Negative Concord and Restructuring in Palestinian Arabic: A Comparison of TAG and CCG Analyses

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Abstract

This paper discusses interactions between negative concord and restructuring/clause union in Palestinian Arabic. Analyses formulated in Tree Adjoining Grammar and Combinatorial Categorial Grammar are compared, with the conclusion that a perspicuous analysis of the the intricacies of the data requires aspects of both formalisms; in particular, the TAG notion of the extended domain of locality and the CCG notion of flexible constituency.

1 Palestinian Arabic Negative Concord

In Palestinian Arabic (PA), negative concord occurs with the determiner **wɛla** "(not) even one," where negative concord describes the failure of an expression which expresses negation in some sentences to do so in others. "**wɛla**-phrases" are interpreted either as negative quantifiers ("NQ-**wɛla**)" or as polarity-sensitive indefinites ("NPI-**wɛla**").

The NQ-interpretation is available preceding the finite verb or verb complex in a clause (1-2) or in fragment answers (3-4):

(1) **wɛla** **nɪtfɪt** **anuːθa** ʕɪnd-ɪk.
not.even bit *femininity at-you(fs)*
"You don't have the least bit of femininity!"

(2) **wɛla** **yoːm** ʕaǧabni l-ɛkɪl.
not.even day *pleased.3ms-me the-food*
"There wasn't even one day the food pleased me!"

(3) Q: šu ḳal-l-ak? A: **wɛla** **iši**.
what said.3ms-to-you *not.even thing*
"What did he say to you? Nothing at all."

(4) Q: miːn šʊfti? A: **wɛla** **ṣuːṣ** ɪbn yomeːn.
who saw.2fs *not.even chick son two-days*
"Who did you see? Not even a two-day old chick!"

A preverbal **wɛla**-phrase preceding a sentential negation marker causes the sentence to have a double-negation reading (5: compare with 2):

(5) **wɛla** **yoːm** **ma**-ʕaǧabni l-ɛkɪl.
not.even day *not-pleased.3ms-me the-food*
"There wasn't one day the food didn't please me!"

NQ-**wɛla** never occurs within the scope of negation but does occur in post-verbal positions which are not *thematically entailed* by the verb (6-7)[1]:

(6) huwwa **wɛla** **iši**!
he *not.even thing*
"He is nothing!"

(7) hiyya maǧruːra ʕala **wɛla** **iši**.
she *conceited.fs upon not.even thing*
"She is conceited for absolutely no reason!"

The NPI-interpretation is only available within the scope of antimorphic operators (Zwarts, 1996), like sentential negation or **bɪduːn** "without" (8-9):

(8) tɪlɪʕti **bɪduːn-ma** tḳuːli **wɛla iši**.
left.2fs without-that say.2fs even thing
"You left without saying even one thing!"

(9) la-s-sɛnna ma-baʕṭiː-hʊm **wɛla luḳmi** ɛkl.
to-the-year not-give.1s-them even bite food
"For the [first] year I don't give them even a bite of [solid] food."

More than one **wɛla**-phrase can have the NPI-interpretation at a time:

(10) ma-ḳʊlt **wɛla iši** **wɛla la-ḥada** fiː-hʊm.
not-said.1s even thing even to-one in-them
"I didn't give anything at all to even one of them."

It follows from the distributions of NQ- and NPI-**wɛla** that **wɛla**-phrases are blocked from post-verbal argument positions which are thematically entailed and which are not "roofed" (Ladusaw, 1992) by an antimorphic operator.

[1] Following (Herburger, 2001), "thematically entailed" means that the meaning of the verb entails the existence of an entity filling the thematic role in question.

1.1 Negative Concord and Locality

PA negative concord is generally subject to strict locality constraints: an NPI **wɛla**-phrase must be contained within the smallest inflected clause containing its licensor. It cannot be separated from its licensor by the boundary of either an indicative (12) or a subjunctive/irrealis (11) complement:

(11) * **ma**-waʕatt [ɛḥki **wɛla maʕ ḥada** fiː-hʊm].
not-promised.1s talk even with one in-them

(12) * batwaḳḳaʕ-**ıš** [ınnhæ bıtḥıbb **wɛla ḥada**].
believe.1s-neg that.3fs likes.3fs even one

Similar sentences with weaker polarity items such as **ḥada** or **ʔaiy ḥada** "anyone" are acceptable:

(13) ma-**waʕatt** ɛḥki maʕ (**ʔaiy**) **ḥada** fiː-hʊm.
not-promised.1s talk with any one in-them
"I didn't promise to talk with any of them."

