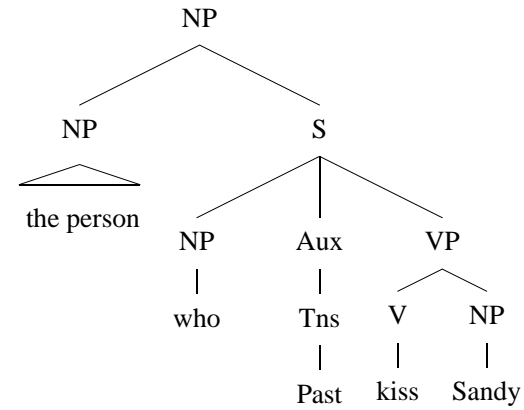


“Classic” transformational grammar is nonmonotonic

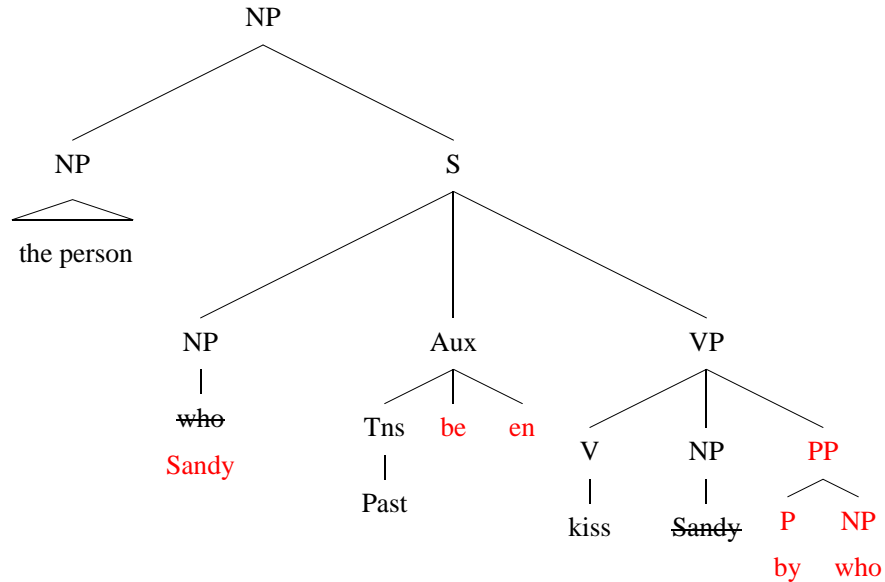
(1) Deep Structure for a relative clause:



1

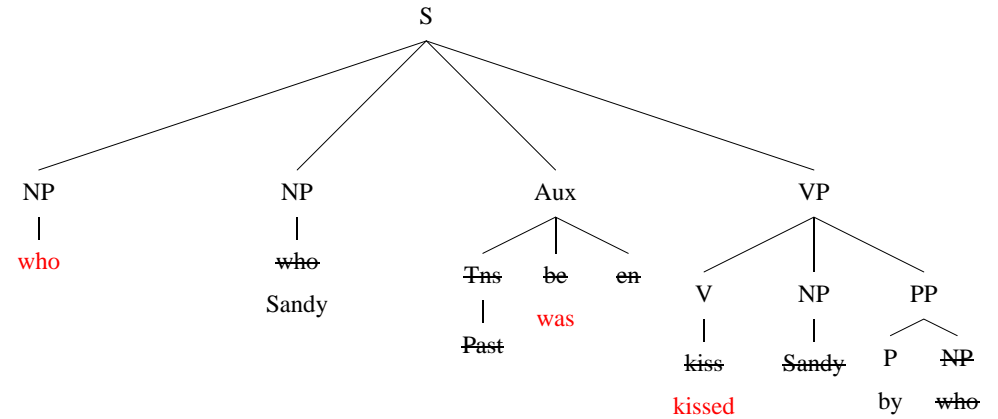
2

(2) Passive applies:



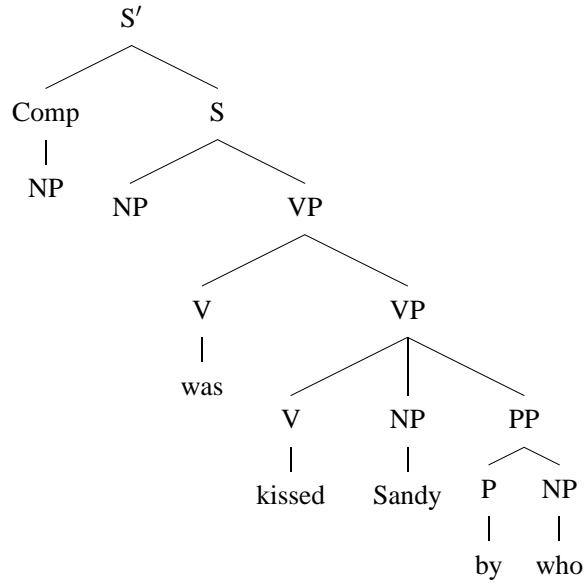
3

(3)



