

Transformational Grammarians and other Paradoxes

Thomas Groß

Aichi University 1
Machihata-cho 1-1, Toyohashi-shi, Aichi-ken, Japan
tmgross@vega.aichi-u.ac.jp

Abstract

This paper argues that morphs can/should be granted node status in tree structures. Most theories of morphology do not do this. For instance, word-based morphologies (Anderson 1992 and others) see inflectional affixes appearing post-syntactically, producing a specific word form based on paradigmatic rules. On the other hand, derivational affixes attach prior to syntax. So-called “bracketing paradoxes” (Williams 1981, Pesetsky 1985, Spencer 1988, Sproat 1988, Beard 1991, Stump 1991) such as *transformational grammarian* concern primarily derivational affixes (here: *-ian*). If a theory can avoid bracketing (or structural) paradoxes by maintaining an entirely surface-based account, then this theory should be preferred over competing theories that posit different levels or strata in order to explain the same phenomenon. This contribution demonstrates that such a surface-based account is possible if the *catena* is acknowledged. The *catena* is a novel unit of syntax and morphosyntax that exists solely in the vertical dominance dimension.

Keywords

Bracketing paradox, catena, morph catena

1 Introduction

(Williams 1981:219f) is credited with introducing “bracketing paradoxes” to theoretical linguistics. He puts forth examples such as the following:

- (1) a. hydroelectricity (2) a. Gödel numbering (3) a. atomic scientist

For example (1a) Williams posits the next structure:

- (1) b. [hydro-[electric-ity]]

The problem with (1b), Williams realizes, is that the structure cannot provide the adjective *hydroelectric* because the prefix and the root do not appear within a bracket that excludes the suffix. In order to accommodate *hydroelectric*, (1b) must be rearranged thus:

(1) c. [[hydro-electric]-ity]]

But (1c) would see the stem affix *hydro-* attaching before the root affix *-ity*. Hence assumptions about affix order and semantic composition generate a conflict between structures expressing important properties, which can only be expressed in mutual exclusion, never in combination.

Williams realizes that the same conflict can occur within compounds. In (2a) the stem suffix *-ing* appears inside the second compound part, even though the compound as such is *Gödel number*. Conversely, in (3a) the root suffix *-ist* must appear before the compound *atomic science* is created. Note first that (Williams 1981:219f) assumes that (2a, 3a) have identical structure:

(2) b. [Gödel [number-ing]] (3) b. [atomic [scient-ist]]

The problem with these (b)-structures is that they do not represent the semantic relationships accurately. The bracketing should, rather, look like this:

(2) c. [[Gödel number]-ing] (3) c. [[atomic scient]-ist]

Preferring the (b)-structures over the (c)-structures necessitates disregarding semantic composition, while choosing the (c)-structures over the (b)-structures incurs conflict with the assumption of Level Ordering (the assumed order in which root and stem affix attach). (Spencer 1988:673) concludes that Level Ordering is not implicated in these cases.¹

The discussion of bracketing paradoxes in the literature starts with (Williams 1981) and extends through (Pesetsky 1985), (Sproat 1988), (Spencer 1988), (Beard 1991), (Stump 1991), (Becker 1993) to recent accounts, for instance in Distributed Morphology (Noyer and Embick 2001) or in HPSG on particle-verb-constructions (Müller 2003). These accounts all acknowledge similar problems with the data. But in its contemporary context, this discussion is a side-show to the problem of whether words are structured in a fashion similar to sentences. The question is whether syntactic principles, in particular headedness, apply to a sufficient degree to morphology. This aspect of Williams' (1981) ideas appears in the "head-debate" between (Zwicky 1985) and (Hudson 1987). This debate is summarized well by (Bauer 1990).

Two trajectories can be distinguished in the accounts just mentioned: the generative camp sees morphology as not much different from syntax and as a result, it assumes that headedness also operates in morphology. (Di Sciullo and Williams 1987), (Di Sciullo 2005), and (Williams 2011) pursue this sort of approach. Williams has become increasingly critical of central assumptions in the generative model, however. The Distributional Morphologists (Halle and Marantz 1993, Embick and Noyer 2001/2007, Harley and Noyer 2003, Embick 2003) are the ones who continue to uphold the central tenets of the "syntactic" approach.

The second camp is known as the Paradigmatic (or Word and Paradigm (WP)) approach; it originates with (Robins 1959) and is best represented by (Matthews 1972),

¹ I disregard Pesetsky's (1985) QF-analysis, and Sproat's (1988) Mapping Principle. The critical discussion of these proposals by Spencer (1988:664-72) strikes me as thorough and accurate.