(14) **batwaḳḳaʕ**-ıš ınnhæ bıtḥıbb (**ʔaiy**) **ḥada**.
believe.1s-neg that.3fs likes.3fs any one
"I don't think that she likes ANY one."

This suggests that negative concord is a strictly bounded dependency like agreement marking, argument realization, or reflexive binding.

However, there are exceptions to this generalization. "Long-distance" negative concord is possible between a matrix negation morpheme and **wɛla**-phrases inside the complements of a small class of verbs, including **bıdd**- "want" (15), **χalla** "to allow" (16), **ḥaːwal** "to try" (17, 26 below) or **ʕırıf** "to know how to, to be able to" (18 below):

(15) ma-**bıddna** nχalli **wɛla zɛlami**.
not-want.1s leave.1p even fellow
"We don't want to leave even one man."

(16) ma-**χallu**ː-niː-š æːkɔl **wɛla lʊḳmi**
not-allowed.3mp-me-neg eat.1s even bite
"They wouldn't let me eat even one bite!"

The embedding can be recursive, provided that only verbs in this class are used (17).

(17) **bıddiː**-š **aḥaːwıl** ɛḥki wɛla maʕ ḥada.
want.1s-neg try.1s speak.1s even with one
"I don't want try to talk with anyone at all."

These verbs correspond to verbs found in many other languages which trigger a process often referred to as *restructuring* or *clause union*. I follow (Aissen and Perlmutter, 1983) in calling them *trigger verbs*. Restructuring involves the stretching of the domain of locality for certain kinds of bounded dependencies from the complement of a trigger verb to include the clause that it heads.

At present no other phenomena have been identified in PA which independently confirm that it has restructuring. However, long-distance negative concord is identified as a restructuring phenomenon in several languages such as West Flemish (Haegeman and Zanuttini, 1996), Polish (Dziwirek, 1998), and Serbian (Progovac, 2000). As such, I assume for now that long-distance negative concord in PA is a form of restructuring as well.

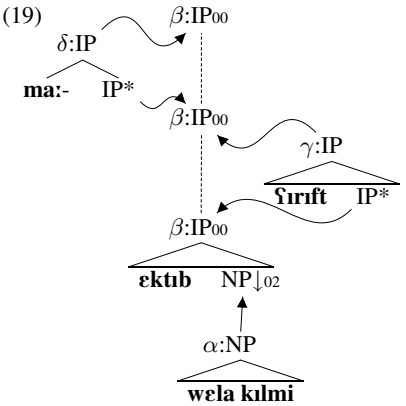
2 A TAG Analysis

Restructuring involves a seeming paradox involving a dependency which is non-local in the hierarchical structure of a sentence but local in its semantics. Tree Adjoining Grammars are well suited for analyzing restructuring because the distinction between a derived tree and the derivation tree associated with it provides two notions of locality.

Restructuring phenomena which have been analyzed with TAGs include clitic-climbing in Spanish and Italian (Bleam, 2000; Kulick, 2000), long-distance scrambling in German (Rambow, 1994), and long-distance agreement in Tsez (Frank, 2006). It therefore is natural to explore a TAG analysis for long-distance negative concord in PA.

To illustrate with a simple example, the negative concord dependency in (18) is licensed within an initial tree headed by **ɛktıb** "write," and is then stretched by adjunction of the auxiliary tree headed by **ʕırıft** "I was able to" (19):

(18) ma-ʕırıft ɛktıb wɛla kılmi.
not-knew.1s write.1s even word
"I wasn't able to write even one word."

