

The prosodic structure of Serbo-Croatian function words: An argument for tied constraints*

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1 Introduction

The question of the proper treatment of clitics has received considerable attention in recent literature on the syntax-morphology and morphology-phonology interfaces (e.g., Marantz 1988, 1989, Zec and Inkelas 1992, Schütze 1994, Selkirk 1996, and references cited there). Selkirk (1996) proposes an elegant theory of the prosodification of clitic function words crosslinguistically, demonstrating that variation in the behavior of function words both within a language (English) and across dialects of a language (Serbo-Croatian) follows straightforwardly from re-rankings of universal constraints in an Optimality Theory (OT) framework (McCarthy and Prince 1993, *in press*; Prince and Smolensky *in press*). In this paper I argue that, in addition to strict re-rankings of constraints, tied constraints are also needed within such a system, in order to capture the Serbo-Croatian facts.¹ I discuss three empirical shortcomings of her analysis, all involving optionality, and show how they can be remedied by appealing to a particular notion of what it means for constraints to be tied in rank. To the extent that Selkirk's basic insights are correct, this supports the conclusion that tied constraints play an important role in OT accounts of the ways in which dependent and independent morphemes are combined into larger prosodic units. It adds to the growing evidence (cf. Anttila 1995, Reynolds 1994, and sources cited there) that a necessary part of OT theories of morphophonology is a particular notion of tied constraints or "crucial nonranking" (Prince and Smolensky *in press*), whereby separate tableaux are computed for each ordering of the relevant constraints and the output of each is a valid possibility in the language.

Selkirk's central claim is that certain differences in the realization of tonal word accents in three Neo-Štokavian (NŠ) dialects of Serbo-Croatian (SC) reflect systematic differences in the organization of function words into prosodic words. Serbo-Croatian has many prepositions, pronouns, auxiliaries, complementizers, particles and conjunctions that are clitics, i.e., that lack the status of Prosodic Word (PWd). Selkirk argues that when these clitics combine with host words, which themselves have the status of PWd, three possible prosodic structures can result, each of which is manifested in a different dialect of SC. These structures

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¹ I will have nothing to say about the analysis of English function words that constitutes the major portion of the same paper.

are schematized in (1), where Fnc^0 represents a functional head, the clitic, and Lex^0 a lexical head that is its host.

- (1) a. “free clitic” [[$\text{Fnc}^0 \text{Lex}^0$] PWd] PPh
 b. “internal clitic” [Fnc^0 [Lex^0] PWd] PPh
 c. “affixal clitic” [[Fnc^0 [Lex^0] PWd] PWd] PPh

In (1a), the function word and its lexical word host are sisters under a single PWd node. In (1b), the lexical word by itself constitutes a PWd , and the function word is not part of any PWd , instead being prosodified by attaching directly to a higher-level constituent, the Phonological Phrase (PPh). (1c) is in some sense a combination of the previous two possibilities: the lexical word constitutes a PWd on its own, but the function word combines with it to form a larger, recursive PWd .

The motivation for assigning these different structures is the fact that the surface tonology of the dialects differs with respect to its treatment of clitics. The differences among the three dialectal structures are captured by the interaction of constraints on prosodification, whose rank ordering differs across the dialects. (The details of these constraints are not relevant here.) In what follows, I assume that Selkirk’s ascription of each of the structures in (1) to a particular dialect of SC is correct, and pursue the implications of these structures for the distribution of tones. All relevant SC facts are taken from Zec (1993), the source on which Selkirk’s description is based. (Zec presents an alternative account of these facts in a derivational, rule-based framework.)

