

Formal Analyses of the Hungarian Verbal Complex
 Temese Szalai and Edward Stabler
 UCLA Linguistics
 3125 Campbell Hall
 Los Angeles, CA 90095-1543

The verbal complexes in Dutch, German, and Hungarian have interesting structures, providing good tests for formal syntactic theories. These structures have posed a problem for theories in the transformational tradition that have assumed just two, distinctly different kinds of movement operations: strictly local, morphologically motivated head movement and unbounded phrasal movement (Chomsky 1986). The problem is that while some verbal complexes seem to consist of only heads, thus allowing a head-movement analysis, there are closely related constructions which involve projections larger than bare heads, thereby requiring phrasal movements of some kind. The (synchronic) similarities between these constructions and also historical considerations suggest that we are missing a generalization by proposing both a head movement analysis and a phrasal one. The TAG formalism does not rest on any assumption of distinctly different head vs. phrasal movement operations, and so the TAG analysis of West-Germanic verb raising proposed by Kroch and Santorini (1991) fares rather well.

This paper explores a new idea from the transformational tradition: an analysis of Hungarian and Germanic verbal complexes that involves phrasal movement only (Koopman & Szabolcsi, forthcoming, hereafter K & Sz). By dropping the assumption that there are two fundamentally different kinds of movement involved, this analysis avoids the problem with earlier transformational approaches to verbal complexes. Moreover, the essence of the analysis is easily formalized in a very simple fragment of transformational grammar that has been formalized by Stabler (1996, 1997). Like the TAG formalism, this formalism involves operations on trees. The proposed analysis

cannot, however, be duplicated in the TAG formalism, because it is based on extensive "remnant movements", of the kind that have gotten a lot of attention especially since Kayne's (1994) influential proposals, and "heavy pied-piping" (Nkemnji 1995, Koopman 1996). (A remnant is a constituent from which extractions have taken place.) The Hungarian verbal complexes "roll up" the tree as remnants increasing in complexity without bound.

Specifically, K & Sz consider the data in the following paradigm, all of which mean "I will not want to begin to go home."

- (1) Nem fogok akarni kezdeni hazamenni
 NEG will+1S want-inf begin-inf home+go-inf
- (2) Nem fogok akarni hazamenni kezdeni
 NEG will+1s want-inf home+go-inf begin-inf
- (3) Nem fogok hazamenni kezdeni akarni
 NEG will+1s home+go-inf begin-inf want-inf

"Haza" is a verbal modifier (P) that cannot appear in sentence final position. Kenesei (1989) noted that sentences like (1) and (3) are (partial) mirror images of one another. Based on this insight, K & Sz observe that Hungarian verbal constructions exhibit fully inverted orders, as in (3), non-inverted orders, as in (1), and partially inverted orders, as in (2). Thus, the following orders are possible:

- V1V2 V3 P V4
- V1 V2 P V4 V3
- V1 P V4 V3 V2

There are restrictions, however, on the character of the partially inverted orders. Specifically, once a lower verb fails to invert its complement, this un-inverted string cannot be inverted by a higher verb. Thus, the following orders are impossible on the relevant reading:

- *V1 [V2 [P [V3 [_ V4]]]]

- *V1 [[V3 [P V4]] V2]
- *V1 [V3[V2 [[P V4] _]]]

K & Sz propose that the acceptable patterns are derived by extracting the arguments of the verbs and then moving the VPs, now containing nothing except the verb, into larger and larger structures:

- V1 V2 V3 [P V4] -> V1 V2 [[P V4] V3] ->
- V1 [[P V4] V3] V2

In the linguistic literature, this type of movement is referred to as “remnant movement”. This analysis also makes use of “heavy pied-piping” in which a feature of a sub-part triggers movement of a larger piece of the structure. K & Sz make a number of theoretical assumptions that dictate this type of strategy. The formalization of these assumptions forms the underpinnings of the analysis to be proposed here.

The assumptions as laid out by K & Sz are, first of all, that all languages are binary branching with underlying Spec-Head-Complement order, following Kayne (1994). Secondly, they adopt the Universal Base Hypothesis (Sportiche 1993, 1995, Cinque 1997, Koopman 1996), which requires that cross-linguistic variation be attributal to factors other than hierarchical differences. Further, they propose that certain categories (DP, CP and PredP) must be licensed by moving into the specifier of a special licensing projection (LP(DP), LP(CP), LP(PredP)). These licensing projections generalize the role of “CASE” in Case Theory. All movement must be overt and motivated by features. They further assume a number of restrictions on movement and principles that force movement. In particular, we have the COMP+ restriction, which is closely related to the Left Branch Condition.

COMP+ Restriction on Movement: A maximal projection can move if it meets either of the following two requirements.