(19)


The locality constraint on negative concord can then be expressed as a generalization about the derivation tree (20): a **wɛla**-phrase α and its licensor δ must be sisters relative to β:

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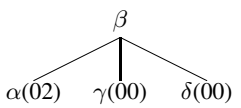


However, several properties of negative concord in PA preclude a simple analysis like this.

2.1 Clause-local Dependencies

The first property is the domain of locality of the negative concord dependency. In a simple TAG, syntactic dependencies are licensed within an elementary tree: they are *tree-local*. However, negative concord in PA is *clause-local*, because **wɛla**-phrases are not licensed within the immediate tree to which they are attached, but instead within the immediate clausal tree containing them.

For example, **wɛla**-phrases can be inside prepositional phrases attached to a negative clause (21):

(21) ma-kaʕatt [$_{PP}$ **ǧænıb** wɛla ḥada fiː-hʊm]
not-sat.1s next.to even one in-them
"I didn't sit next to even one of them."

In a simple TAG analysis, the **wɛla**-phrase first substitutes into the initial tree headed by the preposition, and then the PP attaches to the clausal tree. The relationship between the **wɛla**-phrase and its licensor would therefore not be tree-local.

Clause-locality can be modeled with a "Scope TAG" (Kallmeyer and Joshi, 2003), a multi-component TAG in which quantificational NPs are tree sets containing two parts: a "defective" auxiliary tree IP* which specifies the scope of the quantifier, and an NP-tree which specifies its restriction (referred to here as "scope sets").

While Scope-TAGs are intended for modeling quantifier scope, they can also be used to model clause locality: PPs are assigned to scope sets along with NPs, and a stipulation allows scope sets to combine with each other by means of *set-local* in addition to tree-local adjunction. The IP*-node in the scope-set of a **wɛla**-phrase can adjoin to the IP*-node in the PP scope set, which in turn adjoins to the IP-node of the initial tree.

For example, (21) above can be derived with the elementary trees in (22) (trees are abbreviated), producing the derivation tree in (23):

(22) a. α : { α_1 : IP* , α_2 : NP (**wɛla ḥada**) }

b. γ : { γ_1 : IP*$_{00}$, γ_2 : PP (**ǧænıb** NP↓$_{02}$) }

c. δ: IP (**maː-** IP*) β: IP$_{00}$ (I **kaʕatt**, PP↓$_{02}$)

(23) β (00) — γ_1(00) δ(00) γ_2(02); α_1(00) α_2(02)

However, locality still can't be defined as sisterhood in (23) because nothing in α is a sister of δ.

This can be remedied with the "node-sharing" relation proposed by (Kallmeyer, 2005): two nodes α and β are in a node-sharing relation in a derivation tree T iff they are either in a mother-daughter relation in T at a node address A, or there is a sequence S of nodes $N_1 \ldots N_n$ which is the transitive closure of a mother-daughter relation in T in which the node pairs are related in terms of the root node or foot node in an auxiliary tree.

On this basis, the negative concord locality generalization is that a **wɛla**-phrase and its licensor are "shared-node sisters" in the derivation tree, where shared-node sisters are two nodes A and B which are each in a shared-node relation with a single node C. For example, in (23) β is a shared-node parent of both α_1 and δ. Accordingly, α_1 and δ are shared-node sisters with respect to β.

2.2 Trigger Verbs and Complement Type

The second property of PA long-distance negative concord that complicates a TAG analysis has to do with the kinds of complement that they take.

The trigger-verb vs non-trigger verb distinction is an essential one because restructuring is not the only phenomenon modeled with TAG adjunction. Long-distance $\overline{\text{A}}$-dependencies are derived by adjunction, and (24-25) show that the verbs that block long-distance negative concord allow long-distance $\overline{\text{A}}$-dependencies. This indicates that they must be analyzed as auxiliary trees as well:

(24) miːn **bıtıtwakḳaʕ** yaḥsal ʕala kæːs ıl-ʕæːlım?
who believe.2ms get.3ms upon cup the-world
"Who do you think will get the World Cup?"

(25) šu **waʕatt** (ınnak) taʕtiː-hæ?
what promised.2ms that.2ms give.2ms-her
"What did you promise to give her?"

