GPSG (Gazdar and Pullum, 1982; Gazdar et al., 1985), starting with the works of Nevis (1985) and Zwicky (1987). The most articulate theory of this kind to date is the approach developed by Halpern and Miller (Miller and Halpern, 1993; Halpern, 1995) which provides a general

theory of edge feature percolation based on the distinction between trigger and marking features. Within HPSG, Jesse Tseng has argued in a series of papers for the introduction of edge features into the feature geometry. Although his work stays close in spirit to the GPSG proposals, he dispenses with the distinction between trigger and marking features.[3]

The two theories of edge inflection make slightly different predictions regarding the Hausa facts: under an Anderson-style approach, phrasal attachment should be insensitive to the morphological properties of the word which happens to surface at the relevant edge. Also, if affixation applies to phrases directly, without any percolation of edge features, the presence of phrasal affixes on more deeply embedded constituents should be invisible. In the light of the Hausa data, phrasal affixation clearly makes the wrong predictions: neither haplology of the final marker, nor the selection of morphological forms of the host word should be expected. Edge feature percolation, which ultimately handles aspects of morphological realisation at the lexical, not the phrasal level, actually predicts the occurrence of exactly this kind of interaction.[4]

2.2   Edge feature percolation

Before we embark on our analysis proper, I will briefly lay out the basic principles of edge feature percolation assumed here. In essence, I shall follow quite closley the earlier proposals by Miller and Halpern (1993) and Halpern (1995) and distinguish edge features into trigger features, which launch an edge inflection dependency, and marking features. Following Tseng (2003) I shall assume that edge features will be further distinguished into LEFT and RIGHT features. The value of these feature is a list of edge features, permitting the existence of more than one dependency at any partricular edge. Percolation of feature values is governed by an Edge Feature Principle similar to HPSG's Nonlocal Feature Principle (Pollard and Sag, 1994).

Edge Feature Principle: The right (left) MARK feature of the right (left) daughter is the concatenation of the right (left) MARK and TRIG features of the mother.

(17)   *phrase* →

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[3]Kupść and Tseng (2005) do introduce a trigger feature. In contrast to Miller and Halpern (1993) and Halpern (1995), however, their trigger feature is introduced on a lexical node and percolates up, whereas the Miller/Halpern-style trigger features do not percolate at all. The Polish cliticisation data for which this rather unconstrained percolation mechanism was introduced have meanwhile received an alternative linearisation-based analysis (Crysmann, 2006, to appear), obviating the need for trigger feature percolation.

[4]In more recent work, Anderson et al. (2006) concede the necessity to enrich the theory of phrasal affixation to accomodate interactions lexical properties in Nias, Kuuk Thaayorre and Somali. However, if edge inflection alone can account for both phrasal and morphological cases of peripheral realisation, Anderson's revised theory should be dispreferred on Occamian grounds.

$$
(18) \quad phrase \rightarrow
\begin{bmatrix}
\text{SS} & \begin{bmatrix} \text{EDGE} & \begin{bmatrix} \text{MARK} \,|\, \text{RIGHT} & \boxed{2} \\ \text{TRIG} \,|\, \text{RIGHT} & \boxed{1} \end{bmatrix} \end{bmatrix} \\[2ex]
\text{DTRS} & list \oplus \left\langle \begin{bmatrix} \text{SS} \,|\, \text{EDGE} \,|\, \text{MARK} \,|\, \text{RIGHT} & \boxed{1} \oplus \boxed{2} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{SS} & \begin{bmatrix} \text{EDGE} & \begin{bmatrix} \text{MARK} \,|\, \text{LEFT} & \boxed{2} \\ \text{TRIG} \,|\, \text{LEFT} & \boxed{1} \end{bmatrix} \end{bmatrix} \\[2ex]
\text{DTRS} & \left\langle \begin{bmatrix} \text{SS} \,|\, \text{EDGE} \,|\, \text{MARK} \,|\, \text{LEFT} & \boxed{1} \oplus \boxed{2} \end{bmatrix} \right\rangle \oplus list
\end{bmatrix}
$$

As stated above, the edge feature principle determines the direction of feature percolation. Furthermore, if a trigger feature is encountered at some point in the tree, a corresponding marking feature must be retrieved. The principle by itself, however does not yet guarantee that each marking feature must correspnd to some trigger feature. This can be ensured by a principle such as follows:

MARK feature licensing: every MARK feature must be licensed by a corresponding TRIG feature

Essentially, there are two situations to be controlled for: first, termination of edge dependencies must be a property of root nodes, and second, MARK features are only ever licensed on a peripheral node.