- (a) if it is the rightmost sister of a minimal projection and it has no ancestor which is the

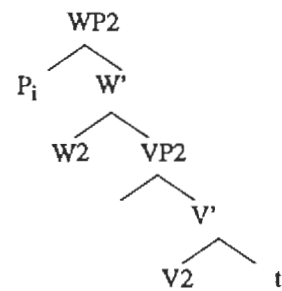
- leftmost daughter of a maximal projection
- (b) if it is the leftmost daughter of a maximal projection and that maximal projection is (1) the rightmost sister of a minimal projection and (2) has no ancestor which is the leftmost daughter of a maximal projection

In addition, they assume the following two principles, from Koopman (1996), which force movement in a number of cases.

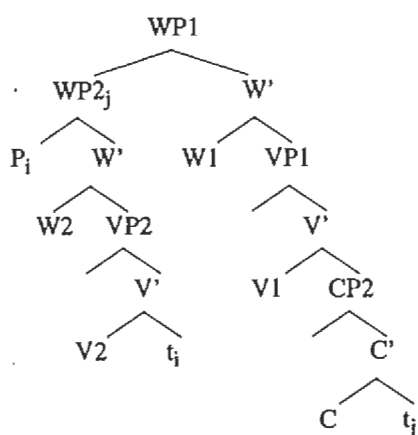
- Principle of Projection Activation (PPA):* A projection is interpretable iff it has lexical material at some stage in the derivation
- Modified LCA:* No projection has both an overt Spec and an overt head at the end of the derivation.

These principles in combination with the restrictions on movement simplify the syntactic analysis of the above data quite considerably. The derivations are reduced to a more-or-less mechanical operation in which constituents “roll up” the tree. Word order differences come from limited sources of optionality. One source of optionality is the amount of material that can pied-pipe. The other source of optionality is the optionality of the functional category PredP, which is discussed in more detail below. A skeleton derivation for an inverted order involving only two verbs has been schematized below to illustrate the character of this analysis.

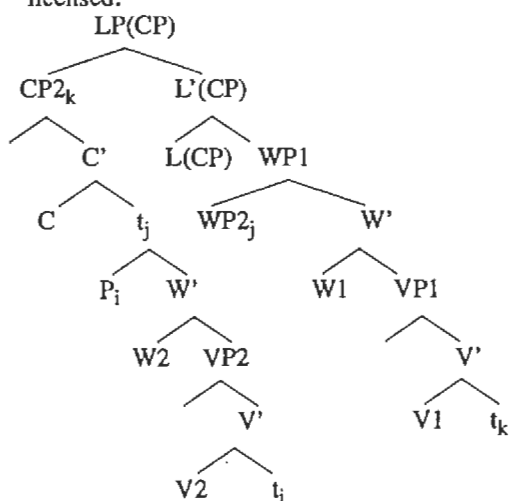
- (1) WP is an extension of VP. All VPs are dominated by a WP. Spec, WP should always be filled. When there is no particle (P) or lower WP or CP to fill this position, the entire VP can move into Spec, WP.



- (2) All WPs are dominated by a CP. This CP can be selected by another auxiliary (here V1). VP1 is dominated by a WP. The lower WP moves into the Spec of the higher WP.



(3) K & Sz generalize Case theory to categories not traditionally thought to require licensing. This results in licensing projections (LPs) for DPs, CPs and PredPs (to be discussed below). An LP wants an XP of the appropriate category in its Specifier. The lowest CP in this derivation did not have an LP(CP) because there was no lower CP that needed to be licensed.



Above we have a fully inverted order. To obtain an un-inverted order, the sources of optionality, namely presence of PredP and amount of pied-piped material, need to be exploited.

Inspired by Koster (1994) and Zwart (1994, 1997), PredP is really another extension of the VP which obligatorily dominates WP in certain circumstances. WP will move to Spec, PredP. PredP must then be licensed in an LP(PredP) position. WP will then cause large portions of structure to pied-pipe.

Using the type of strategy outlined above it is possible for constituents to "roll up" the tree, forming unbounded dependencies. The technology proposed by K & Sz can be used to generate $a^n b^n c^n d^n e^n$ type languages. In fact, this style of derivation derives languages well outside the class of mildly context sensitive languages. In this framework, the same kind of derivation, "rolling up" constituents by moving remnants, easily derives the language $a^n b^n c^n d^n e^n$. Roughly,

... \rightarrow eaabbccdd[ee] \rightarrow [ee]eaabbccdd \rightarrow
 $d[ee]eaabbccdd \rightarrow [dd]d[ee]eaabbcc \rightarrow$...
 \rightarrow aaabbcccccdee

In fact, it is possible to obtain unboundedly many counting dependencies in this fashion.