Failure to distinguish between trigger and non-trigger verbs will therefore over-predict the occurrence of long-distance negative concord.

PA trigger verbs vary as to the types of complements they take. For example, **ḥaːwal** "try to" or **ḳıdır** "be able to" optionally allow a complementizer **ʔınn**- (26), while **bıdd**- "want" or **ʕırıf** "know to, be able to" exclude it (27):

(26) ma-ḥaːwalt (**ınni**) ɛḥki wɛla maʕ ḥada.
not-tried.1s that.1s speak.1s even with one
"I didn't try to talk with even one of them."

(27) ma-bıdd-iː-ıš (***ınni**) ašuːf wɛla ḥada.
not-want.1s-neg that.1s see.1s even one
"I don't want to see even ONE of them."

Assuming that the presence of **ʔınn-** indicates a CP and that verbal agreement indicates an IP, (26-27) show that some trigger verbs allow either CPs or IPs as complements, while others allow only IPs.

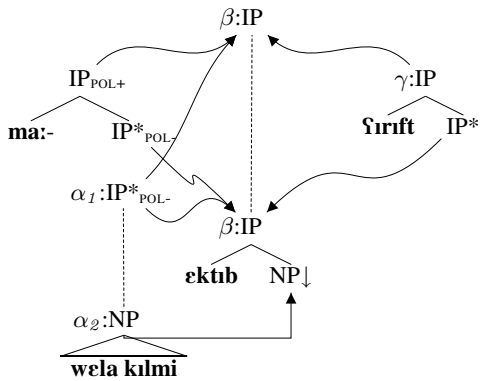
Furthermore, the complement of the non-trigger verb **waʕatt** in (25) can include the complementizer **ʔınn-**, indicating that **waʕatt** takes the same kinds of complements as do trigger verbs like **ḳıdır** and **ḥa:wal** in (26). It follows that complement size does not distinguish trigger verbs from non-trigger verbs.

This excludes a "reduced complement" analysis of restructuring in which trigger verbs take "smaller" VP-sized complements than other kinds of subordinating verbs do (Bleam, 2000; Kulick, 2000). I make the distinction using Dowty's (Dowty, 1994) analysis of negative concord licensing. Dowty models negative concord with a binary 'negation' feature (referred to here as 'polarity'). When a negative concord item combines with a clausal category it specifies (by unification) the clause as having a negative value for this feature.

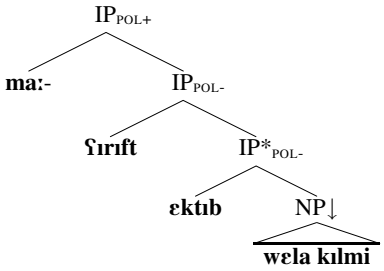
In addition, Dowty assumes that root clauses must be rooted with a POL+ node (referred to here as the 'root clause polarity constraint'). Negation morphemes take a POL- argument and return POL+. A root clause containing a negative concord item and no negation morpheme will be rooted with a POL- node, violating the root clause polarity constraint. This derives the "roofing" requirement.

Non-trigger verbs are distinguished by taking POL+ complements, while trigger verbs inherit the polarity features specified on the root nodes of their complements. In an analysis of (18), the derivation in (28) results in (29), satisfying the root clause polarity constraint.

(28)



(29)



2.3 Negation Morphology

The last property to be dealt with involves negation morphology in PA. Negation is expressed with some combination of the proclitic **ma:-** and the enclitic **-š**. **-š** appears to be a second-position clitic: it attaches to the first word-sized constituent in the production of an IP-constituent, provided that the word contains a morpheme expressing person features (Awwad, 1987; Eid, 1993; Hoyt, to appear).

Frequently **-š** attaches to the leftmost verb in a clause. This is the main verb in a mono-verbal clause (30), or the leftmost auxiliary in a clause with compound tense-aspect-mood marking (31):

(30) ma-**nımt**-ıš fi-l-le:l.
not-slept.1s-neg in-the-night
"I didn't sleep last night."

(31) ma-**kʊnt**-ıš ʕa:rıf we:n aḥʊṭṭ-u.
not-was.1s-neg know.actpart.ms where put.1s-it
"I didn't know where to put it."

