

Eliminating  
bracketing  
paradoxes in  
phonologically  
driven syntax

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# Abstract

This revision of a PowerPoint presentation from a University of British Columbia talk on 4 March 2021 outlines how a phonologically driven theory of grammar (Schmerling 2018) explains apparent misalignments of syntactic and prosodic structures as resulting from operations that substitute units of varying weight at prosodic edges and that apply bottom to top in the formation of larger structures. On this approach, **syntax is semantically relevant relations among prosodic structures**. This theory is a generalization to units larger than prosodic words of the item-and-process morphology of Edward Sapir and his students. A Sapirian perspective on the relationship between grammar and phonology allows us to view “bracketing paradoxes” identified to date as involving affixations, i.e., operations that increment prosodic words within prosodic phrases. A broader perspective on the sound-grammar relationship, however, lets us see affixations as akin to substitutions of units smaller than words, like the mutations of Celtic initial consonants or of syllable nuclei as in Germanic umlaut and Indo-European and Penutian ablaut. Formation operations that apply directly to prosodic structures further allow us to revise our conception of the motivation for syntactic categories, which can now be divorced from units properly seen as prosodic and which are thus applicable to languages traditionally seen as typologically incommensurate. A further advantage of this approach to linguistic structure is its ability to explain lexicalization of linguistic expressions as simply entailing a prosodic structure (initially) ceasing to be derived according to some formation rule.

# What are bracketing paradoxes?

- As the term is used in current Generative theory, a bracketing paradox arises when two disparate sets of considerations point to different syntactic structures.
- A simple example from English: *New Yorker*. Prosodic considerations point to the bracketing [[New] [Yorker]].

But *New Yorker* doesn't mean a Yorker that is new; the semantics of this phrase points to the bracketing [[New York] er].

N.b. “bracketing” presupposes we're dealing with **grammatical** units (morphemes, grammatical words, grammatical phrases).

- My proposal: the *New Yorker* phenomenon involves neither bracketing nor a paradox.

# What is phonologically driven syntax?

- In item-and-process (IP) morphology (Edward Sapir and successors), processes manipulate phonological (prosodic) structures. Processes have **phonological** inputs and outputs.
- The only difference between “morphology” and “syntax” is that “morphology” refers to word-internal processes, where by “word” I mean a prosodic word, whereas “syntax” involves prosodic units that are larger than these. Neither term is needed in grammatical theory itself.

There is no “morphology-syntax interface” in the sense of a relation between distinct systems within a grammar. Put differently, there is no morphology-to-syntax or syntax-to-morphology mapping.

# What is phonologically driven syntax? (cont.)

- Formation rules collectively **partition** the language's set of phonological structures into subsets, each belonging to a syntactic category. For example, the set of all nouns is a subset of the set of all phonological structures; the set of all verbs is a subset of the set of all phonological structures, etc. (I'm using "noun" and "verb" in a pre-theoretic way.)
- An  $n$ -place formation rule (a rule with  $n$  inputs) consists of
  - An  $n$ -place operation (process),
  - An input category or  $n$  input categories (do we only find 1- and 2-place operations?), and
  - An output category.

# Examples of word-internal processes

➤ Two 1-place operations (from standard German)

- Umlaut (fronting of syllable nuclei)

a → ä

o → ö

u → ü

- Suffixation (here *-chen* suffixation; the suffix varies geographically)

*Bruder* 'brother' → *Brüderchen* 'little brother'

- Umlaut is pervasive in German, also occurring in derived feminine nouns (*Franzose* 'Frenchman', *Französin* 'Frenchwoman'), comparative adjectives (*groß* 'big', *größer* 'bigger'), derived verbs (*klar* 'clear', *erklären* 'to explain'), and many others. A long-standing but elusive goal has been a principled way to state umlaut once and for all, without reference to a particular formation. Achieving this goal is straightforward in the algebraic formalization of phonologically based syntax to be discussed today.

➤ A 2-place operation: compounding (English)

*black, bird* → *bláckbird*

# A phonological algebra

(Cf. Hockett 1954, Schmerling 2018.)

- Mathematically, an IP system contains
  - A non-empty set  $A$  of phonological structures, and
  - A non-empty set of operations (processes) over  $A$ .

$A$  is the smallest set containing as members all the basic expressions of  $A$  and closed under the operations. (I.e., the outputs of all the operations are also members of  $A$ ; linguistically, all the operations (processes) are **productive**.)

- The set of phonological structures includes as subsets
  - A set of basic (non-derived) expressions, and
  - A set of expressions derived by the operations.