2 The basic facts

Serbo-Croatian is generally described as a pitch accent language. There has been much discussion in the literature concerning the underlying nature of SC accentuation and its phonetic realizations (see Lehiste and Ivić 1986 for review). Since my purpose here is to scrutinize Selkirk’s analysis, I will follow her in assuming Zec’s account, under which accent is represented underlyingly as tone and phonetically realized most often as pitch, while stress in SC is derived from tone and realized most often as length. It is not obvious that such an account is preferable to one in which metrical structure would be underlying, with tone facts derived from it. Zec argues for the former approach on the grounds that surface stress is predictable from surface tones, but not vice versa, but this does not mean that both surface features are not predictable from a slightly more abstract metrical representation (Michael Kenstowicz, p.c.).

Under the tone-based account, then, morphemes in SC can either have one high tone or be toneless underlyingly. A word that results from combining morphemes in the lexicon is subject to the same constraint: it may have at most one high tone, and that tone will be associated with a particular mora.² The means

² See Zec 1993 for the relevant definition of mora and arguments against a syllable-based analysis.

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by which the location of lexical tone is determined will not be of concern here—see Zec 1993 for discussion. Low tones are absent underlyingly and are supplied by a late default rule.

In all Neo-Štokavian dialects, non-initial high tone is subject to a rule spreading it one mora to the left. This process is exemplified in (2), where underlying forms are shown to the left of the arrow and surface forms to the right.³ The example in (2d) shows the rule failing to apply, since the high tone has nowhere to spread to; this form also illustrates that spreading must be right-to-left rather than left-to-right, because the latter choice could not derive the tone contrast between (2c) and (2d), involving the same stem.

- | | |
|---|---|
| <p>(2) a. marama → marama</p> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="text-align: center;"> $\begin{array}{c} \\ \text{H} \\ \text{'scarf'}$</div> <div style="text-align: center;"> $\begin{array}{c} \diagdown \\ \text{H} \end{array}$ </div> </div> | <p>b. raazlika → raazlika</p> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="text-align: center;"> $\begin{array}{c} \\ \text{H} \\ \text{'difference'}$</div> <div style="text-align: center;"> $\begin{array}{c} \diagdown \\ \text{H} \end{array}$ </div> </div> |
| <p>c. ne-raadnik → ne-raadnik</p> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="text-align: center;"> $\begin{array}{c} \\ \text{H} \\ \text{'non-worker'}$</div> <div style="text-align: center;"> $\begin{array}{c} \diagdown \\ \text{H} \end{array}$ </div> </div> | <p>d. raadnik → raadnik</p> <div style="display: flex; justify-content: center; gap: 20px;"> <div style="text-align: center;"> $\begin{array}{c} \\ \text{H} \\ \text{'worker'}$</div> <div style="text-align: center;"> $\begin{array}{c} \\ \text{H} \end{array}$ </div> </div> |

We can describe the spreading rule as in (3), where square brackets indicate that the rule is confined to apply within a certain domain, whose precise identity will be explored below. It should be noted here that in all three dialects, this rule is obligatory within a lexical word.

- (3) High Tone Spread (HTS): Spread a singly linked H one mora to the left
- $$[\mu \text{O} \mu \quad \mu \quad \emptyset] \rightarrow [\mu \text{O} \mu \quad \mu \quad \emptyset]$$
- $\begin{array}{c} | \\ \text{H} \end{array}$

$\begin{array}{c} \diagdown \\ \text{H} \end{array}$

Note that the linking line in the structural description of the rule must be taken as exhaustive, since the rule never applies iteratively: H cannot become more than doubly linked. I will assume that this rule is implemented by a constraint H-BINARITY, which requires that a H tone be doubly linked.⁴ It is prevented from applying across certain prosodic constituent boundaries by NOCROSSING constraints that disallow a tone being linking across those boundaries.

Lexical words that lack underlying tone because they are made up of toneless morphemes always undergo a process of default initial high tone insertion when uttered in isolation, as exemplified in (4) for an underlyingly toneless verb stem.

³ I follow Zec's transcriptions throughout; vowel length is represented as gemination.

⁴ I shall not be concerned here with how to implement in constraints the requirement that spreading go leftward.

