

Mehrworteinheiten

mit Tree Adjoining Grammar: Abeillé & Schabes (1996)

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Status von Abeillé & Schabes (1996)

- einschlägig für die LTAG-Literatur
- explizite Modellierung der Syntax-Semantik-Schnittstelle

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Aufbau

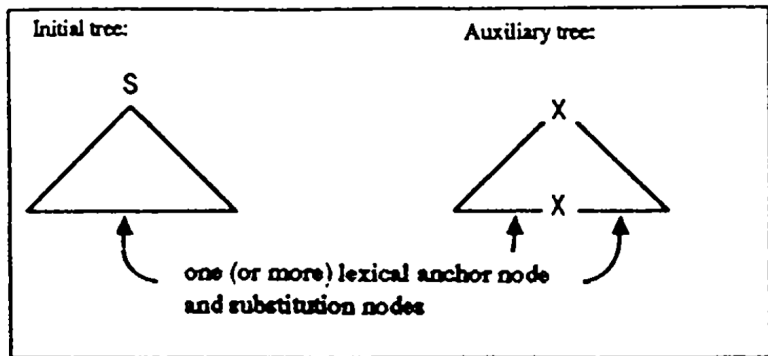
- 1 Introduction to Lexicalized TAGs
- 2 Non-compositionality and discontinuities
- 3 Representation in a Lexicalized Tree Adjoining Grammar
- 4 Synchronous TAG and semantic interpretation
- 5 Relevance for NLP

1. Introduction to LTAG

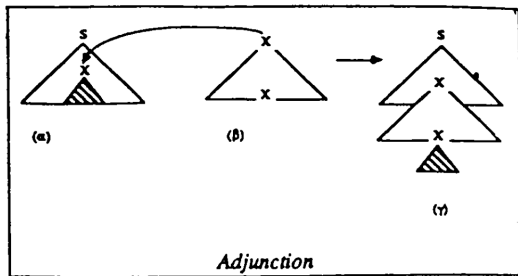
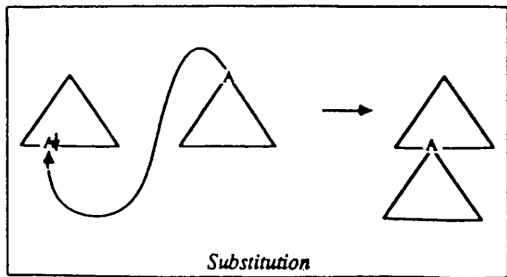
LTAG:

- elementary trees with at least one lexical anchor
- substitution + adjunction
- extended domain of locality
- “Elementary trees define syntactic and semantic units at the same time.”
- “factoring of recursion from the domain of dependencies”
- tree families

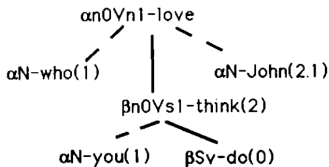
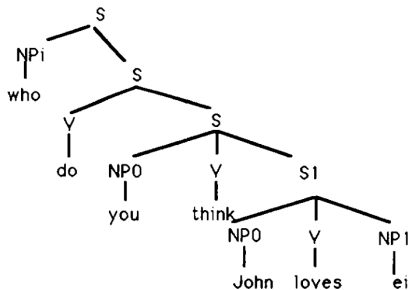
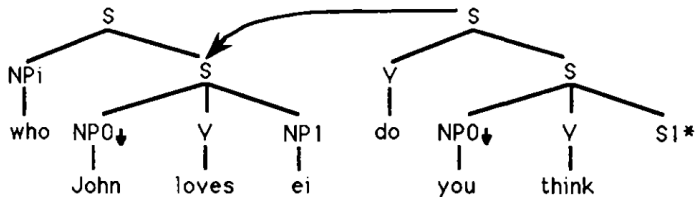
1. Introduction to LTAG: Initial & auxiliary trees



1. Introduction to LTAG: Substitution & adjunction



1. Introduction to LTAG: Example



1. Introduction to LTAG: Resümee

*Because of their two-fold perspective on syntactic description, TAGs are a **fruitful formalism to explore discrepancies between syntactic properties (as exhibited by the derived trees) and semantic ones (as exhibited by the derivation trees)**. The idiomatic (or semi-idiomatic) expressions studied here are clearly of this kind: their syntax is regularly compositional, while their semantics is not. Their derived trees are thus the same as those of non-idiomatic constructions, but their derivation trees are different.*

2. Non-compositionality and discontinuities

Complex predicates can be of different kinds:

- totally unanalysable semantically (*kick the bucket*)
- unpredictable distributional restrictions (VPC, LVC)

These complex predicates exhibit syntactic properties ranging from **total fixity** to **total flexibility**.