Elsewhere **-š** attaches to various non-verbal words, including the pronoun **ḥada** "(any)one" (32), the existential particle **fi:** (33), inflected prepositions (34), and the adverb **ʕʊmr** "ever" (35):

(32) ma-**ḥada:**-š kæ:n yıʕğır-na.
not-one.ms-neg was.3ms rent.3ms-us
"No one would rent to us."

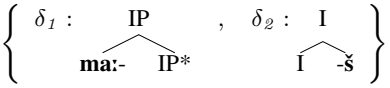
(33) ma-**fiš**-š fi-d-dınya mıθıl-hın.
not-exist-neg in-the-word like-them.fp
"There isn't [anything] in the world like them."

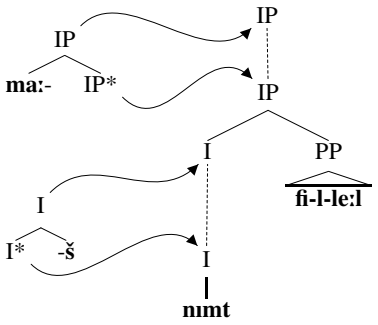
(34) bæḳi:-l-ɛ faras ma-**l-hæ:**-š ʊχt.
was.3ms-to-him mare not-to-her-neg sister
"He had a mare [that was] without compare."

(35) ma-**ʕʊmr**-hæ:-š ḥaṭṭat mawḍu:ʕ fi-l-mʊntada.
not-age-3fs-neg put.3fs subject in-the-club
"She never posted a thread on `montada.com`."

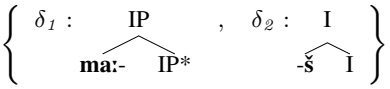
These expressions all contain a morpheme expressing person features and host **-š** when they occur as the first word in the clause. It follows that **-š** is constrained to occur in the second position attached to a word that is inflected for person.

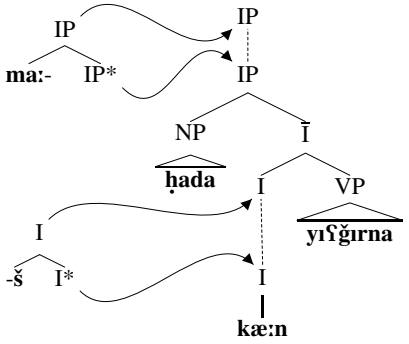
The cases in which **-š** attaches to a verb can be modeled by assuming that **ma:-** and **-š** are part of a tree set and that **-š** adjoins to right of an I-node:

(36) 

(37) 

The cases with **-š** attached to a non-verbal expression require a second analysis. One possibility is to assume a second tree for **-š** like the first, except with **-š** preceding the foot node. This requires stipulating a morphological output filter that affixes **-š** to the preceding word and blocks use of δ_2 in (36):

(38) 

(39) 

An alternative would be to stipulate multiple lexical entries targeting nouns, prepositions, and adverbs and to allow **-š** to adjoin directly to the words to which it is attached morphologically. This would remove the need to stipulate extra-grammatical morphological rules. However, it would also require adjunction with greater than set-local power, as well as supplementary stipulations forcing **-š** to adjoin to the second position.

Either solutions would still not be adaquate for examples like the following in which **-š** is separated from the I^0-node by a PP which appears to form a constituent with **ḥada**:

(40) ma-[$_{NP}$ ḥada**:-š** [$_{PP}$ fiː-hʊm]] b-ɪʕrɪf-ni.
not- one-neg in-them knows.3ms-me
"Not one of them knows me."

A TAG analysis of (40) would require **ma:**- to adjoin to the "know" tree, while the **-š** would adjoin to the **ḥada** tree. This would require a TAG with greater than even set-local power along with a morphological filter forcing **-š** to adjoin into the second position.

2.4 Summary

A TAG analysis of PA long-distance negative concord allows the locality of negative concord licensing to be stated as a generalization about shared-node derivation trees. However, the analysis requires brute force stipulations to capture the morphological expression of negation in PA negative sentences. Moreover, the TAG analysis does not provide a way to express the simple morphological generalization that **-š** is a second-position clitic.