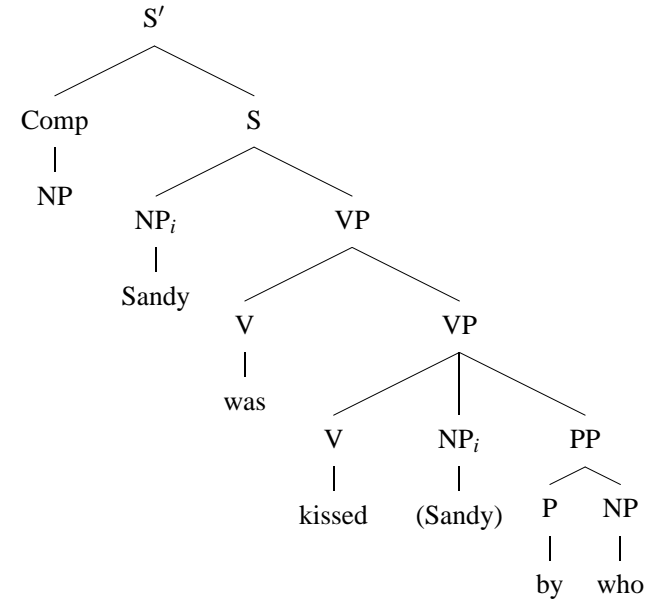
4

(4) Alternative “Deep Structure” for relative clause



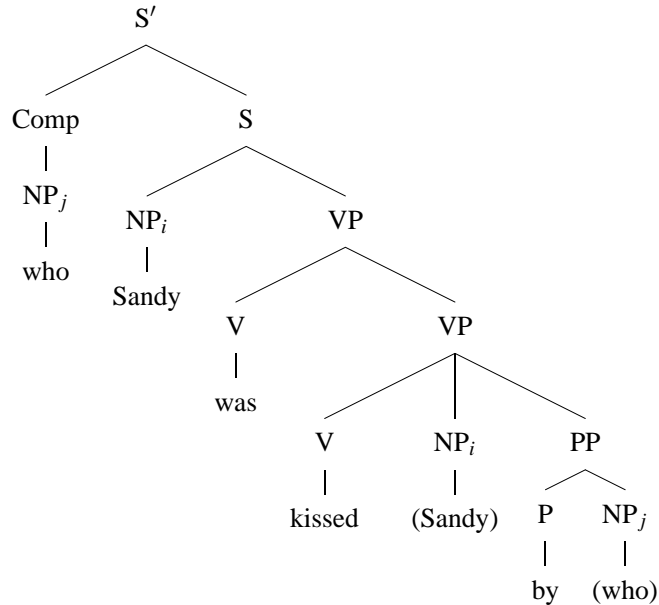
5

(5) Passive applies



6

(6) And then *wh*-movement applies



7

Derivations and representations

Important points:

- In the second (monotonic) derivation, no information is lost in the course of the derivation
- Information that is added is compatible with the “old” information

In consequence, order of application is irrelevant, and in fact we don’t need a “derivation” at all. All “changes” can be stated as constraints on a single structure. For example, the requirement on transformations that they only move elements upwards in the tree can be recast as a constraint holding between a coindexed phrase and its “gap”.

Unification-based theories are DECLARATIVE (non-derivational).

8

Equality of information

In English, the subject the finite verb in a sentence have to *agree*:

- (7) a. the building is/*are shaking
b. the buildings *is/are shaking
- (8) person & number of subject = person & number of finite verb

Stretching it a little, we can view many types of relations as involving EQUALITY:

- (9) a. Er hilft *mich/mir.
he helps *me(ACC)/me(DAT)
He helps me.
b. Er sieht mich/*mir.
he sees me(ACC)/*me(DAT)
He sees me.
- (10) case required by the verb on its object = case of the object

9

Partiality and transitivity

The information can be partial on either (or both) side of the equation:

- (12) a. The salmon is/are jumping.
b. The child/children jumped.
c. The salmon jumped.

Equality can hold between more than two elements:

- (13) a. The salmon which has been in the lake has/*have been jumping.
b. The salmon which *has/have been in the lake have been jumping.
c. The boys who *has/have been in the lake swam.
- (14) number/person of finite verb in main clause = number/person of head noun in subject NP = number/person of finite verb in relative clause

11

Partiality of information

But the information may be PARTIAL on one or the other side of the equation.

- (11) *I*(1 SINGULAR) *go*
you(2 SINGULAR) *go*
we(1 PLURAL) *go*
you(2 PLURAL) *go*
they(3 PLURAL) *go*
he/she/it(3 SINGULAR) *goes*

- Solution 1: allow for massive ambiguity/homophony
- Solution 2: allow partial information that can be filled in through equation with more complete information

10

Unification and feature structures

All the information in a syntactic objects is expressed in terms of FEATURE STRUCTURES.

