Robert Frank, *Phrase structure composition and syntactic dependencies*  

Reviewed by Chung-Hye Han, Simon Fraser University

This book presents a theory of grammar that incorporates the structure composition operations of Tree Adjoining Grammar (TAG) with a number of ideas from the Minimalist program. TAG is a mathematically well-defined formal grammar, first outlined in Joshi, Levy & Takahashi (1975). It is a tree-rewriting system that is more powerful than context-free grammars, but not as powerful as context-sensitive grammars. Work on linguistic applications of TAG began in the early 1980’s (see, for example, Kroch & Joshi (1985)).

The fundamental thesis in TAG-based linguistic work is that grammatical well-formedness conditions and syntactic dependencies are localized within the domain of TAG’s primitive elements, i.e. within a set of predefined pieces of tree structure, called *elementary trees*. Elementary trees are also the source of any cross-linguistic variation as languages may differ in what they take to be well-formed elementary trees. Elementary trees are combined with one another by the universal derivational operations of *substitution* and *adjoining*. In
essence, TAG-based linguistic theories can be seen as theories of the well-formedness of elementary trees.

In this book, Robert Frank builds a comprehensive theory of TAG-based grammar, which is founded on some of the early work in this area, including his own (Frank 1992). He provides a thorough review of the linguistic work in TAG and proposes several principles for elementary tree formation, consolidating these principles into a coherent overall structure. Throughout the book, Frank demonstrates that Subjacency, Relativized Minimality and Shortest Move, which need to be explicitly stipulated as locality constraints on movement in transformational grammar, can be derived from the nature of TAG’s derivational machinery when coupled with independently motivated assumptions concerning the nature of elementary trees. This is a truly groundbreaking idea as it provides an explanation as to why these constraints exist in natural language. Frank shows that this new model captures in a simple and elegant fashion many of the valuable insights gained in several decades of research on generative grammar. An additional advantage of Frank’s model is that it has a more restrictive computational power than its Minimalist alternative.

In Chapter 1, ‘Setting the stage’, Frank places TAG-based grammar in the historical context of transformation-based generative grammar, clarifying his
assumptions and describing the basics of TAG. TAG’s main structures and operations are similar to Chomsky’s (1957, 1975) kernel sentences and generalized transformations, and it may be noted that some of the ideas in Chomsky’s earlier work have independently found new currency in the Minimalist program (Chomsky 1995, 2000, 2001). Frank postulates that TAG’s elementary trees are constructed by Move and Merge. Once elementary trees have been built, they combine with each other by substitution and adjoining to form recursively bigger structures.

Frank emphasizes the fundamental TAG hypothesis that ‘every syntactic dependency is expressed locally within a single elementary tree’ (22), and shows that apparent non-local dependencies are created by adjoining. For example, a sentence with an unbounded wh-dependency, as in the complement clause in (1),

(1) I wonder [which book, Gabriel had thought his friends should read t₁]

is derived from an elementary tree representing the embedded clause [which book, his friends should read t₁], in which the wh-phrase which book has already been fronted. As a second step, an auxiliary tree representing [Gabriel had thought] adjoins to the C’ node and thereby stretches the dependency
between the *wh*-phrase and its trace. In this chapter, Frank also explains the notion of TAG derivation structure, which is a representation of the derivational history of a derived phrase structure tree.

Chapter 2, ‘The nature of elementary trees’, discusses in detail well-formedness conditions on elementary trees. Frank argues that an elementary tree consists of a thematic domain. A thematic domain includes the structural context in which a single lexical predicate takes its arguments and the predicate’s extended projections (in the sense of Grimshaw 1991), such as TP and CP. Frank recasts these well-formedness conditions as the three statements in (2)-(4), which together guarantee that an elementary tree must be an (extended) projection of a single lexical head with all and only its argument slots appearing as frontier nonterminals.

(2) **Condition on Elementary Tree Minimality (CETM):** (54)

The syntactic heads in an elementary tree and their projections must form an extended projection of a single lexical head.

(3) **θ-Criterion (TAG version) (part 1):** (55)

If H is the lexical head of elementary tree T, H assigns all of its θ-roles within T.
(4)  θ-Criterion (TAG version) (part 2): (55)

If A is a frontier nonterminal node of elementary tree T, A must be assigned a θ-role in T.

Argument content is inserted into the frontier nonterminals by substitution.

In order to force the VP-internal subject DP to move to [Spec,TP], Frank adopts the Extended Projection Principle, as stated in (5).