3 A CCG Analysis

The TAG analysis founders on the distribution of **-š** because TAG trees are phrase structures, making it difficult to state constraints on strings of words rather than on hierarchical structure. Categorial Grammar, on the other hand, is a string calculus: its operations result in string concatenation rather than structure expansion. For this reason, a CG can be constrained to not generate particular kinds of strings, and therefore provides a way to state constraints on the distribution of **-š** more directly than a phrase-structure grammar does.

3.1 Modeling Negative Concord with CCG

I assume a *Combinatory Categorial Grammar* (Steedman, 2000b; Baldridge and Kruijff, 2003). NPI-**wɛla**-phrases are raised categories which look to the left for an s-headed POL- category (abbreviated as s^-) as in (41). I continue to assume the *root clause polarity principle*. NQ-**wɛla** phrases, on the other hand, are treated as negative quantifiers which look for their s^+-headed argument to the right (42):

(41) NPI-**wɛla** :- $\mathsf{s}^-\$\backslash(\mathsf{s}^-\$/\mathsf{np})$:
$\lambda P\lambda Q.\neg\exists x[P(x)\ \&\ Q(x)]$

(42) NQ-**wɛla** :- $\mathsf{s}^+\$/(\mathsf{s}^+\$\backslash\mathsf{np})$:
$\lambda P\lambda Q.\exists x[P(x)\ \&\ Q(x)]$

The negation morphemes have the types in (43-44) (**-š** is semantically vacuous), while the verbs **šuft** "I saw" and **ḥa:walt** "I tried" are as in (45-46)[2]:

(43) **ma:**- :- $\mathsf{s}^+/\mathsf{s}^-$: $\lambda P_{st}.\neg P(e)$

(44) **-š** :- $\mathsf{s}^-\backslash_\times\mathsf{s}^-$

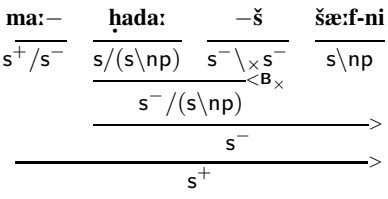
(45) **šʊft** :- $(\mathsf{s}\backslash\mathsf{np})/\mathsf{np}$: $\lambda y.\lambda x.[x$ saw $y]$

(46) **ḥa:walt** :- $(\mathsf{s}\backslash\mathsf{np})/(\mathsf{s}\backslash\mathsf{np})$: $\lambda x.\lambda P_{st}.[x$ tries $P(x)]$

[2]The type assignments ignore the representation of VS word order and pro-drop sentences.

The -**š** is an identity function over s-categories with a POL- feature, while **maː**- takes a s^- category and returns a s^+, satisfying the root clause polarity constraint. This is just as in the TAG analysis. The slash in the -**š** functor is marked with the permutative $\times$-modality (Baldridge and Kruijff, 2003). This forces -**š** to compose with a preceding s-headed functor and return a functor seeking its arguments to the right (Figures 47-48)[3].

(47)



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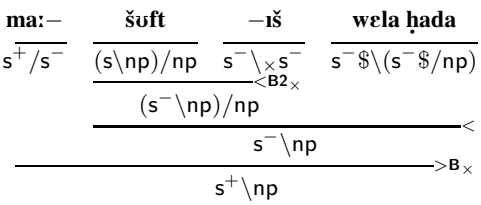


The CCG analysis improves on the TAG analysis inasmuch as it allows -**š** to attach to both verbal and non-verbal stems with just one category. However, it does not account for the second-position restriction on -**š** and over-predicts its distribution.

In order to account for the second-position effect, CCG must be augmented to distinguish between lexical and phrasal categories. Proposals of this sort have been made by Kraak (Kraak, 1995) and Bozsahin (Bozsahin, 2002), both of which use a system of features to distinguish morphological types coupled with functor modalities to distinguish morphological and phrasal composition.