(Anderson 1992), and (Stump 2001). The WP approach sees inflectional morphology as rule-based (or realizational): the word form of a verb is created by a specific rule (e.g. V+/PAST/ creates *saw*, *made*, and *hinted* equally reliably, whereby more specific realizations of that rule block the more general, i.e. regular, realizations). In order to arrive at an unambiguous treatment of bracketing paradoxes, derivation needs to be addressed. (Stump 1991: 720), for instance, argues that the expression *atomic scientist* is simply the value of the paradigm function of the suffix based on the “morpholexical rule” of the suffix. The problem is, though, that attributive modifiers, such as *tall* in *tall scientist*, will not conform to the same paradigm function.

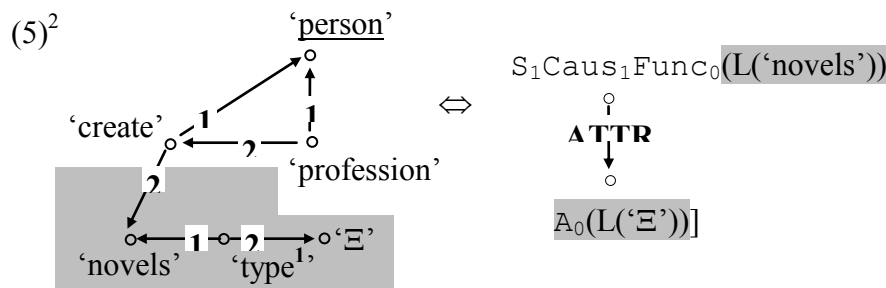
The discussion now proceeds to a brief, and hopefully accurate, description of the treatment of “person noun” paradoxes (Spencer 1988:673) of the sort illustrated in (1-3) in Meaning-Text Theory. Since an anonymous reviewer requested examples, a third section is devoted to syntactic catenae. Thereafter, a brief outline of catena-based morphology follows, which basically argues that morphs should indeed receive node status on the surface. Once granted node status, the paradoxical aspect of data like (1-3) disappears entirely.

2 Personal nouns in MTT

In Meaning-Text Theory (Mel’čuk 1988/2003, Kahane 2003), bracketing paradoxes are absent due to the multistratal system. According to (Mel’čuk 2009: 2), MTT posits three modules (semantics, syntax, and morphology+phonology), which correspond in the following manner:

$$(4) \{SemR_i\} \Leftrightarrow \{SyntR_k\} \Leftrightarrow \{MorphR_l\} \Leftrightarrow \{PhonR_i\}$$

The syntax and morphology levels are further divided into *deep* and *surface* structures. For the expression *historical novelist*, which would traditionally be considered a bracketing paradox, MTT posits the next semantic rule:



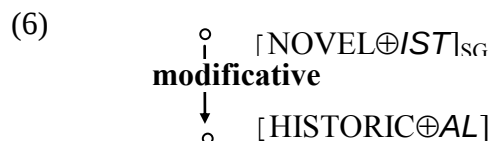
The shadowed areas show the lexemes that appear in the resulting expression. The semantic rule on the left shows that the attribute *historical* modifies *novels*. The non-shadowed components on the left show the logical relationship for a person whose profession it is to create *historical novels*. The right side shows the DSyntS, where the attribute depends on the

² Structure (5) stems from an unpublished manuscript which Igor Mel’čuk kindly provided. Needless to say, anything I say here about this issue reflects my own – perhaps mistaken – understanding of this matter, not Igor Mel’čuk’s.

nominal *novels* indexed by the complex LF $S_1\text{Caus}_1\text{Func}_0$, meaning ‘who causes that L begins to exist’.

The predicate ‘create’ can be substituted against others in order to ensure that *transformational grammarian*, *baroque flautist*, etc. fit rule (5). A transformational grammarian, namely, does not create transformational grammars, but works with them, and a baroque flautist does not make baroque flutes, but plays them. These predicates can be represented by a metavariable. These details are, however, not important.

The DSynt-structure to the right of (5) can then be mapped to a surface structure (SSyntS):



The italicized suffixes are not yet realized at this level, but rather they stand for groups of suffixes with similar functions; for instance, *IST* may also stand for *-ian*, *-er*, or *-or*, and *AL* can also stand for *-ic*. The Deep Morphological Structure (DMorphS) would therefore look like this:

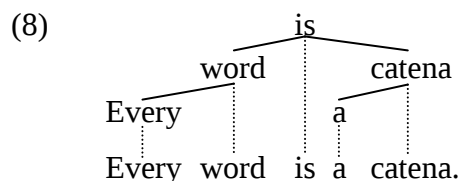


At the DMorphS, the suffixes still function as variables. It is not until the morphological surface structure (SMorphS) that *historical novelist* is realized concretely.