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(7) NŠ-1	NŠ-2	NŠ-3
a. u graad H ‘in (the) town’	c. u graad H ‘in (the) town’	d. u glaavu H OR e. u glaavu H ‘into (the) head’
b. iza graada H ‘behind (the) town’		f. ispod leda H OR g. ispod leda H ‘under (the) ice’

It is apparent from the table that in dialect NŠ-1, the domain of application of IHI comprises both the lexical word host and the clitic that is attached to it, while in NŠ-2 its domain comprises only the lexical word, and in NŠ-3 both options are available.⁶

Let us now consider the facts of high tone spread (HTS) in the same dialects of SC. The relevant data are shown in (8); note that in (8h-j) the lexical word is underlyingly toneless and the H arises by IHI.

⁶ I follow Zec’s arbitrary numbering of the dialects; the reader is referred to her discussion for geographical and other relevant information.

(8)	NŠ-1	NŠ-2	NŠ-3	
a.	u kuću 'into (the) house'	d.	u kuću 'into (the) house'	
b.	ispred kuće 'in front of (the) house'	e.	ispred kuće 'in front of (the) house'	
c.	vidiim kuće 'I see (a) house'		f.	u banju OR u banju 'to (the) spa'
			h.	iz salaaša OR iz salaaša 'from (the) field'
			i.	OR iz salaaša 'from (the) field'
			j.	OR u salaašu 'in (the) field'

(8a, b) show that in NŠ-1, HTS applies not only within a lexical word, but also between a lexical word and a proclitic attached to it; (8c) shows that it cannot generally apply between two lexical words (but see below for a qualification). In contrast, in NŠ-2 HTS can never cross out of a lexical word, as (8d, e) show. In NŠ-3, HTS from a lexical word to its proclitic is optional, as (8f) versus (8g) shows. (8h–j) show that the combination of two possible loci for IHI plus the optionality of HTS to a proclitic can result in a three-way alternation in NŠ-3.

One additional wrinkle in the behavior of HTS is that in NŠ-1, but crucially not in NŠ-2 or NŠ-3, HTS can apply across a PWd boundary if the preceding word happens not to be associated with a tone (this is impossible in (8c) since the verb always receives a tone); attested cases of spreading out of a PWd involve spreading to a numeral or a nonclitic pronoun, as in (9). Purely for expository purposes, I refer to this set of targets as *weak PWds*. Importantly, spreading to a weak PWd is optional in NŠ-1, while spreading within a PWd, as in (8a, b), is obligatory.

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- (9) a. svu nooć
 |
 H
- b. svu nooć
 |
 H
 'all night'

Note that the class of words that can be targets of this cross-PWd spreading in NŠ-1 receive tone by IHI only optionally, in all three dialects (Zec 1993). If IHI applies to such a weak PWd, spreading is blocked because no word may be linked to more than one H tone. Thus, descriptively speaking, IHI first applies, optionally, to the weak PWd, bleeding HTS if a tone is actually inserted; then, HTS tries to apply, also optionally. Although Zec does not directly report any three-way alternations, her description implies that for polysyllabic weak PWds followed by H-initial PWds, three outputs should be possible: weak PWd with initial H, weak PWd with final H spread from the preceding PWd, or unaccented weak PWd and no spreading. Descriptively, these three options in NŠ-1 resemble the alternation in (8h–j) of NŠ-3, but they involve different prosodic constituents.

3 Assessment of Selkirk's analysis

Let us now consider how Selkirk accounts for the facts in (7) and (8), assuming that she is committed to the representations given in (1), repeated below. Selkirk proposes that Fnc-Lex combinations always have the structure (1a) in NŠ-1, the structure (1b) in NŠ-2, and the structure (1c) in NŠ-3.