(19) Root node marking condition

$$
root \rightarrow \begin{bmatrix} \text{SS} \,|\, \text{EDGE} \,|\, \text{MARK} & \begin{bmatrix} \text{LEFT} & \langle \rangle \\ \text{RIGHT} & \langle \rangle \end{bmatrix} \end{bmatrix}
$$

(20) Non-peripheral marking condition

a. $phrase \rightarrow$
$$
\begin{bmatrix} \text{DTRS} \; list\left(\begin{bmatrix} \text{SS} \,|\, \text{EDGE} \,|\, \text{MARK} \,|\, \text{RIGHT} \, \langle \rangle \end{bmatrix} \right) \oplus \left\langle \begin{bmatrix} \; \end{bmatrix} \right\rangle \end{bmatrix}
$$

b. $phrase \rightarrow$
$$
\begin{bmatrix} \text{DTRS} \; \left\langle \begin{bmatrix} \; \end{bmatrix} \right\rangle \oplus list\left(\begin{bmatrix} \text{SS} \,|\, \text{EDGE} \,|\, \text{MARK} \,|\, \text{LEFT} \, \langle \rangle \end{bmatrix} \right) \end{bmatrix}
$$

By (non-persistent) default, the TRIG features of phrasal signs and MARK features of lexical signs will be the empty list.

2.3 Discontinuous negation

As suggested by the scope data above, discontinuous negative marking in Hausa, both initial and final, should be regarded as edge marking of a phrasal construction

that carries negative force. Thus, extending the proposal by Fokkens et al. (2009) from head feature percolation to edge feature percolation I suggest that negation in these cases is introduced by a unary phrase structure schema that restricts its mother's SS|EDGE|TRIGGER|LEFT and SS|EDGE|TRIGGER|RIGHT features to the value *<neg>*.

(21)

$$
\begin{bmatrix}
\text{C-CONT} & \begin{bmatrix} \text{RELS} & \left\langle \begin{bmatrix} \text{PRED} & \textit{neg-rel} \\ \text{ARG} & \boxed{1} \end{bmatrix} \right\rangle \\ \text{HCONS} & \left\langle \begin{bmatrix} \textit{outscopes} \\ \text{HARG} & \boxed{1} \\ \text{LARG} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}, \\[2em]
\text{SS}\,|\,\text{EDGE} & \begin{bmatrix} \text{TRIG}\,|\,\text{LEFT} & \left\langle \textit{neg} \right\rangle \\ \text{TRIG}\,|\,\text{RIGHT} & \left\langle \textit{neg} \right\rangle \end{bmatrix} \\[1.5em]
\text{DTRS} & \left\langle \begin{bmatrix} \text{SS}\,|\,\text{L} & \begin{bmatrix} \text{CONT}\,|\,\text{HOOK}\,|\,\text{LTOP} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

As captured by the MRS description above, negation semantically outscopes the local top handle of its syntactic daughter. Thus, the constructional introduction of semantics enables us to fix semantic scope by syntactic attachment.

Note further that the negation construction does not specify any syntactic constraints as to which daughters it can be applied. As a consequence, the phrase structure schema above will serve to introduce both sentential negation and VP negation.

According to the Edge Feature Principle, the daughter node in this construction will have non-empty lists for the corresponding left and right MARK features, from where they will percolate down along the periphery.

2.4 Right edge marking

Having established how the edge dependency is launched by a unary prase structure schema carrying negative force, we can now turn to the introduction of the exponents of negative marking, starting with the final marker *ba*.

Making the straightforward assumption that (final) *ba* is the only lexical item in Hausa that has a non-empty specification for the relevant marking feature SS|EDGE|MARKING|RIGHT, we can model quite directly that constructionally introduced negation must be expressed at the right edge. By (non-persistent) lexical default, all other lexical entries specify the empty list.