- more flexible → more compositional? (Wasow, Sag & Nunberg 1983)
- No!

However, extensive listings of idioms for French has shown no clear link between their undergoing certain syntactic rules or not and semantic differences between them (Gross 1982; 1988).

2. Non-compositionality and discontinuities

Discontinuities can be of different kinds:

- insertion of modifiers
- application of syntactic rules
- definition of the complex predicate itself

⇒ “discontinuities may arise dynamically in almost any idiom even those which seem the most frozen ones”

2.1 Discontinuities with “fixed” idioms

“bounded” discontinuities

- (1) a. He took Mary's words into account.
- b. John is raining on his brother's parade.
- (2) a. La moutarde monte au nez de Jean = La moutarde lui monte au nez.
- b. Des ailes poussent à Jean = Des ailes lui poussent.

“unbounded” discontinuities (insertion of auxiliaries and adverbials)

- (3) a. The roof will soon cave in on John.
- b. All hell seemed to be likely to break loose.
- c. John kicked the proverbial bucket.

2.2 Discontinuities with “flexible” idioms

Insertion of adjectives:

- (4) a. Jean prend une réelle veste.
- b. We should leave no legal stone unturned.

Following passivization:

- (5) The beans continue to appear to be certain to be spilled.

Following extraction:

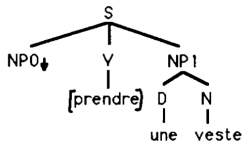
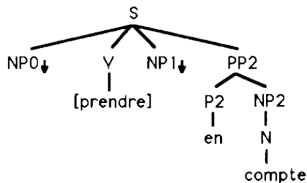
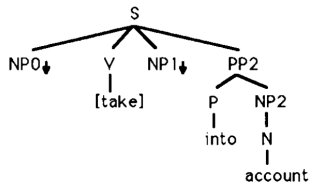
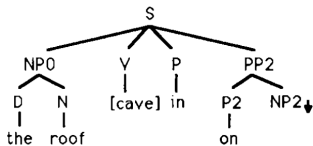
- (6) Which strings do you think that everybody knows that they pulled?

Complex NP Constraint violations (contrary to “free” sentences):

- (7) a. The trip to Spain that John took.
- b. Spain, where John took a trip to.

3. Representation in an LTAG

Non-compositional predicates as elementary trees with multiple anchor:



“**unbounded**” discontinuities: internal node as target for adjunction

“**bounded**” discontinuities: leaf node as target for substitution

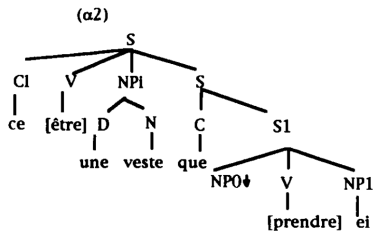
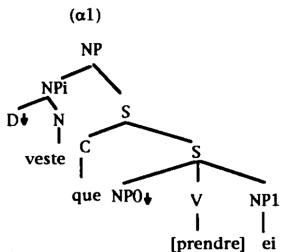
3. Representation in an LTAG: Idioms versus “free” sentences