- (1) a. "free clitic": [[Fnc⁰ Lex⁰]PWd]PPh
 b. "internal clitic" [Fnc⁰ [Lex⁰]PWd]PPh
 c. "affixal clitic" [[Fnc⁰ [Lex⁰]PWd]PWd]PPh

It is easy to verify that these structures produce the correct results for IHI in NŠ-1 and NŠ-2, but NŠ-3 requires further comment. In particular, either of the valid sites for inserting default H in NŠ-3 ((7d vs. e) or (7f vs. g)) involves satisfying INITIALACCENT with respect to one of the PWds while violating it with respect to the other. Thus, the two forms are equally optimal, each incurring one violation of INITIALACCENT, and so both are allowed to surface.⁷ It is not possible to satisfy INITIALACCENT with respect to both PWds by inserting two (singly-linked) H tones, because this would violate the inviolable constraint that disallows more than H one tone within a word.

What about HTS under the three structures in (1)? In NŠ-1, spreading from Lex to Fnc is obligatory; since there is no PWd boundary between them (1a), nothing will prevent HTS from applying in this environment. In NŠ-2, spreading from Lex to Fnc is impossible; since there is always a PWd boundary

⁷ But see below for potential problems.

between them (1b), HTS will be correctly blocked as long as the NOCROSSING constraint is ranked above H-BINARITY in this dialect. Where things start to get sticky is in NŠ-3. Before spelling out details, we should note that one cannot simply say that speakers of NŠ-3 are bi-dialectal, allowing the union of the set of valid forms for dialects NŠ-1 and NŠ-2, because NŠ-3 has a form that both other dialects lack, viz. (8i).

Selkirk actually does not mention forms like (7e, g) or (8j), wherein H has failed to spread from Lex to a preceding Fnc, so I put these forms aside for the moment. Her analysis already encounters a problem in dealing with alternations like (8h vs. i), that is, the option of a singly-linked H on Fnc versus a H linked both to the initial syllable of Lex and the initial syllable of Fnc. This problem is raised but not solved in Selkirk's footnote 14. The problem is to explain why the structure in which spreading has occurred (8i) is not favored over the one where the H is inserted directly on the clitic (8h), given that the former appears to satisfy the INITIALACCENT constraint with regard to *both* the inner and outer PWds, whereas the latter appears to violate it with regard to the inner PWd. That is, by expressing IHI as a constraint rather than as a rule that inserts H at the beginning of a toneless PWd (as in Zec's analysis), it is predicted that it seeks to be satisfied with respect to *every* PWd in a recursive structure. This means that spreading should satisfy INITIALACCENT and single linking should induce one violation of it, making the two outputs unequally optimal, contrary to fact. Selkirk suggests that there ought to be some reason why spreading fails to satisfy INITIALACCENT with respect to the larger PWd, perhaps due to "the characterization of the default accent phenomenon itself, and its relation to word stress (see Zec, 1994)." I propose that this optionality, along with further considerations, points to the need for tied constraints. Once this is accepted, there will be no need to stipulate an idiosyncratic property of doubly-linked H with regard to INITIALACCENT.

A second empirical problem for Selkirk's analysis is the fact that spreading to Fnc is optional in NŠ-3 (7e, 7g, 8j). Recall that this is in contrast to the behavior of spreading within a lexical word, which is obligatory in all three dialects. This raises another instance of the optionality problem: without special stipulations, spreading should satisfy INITIALACCENT with respect to both PWds, whereas nonspreading from Lex, as in (8j), just like inserting the default H on Fnc, violates INITIALACCENT with respect to one of the PWds. Thus, the nonspreading option should lose to the spreading option, particularly since spreading is otherwise obligatory. This problem cannot be solved by re-ranking INITIALACCENT below a NOCROSSING constraint, since then the spreading option (8i) should always lose to (8h) and (8j). Thus, while the recursive PWd structure (1c) elegantly captures optionality for IHI, it cannot do so for optionality involving HTS.