(22)   Final marker (preliminary version):

$$
\begin{bmatrix}
\text{PH} & \left\langle \text{ba} \right\rangle \\[2pt]
\text{SS} & \begin{bmatrix}
\text{L} & \begin{bmatrix} \text{CONT} & \begin{bmatrix} \text{RELS} & \langle\rangle \\ \text{HCONS} & \langle\rangle \end{bmatrix} \end{bmatrix} \\[10pt]
\text{EDGE} & \begin{bmatrix} \text{MARK}\,|\,\text{RIGHT} & \left\langle \textit{neg} \mid \textit{list(neg)} \right\rangle \end{bmatrix}
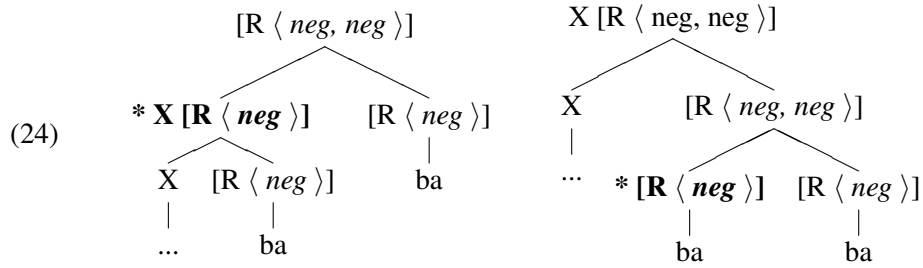\end{bmatrix}
\end{bmatrix}
$$

The possibility for final *ba* to undergo haplology, i.e. its potential to function as the exponent of more than one negation is captured in the above lexical description by constraining *ba* to express an at least 1-elementary list of *neg*-marking features. Put differently, haplology is treated here in terms of a single lexical item discharging more than one edge inflection dependency at a time.

The remaining question regarding the syntax of the final marker relates to its attachement site: Given the Edge Feature Principle, it is clear that any edge marker much be in the syntactic scope of all triggers it marks, i.e., attachment must be low. But how low exactly must final *ba* attach? Since Hausa is a head-initial language, there is often more than one potential attachment site at the right periphery. In order to contain spurious ambiguity, I shall suggest that *ba* attaches to the preceding lexical item. Moreover, lowest attachment is the only principled choice that is at the same time compatible with both VP and sentential negation. Thus, we can give the following revised lexical entry for *ba*:

(23)   Final marker (final version):

$$
\begin{bmatrix}
\text{PH} & \left\langle \text{ba} \right\rangle \\[2pt]
\text{SS} & \begin{bmatrix}
\text{L} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HD} & \begin{bmatrix} \text{SPEC} & \begin{bmatrix} \text{LEX} & + \\ \text{EDGE}\,|\,\text{MARK}\,|\,\text{LEFT} & \langle\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \\[14pt]
\text{CONT} & \begin{bmatrix} \text{RELS} & \langle\rangle \\ \text{HCONS} & \langle\rangle \end{bmatrix} \end{bmatrix} \\[14pt]
\text{EDGE} & \begin{bmatrix} \text{MARK}\,|\,\text{RIGHT} & \left\langle \textit{neg} \mid \textit{list}\big(\textit{neg}\big) \right\rangle \end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

The low attachment hypothesis not only provides a solution for the problem of spurious ambiguity, but it also enforces haplology, because the only two possible ways a sequence of more than one *ba* could ever arise is for the second to attach to the first, or else for the second to attach to a lexical constituent already marked for *ba*.

(24)

[R ⟨ *neg, neg* ⟩]

    * X [R ⟨ *neg* ⟩]   [R ⟨ *neg* ⟩]

    X [R ⟨ *neg* ⟩]   ba

    ... ba

X [R ⟨ neg, neg ⟩]

  X   [R ⟨ *neg, neg* ⟩]

  ... *** [R ⟨ *neg* ⟩]** [R ⟨ *neg* ⟩]

  ba   ba

In any case, as illustrated schematically by the tree structure above, the first *ba* will end up either in a non-peripheral position itself, or the lexical constituent it marks will be non-final. However, both situations are already ruled out by the principle of MARK feature licensing.

2.5 Left edge marking

Analogous to final *ba*, the initial marker *bǎ* as well as negative TAM paradigms will be the only lexical items with a non-empty specification for the left marking feature. In order to abstract out common properties of negative TAM categories and the initial marker of sentential negation, I shall postulate a lexical type *l-neg-marking* from which both types of initial negative markers inherit.