- same derived trees

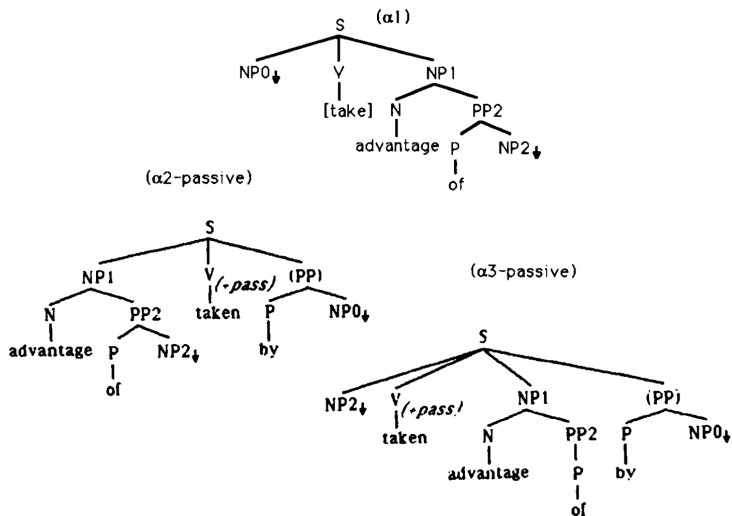
*Such extended trees make idioms fall naturally into the same grammar as “free” sentences, since they are elementary trees corresponding exactly to regular **derived trees**.*

- same range of admissible syntactic rules (= tree families)

idioms select sets of elementary trees (Tree Families), which gather all their possible syntactic realizations such as wh-question, relative clauses, passive ...



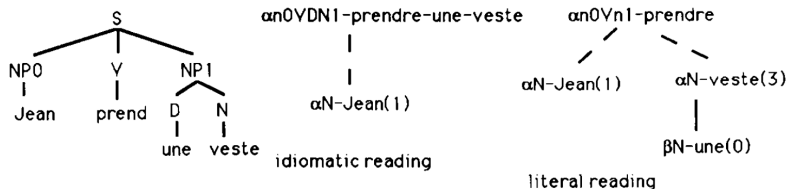
3. Representation in an LTAG: Tree families



⇒ more syntactic flexibility for idiomatic constructions than for “free” sentences

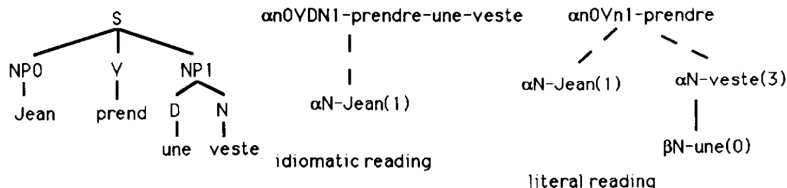
3. Representation in an LTAG: Ambiguity

*Literal and idiomatic interpretations of such ambiguous sentences correspond to two **identical derived trees**, but to two **different derivation trees** [...].*



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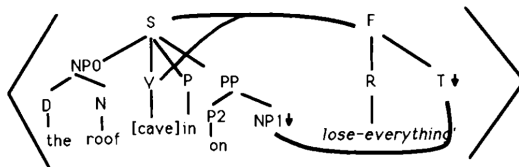
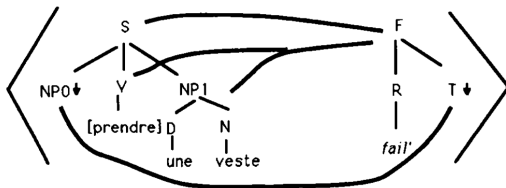


Alternativen (mit Parallelismus zwischen Syntax und Semantik)

- Stipulation eines Idiom-Kopfes (LFG, Bresnan 1982)
- Quasi-Argumente mit Dummy-Thetarolle (Chomsky 1981)
- Ad-hoc-Dekomposition (Wasow, Sag & Nunberg 1983)

4. Synchronous TAGs and semantic interpretation

- eingeführt in Shieber & Schabes (1990)
- Elementarstrukturen: Baumpaare, die synchron verwendet werden
 - syntaktischer Baum + semantischer Baum
 - Knoten können verlinkt sein.



4. Synchronous TAGs and semantic interpretation

Fallstudie: “adjectives adjoining to frozen parts of the idiom”

- entweder Adverb- oder Argumentinterpretation
- abhängig von der “Transitivität”

semantically transitive/intransitive idioms
≠
compositional / non-compositional idioms

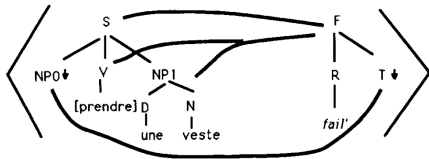
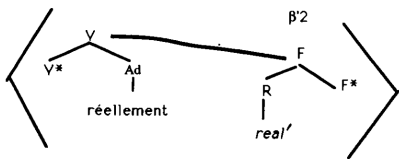
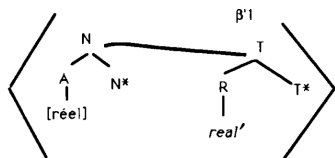
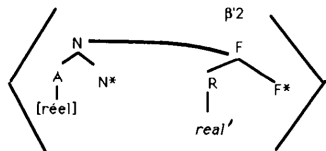
4. Synchronous TAGs and semantic interpretation (cont.)