(5)  Extended Projection Principle (EPP): (57)

All TP projections within an elementary tree must have specifiers.

Frank notes that modifiers like PPs, AdvPs, and relative clauses are introduced into the structure by the adjoining of auxiliary trees with recursive root and foot nodes. He argues that these auxiliary trees are well-formed elementary trees according to the CETM and the θ-Criterion, on the assumption that θ-identification (in the sense of Higginbotham 1985) is subsumed by θ-role assignment.

In chapter 3, ‘A case study: raising’, Frank presents a TAG-based analysis of subject-to-subject raising, extending the work by Kroch & Joshi (1985) and
Frank (1992). The goal of this chapter is to demonstrate how the TAG derivational machinery described in chapter 1 and Frank’s theory of elementary trees developed in chapter 2 can derive apparent non-local dependencies that are created by raising. To derive a raising sentence such as *Eleanor seemed to know the answer, there must be an elementary tree representing the infinitival clause *Eleanor to know the answer, in which the subject DP has moved from [Spec,VP] to [Spec,TP]. Secondly, a T’-rooted auxiliary tree representing *seemed must adjoin into the elementary tree at T’, expanding the infinitival clause. Frank shows that in a TAG-based analysis of raising, the impossibility of super-raising as in *Eleanor, seemed [it was certain [t, to know the answer]] follows directly from the principle of elementary tree well-formedness and the way in which adjoining composes elementary trees. In contrast, past analyses required explicit stipulations, such as Shortest Move, the Extension Condition, or an antecedent government condition on traces, to rule out instances of super-raising.

Frank then addresses the absence of intermediate traces in TAG-based analyses and argues that an array of phenomena that have traditionally been attributed to the presence of intermediate traces, as, for example, reconstruction, can all be given alternative accounts. This chapter also includes a discussion of (non)raising in nominals, as in *Leon’s appearance to have left surprised me,
and explains the ungrammaticality as due to the fact that elementary trees for nominals are not able to provide a recursive structure that permits adjoining. Frank concludes this chapter with a detailed analysis of copular sentences, as, for example, *The assassination of the king was the cause of the war*, arguing, contra Moro’s (1997) analysis, that they differ from raising sentences. In Frank’s account, copula *be* cannot head its own elementary tree because it is not a lexical predicate, given that it does not assign any θ-roles. Instead, an elementary tree for copular sentences must include both the copula and the structure for the small clause complement of the copula. Frank goes on to consider how this analysis may account for those syntactic properties of copular sentences that remained unresolved under Moro’s raising analysis.

Chapter 4, ‘Local constraints and local economy’, presents economy conditions and grammatical constraints which apply to elementary tree derivation. Frank recasts conditions on elementary trees, such as the EPP, in terms of a feature-checking mechanism along the lines of Chomsky (1995, 2000). The EPP results from the presence of an uninterpretable selectional feature on every T head which must be checked by an interpretable feature D in [Spec,TP] in the course of the syntactic derivation.

Frank further assumes that elementary tree derivation starts with a numeration which has the following two properties (124): (i) ‘the numeration
may include only as much structure as can produce a single elementary tree’
(124); and (ii) numerations ‘may include nonprojected nonterminals along with
lexical and functional heads’ (124). Frank’s conception of a numeration as the
set that produces elementary trees is an important departure from the
Minimalist notion of numeration, which allows for an unbounded set of lexical
items but bans the presence of nonprojected nonterminals.

Based on his assumptions regarding numerations in elementary tree
derivations, Frank formulates three economy principles, stated below.

(6) Maximal Checking Principle (MCP): (126)

The output of an elementary tree derivation from numeration N must
contain as few uninterpretable features as possible.

(7) All-or-Nothing Checking Regimen (ANCR): (136)

In an elementary tree, if some of the uninterpretable features of a lexical
item are checked, they must all be checked.

(8) Greed: (158)

Adjoining may apply at some node of an elementary tree T only if it
results in the elimination of uninterpretable features in T.
The MCP ensures that if there is a DP which can move to [Spec,TP], then it must do so. At the same time, it allows EPP-violating elementary trees, such as T’-headed auxiliary trees in raising structures, as these trees do not include a potential DP which can check the EPP of T. The ANCR rules out elementary trees containing expletive *there without an associate. While the EPP-feature of T is checked within such an elementary tree (through the merger of *there), T’s ϕ-features remain unchecked (as there is no associate to check them). Finally, Greed rules out examples like *Daniel seems adores his brother, where the T’-headed auxiliary tree representing seems has adjoined into the elementary tree representing the finite clause Daniel adores his brother. Here, the case feature of the DP Daniel has already been checked by finite T, and adjoining of the auxiliary tree into T’ will not eliminate any uninterpretable feature on the elementary tree.