These derivations require very large trees which make use of very little recursion, although extensive use is made of mechanical operations to ensure regularities between structures. This suggests that, if K & Sz are on the right track, TAG formalisms of their analysis would require many large elementary trees, leaving important regularities to the characterization of the elementary tree set.

It is easy to adapt Stabler's (1996, 1997) Derivational Minimalism to formalize this type of derivation, using only phrasal movement from certain structural configurations to derive the acceptable structures without allowing the unacceptable ones. This adaptation will then also allow unbounded counting dependencies to be captured in Derivational Minimalism, which has already been shown to be capable of capturing copying languages (Cornell 1996, Stabler 1997).

To adapt this derivation to Stabler's framework, certain aspects of the K & Sz proposal need to be formalized. The COMP+ restriction on movement has already been discussed. The additional principles and restrictions on movement can be formalized in terms of features in the Derivational Minimalism framework. For example, the requirement that all movement be overt is translated into Derivational Minimal-

ism by requiring that all attractor features be strong (+X features only).

The PPA will be formalized by requiring that all lexical entries bear at least one strong attractor feature. This will ensure that all minimal projections have something in their specifiers at some stage of the derivation.

To capture the Modified LCA, all empty heads will have a strong attractor feature. Additionally, a mechanism will be established to verify that when an overt lexical item licenses a constituent that constituent has additional licensee features if it is overt.

The universal base that K & Sz assume is ensured through feature selection. Lexical items will select features in the following order for the relevant domain:

Ipred >> lc >> ld >> pred >> inf >> w >>v

Using these mechanisms, it is easy to formalize the basics of the K & Sz analysis in Derivational Minimalism. Because the formalism is so simple and the analysis so mechanical, the prospects here look quite good. Additionally, the type of analysis proposed here allows for any number of counting dependencies to be enforced. Derivational Minimalism can handle these dependencies quite simply, by “rolling up” constituents. Languages like these cannot be defined in standard TAGs (Vijay-Shanker and Weir 1994). The lack of recursion makes this type of analysis challenging in standard TAGs. Moreover, the regularities of the data will not be readily observable as the regularities seem to have mechanical properties.

References

- Chomsky, N. 1986. *Barriers*. MIT Press, Cambridge, Massachusetts.
- Chomsky, N. 1995. *The Minimalist Program*. MIT Press, Cambridge, Massachusetts.
- Cornell, T. 1996. A minimalist grammar for the copy language, SFB 340 Technical Report #79, University of Tübingen, <http://www.sfs.nphil.uni-tuebingen.de/~cornell/>
- Kayne, R. 1994. *The Antisymmetry of Syntax*. MIT Press, Cambridge, Massachusetts.
- Kenesei, I. 1989. “Logikus-e a magyar szorend?” *Altalanos Nyelvezzeti Tanulmányok* 17, 105 - 152.
- Koopman, H. and A. Szabolcsi. *Verbal Complexes*. forthcoming.
- Koopman, H. 1996. The Spec-Head Configuration. In E. Garret and F. Lee, eds., *Syntax at Sunset, UCLA Working Papers in Syntax and Semantics* 1.
- Koster, J. 1994. “Predicate Incorporation and the Word Order of Dutch” in G. Cinque, J.-Y. Pollock, L. Rizzi and R. Zannuttini, eds., *Paths Towards Universal Grammar*, 255-276, Georgetown Univ. Press: Washington, D.C..
- Kroch, A.S. and B. Santorini. 1991. The derived constituent structure of the West Germanic Verb Raising construction. In Freidin, R., ed., *Principles and parameters in comparative grammar*, pages 269-338. MIT Press, Cambridge, Massachusetts.
- Nkemnji, M. 1995. Heavy pied-piping in Nweh. Ph.D. Dissertation, UCLA.
- Sportiche, D. 1995. Sketch of a reductionist approach to syntactic variation and dependencies. In H. Campos and P. Kempchinsky, eds., *Evolution and Revolution in Linguistic Theory*, pages 356-398. Georgetown University Press, Washington, D.C..
- Stabler, E. 1996. Computing quantifier scope. In A. Szabolcsi, ed., *Ways of Scope Taking*, Kluwer, Boston.
- Stabler, E. 1997. Derivational Minimalism. In C. Retore, ed., *Logical Aspects of Computational Linguistics*, pages 68-95. Springer-Verlag (Lecture Notes in Computer Science 1328), NY.
- Vijay-Shanker, K. and D. Weir. 1994. The equivalence of four extensions of context free grammar formalisms. *Mathematical Systems Theory*, 27:511-545.
- Zwart, C.J.-W. 1994. Dutch is Head Initial. *The Linguistic Review*, 11:377-406.
- Zwart, C.J.-W. 1997. *Morphosyntax of Verb Movement*. Kluwer, Dordrecht