

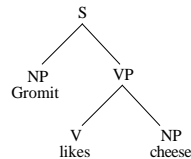
Linear Order and Constituency

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Point of the argument: to show that we can explain why different syntactic constituency tests yield different results, and predict the results of specific tests, if we assume that syntactic structure-building proceeds *incrementally, from left-to-right*.

I. Introduction

- (1) a. Gromit [likes cheese] and [hates cats] (coordination)
 b. Gromit [likes cheese] and Wallace does too (deletion/ellipsis)
 c. [Like cheese] though Gromit does ____, he can't stand Brie.(movement)
 d. Wallace and Gromit like each other. (reciprocal binding)
 e. * Each other like Wallace and Gromit. (illicit reciprocal binding)



Premises

- A. *Constituency hypothesis* (largely uncontroversial): constituency tests (coordination, movement, binding, deletion, substitution etc.) are diagnostics for the structure of sentences, because these tests all make reference to *constituents*.
- B. *Single structure hypothesis* (more controversial): the structural description of a sentence consists of a *single* hierarchical structure or structural derivation. Sentences do not have multiple parallel structures.
- C. *(Non-)Ordering hypothesis* (largely uncontroversial): syntactic structures must either satisfy a set of structural constraints which make no reference to order of construction, or the structures are assembled in a bottom-up fashion, proceeding from most embedded to least embedded pieces of the structure.

Problems

- A. Different constituency tests pick out different sets of strings as constituents. Although this does not contradict the premises above, it does not follow from them.

Coordination is a very 'liberal' diagnostic

- (2) a. Wallace [visited Wendolene] and [bought some wool].
 b. Wallace gave [Gromit a biscuit] and [Shawn some cheese] for breakfast.
 c. [Wallace designed] and [Gromit built] an enormous tin moon-rocket.
 d. Alice [knew that Fred wanted to write to] and [hoped that he wanted to talk to] the president.

Some strings that can be coordinated cannot undergo movement:

- (3) a. [*Gromit a biscuit] Wallace gave ____ for breakfast.
 b. *Wallace gave ____ for breakfast [his favorite pet beagle an enormous chewy dog-biscuit.]

Some strings that can be coordinated cannot undergo ellipsis:

- (4) a. Alice [knew that Fred wanted to write to the queen] and [hoped that he wanted to talk to] the president.
 b. Alice [knew that Fred wanted to write to the queen] and Ethel did too.
- (5) a. Alice [knew that Fred wanted to write to] and [hoped that he wanted to talk to] the president.
 b. *Alice [knew that Fred wanted to write to the queen] and Ethel did to the president.

- B. In some instances, constituency tests pick out *overlapping* strings as constituents, which is at odds with the premises above.

Coordination of overlapping strings

- (6) a. Wallace gave [Gromit a biscuit] and [Shawn some cheese] for breakfast.
 b. Wallace gave Gromit [a biscuit in the morning] and [some cheese just before bedtime.]

VP-fronting in conflict with anaphor-binding possibilities (Pesetsky 1995)

- (7) a. ...and [give the books to **them** in the garden] he did ____ on **each other's** birthdays.
 b. ...and [give the books to **them**] he did ____ in the garden on **each other's** birthdays.

- C. Although there are excellent characterizations of the range of constituents identified by individual structural diagnostics, there is no general theory of *why* particular structural tests pick out the strings that they do as constituents, and not others.

Theories

These problems for the premises above are well-known, and have been addressed by a number of theories.