Chapter 4 further contains analyses of Icelandic constructions involving long distance agreement between a higher verb and a nominative DP in a lower clause, and of so-called quirky subjects, which crucially rely on the ANCR and the MCP. Frank concludes the chapter with a detailed illustration of the mechanism involved in feature checking across elementary trees/feature

Chapter 5, ‘A case study: wh-dependencies’, provides a TAG-based analysis of wh-dependencies. As in the chapter on raising, Frank demonstrates how his proposed well-formedness conditions on elementary trees and the TAG derivational machinery can derive apparent non-local wh-dependencies. In a fashion parallel to his analysis of raising constructions, Frank postulates initial elementary-tree-internal wh-movement, followed by the adjoining of a C’-rooted auxiliary tree. After a detailed analysis of the feature checking mechanisms involved in wh-dependencies, Frank demonstrates how island effects can be derived in this TAG-based account of wh-movement. For example, extraction from wh-islands (e.g. *What, book did Mark ask [whom you gave t,]? ) necessitates an elementary tree with multiple specifiers of CP for multiple wh-fronting, given that all movement must be local to an elementary tree. But an elementary tree with multiple specifiers is not possible in English, as such configuration is not permitted in monoclausal English questions (e.g. *I wonder [what book whom Mark gave]). This analysis predicts that in languages that allow multiple wh-fronting in monoclausal questions should allow elementary trees with multiple specifiers of CP and
therefore allow extraction out of *wh*-islands. Frank, citing Kroch, shows that this prediction is confirmed by data from Romanian and Bulgarian.

Other island effects, such as extraction from complex NPs, relative clauses, adjunct clauses and subject clauses, are ungrammatical either because there is no well-formed elementary tree that would allow such a movement, or because the TAG derivational machinery makes it impossible to combine the elementary trees involved. This chapter also discusses Multi-Component TAG (MC-TAG), an extension to the TAG system, which can handle extraction out of weak islands (e.g. *Which car, does Sally wonder [how to fix t.]*?) and nominals (e.g. *Which politician, did you take [a picture of t.]*?).

In Chapter 6, ‘Looking onward’, Frank concludes his book by discussing some linguistic phenomena which are known difficulties for a TAG-based theory, such as Romance clitic climbing and scrambling phenomena in German and Japanese. As Frank points out, some progress has been made in suggesting analyses for these phenomena (Kulick 2000). Frank also discusses interface issues and suggests, following Kallmeyer & Joshi (2003), that the TAG derivation structure, which encodes the sequence of derivational steps, may serve as the interface for semantic interpretation. A good candidate for an input to the phonological component may be TAG derived phrase structure tree.
Frank’s clear exposition throughout makes the contents of the book accessible to readers who are novices to the TAG framework. Nonetheless, his in-depth comparison between TAG-based and Minimalist analyses and thorough study of many empirical phenomena make the book essential reading for advanced readers interested in the issue of locality in syntax in general. The data used in the argumentation are not only from English but come from various other languages, such as Icelandic, Romanian, Bulgarian, Georgian, and German, to name but a few, illustrating how cross-linguistic variation can be handled in the model of grammar advocated in the book. References abound to works on TAG-based as well as on transformation-based grammar, where more detailed discussion can be found on several topics touched upon in this book.

While there are some differences in the details, Chomsky’s (2000, 2001) definition of phase overlaps and shares motivations with the TAG-based model of grammar. Similar to elementary trees, phases are privileged derivational domains where many syntactic dependencies are localized. Chomsky’s Phase Impenetrability Condition allows movement out of the edge of phases, obtaining similar results as adjoining. The two systems are thoroughly compared in Frank (to appear). Despite transformation-based syntactic theory seemingly developing into an approach which is comparable to the TAG-based theory of grammar, the body of work on linguistic applications of TAG has not
received much attention from the wider community of generative syntacticians. Frank’s comprehensive and detailed work properly situates the TAG-based theory of grammar within the larger context of the framework of generative grammar. It remains to be seen whether this book will encourage a re-evaluation of the existing TAG syntactic literature by a broader readership. In any case, it is sure to produce a positive impact on syntactic theorizing in the long term.
REFERENCES


Author’s address: Department of Linguistics, Simon Fraser University, 8888 University Drive, Burnaby BC, V5A 1S6, Canada.

chunghye@sfu.ca

(Received 26 August 2005)