‘Single Cycle’ Languages: Empirical Evidence for TAG-Adjoining

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Abstract

Russian and Polish lack ’unbounded’ syntactic dependencies that fall into the primary empirical domain of TAG-Adjoining, namely, long-distance movement/filler-gap dependencies across a tensed clause boundary. A theory that incorporates Adjoining as a recursive structure building device provides a novel and straightforward account of this gap, whereas existing theories of syntactic locality, e.g. of the standard Minimalist kind, face difficulties explaining the phenomenon. These languages thus supply direct linguistic evidence for Adjoining.

1 Introduction

Frank (2002), elaborating on earlier work (Kroch, 1987) shows that incorporating TAG-Adjoining into a theory of Universal Grammar of the Minimalist kind (Chomsky, 1995; Chomsky, 2000) yields a number of important empirical advantages. In particular, Adjoining provides a simple and elegant solution for the long-standing and difficult problem in modern syntactic theory concerning a proper formulation of the recursive, or ’successive-cyclic’, character of unbounded long movement in examples such as (1) where the wh-phrase stops by each intermediate CP (’Comp’).

(1) [$_{CP}$ Who$_1$ does Peter think [$_{CP}$ t$_1$ (that) Mary saw t$_1$]]?

According to Frank (2002), there is no long movement per se in (1); rather, only a local wh-movement takes place within the embedded clause (2-a), and the matrix part (2-b) is later ‘interpolated’ by Adjoining at the C’ node.

(2) a. [$_{CP}$ Who$_1$ [$_{C'}$ Mary saw t$_1$]]
b. [$_{C'}$ does Peter think]

Other long-distance dependencies, such as long ‘subject raising’ (e.g. *John seems to be likely to be smart*) are treated along similar lines.

Long-distance dependencies (LDD) thus reduce to local dependencies within an elementary tree (in the sense of TAG) coupled with the recursive mechanism of ’interpolating’ additional structural chunk(s) by Adjoining. It follows that if the recursive engine in the form of Adjoining were rendered inoperative in some language, LDDs that are built with Adjoining will not be possible in that language. In this study, we investigate Russian and Polish and argue that those are indeed languages that meet that expectation.

2 Data

A systematization of the relevant data leads to the following descriptive generalization: movement/filler-gap dependencies of any kind in Russian and Polish are strictly confined to a single Tense domain, roughly, C(omplementizer) P(hrase) in the standardly assumed clause structure.

Consider first the case of A′-movement. It is well known that Russian lacks standard long-distance wh-movement out of finite (tensed) clauses of the type in (1) (Comrie (1972), among others). Russian also lacks other long-distance A’-dependencies such as Topicalization (Müller and Sternefeld, 1993). This is shown in (3).

(3) a. ?*Kogo ty sčitaeš’ čto Maša ljubit?
Whom-acc you believe that Masha loves

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b. ?*etu knigu Ivan sčitaet čto emu
this book Ivan believes that him
dal Maksim
gave Maksim

Aside from finite clauses, wh-movement is possible out of control infinitival as well as out of subjunctive complements:

(4) Kogo Ivan xočet priglasit' na
Whom Ivan wants to-invite to
večerinku?
party

(5) Kogo Ivan xotel čtoby my priglasili?
Whom Ivan wanted that-sbj we invited

Control infinitivals in Russian have been independently shown to be domains smaller than CP, namely, VPs (Babby, 1998), unlike in English where they are analyzed as either CPs or TPs, depending on a theory.[1] Subjunctive clauses present a well known 'restructuring' context. In many languages, they trigger 'clause union' and allow otherwise clause-bound processes, e.g. clitic climbing. In Russian, subjunctive clauses display the obviation effect with respect to Condition B whereby the embedded subject must have a reference disjoint with that of the matrix subject, typical of a clause-bound process:

(6) *Ivan$_i$ xočet čtoby on$_i$ uexal
Ivan wants that-subjnct he left

Given this and other local effects, subjunctives in Russian and other languages have been argued to involve a 'domain extension' process (not very well understood in a derivational theory) collapsing matrix and embedded clauses into a single Tense domain ((Picallo, 1984; Progovac, 1993; Terzi, 1992) among others).

The precise nature of the single Tense domain restriction in Russian has remained largely unclear. A number of technical solutions were proposed in the Government and Binding and Minimalist frameworks in the form of various constraints on extraction and additional barriers (Müller, 1995; Zaenen, 1983; Pesetsky, 1982; Stepanov, 2001; Koster, 1978). However, the question why Russian and Polish should differ from English in this manner continues to be subject to much discussion.