3 Catenae in syntax

This section introduces the notion of the syntactic catena, and it provides evidence that it is a highly salient unit of syntax. Brief examples are provided that show how catenae operate in idiom formation, ellipsis, predicate expansion, and constructions. A catena-based analysis of displacement is already discussed in detail in (Groß and Osborne 2009).

First, however, the concept of the catena is introduced: A catena is ANY WORD OR COMBINATION OF WORDS THAT IS CONTINUOUS WITH RESPECT TO DOMINANCE. This means that any word combination the words of which are connected by immediate dependency relationships qualifies as a catena. Put differently, any tree or subtree of a tree qualifies as a catena. The next example shows how this works:

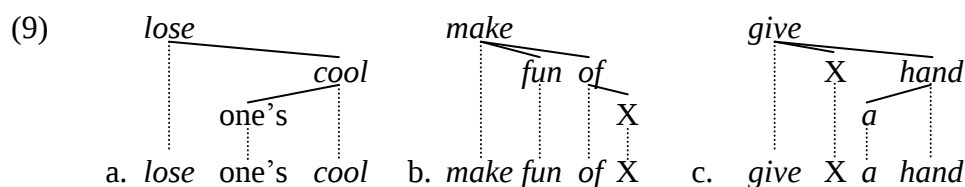


Example (8) contains 15 distinct catenae, all of which are listed here: *every*, *word*, *is*, *a*, *catena*, *every word*, *word is*, *is...catena*, *a catena*, *every word is*, *word is...catena*, *is a catena*, *every word is...catena*, *word is a catena*, and *every word is a catena*. Every word combination qualifying as a catena constitutes a subtree of continuous, i.e. uninterrupted, dependency

relationships. There are 16 distinct non-catena word combinations in (8), e.g. *every...is*, *every...a*, *every...catena*, *word...a*, *word...catena*, *is a*, *every word...a*, etc. These word combinations fail to qualify as catenae because they are NOT continuous in the vertical dimension, i.e. they do NOT form subtrees.

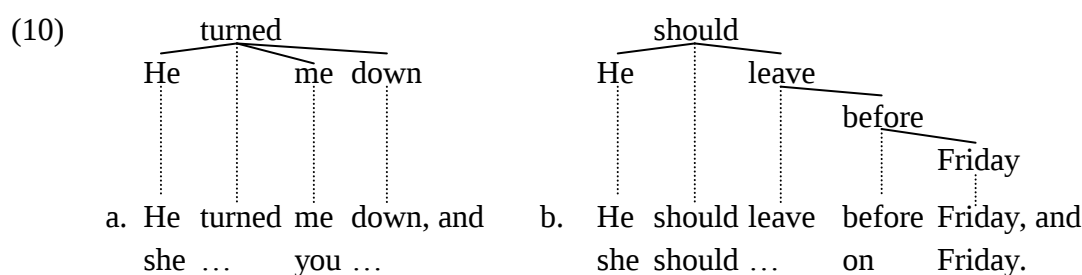
The following data demonstrate the potential of the catena concept for theories of syntax. Data from idiom formation, ellipsis, predicate expansion, constructions, and displacement are briefly considered; the conclusion will be not only that catenae are singularly important to describe and explain these data, but that the notion of dominance applied in (8) is the accurate one. The points made and data examined are discussed in much greater detail in (O'Grady 1998), (Osborne 2005), (Groß 2010), (Osborne in press), and (Osborne et al. in press.a, in press.b).

The first piece of evidence concerns idiom formation. (O'Grady 1998) shows that many idioms cannot be stored as constituents in the lexicon, but rather they are "chains" (=catenae). The next examples are taken from (Osborne et.al. in press.a):



The idioms proper, which are italicized in (9), fail to form constituents: *lose...cool* in (9a), *make fun of* in (9b), and *give...a hand* in (9c) do not qualify as constituents because they fail to include *one's* in (11a), and *X* in (9bc). The idioms proper do, however, qualify as catenae.