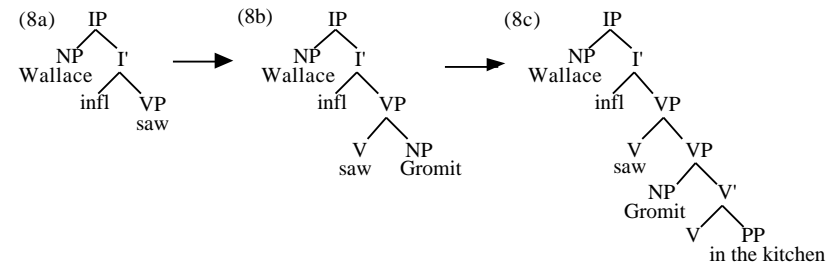
- *Modified Constituency hypothesis*: assumptions changed about what specific tests show: e.g. binding tests require m-command rather than c-command; participation of non-constituents is exceptionally allowed in coordination; assumption of invisible movement or null material.
- *Drop Single structure hypothesis*: assume that sentences may have two or more parallel syntactic structures, a.k.a. flexible constituency. Different versions adopted in Categorical Grammar (Ades & Steedman 1982, Steedman 1996, Dowty 1988, Pickering & Barry 1993, etc.) and in phrase-structure grammar (Pesetsky 1995, Brody 1994).

Proposal

Goal here is to show evidence that a better understanding of differences among constituency tests is available if we hold constant the *Constituency hypothesis* and the *Single structure hypothesis*, and instead revise the (*Non-*)*Ordering hypothesis*, as follows:

Incrementality hypothesis

Sentence structures are built incrementally from left-to-right, i.e. in the order in which terminal elements are pronounced.



Consequences:

- Since constituency changes systematically as new material is added to structure, and different structural diagnostics apply at different points in a derivation, certain systematic differences between constituency tests can be explained.
- No need to relax Constituency hypothesis or Single structure hypothesis.
- Since all tests apply to same structural derivation, we can explain why conflicts between constituency tests are more restricted than is predicted by flexible constituency theories.
- Sentence production and comprehension proceed incrementally from left-to-right. Incremental grammatical derivations remove a principal objection to identity of grammar-parser-producer.

II. Specific Predictions

A. Range of constituents picked out by individual structural tests

Prediction: the range of constituents that a constituency test may pick out is constrained by the stage(s) in an incremental derivation to which the test makes reference.

Consequence: if a test makes reference to multiple stages in an incremental derivation, then it can only pick out those constituents which are available at *all* of those derivational stages.

COORDINATION

Predicted to be extremely liberal, because coordinated strings are immediately adjacent; hence no risk of first conjunct losing its constituency before second conjunct built. Should, in principle, be possible for all constituents of a derivation.

- Wallace [visited Wendolene] and [bought some wool].
 - Wallace gave [Gromit a biscuit] and [Shawn some cheese] for breakfast.
 - [Wallace designed] and [Gromit built] an enormous tin moon-rocket.
 - Alice [knew that Fred wanted to write to] and [hoped that he wanted to talk to] the president.

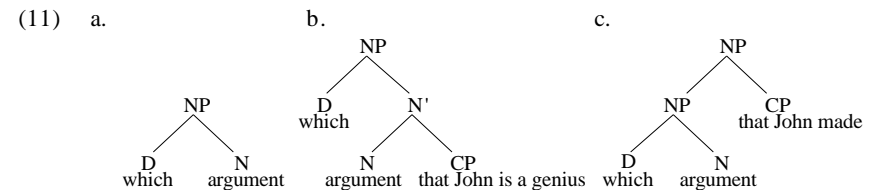
...of course, some strings are *never* constituents:

- *The man [who built the rocket has] and [who studied robots designed] a dog.

MOVEMENT

Predicted to pick out narrower range of constituents than coordination, because moved constituent must be a constituent at each stage in the derivation that a link of the movement chain is built.

- Interaction of Right Node Raising and Movement (see below)
- Constituency constrains 'reconstruction' effects:



String [which argument] can only move to theta-position if it is a constituent at the point when the theta-position is built. If [which argument] is a non-constituent, other NP material is obligatorily ‘pied-piped’, such that a constituent is moved. Derives well-known argument/adjunct contrast for reconstruction (Lebeaux 1988; for much additional discussion see Cresti 1995, Fox 1997, Heycock 1995, Romero 1997, Sharvit 1997 among others).

- (12) a. Which argument that John_i made did he_i believe?
 b. ??/*Which argument that John_i is a genius did he_i believe?