4 Solution #1

One solution to both of the problems noted so far would be to suggest that NŠ-3 really has three options for prosodifying Fnc-Lex sequences, namely, the three structures given in (1). Each structure would correspond to one of the

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three tone configurations shown in (8h–j): two look just like their counterparts in NŠ-1 and NŠ-2, and the third results from the structure (1c).⁸ Such a solution of course requires that speakers allow three different rankings of the constraints that govern the prosodification of these Lex-Fnc sequences. The relevant rankings are listed in (10), from Selkirk.

- (10) a. NonRecp_{W_d}, Exh_{pp_h} >> WdCon, PWdCon (1a)
 b. WdCon, PWdCon, NonRecp_{W_d} >> Exh_{pp_h} (1b)
 c. WdCon, Exh_{pp_h} >> NonRec_{p_{W_d}}, PWdCon (1c)

Allowing all three rankings as alternatives within the grammar of NŠ-3 is thus a possible solution to the two problems raised above. This effectively requires a notion of tied constraints, in the sense that pairs of constraints can be ranked in either order, with the output of each ranking *not* being subject to competition governed by lower-ranked constraints. To take a concrete example, consider the constraint ranking in (11), where the bi-directional arrows indicate a tie between the constraints immediately to either side of them.

- (11) Exh_{pp_h} >> NonRec_{p_{W_d}} <<>> WdCon >> PWdCon

This is effectively a shorthand for two grammars, one where NonRec_{p_{W_d}} is ranked above WdCon, one where WdCon is ranked above NonRec_{p_{W_d}}. Each grammar yields an output for a given input, and both outputs for that input are possible forms in the language described by (11). This example would corre-

⁸ Actually, some tricky maneuvering is required to make structure (1c) yield an output like (8i), wherein HTS spreads out of the inner PWd but stays within the outer PWd. There are two different tacks we could take, which make different predictions for forms of a sort that Zec does not discuss, namely, forms where the proclitic is polysyllabic. Zec cites no examples like (7g) where spreading occurs, though her description provides no reason to expect that optional spreading would not occur there, just as it does to a monosyllabic proclitic in (8i). If it turns out that spreading is *not* possible in polysyllabic cases, this would strongly suggest that what drives HTS to monosyllabic proclitics in examples like (8i) is precisely that fact that such spreading also happens to allow INITIALACCENT to be satisfied with respect to the outer PWd (counter to Selkirk's assumption). In that case, output (8i) could be derived under structure (1c) by ranking INITIALACCENT above NOCROSSING, because spreading H is the only way to avoid a violation of INITIALACCENT with respect to one or other of the PWds. Then, the fact that such spreading violates NOCROSSING by crossing a PWd boundary would be irrelevant.

However, since I consider this to be the less likely state of affairs, in the rest of this paper I shall assume that optional HTS continues to be available when the proclitic is disyllabic in NŠ-3. In that case, spreading H from Lex will *not* satisfy INITIALACCENT a second time, so INITIALACCENT cannot force such spreading to occur. This means that there has to be some other way to induce spreading across a PWd-internal PWd boundary, without inducing free spreading to a completely separate PWd. (Recall from above that NŠ-3 never allows HTS to apply between two separate PWds, unlike NŠ-1.) How to accomplish this will be discussed under Solution #2, but that method would apply equally well here.

spond to the union of the forms generated under (10a) and (10c). An additional tie would have to be added to express all the options available in NŠ-3.⁹

5 Solution #2

I now want to pursue a different solution. The solution just explored seems to lose some of the elegance of Selkirk's account, since dialect variation is no longer simply a matter of a single re-ranking of constraints. Furthermore, an additional fact not discussed by Selkirk points to the possibility that a different constraint could explain some of the optionality within NŠ-3 while maintaining a single prosodic structure for that dialect.