Ellipsis is characterized by material missing from utterances. Linguists distinguish many different forms of ellipsis such as gapping, VP-deletion, pseudogapping, stripping, etc. What unifies these ellipsis mechanisms is the requirement that the elided material must form a catena. The next examples are again taken from (Osborne et.al. in press.a):



Example (10a) shows gapping. Note that the elided material in the second conjunct is non-contiguous, hence it fails to form a constituent. Example (10b) shows pseudogapping.

Verbs can be modified in order to accommodate valence, voice, aspect, modality, tense, and/or mood. In English many of these predicate expansions appear as individual words. The verb and these expansions always constitute a catena:

- (11)
-
- a. We go. b. We *will* go. c. We *have* gone. d. We *will* *have* gone.
- (12)
-
- a. We *will* *be* seen. b. We *have* *been* seen. c. We *will* *have* *been* seen.

The predicate of the verb *go* is expanded by mood/tense (11b), aspect/tense (11c), and mood/tense/aspect (11d). In (12a-c), the passive expands the verb *see*; the passive predicate is expanded by mood/tense (12a), aspect/tense (12b), and mood/aspect/tense in (12c). Note that the expansions (in italics) invariably form catenae, and that they also form catenae together with the verb.

The italicized words in (11b-d, 12) are recognized as constructions in Construction Grammars. Constructions, like idioms, elided material, and predicate expansions, qualify as catenae. A comparatively new construction super-type are *snowclones*.³ The term was suggested by Glen Whitman in response to a request by (Geoffrey Pullum 2003). Snowclones are phrasal templates that convey clichés by referencing shared cultural knowledge. One famous snowclone is Shakespeare's *To be or not to be*, where any VP can now appear instead of *be*. Other examples include *the mother of all X*, originating from the 1991 Gulf War as *the mother of all wars*, *have X*, *will travel* from Robert Heinlein's novel *Have spacesuit, will travel*, *Got X?* from the advertisement *Got milk?*. Note that none of the snowclones above qualifies as a constituent; they do, however, qualify as catenae as the next trees show:

- (13)
-
- a. the mother of all NOUN[PL] b. have NOUN, will travel c. Got NOUN?

Due to limited space, the above examples must suffice as representative of many other constructions. For a catena-based analysis of constructions, the reader should (Groß and Osborne to appear).

4 Catenae in morphology

The data examined so far suggest that one should explore the possibility of catena in morphology. Are parts of words organized in a fashion similar to words in syntax, i.e. in terms of catenae. And, indeed, it is possible to view the internal structure of complex words in a

³ <http://en.wikipedia.org/wiki/Snowclone>

similar fashion. If one replaces “word” with “morph” in the definition of the catena above, one gains the *morph catena*. Two morphs form a morph catena, when the one morph immediately dominates the other. If both morphs are contained within the same word, then *distribution* decides which morph dominates the other. Consider the following examples, where the dotted edges symbolize an *intra-word* dependencies:

- (14)
- | | | | |
|-------------|--------------|--------------|-----------------|
| | | | |
| a. walk -ed | b. escape -d | c. sweet -er | d. grammar -ian |

The morph combination *walk-ed* in (14a) distributes like a past tense verb or a participle. In fact, the entire expression distributes like a word marked with *-ed*, rather than as a word in which the morph *walk* appears. The morph tree (14a) further represents the correct semantic scope: the morph *walk* is in the scope of the suffix *-ed*, because the entire expression means the past tense or participle form of *walk*, rather than that a past tense or participle form is engaged in the activity of walking.

The same sort of observation is true for (14b-d). The adjective in (14c) distributes like a comparative adjective, rather than as a positive adjective. The adjective *sweet* is in the semantic scope of the comparative; the entire expression does not mean that the comparative is sweet. The noun in (14d) distributes like a personal noun, rather than as the lexical noun which forms the base. The morph *grammar* is in the semantic scope of the personal suffix; the entire expression does not mean that a person is a grammar. The basis for determining intra-word dominance is thus similar to (Mel’čuk’s 2003: 200f) criterion of “surface syntactic dominance” for determining inter-word dominance.