DELETION/ELLIPSIS

Predicted to pick out a narrower range of constituents: the string that licenses ellipsis must be a constituent both when it is first built and when the ellipsis site is built & licensed, i.e. constituent must be present beyond completion of sentence which is antecedent of ellipsis.

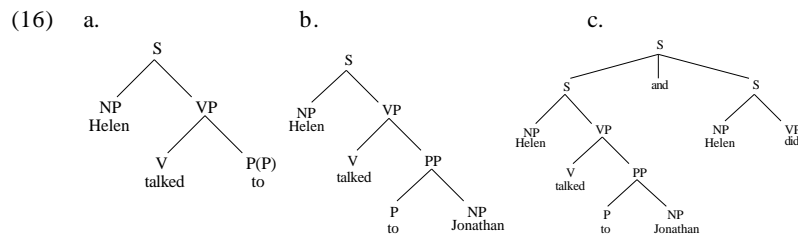
- Verb–preposition strings may be coordinated:

- (13) a. John talked to and gossiped about the kid who sprayed paint on his car.
 b. The cat looked at and then slept on the rug in the middle of the living room.

- But they cannot be deleted in ellipsis constructions, a.k.a. ‘pseudogapping’ (Postal 1986, Baltin & Postal 1996).

- (14) a. Helen talked to Jonathan, and Alice did ___ *(to) Matthew.
 b. The cat slept on the mat, and the dog did ___ *(on) the chair.
 (15) a. Helen talked to Jonathan more often than Alice did ___ *(to) Matthew.
 b. The cat slept on the mat more often than the dog did ___ *(on) the chair.

- Reason: pseudogapping requires licensing of ellipsis site after V+P constituent has been destroyed by addition of NP.



B. Conditions for Constituency Conflicts

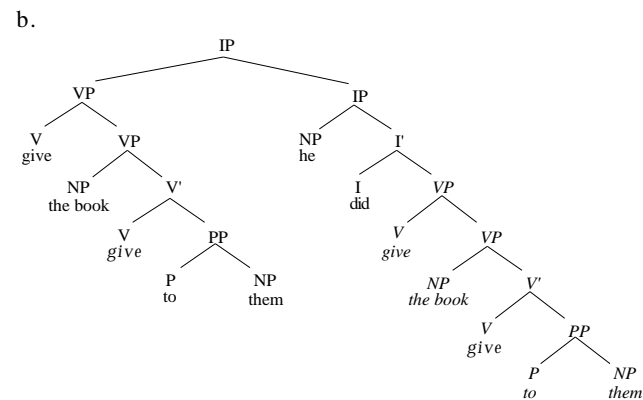
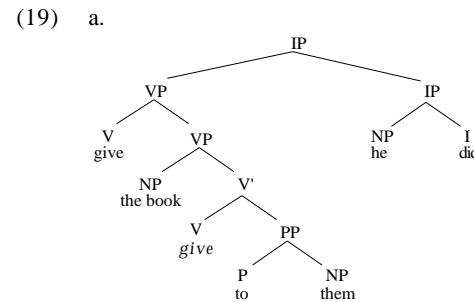
Prediction: conflicts between different tests can arise when tests can apply at different stages in the incremental derivation of a sentence.

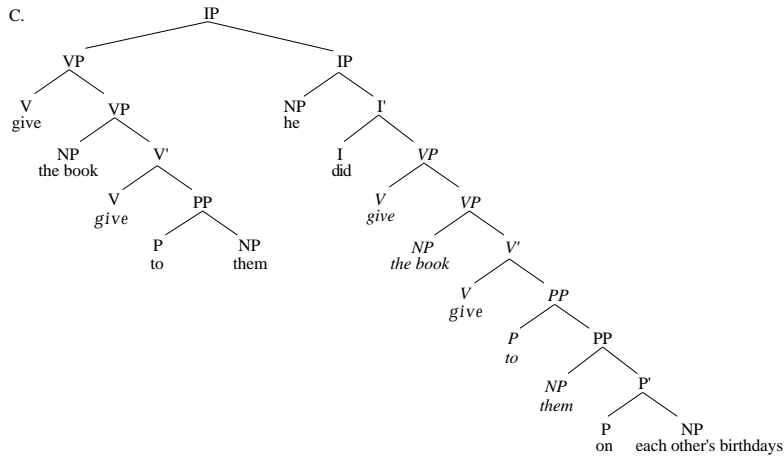
- Overlapping strings may be coordinated, because they are constituents at different points in an incremental derivation.