As noted above, there are some cases in NŠ-1 where HTS *optionally* extends beyond a PWd boundary, to another word within the same Phonological Phrase, as shown in (9). First, it should be pointed out that this last example of optionality is again problematic for Selkirk's account, for the same reason that optional spreading within a PWd in NŠ-3 was. However, the solution I suggested above with respect to optionality in NŠ-3, namely, appealing to different possible prosodifications, seems less likely to work for this optionality in NŠ-1. The reason is that there can be no ambiguity in the prosodification of Fnc-Lex sequences in NŠ-1: these are *always* treated as a simple PWd for purposes of IHI and HTS. Thus, if optional spreading in cases like (9) were to be explained by alternative prosodic structures, it would have to invoke some constituent larger than the PWd.¹⁰ In principle, one could say that weak PWds either are or are not incorporated into the same PPh as their following head noun in NŠ-1. But this is a fairly drastic move that ought to have consequences for all other prosodic phenomena that are sensitive to PPh boundaries. I am not aware of any evidence that this is the case.

I wish to suggest an alternative in which what is going on in NŠ-1 reflects the action of a NOCROSSING constraint, involved in a tie. (It will turn out that we can use another flavor of this constraint, also in a tie, to account for the variation internal to NŠ-3 without resorting to multiple possible prosodic structures.) In order to get the alternations within NŠ-1, we simply need to say that NOCROSSING is tied with H-BINARITY. When H-BINARITY is ranked higher, cross-word spreading is induced, while when NOCROSSING is ranked higher, spreading is blocked across PWds but is unaffected within PWds, as desired since

⁹ It may actually not be possible to accomplish this, depending on how one restricts the mechanics of tied constraints. In particular, the constraints that need to be "swapped," relative to (11), to generate the (1b) structure are Exh_{PPh} and PWdCon, but these are not adjacent in the ranking in (11). It therefore does not make sense to speak of these two as "tied" in any intuitive sense; rather, the notion for allowing optionality would involve "exchangeable" constraints, obviously a more powerful device.

¹⁰ Otherwise, if the noun PWd could encompass the weak PWd as well, INITIALACCENT should have the option of accenting that pronoun *instead of* the noun, whereas in reality INITIALACCENT treats the weak PWd independently from the head noun.

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it is obligatory there. In NŠ-2 and NŠ-3, this NOCROSSING constraint is always ranked strictly above H-BINARITY.¹¹

Let us now consider how a NOCROSSING constraint can help us with the alternations internal to PWd in NŠ-3. We return to Selkirk's assumption that in NŠ-3, Fnc-Lex sequences are always prosodified with the recursive structure (1c), in which a PWd dominates just the Lex, and a larger PWd subsumes Fnc and Lex together. The key observation is that in this configuration, unlike in NŠ-1, there is a PWd boundary between Lex and Fnc. The obvious hypothesis is that this boundary is responsible for optionality of HTS across it, just as a PWd boundary was responsible for optionality of HTS to prenominal modifiers in NŠ-1. However, we cannot appeal to exactly the same NOCROSSING constraint in NŠ-3 as we did in NŠ-1, because in NŠ-3, as noted above, spreading *outside* the larger PWd is *never* possible. That is, (9b) is ungrammatical in NŠ-3. Fortunately, there are differences between the prosodic structures of (9b) versus (8i): in (9b), there is both a left and a right PWd edge between the two words, and no PWd that dominates both of them, whereas in (8i) there is only a left PWd edge intervening, and there is also a PWd that dominates both of them.

Therefore, I propose that there are two NOCROSSING constraints at work in SC: one prohibits tone spread that crosses into a PWd that does not contain the source tone (NOCROSSINGIN), the other prohibits tone spread that crosses out of a PWd that contains the source tone (NOCROSSINGOUT).¹² These can be independently ranked. In NŠ-1, NOCROSSINGIN is the constraint that is tied with H-BINARITY to derive the options in (9). In NŠ-3, NOCROSSINGIN is always ranked strictly above H-BINARITY, so (9b) will always be blocked, but NOCROSSINGOUT is tied with H-BINARITY, so that (8i) is generable alongside (8j).