The result is that a simple CCG analysis overgenerates the clitic ordering posibilities while the TAG analysis undergenerates them. CCG and MC-TAG are weakly equivalent in generative power. This means that a TAG account for the second-position effect requires extension of its generative power while a CCG account of the same phenomenon requires restriction of its generative power, and is therefore to be preferred.

3.2 Long-Distance Negative Concord

A CCG analysis of long-distance negative concord also has to distinguish between trigger verbs and non-trigger verbs. The CCG analog of TAG adjunction is *function composition*, the rule used to model long-distance dependencies in general.

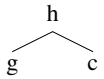
[3]Logical forms are supressed in the derivations.

Long-distance negative concord must therefore involve a specific kind of composition that is subject to stricter constraints than the more general kind of composition. Just as the TAG analysis above had to distinguish trigger-verb auxiliary trees from non-trigger verb auxiliary trees, a CCG analysis which does not distinguish between different kinds of long-distance dependencies will therefore over-predict the availability of long-distance negative concord unless further restrictions are placed on function composition.

I model the trigger verb vs non-trigger distinction in CCG by adapting Hepple's (Hepple, 1990) analysis of island constraints in Categorial Type Logic. Hepple assigns unary modalities to the arguments of clausal categories (such as subordinating verbs or relative pronouns) as well as to the nominal argument of a type-raised extracted category (such as a question word or topicalized noun phrase). The former are referred to as "bounding modalities," and the latter as "penetrative modalities." These modalities are ordered in a type-hierarchy. *Interaction axioms* require the penetrative modality of an extraction category to be compatible with the bounding category of its argument in terms of this hierarchy.

The unary modalities in CTL correspond to features on CCG category labels, so to adapt Hepple's analysis, I define a feature attribute "locality" (LOC) that takes a hierarchy of values:

(49)



Following Hepple's terminology, the *c* value defines an penetrative feature that is blocked by the *g* value, while *h* is the most general or permissive bounding feature that unifies with either c or g.

To model locality restrictions I assume that a functor category is specified with a LOC-feature that "spreads" across the atomic sub-types of the category, meaning that a single instance of the feature is represented on each atomic category in the function. Instances of a feature are represented as numerial subscripts on the feature values. For example, a transitive verb is specified as follows[4]:

(50) $(\mathsf{s}_{loc_1=h}\backslash\mathsf{np}_{loc_1=h})/\mathsf{np}_{loc_1=h}$

If two categories specified with compatible LOC-values combine, all instances of each of their features unify as the more specific of the two values.

[4]In what follows, feature specifications like $loc_1 = h$ are abbreviated as h_1.

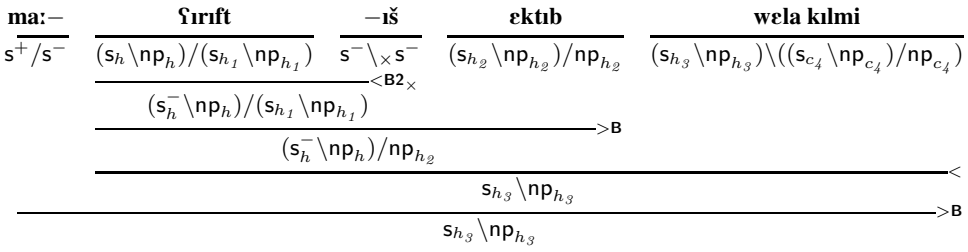


Figure 1:

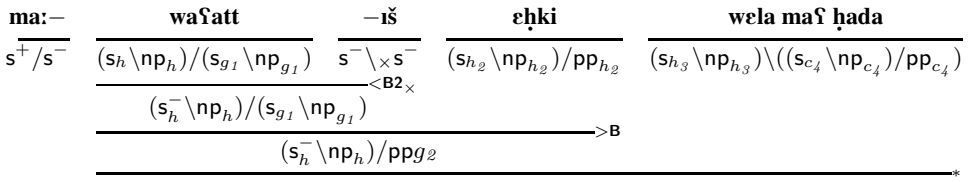


Figure 2:

For example, composing x_{g_1}/y_{g_1} with y_{h_2}/z_{h_2} gives in x_{g_1}/z_{g_2}, where h has unified with g as g.