- (17) a. Wallace gave [Gromit a biscuit] and [Shawn some cheese] for breakfast.
 b. Wallace gave Gromit [a biscuit in the morning] and [some cheese just before bedtime.]

- (18) a. [give]
 b. [give Gromit]
 c. [give [Gromit [a biscuit]]]
 d. [give [Gromit [[a biscuit] [for breakfast]]]]

- Conflict between movement/ellipsis and binding results is possible, because binding relations established after movement/ellipsis relations in incremental derivation.





C. Vanishing Constituents

Prediction: constituents become unavailable to syntactic processes once they have been destroyed.

- Both VP-fronting (VPF) and VP-ellipsis (VPE) can move/delete strings beginning at the *left-edge* of VP.

- (20) a. ... and [give candy to children in libraries on weekends] he did.
 b. ... and [give candy to children in libraries] he did on weekends.
 c. ... and [give candy to children] he did in libraries on weekends.
 d. ... and [give candy] he did to children in libraries on weekends.
 e. * ...and [to children in libraries] he did give candy on weekends.
 f. * ...and [in libraries on weekends] he did give candy to children.

- (21) a. John gives candy to children in libraries on weekends, and Mary does (too).
 b. John gives candy to children in libraries on weekends and Mary does on federal holidays.
 c. John gives candy to children in libraries on weekends and Mary does in urban parks on federal holidays.

- Internal to the fronted/elided portion of VP, both VPF and VPE pass tests for right-branching VP-structure (i.e. tests from Barss & Lasnik 1986, Larson 1988 etc.).

- (22) a. ... and [introduce **the children to each other**] the teacher proceeded to do.
 b. ... and [congratulate **everybody on his** birthday] he did.

- (23) a. The principal introduced **the children to each other**, and then the teacher did (too).
 b. The boss congratulated **everybody on his** birthday, and the receptionist did (too).

- When only part of the VP is fronted, VPF still passes diagnostics of right-branching VP-structure. Conflict between VP-fronting and binding is possible, because movement chain is complete before binding chain is constructed.

- (24) a. John said he would give books to them,
 ... and give books to them he did [on each other's birthdays].
 (reciprocal binding)
 b. Mary said she would congratulate every boy,
 ... and congratulate every boy she did [at his graduation].
 (variable binding)
 c. John said he would read every book,
 ... and read every book he did [at breakneck speed].
 (collective and distributive scope readings)

- In contrast, when only part of VP undergoes ellipsis, diagnostics of right-branching structure fail:

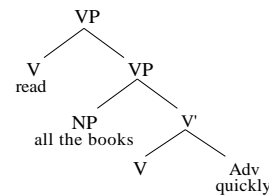
- (25) a. * John gave books to **them on each other's** birthdays,
 and Mary did [on **each other's** first day of school].
 (reciprocal binding)
 b. * Mary congratulated **every boy at his** graduation,
 and Sue did [at **his** 21st birthday party].
 (variable binding)

- (26) Mary finished every book quickly.
 (collective and distributive scope readings)

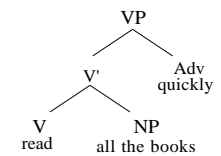
- (27) Mary finished every book quickly, and John did slowly.
 (collective reading only)

- Explanation: ellipsis must be licensed in second conjunct after adverbial has been added in initial conjunct. Creation of right-branching structure in initial conjunct destroys the V+NP constituent, which therefore can no longer license ellipsis.

- (28) a.



- b.



- Comparative Ellipsis (Heim 1985, Diesing 1992) allows more minimal contrast than VPF/VPE. Adverbial phrase may be present in either or both conjuncts.