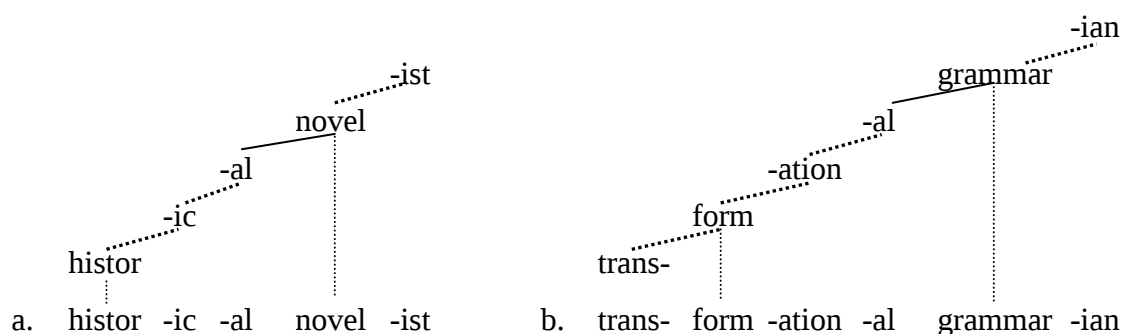
The next case concerns morphs being contained in two different words. Two morphs contained in two different words still form a morph catena if the one morph licenses the appearance of the entire word that contains the other morph. In a sense, this definition builds on (Mel’čuk’s 2003: 205) criterion of omissibility and cooccurrence. The next examples illustrate *inter-word* morphological dependencies:

- (15)
- | | | |
|-----------------|------------------|-----------------------------------|
| | | |
| a. is finish-ed | b. has finish-ed | c. trans- form -ation -al grammar |

The morphological structure of *finish-ed* in (15a,b) is an intra-word dependency, and it thus follows the remarks made concerning (14). The adjective *trans-form-ation-al* exhibits three intra-word dependencies. The crucial observation concerning (20c) is that the central morph catenae (that one might expect) are all present: *form*, *transform*, *formation*, *transformation*, *formational*, and *transformational* are all present as catenae. The suffix *-ed* constitutes the root in *finish-ed*, and the suffix *-al* is the root of *trans-form-ation-al*. These suffixes are directly dominated by the morphs *is*, *has*, and *grammar* because the latter license the appearance of the entire words *finished* and *transformational*, of which the suffixes *-ed* and *-al* form the roots.

Personal noun constructions such as *historical novelist*, *transformational grammarian*, etc. cease to be paradoxical on this analysis. Their entire structure is given below:

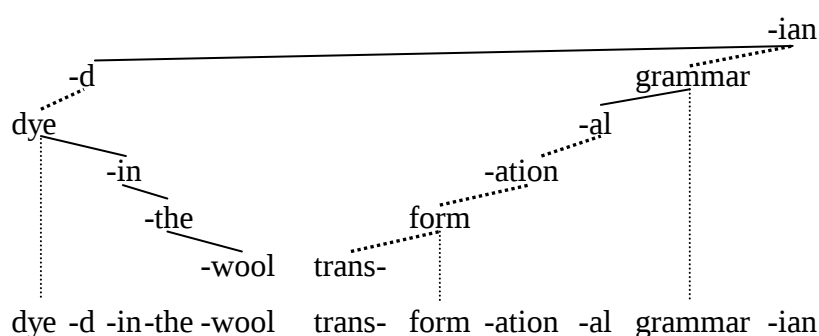
(16)



An analysis along the lines of (16) is parsimonious and simple. No semantic rules are necessary because the pertinent meanings can be read directly off the tree structure. For instance, (16a) shows the relevant catenae *histor-ic-al*, *novel*, *histor-ic-al novel*, and *novel-ist*; these catenae all combine in a straightforward fashion to yield *histor-ic-al novel-ist*. The same is true for (16b), and, for that matter, for all personal noun expressions outright.

Furthermore, the distinction between deep and surface structural representations also loses much of its motivation, since everything that needs to be shown is present on the surface. And the problem with attributive modifiers on the person suffix disappears:

(17)



The complex attributive *dyed-in-the-wool* modifies the person, rather than the grammar. The attributive expression exhibits a further application of the catena, namely one in which the free morphs *-in*, *-the*, and *-wool* recursively cliticize to the morph *dye*. On the catena approach, the fact that the participle morph *-d* intervenes in the linear dimension is irrelevant. Since the morphs *dye*, *-in*, *-the*, and *-wool* form a continuous morph catena, their semantic coherence is guaranteed. The fact that the subordinated morphs lose their ability to constitute prosodic words on their own is symbolized by the hyphens. A hyphen on a free morph indicates that this morph behaves similar to an affix in a specific context.

This section shows how complex words can be analyzed as morph catenae. Once one acknowledges catenae in word structure, a parsimonious account of bracketing paradoxes becomes possible. A catena-based account can stay on the surface, and even allow for a surface-based description of the semantic relationships that motivate the structure.

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