LDDs are also missing in the context of so called A-movement. Long subject raising is unavailable in Russian (even though predicates with 'raising' semantics are available), unlike in English, cf. (7):[2]

(7) *Ivan kažetsja byt' bol'nym
Ivan seems to-be sick

On the standard view in transformational theory (Chomsky, 1981) both subject raising and object raising, or Exceptional Case Marking (ECM), cases are explained by the same principles. In this respect, it is not surprising that Russian lacks infinitival ECM contexts as well (Brecht, 1974; Lasnik, 1998):

(8) *Ivan sčitaet Mariju byt' umnoj
Ivan considers Mary to-be smart

Aspectual, or 'phase' verbs (*begin, continue*) have sometimes been argued to involve long (cross-clausal) raising (Perlmutter, 1970). A number of empirical diagnostics applied to Russian clearly demonstrate the monoclausal (single Tense) character of these constructions in this language (Stepanov, 2006). For instance, assuming that sentential adverbs such as *possibly* modify the Tense (TP) domain (Watanabe, 1993), in a truly biclausal configuration a lower TP adverb could in principle have a narrower scope with respect to the matrix verb. However, with Russian aspectuals the situation is different. In (9) *na sledujuščej nedele* necessarily modifies the entire sentence, along with *vozmožno*:

(9) On vozmožno prodolžit na
He possibly will-continue on
sledujuščej nedele čitat' knigu
next week to-read book

Other potential candidates for cross-clausal LDD in Russian such as epistemic modal constructions have also been argued to involve a single Tense domain (Schoorlemmer, 1994). In effect, the current literature on Russian syntax reveals no clear cases of LDD spanning more than one Tense domain, and those contexts that have been assumed

[1] Babby's relevant argument draws on the assumption that the silent PRO subject has null dative case in Russian. Thus a contrastive reflexive doubling the PRO subject appears in dative case in non-obligatory control sentences, but must appear in nominative in obligatory control cases. Babby argues that the latter involves no PRO at all, just a bare VP.

[2] The 'small clause' version of (7) (without *byt'*) is allowed. Small clause sentences also involve a single Tense domain (Stowell, 1981)

to do that (often on analogy with other languages), on closer introspection show the single Tense behavior, such as those above.

A similar state of affairs was found in Polish, where the lack of LDD in the domain of A′-movement out of finite clauses is well documented (see (Giejgo, 1981; Zabrocki, 1981; Witkos, 1981) for A′-movement cases, and (Zabrocki, 1981) for A-movement cases).

One may entertain two analytical strategies in handling the Russian/Polish facts. One is to look for separate analyses of the lack of long A'- and A-dependencies. We believe such an approach would miss an important generalization concerning the across-the-board character of local movement dependencies in these languages. A more intriguing and fruitful possibility to explore is that Russian and Polish only allow dependencies confined, roughly speaking, to a single CP. We call such languages 'single cycle' languages, in contrast to the more familiar, 'successive cyclic' language type (English). The question to be addressed now is: what is responsible for the 'single cycle' property?

3 The traditional approach

The standard approach in transformational syntactic theory since Chomsky (1965) and to this day (Chomsky, 2001) maintains that syntactic movement dependencies are a priori unconstrained by the size of the structure over which they are formed; in fact, in this approach there are no a priori restrictions on structure building at all. The structure building operation 'Merge' applies recursively until the material available for sentence building (lexical items, previously built chunks of structure) is exhausted. This approach has an inherent difficulty handling the Russian/Polish facts since it is not clear what would prevent a dependency to stretch as long as the size of the structure permits, in some languages but not others.[3] The usual strategy in this case would be to impose additional constraints on movement in 'single cycle' languages which do not apply in languages like English. This may be satisfactory at some level of analysis, but involves a real complication in this theory. A more attractive possibility, we believe, would be to have this constraint follow from the architecture of the theory itself. TAG provides just the right platform to make this explicit.

4 A TAG solution

We explore the linguistic version of TAG in Frank (2002) which bears close resemblance to the mainstream Minimalist model. In this version of TAG syntactic movement is naturally limited by the size of maximal structural domains built by Merge - *elementary trees*. Crucially, all movement takes place within elementary trees, *before* these trees are joined together into a complex structure by designated operations - Substitution and Adjoining.[4] The recursive character of LDDs ('successive cyclicity') is seen in this system as a consequence of recursion in structure building at particular structural nodes, such as C′ or T′ (in the sense of X-bar theory). In particular, the recursive aspect of LDD is captured via the structure building operation Adjoining which interposes additional structure in between the head and the tail of a local dependency at a recursive node within a given elementary tree (see Section 1).