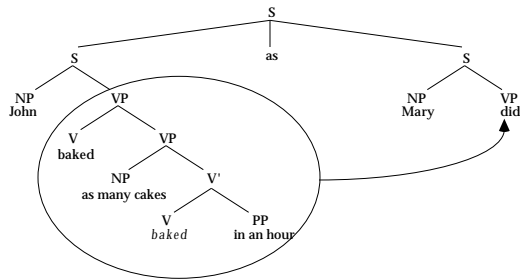
- (29) a. John read as many books as Bill did on Thursday.
 b. John read as many books on Tuesday as Bill did on Thursday.

Prediction: diagnostics of right-branching VPs will succeed when non-elided adverbial is present in just one conjunct (36a-b), and fail when it is present in both conjuncts (36c).

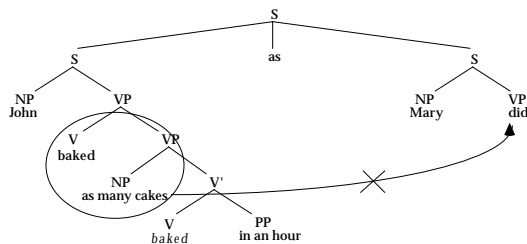
- (30) a. John read as many books as Bill did in a week.
 (collective and distributive readings both ok)
 b. John read as many books in a week as Bill did.
 (collective and distributive readings both ok)
 c. John read as many books in a week as Bill did in a month.
 (collective reading ok, distributive reading impossible)

- (31) a. (?) The provost met as many students_i as the dean did when they_{ij} were first entering the university.
 b. * The provost met as many students_i when they_i were first entering the university as the dean did when they_{ij} were graduating.

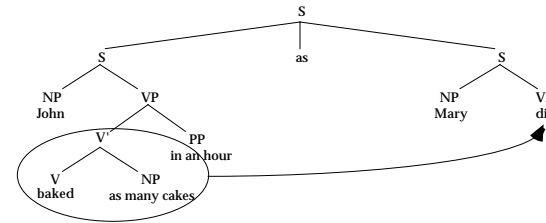
- (32) a.



- b.



c.



Note: the basic loss-of-scope-in-ellipsis facts are not the evidence for incremental structure building: rather it is the *contrast* between the ellipsis and fronting facts, and the parallel contrast in comparative ellipsis examples.

D. Constraining Liberal Diagnostics

- Right Node Raising: name given to family of coordination structures not predicted by standard constituency structures.

- (33) a. “Stone also suggests that Nixon knew of, though he did not attempt to participate in, US attempts to assassinate Fidel Castro.”

(Boston Sunday Globe movie section)

- b. “We’re sorry for the delay in this flight. The machine that rips the handles off of and punches holes in your baggage was broken, so it all had to be done manually.”

(in flight announcement, following LSA meeting, 1996)

- c. “Have you ever engaged in, conspired to engage in, or do you intend to engage in, or have you ever solicited membership or funds for, or have you through any means ever assisted or provided any type of material support to, any person or organization that has ever engaged or conspired to engage, in sabotage, kidnapping, political assassination, hijacking, or any other form of terrorist application?”

(question on INS form I-485, green card application)

- Across-the-board extraction approach (Ross 1967, Maling 1972, Postal 1974 etc.). Challenged by numerous arguments that shared material in RNR is not moved. e.g. insensitivity to *wh*-islands (Wexler & Culicover 1980); P-stranding in a language which strictly bans P-stranding for movement (Irish, Spanish, French, Polish: McCloskey 1986); sharing of strings that cannot be moved (Phillips 1996).

Under Incrementality hypothesis, RNR may be analysed as coordination of *non-final constituents*.

Prediction: if the conjuncts found in RNR are just non-final constituents, then it should only be possible to refer to them for as long as the shared material has not been added to the structure.