(25) *l-neg-marking* →
$$\left[\text{EDGE} \left[\text{MARK} \left[\begin{array}{ll} \text{LEFT} & \langle neg \rangle \\ \text{RIGHT} & \langle \rangle \end{array} \right] \right] \right]$$

Since the negative TAM categories, appear in the same syntactic position as their affirmative counterparts, namely as VP-initial finite verbal heads, nothing special must be said about these markers, except that forms in the discontinuous negative paradigms are instances of *l-neg-marking*, whereas forms in the corresponding affirmative paradigm are not and will carry the (default) specification [SS|EDGE|MARK|LEFT <>]. A sample lexical entry for the fused 3rd singular masculine negative completive marker is given below.

(26)

$$
\begin{bmatrix}
\textit{l-neg-marking} \\
\text{PH} \quad \left\langle \text{bài} \right\rangle \\
\text{SS} \mid \text{L}
\begin{bmatrix}
\text{CAT}
\begin{bmatrix}
\text{HD}
\begin{bmatrix}
\text{AGR} \quad \boxed{0}
\begin{bmatrix}
\text{PER} & \textit{3} \\
\text{NUM} & \textit{sg} \\
\text{GEND} & \textit{m}
\end{bmatrix} \\
\text{VFORM} \quad \textit{fin}
\end{bmatrix} \\
\text{VAL}
\begin{bmatrix}
\text{SUBJ} \quad \left\langle \boxed{1} \left[\text{L} \mid \text{CAT} \mid \text{HD} \mid \text{AGR} \quad \boxed{0} \right] \right\rangle \\
\text{COMPS} \quad \left\langle \text{L}
\begin{bmatrix}
\text{CAT}
\begin{bmatrix}
\text{HD} & \left[\text{VFORM } \textit{infin} \right] \\
\text{VAL}
\begin{bmatrix}
\text{SUBJ} & \left\langle \boxed{1} \right\rangle \\
\text{COMPS} & \langle \rangle
\end{bmatrix}
\end{bmatrix} \\
\text{CONT} \left[\text{HOOK} \mid \text{INDEX} \boxed{2} \right]
\end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix} \\
\text{CONT} \left[\text{HOOK} \mid \text{INDEX} \boxed{2} \textit{ event} \left[\text{TAM } \textit{completive} \right] \right]
\end{bmatrix}
\end{bmatrix}
$$

As depicted in the lexical entry above, negative TAM markers, just like affirmative TAM markers, are analysed as auxiliaries, combining with an untensed VP, inheriting the yet unrealised subject of their VP complement (=raising).
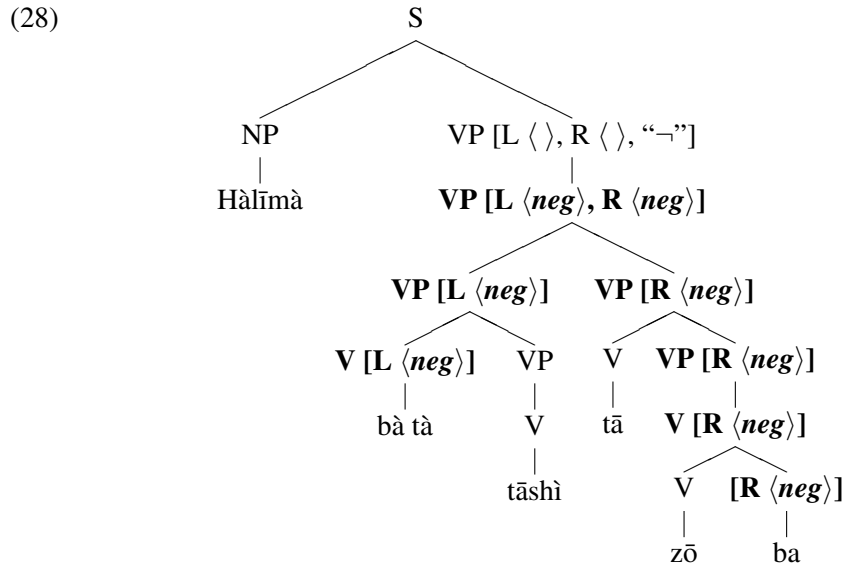
Since the syntactic position of TAM markers, and, therefore, negative TAM markers is fixed to the position immediately preceding VP, it follows from the very nature of edge feature percolation that the trigger feature licensing this left edge inflection must strictly dominate VP as well. As a consequence, the VP-final realisation of closing *ba* follows without any further stipulation.