# Takeaways so far

- The only important notion of “word” in linguistic theory is a **prosodic** one.
- The word/phrase distinction doesn’t align with a grammar-subsystem distinction (“morphology” vs. “syntax”; “lexicon” vs. “syntax,” etc.); a word-internal phenomenon in one language, or one part of a language, might correspond elsewhere to a phenomenon involving more than one word.
- The mathematics of the system allows for primitive operations, but it also allows for the operations invoked in the formation rules to be the **composition** of primitive operations; this was illustrated in German diminutives like *Brüderchen*. Two primitive operations are involved: **umlaut** (vowel fronting) and **suffixation**. The composition of these, umlaut-*cum*-suffixation, is the operation invoked in the diminutive formation rule. This analysis captures the idea that umlaut is “part of the suffix.”
- The mathematics requires only that the operation invoked in a given formation rule be definable as a set of ordered pairs for which each element from the input set is mapped to a unique element from the output set (two examples: {<sing, sang>, <dream, dreamt>, <go, went>, <walk, walked>, ...}; {<sing, sung>, <dream, dreamt>, <go, gone>, <walk, walked>, ...}). Operations are mainly constrained by prosodic theory; “prosodic morphology” is generalized.



# What are syntactic categories (not) good for?

- We already have a distinction between basic and derived linguistic expressions; we have no need to recapitulate that distinction in the category system, as “lexical” vs. “phrasal” categories.
- Syntactic category information isn’t needed in a characterization of the language’s operations; only phonological information is.
- If a language’s basic expressions comprise the generator set (the set of basic expressions) of an algebra that has a non-empty set of operations, then we already have a notion of constituent structure: each expression of the language is a constituent. This will be seen shortly, when we get to the constituent structure of *New Yorker*.

# The fundamental problem with mainstream “bracketing paradoxes”

- The mainstream approach assumes that grammatical structures are made up of bracketed abstract formatives.
- On a strictly IP approach, a language’s expressions **are** phonological structures whose constituent structures aren’t given by brackets but by the steps in those expressions’ formation.
- Affixation is much like other phenomena (e.g., umlaut) that don’t involve entire morphemes.
- One can thus ask whether a phonological approach to *New Yorker* is well motivated. I believe the answer to this question is yes. Let’s start with the grammatical structure of *New Yorker* on the IP approach outlined here.

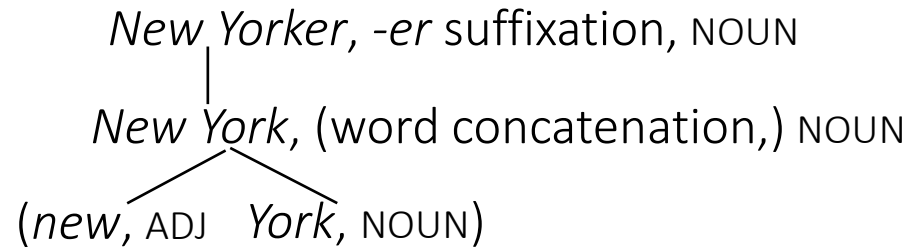
# The constituent structure of *New Yorker*

- Synchronically, we start with the two-word basic expression *New York*. The grammar tells us that *New York* is a noun (again using this as a pretheoretic term).
- Proceeding bottom to top, we suffix *-er* to the right of its rightmost word; the result consists of two prosodic words, as before. The word on the right has now been incremented by *-er*.
- The formation rule that invokes *-er* suffixation assigns its output to the noun category.

*New York* is a basic noun; *New Yorker* is a derived noun.

# The constituent structure of *New Yorker* (cont.)

We can diagram this derivation as follows, where each node of the tree is a step in the formation of *New Yorker*.



- Each node is a (rough!) transcription of an expression, followed by the operation that derives it (if any) and then its category. In the spirit of Montague (1973), we would ultimately want the penultimate tier of the tree to point to the relevant formation rule, and we can recover the operation from that.
- Synchronically, no operation would be given for *New York*, because this is a basic expression (not derived).
- In the lexicalization of *New York*, the bottom tier of the tree and the indication of the operation that derived *New York* (what's in parentheses) were eliminated. This allowed *New York* to have an idiosyncratic meaning, no longer entailing a connection to York, England.

# Evidence of lexicalization

- *Even old New York was once New Amsterdam* (no contradiction)
  - Jimmy Kennedy & Nat Simon, “Istanbul (not Constantinople)”
  
- *El Salvador* (Spanish) ‘the Saviour’, country in Central America
  - *Voy al Salvador* ‘I’m going to the Saviour’
  - *Voy a El Salvador* ‘I’m going to El Salvador’
  
- *Legrand* (French surname), *le grand* ‘the big/tall one (masc.)’
  - *Je vais à Legrand* ‘I’m going to Legrand’
  - *Je vais au grand.* ‘I’m going to the big one’
  
- *United States* (now singular, but plural before the U.S. Civil War)

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