NPI-**wɛla** NPs are specified with the *c* value:

(51) **wɛla ḥada** :- $s_{c_1}\$\backslash(s_{c_1}\$/np_{c_1})$

Trigger verbs impose the *h* bounding feature on their complements, while non-trigger embedding verbs impose the *g* feature:

(52) **bıdd-** "want," **ʕırıf** "be able to," **ḥa:wal** "try to" :- $s\backslash np/(s_h\backslash np_h)$

(53) **waʕad-yu:ʕıd** "promise to" :- $s\backslash np/(s_g\backslash np_g)$

According to (49), *h*-marked categories are compatible with *c*-categories, while *g*-marked categories clash with *c*-marked categories.

For example, in an analysis of (18), **wɛla kılmi** applies to the composition of **ʕırıft** and **ɛktıb**. This is possible because the penetrative feature *c* on the **wɛla**-phrase is compatible with the *h* bounding feature which **ʕırıft** passes to its complement, allowing the **wɛla**-phrase to take the composed constituent as its argument (Figure 1).

Long-distance negative concord is blocked in two ways. A wide-scope derivation (in which the **wɛla**-phrase combines with the composition of the matrix and embedded verbs) is blocked by a feature clash between the *g* and *c* features (Figure 2).

This feature clash results from the composition of **waʕatt** "promise" with **ɛḥki** "speak." The clausal argument of **waʕatt** has a *g*-value for the bounding feature that unifies with the *h*-values marked on **ɛḥki**. They unify as *g* (the more specific) feature. This spreads across the result category to the PP argument. The *g* value on the PP clashes with the bounding feature specified on the **wɛla**-NP, blocking further derivation.

A narrow scope derivation (in which the **wɛla**-phrase combines with the embedded verb only) is blocked because of a resulting clash in polarity features between the embedded clause and the matrix verb (Figure 3). This expresses the intuition that **wɛla**-phrases have to have a local licensor.

4 Comparison and Discussion

While the TAG analysis founders on the complexities of PA negation morphology, it does provide an intuitive way to describe restructuring verbs as a natural class that excludes non-trigger verbs and includes auxiliary verbs, the other kinds of verb that are "transparent" to negative concord.

In contrast, the CCG analysis relies technical ingenuity, it not being clear to what extent the LOC-features reflects a linguistic intuition. The CCG analysis does, however, capture the linear distribution of the negation morphemes in PA. It would therefore be interesting to explore further whether the Hepple-style feature/modality approach could be associated with some linguistic phenomenon.

One possibility is to follow (Hepple, 1997) by recasting locality features as a hierarchy of thematic dependency relations. This would define the domain of locality for movement as the domain of the head in a dependency graph, and would provide a CCG analog of a TAG derivation tree.

Another possibility in a very different direction would be to explore a connection between locality features and Steedman's theory of intonation (Steedman, 2000a). The locality features used

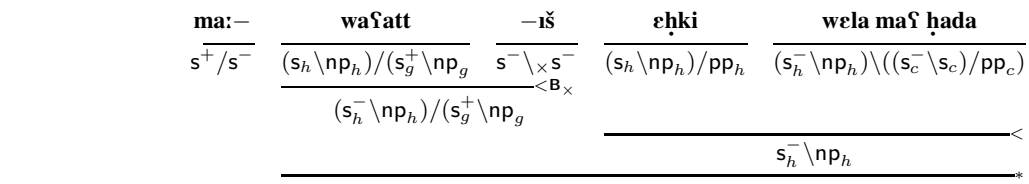


Figure 3:

here are very similar to the information structure features that Steedman's uses to model intonation in English. This suggests an investigate of the prosodic properties of restructuring sentences in Arabic (and in other languages) to see whether restructuring correlates with certain prosodic properties, and whether those properties could be modeled using an analysis like Steedman's.

There has been very little study of sentential intonation in Arabic. However, should such parallels exist, they would imply recasting Hepple's approach to extraction constraints as a theory of intonation. This would suggest a correlation between syntactic locality and prosodic phrasing, a generalization which has been noted for Italian trigger verbs (Monachesi, 1999).

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