According to Newman (2000), discontinuous marking of negation outside the TAM system is effected by *bà* ... *ba*: in addition to sentential negation, this discontinuous marker is used for constituent negation of NPs and PPs, but not VPs. Since the only common property of all these environments is their degree of saturation, I suggest that the initial marker *bà* selects (via SPEC) a fully saturated phrase as its attachment site (see (27)).

(27)

$$
\begin{bmatrix}
\textit{l-neg-marking} \\
\text{PH} \quad \left\langle \text{bà} \right\rangle \\
\text{SS} \mid \text{L}
\begin{bmatrix}
\text{CAT} \left[\text{HD} \left[\text{SPEC} \left[\text{L} \mid \text{CAT} \mid \text{VAL}
\begin{bmatrix}
\text{SUBJ} & \langle \rangle \\
\text{COMPS} & \langle \rangle \\
\text{SPR} & \langle \rangle
\end{bmatrix} \right] \right] \right] \\
\text{CONT}
\begin{bmatrix}
\text{RELS} & \langle \rangle \\
\text{HCONS} & \langle \rangle
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

Once we make this assumption, the linear position of final *ba* will, again, be a mere corollary of the attachment of the initial marker and the Edge Feature Principle.
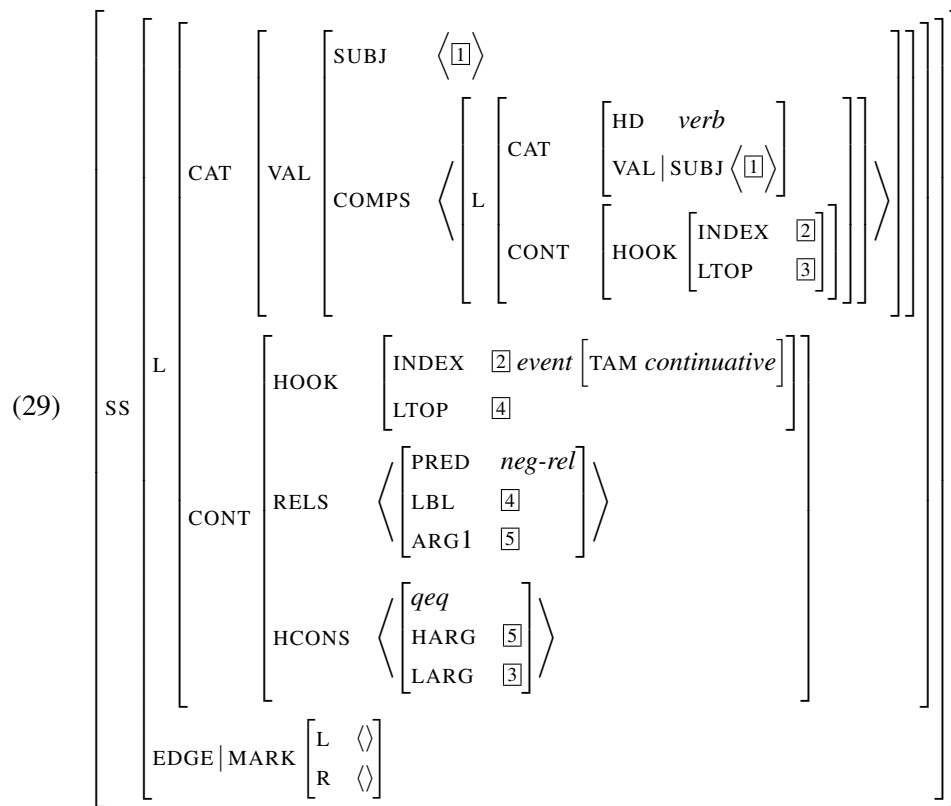
Before we close our discussion of discontinuous negative marking, let us briefly return to the case of wide scope over coordination. We have seen above that the attachment properties of negative TAM markers determine the tree-structural position of constructional negation. However, with initial conjuncts in coordinated VPs, there are actually two positions available that are consistent with both the subcategorisation requirements of the initial marker and the MARK feature licensing principle: either, negation immediately dominates the minimal VP, in which case we get a narrow scope reading, with the final marker contained in the first conjunct, or else, it dominates the coordinate structure, in which case the final marker must appear at the right edge of the final conjunct and the sentence will receive a wide scope reading of negation.