- Non-coordinate RNR (Hudson 1976, Postal 1994): boldface string acts like a conjunction

- (34) a. Of the people questioned, [those who liked] **outnumbered by two to one** [those who disliked] the way in which the devaluation of the pound had been handled.
 b. I'd have said he was sitting [on the edge of] **rather than** [in the middle of] the puddle.
 c. It's interesting to compare [the people who like] **with** [the people who dislike] the power of the unions.
- (35) a. [Politicians who have fought for] **may well snub** [those who have fought against] animal rights.
 b. [People who are learning to speak (in)] **may hate** [those who already can speak (in)] that little-known language.
 c. [People who believe there may soon be on Venus] **tend to distrust** [those who believe there already are on Mars] extraterrestrials capable of understanding parasitic gaps.
 d. [Spies who learn *when*] **can be more valuable than** [those able to learn *where*] major troop movements are going to occur.

- Non-coordinate RNR is not subject to the Coordinate Structure Constraint. This provides a tool to test our prediction about RNR conjuncts.

- (36) a. [The people who liked] **easily outnumbered** the people who disliked the movie.
 b. [The people who liked] **must ___ have easily outnumbered** the people who disliked the movie.
 c. [The people who liked] **seemed ___ to have far outnumbered** the people who disliked the movie.
 d. [The people who like] **are easily outnumbered ___ by** the people who dislike the movie.
 e. [The people who liked] **arrived ___ much earlier than** the people who disliked the movie.
 f. [Which voter group that liked] ___ **outnumbered** which voter group that disliked the info-mercial?

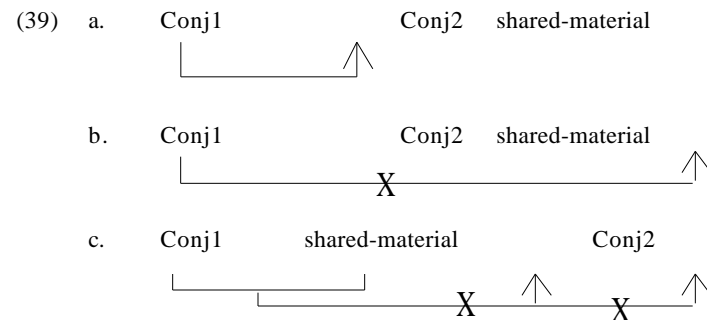
- Constraint on movement in non-coordinate RNR

- (37) a. [The people who liked] seemed ___ to have offended the people who disliked the movie about Reagan's childhood.
 b. * [The people who liked] seemed to the people who disliked the movie about Reagan's childhood ___ to be complete fools.

- c. * [The people who liked the movie about Reagan's childhood] seemed to the people who disliked ___ to be complete fools.

- (38) a. [Which voter group that liked] ___ outnumbered which voter group that disliked the info-mercial?
 b. * [Which voter group that disliked] did which voter group that liked the info-mercial outnumber ___?
 c. * [Which voter group that disliked the info-mercial] did which voter group that liked outnumber ___?

- Generalization: shared material must follow surface *and* underlying positions of both conjuncts. Reason: once shared material is added, constituency changes and conjuncts no longer have parallel structure.



Generalization is explained if RNR conjuncts only exist until point where shared material destroys their constituency; not expected under coordination + deletion account.

Note: although I assume that RNR requires that the conjuncts be constituents when they are coordinated, I see no alternative to some version of discontinuous constituency (McCawley 1982) or 3-dimensional structures (Goodall 1987, Muadz 1991, Moltmann 1992) to account for the sharing of material to the right of the conjuncts.

E. Constituency vs. Hierarchy tests

Prediction: in the left-to-right assembly of a phrase marker, addition of new material often destroys existing constituents. However, addition of new material never destroys existing asymmetric c-command relations. Therefore, although tests of constituency may conflict, we predict that tests of c-command/hierarchy should *never* conflict with one another.

III. Conclusion

- Incremental structure building places a bound on the range of constituents that any given test can pick out, which can be predicted from how the test applies.
- Possible to explain differences between results of different tests without recourse to flexible constituency.
- Predicts when constituency conflicts are possible, and where they are impossible; flexible constituency theories overgenerate because tests giving different results read off independent structures.
- The existence of incremental structure-building mechanisms is independently well motivated based on studies of language parsing and production (entirely uncontroversial in parsing; see Ferreira 1997, Levelt 1989 & references therein for evidence for incrementality in production).

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