What about the third possible output in NŠ-3, namely (8h)? Note that when NOCROSSINGOUT is ranked above both H-BINARITY and INITIALACCENT, doubly-linking a H to both Fnc and Lex will not be possible, so H-BINARITY cannot be satisfied regardless of whether H is inserted on Lex (8j) or Fnc (8h). Thus, H-BINARITY will not choose between those two locations for IHI. INITIALACCENT is satisfied once and violated once by each choice, so it does not distinguish them either, and NOCROSSINGOUT is satisfied by both. Thus, these two outputs, (8h) and (8j) (not the two options Selkirk originally discussed), *could* be successfully generated in the way she proposed, as

¹¹ As Yoonjung Kang points out, I have ignored the effects of INITIALACCENT on the weak PWd in this description. Recall that the optionality of IHI on the weak PWd and the optionality of HTS to the weak PWd are independent, in that there are possible outputs in which *neither* applies. Thus, optionality of IHI cannot be explained by a tie between INITIALACCENT and H-BINARITY. I make no proposal for how to implement it, but it need not interact with optional spreading.

¹² As Yoonjung Kang points out, this formulation in terms of containment makes different predictions from a possible linear formulation that would refer only to whether tone spread crosses a right versus a left PWd edge. Unfortunately, I am not aware of data that would allow testing the crucial predictions, but I share her hunch that the containment formulation is more likely.

equally optimal candidates within a single constraint ranking.¹³ In order to ensure that (8i) does not beat out both of them, INITIALACCENT is always ranked below H-BINARITY and NOCROSSINGOUT.

In summary, we see that all three alternants in NŠ-3 can be generated by assuming a single recursive PWd structure for that dialect, the one Selkirk originally proposed, provided we allow the tied ranking of H-BINARITY and NOCROSSINGOUT in the sense spelled out above. Under this approach, as under solution #1, the use of tied constraints is crucial to capturing the facts.

6 Conclusion

In this paper, I have argued that under either of two possible analyses of NŠ Serbo-Croatian dialects, both of which follow the basic insights of Selkirk (1996), tied constraints must crucially be appealed to. Admitting this possibility into UG evidently makes part of the learner's task (namely, learning the constraint rankings) more difficult, since it greatly increases the number of possible grammars. The learnability problem might be lessened, however, if there were limits on which kinds of constraints could be eligible for entering into ties. I speculate that this leads to a reason for preferring solution #2 over solution #1. Recall that in solution #1, the constraints that have to be tied are those that define possible prosodic structures of a language, e.g., whether recursive PWds are available, whether clitics are free versus internal versus affixal, etc. In contrast, in solution #2, the constraints involved in ties affect only multiply-linked H tones, or in more traditional terms, only the process of H-spreading. It seems plausible to suggest that allowing ties in the former domain would be more detrimental to the learner, because a wide range of phonological processes will be sensitive to the prosodic structures of the language, so that if the learner is always entertaining the possibility of multiple alternatives, it will be difficult to settle on the correct rankings that affect particular processes. In contrast, if UG specifies that "structure defining" constraints can never be involved in ties, then once evidence for one ranking of these constraints has been encountered, no further structures need be considered. In traditional terms, I am hypothesizing that UG limits optionality to rules/processes, and disallows optionality in the mapping from syntactic to prosodic structures.¹⁴ Obviously, further work is needed to establish whether such a restriction could be maintained in the face of other data, and whether these intuitive learnability considerations can be formally cashed out.

¹³ Of course, we need to worry about whether any lower-ranked constraint will prefer one or other of the two H placements. If so, then another tie would have to be posited between constraints that prefer a H linked to Lex versus a H linked to Fnc.

¹⁴ I of course do not mean to suggest that there is no optionality in the way in which a given syntactic structure can be prosodified. Rather, a narrower claim is intended, namely that there is no optionality in the *kind* of structures that can be assigned. For example, (in Selkirk's terms) a given syntactic Fnc-Lex sequence does not have the option of being prosodified either as an internal clitic or as an affixal clitic. This is the intended effect of disallowing ties among the constraints responsible for defining possible prosodic structures.

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