(28)

```
                               S
              ┌────────────────┴────────────────┐
             NP                    VP [L ⟨ ⟩, R ⟨ ⟩, "¬"]
              │                            │
           Hàlīmà              VP [L ⟨neg⟩, R ⟨neg⟩]
                                ┌───────────┴───────────┐
                        VP [L ⟨neg⟩]            VP [R ⟨neg⟩]
                        ┌──────┴──────┐         ┌──────┴──────┐
                  V [L ⟨neg⟩]        VP         V       VP [R ⟨neg⟩]
                        │             │         │            │
                      bà tà           V         tā      V [R ⟨neg⟩]
                                      │                 ┌────┴────┐
                                    tāshì               V      [R ⟨neg⟩]
                                                        │          │
                                                       zō         ba
```

It should be clear that negative TAM markers on non-initial conjuncts can only ever signal narrow scope, owing to the fact that the MARK Feature Licensing principle rules out left edge features on non-left nodes.

2.6 Lexical negation

Having provided an account of discontinuous negative marking in Hausa, the obvious remaining question is as to how continuous negation fits into this picture. Thus, a brief remark is in order concerning non-discontinuous markers of negation, such as continuative TAM and the inhibitive marker *kadà*. Given that there is no evidence that these TAM markers can scope higher than what is expected by their surface position, I suggest they inherently carry negative force and do not function as edge inflection. The difference between discontinuous an continuous negation in Hausa will be reduced to the difference between lexical and constructional negation.

(29)
$$
\begin{bmatrix}
\text{SS} & \begin{bmatrix}
\text{L} & \begin{bmatrix}
\text{CAT} & \begin{bmatrix}
\text{VAL} & \begin{bmatrix}
\text{SUBJ} & \langle\boxed{1}\rangle \\
\text{COMPS} & \left\langle \text{L}\begin{bmatrix}
\text{CAT} & \begin{bmatrix} \text{HD} & verb \\ \text{VAL}\,|\,\text{SUBJ} & \langle\boxed{1}\rangle \end{bmatrix} \\
\text{CONT} & \begin{bmatrix} \text{HOOK} & \begin{bmatrix} \text{INDEX} & \boxed{2} \\ \text{LTOP} & \boxed{3} \end{bmatrix} \end{bmatrix}
\end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix} \\[4ex]
\text{CONT} & \begin{bmatrix}
\text{HOOK} & \begin{bmatrix} \text{INDEX} & \boxed{2}\ event\,[\text{TAM}\ continuative] \\ \text{LTOP} & \boxed{4} \end{bmatrix} \\
\text{RELS} & \left\langle \begin{bmatrix} \text{PRED} & neg\text{-}rel \\ \text{LBL} & \boxed{4} \\ \text{ARG1} & \boxed{5} \end{bmatrix} \right\rangle \\
\text{HCONS} & \left\langle \begin{bmatrix} qeq \\ \text{HARG} & \boxed{5} \\ \text{LARG} & \boxed{3} \end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix} \\[4ex]
\text{EDGE}\,|\,\text{MARK} & \begin{bmatrix} \text{L} & \langle\rangle \\ \text{R} & \langle\rangle \end{bmatrix}
\end{bmatrix}
$$

As depicted in the lexical entry of the negative continuous marker given above, negative force is directly contributed by the content value of the marker. Just like the non-continuative TAM markers, this marker also subcategorises for a VP, inheriting the yet unrealised subject valency. The semantic scope of negation is fixed lexically, outscoping the local top handle of its VP complement. Since auxiliaries are assumed to be heads, the handle of the negation relation will be the new local top handle of the auxiliary-VP complex, in accordance with HPSG's Semantics Principle (Pollard and Sag, 1994; Copestake et al., 2005).

3 Conclusion

We have seen that morphological and scopal properties of discontinuous negation in Hausa give rise to an analytical paradox. Using a constructional approach to the introduction of negative force, combined with edge inflection, a unified account of these properties could be provided that also captures the observed haplology effects. Finally, it has been shown that Hausa discontinuous negative marking constitutes yet another phenomenon that favours the edge feature percolation approach over Anderson-style phrasal affixation.

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