Notably, in virtually all cases of LDDs considered in Frank's study the additional structure operated by Adjoining constituted a Tensed domain. This approach suggests a natural direction to pursue with respect to 'single cycle' languages that can be summarized in (10):

(10) *Proposal*
TAG-Adjoining is inoperative in 'single cycle' languages.

If Adjoining is unavailable, there is no way to combine two elementary trees as in (2). (10) straightforwardly accounts for the fact that Russian and Polish feature neither A- nor A'-LDD, that is, the type of constructions in which recursive ('successive cyclic') movement is involved. This proposal makes no recourse to additional theoretical constructs as the traditional approaches but makes use of the existing machinery of TAG which provides a simple and accurate description of the phenomenon.

In effect, (10) implies that a source of parametric variation lies in the phrase structural component, to which Adjoining naturally belongs. The

[3] The controversy in formulating the 'successive cyclic' character of LDDs in English and other languages, mentioned in Section 1 is part of that difficulty.

[4] Substitution connects the root node of one elementary tree in an empty slot in another elementary tree, similarly to a Generalized Transformation of Chomsky (1955/75) or Chomsky (1995), Ch.3.

idea of phrase structure as a locus of parametric variation, and implications for child language acquisition and learnability, have been explored in detail in Lebeaux (1988/2000), a precursor to standard Minimalism. We believe it is possible to frame (10) in the general scheme of Lebeaux's parametric model.

5 Parametric and acquisitional aspects

Lebeaux (1988/2000) proposes that particular grammars are hierarchically ordered by their complexity: a grammar G_0 that features operations O_1 and O_2 properly contain a grammar G_1 that features only O_1. Considering the operations Adjoin-α and Conjoin-α, Lebeaux represents the relevant parametric space as in (11), where arrows are to be read as addition of an operation to the grammar, and parenthesis as 'invisibility' for the learner.

(11) $\quad$ Adjoin-α $\quad$ Conjoin-α

$$G_0\ ((\longrightarrow G_1)\ \longrightarrow G_2)$$

Different parametric options correspond to different sets of erased parentheses (outermost first). Furthermore, Lebeaux proposes that the parametric sequence (11) actually mirrors (in his terms, is 'congruent to') the time course of children's grammatical development. That is, in the course of language development children proceed from less to more computationally complex grammars, along the lines of (11).

Frank (1998) takes up the developmental portion of Lebeaux's congruency thesis in the context of TAG-Adjoining, suggesting that the developmental sequence for English speaking children proceeds from the grammar without Adjoining to a grammar with Adjoining. Viewed in this manner, the proposal explains, among other things, why children learning English initially fail to construe even simple cases of long-distance wh-movement or subject to subject raising, while performing well on constructions with similar processing load that do not involve recursion. Representing Frank's proposal with Lebeaux type notation may look as in (12) (Merge and Move operate within an elementary tree; cf. above).

(12) $\quad$ Adjoining

$$...G_1\ ^{Move,Merge}\longrightarrow G_2$$

In the context of Lebeaux's congruency thesis, Frank's proposal begs a question as to whether there exist a parametric sequence that corresponds to the proposed developmental sequence. Frank does not attempt an answer. But now we are able to fill in this gap. Specifically, we now say that, indeed, the parametric sequence includes a computationally more complex grammar with Adjoining which properly contains the grammar without Adjoining, as represented in (13).

(13) $\quad$ Adjoining

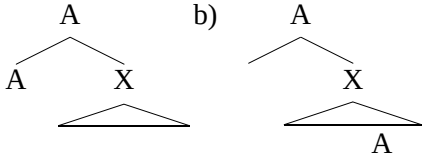
$$...G_1\ ^{Move,Merge}(\longrightarrow G_2)$$

Here, one parametric option is G_1 (no parentheses erased) corresponding to 'single cycle' languages like Russian and Polish. The option erasing the parentheses in (13) results in languages with usual recursive LDDs (English etc). This is exactly as expected under the Congruency thesis. 'Single cycle' languages thus provide strong evidence for 1) the TAG operation Adjoining; 2) Lebeaux's congruency thesis; and 3) Frank's acquisitional sequence with respect to Adjoining.