“**semantically intransitive**” \Rightarrow Adverbinterpretation

- (8) a. John took unfair advantage of the proposition.
= John unfairly took advantage of the proposition.
- b. Jean prend une réelle veste.
= Jean prend réellement une veste.
- c. Jean aime les réels amis.
* = Jean aime réellement les amis.

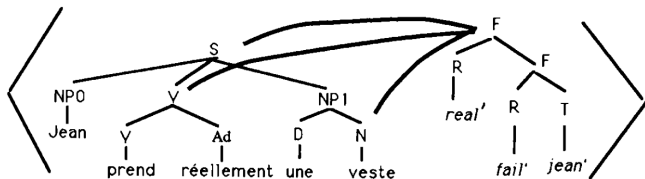
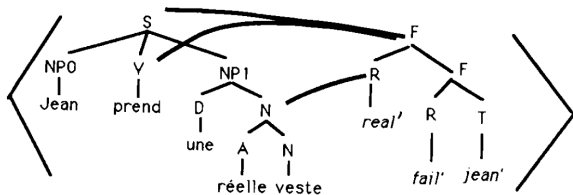
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Modellierung: Ambiguität des Adjektives



4. Synchronous TAGs and semantic interpretation (cont.)

Adnominale Adjektive haben weiten Skopus:



Ähnliche Modellierung bei Relativsätzen

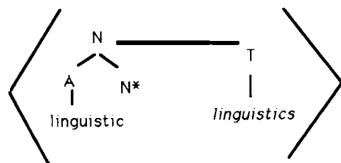
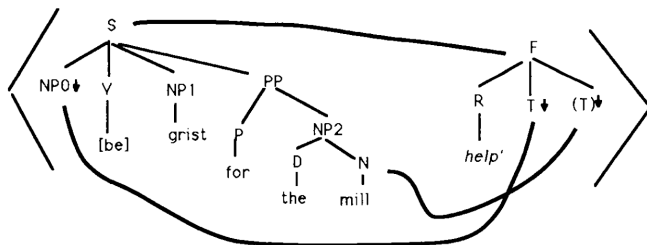
4. Synchronous TAGs and semantic interpretation (cont.)

“**semantically transitive**” \Rightarrow Argumentinterpretation

- (9) a. This is grist for the mill = this helps
b. This is grist for the linguistic mill = this helps linguistics (or linguists)

4. Synchronous TAGs and semantic interpretation (cont.)

Modellierung: Ambiguität des Adjektivs [!]



Bemerkungen zum Parsen und zum maschinellen Übersetzen

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Kritik?

- [1] Abeillé, Anne & Yves Schabes. 1996. Non-compositional discontinuous constituents in Tree Adjoining Grammar. In Harry Bunt & Arthur van Horck (eds.), *Discontinuous constituency*, 279–306. Berlin, Germany: Mouton de Gruyter.
- [2] Bresnan, Joan. 1982. The passive in lexical theory. In Joan Bresnan (ed.), *The mental representation of grammatical relations*, 40–65. Cambridge, MA: MIT Press.
- [3] Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.
- [4] Newmeyer, Frederick J. 1974. The regularity of idiom behavior. *Lingua* 34(4). 327–342.
- [5] Shieber, Stuart M. & Yves Schabes. 1990. Synchronous tree-adjoining grammars. In *Proceedings of the 13th international conference on computational linguistics*, vol. 3, 253–258. Helsinki, Finland.
- [6] Wasow, Thomas, Ivan Sag & Geoffrey Nunberg. 1983. Idioms: An interim report. In *Proceedings of the XIIIth International Congress of Linguistics, Tokyo*, 102–105.