6 Refining Adjoining

Auxiliary trees, utilized by Adjoining, come in two varieties, both of which adhere to a principal requirement: the 'root' and 'foot' node of such tree must be categorically identical (e.g. CP), in order for Adjoining to succeed. In one variety the root node directly dominates the foot node (14-a). This case corresponds to standard transformational adjunction. In the second variety there is structural material between the root and the foot nodes (14-b):

(14) a) b)



The recursive structures we are interested in involve only the 'interpolation' variety in (14-b). But (10) refers to the prohibition of Adjoining in general. That is, in the present form it is too powerful: it rules out not only 'interpolated' cases of Adjoining, but also regular cases of base-generated adjunction, e.g. VP or DP modifiers (adverbs or adjectives).

One direction that one might undertake in this regard is to relax (10) and allow Adjoining for particular nodes in Russian, while excluding it for others. This amounts, essentially, to specifying the list of recursive nodes for grammars of particular

languages. In this manner, we automatically constrain the types of possible auxiliary trees, targeted by Adjoining. Such lists are commonly used in various formal versions of TAG (cf. (Abeillé and Rambow, 2000)). Our parametric variation could then be captured for instance as follows:

(15) English: Aux = {TP, CP, VP, DP}
Russian: Aux = {VP, DP}

Another, more interesting alternative, is to make a principled distinction between the two cases of Adjoining. In fact, there is a well established linguistically sound method of distinguishing the types of root and foot nodes in (14)a and (14)b. The method goes back to structural distinction between segments and full categories, along the lines of Chomsky (1986) (who, in turn, builds on the work of R. May). Namely, both nodes labeled A in (14)a are in fact segments of a single category A. In contrast, the nodes labeled A in (14)b are full categories (note that the 'listing' solution above ignores this state of affairs). It seems appropriate, therefore, to split Adjoining into two different operations, e.g. *Adjunction* (which coincides with the traditional transformational usage) for (14)a, and *Interpolation* for the case (14)a. The proposal in (10) then pertains to the latter, without loss of generality. Details of this alternative are discussed in Stepanov (2006).

7 Further issues

The proposal explored in (10) does not imply that the recursive component is completely excluded in 'single cycle' languages. Declarative sentences with one or more embedded tensed clauses are of course available. In the linguistic version of TAG adopted here, those are built by Substitution - at the CP node (for details, see Frank (2002). Furthermore, wh-extraction facts concerning control infinitivals and subjunctives and Russian and Polish suggest that certain recursive structural domains (e.g. VPs in control infinitivals) are built by Merge within a single elementary tree, and therefore, that not all prima facie LDDs are exclusively handled with Adjoining, in contrast to Frank (2002). In particular, Adjoining is responsible only for LDDs that involve more than one Tense domain, while all others are built with Merge within a single elementary tree, and are not, strictly speaking, LDDs at all as they do not display the 'successive cyclic' character.

This raises two further issues. One issue concerns a possible need to slightly modify the criteria of well-formedness of elementary trees formed by Merge as discussed by Frank (2002) to allow the above contexts. Another issue concerns making more precise the proper division of labor with respect to two types of LDDs. In a system such as Frank (2002) the distinction can be captured in terms of *selectional restrictions*, perhaps of semantic kind. Selection usually plays a crucial role in forming an elementary tree by Merge: in most recent transformational theories, selection directly determines a candidate for Merge. On the other hand, it is conceivable to suppose that Adjoining - the operation that interpolates one elementary tree into another *after* both have already been built by Merge - has little to do with selection. Therefore, dependencies that are formed via selection in direct or indirect manner, cannot be relegated to Adjoining. Further aspects of this suggestion remain to be explored.

8 Conclusion

Integration of TAG mechanisms into the mainstream linguistic theory leads to a significant widening of its empirical coverage in various domains. As shown in previous work, a major strength of the TAG formalism lies in its great potential to capture facts concerning strict locality of syntactic dependencies in natural language. The present study applies the TAG machinery in the domain of well known but ill explained phenomenon of radical across-the-board locality of syntactic dependencies in two Slavic languages, Russian and Polish. We have shown that making use of the TAG operation Adjoining leads to a simple and straightforward account of this phenomenon, while the standard (pre-)Minimalist model of syntax faces conceptual difficulties in this regard. We also provided independent support for the thesis of congruency of the parametric and acquisitional sequences with respect to Adjoining (Lebeaux, 1988/2000; Frank, 1998) and suggested ways of refining Adjoining in light of the new empirical data.

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