- Feature structures are partial functions from FEATURES to VALUES
- The values may themselves be feature structures
- Two features in the structure can share a common value (feature structures are reentrant)

Two structures can UNIFY if they contain no conflicting information:

- The information they contain is the same. *Or*
- One structure contains information that the other does not

The structure arising from unification contains all the information from both structures and nothing else.

12

Subject-verb agreement: mutually partial information

Features of *salmon*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{person} : 3rd \end{array} \right]$

Agreement information on *have*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{number} : plural \end{array} \right]$

Result of unification: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{person} : 3rd \\ \text{number} : plural \end{array} \right]$

13

Subject-verb agreement: conflicting information

Features of *Jonathan*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{person} : 3rd \\ \text{number} : singular \end{array} \right]$

Agreement information on *have*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{number} : plural \end{array} \right]$

... unification is blocked

14

Subject-verb agreement: conflicting information

Features of *Jonathan*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{person} : 3rd \\ \text{number} : singular \end{array} \right]$

Agreement information on *have*: $\left[\begin{array}{l} \text{cat} : \left[\begin{array}{l} n : + \\ v : - \end{array} \right] \\ \text{number} : plural \end{array} \right]$

... unification is blocked

15

Transitivity: Germanic unbounded dependencies

A verb may specify a particular category for its object:

- (15) a. She is cynical/a cynic/in a bad mood/leaving tomorrow.
b. She became cynical/a cynic/*in a bad mood/*leaving tomorrow.

or some feature of it, such as case:

- (16) Ich habe Wolfgang/dem Mann/*der Mann/*den Mann geholfen.

And the “gap” agrees in these specifications with its “binder”:

- (17) a. Cynical/A cynic/*In a bad mood/*Leaving tomorrow, she will never become.
b. Wolfgang/dem Mann/*der Mann/*den Mann habe ich geholfen.

So all three pieces of information are unified.

16

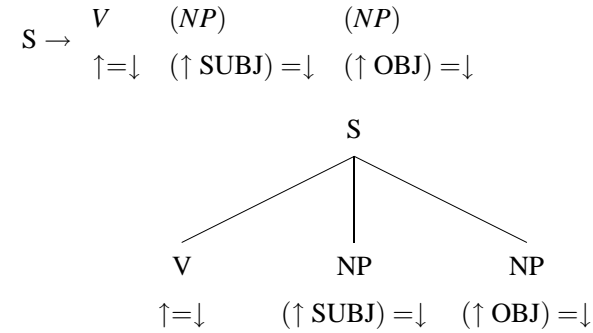
Modern Irish verbal forms

“Analytic” verb forms like *chuir* require a subject with an overt lexical head (here *me* ‘I’); “synthetic” verb forms like *chuirfinn* require subjects with no overtly expressed lexical head (e.g. *me* must be absent).

- (18)
- Chuir *me* *fein* *isteach* ar an *phosi* sin
put(PST) I EMPH in on the job that
 - Chuirfinn *fein* *isteach* ar an *phost* sin
would put EMPH in on the job that
 - *Chuir *fein* *isteach* ar an *phosi* sin
put(PST) EMPH in on the job that
 - *Chuirfinn *me* *fein* *isteach* ar an *phost* sin
would put I EMPH in on the job that

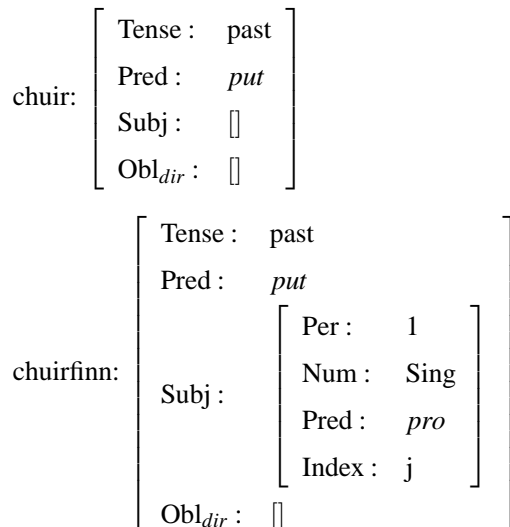
17

Irish verbal forms: LFG



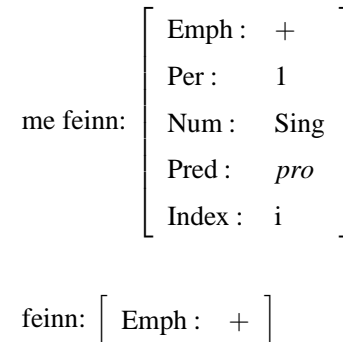
18

Irish verbal forms: LFG



19

Irish verbal forms: LFG



20

Irish verbal forms: LFG

Success!

| | | | |
|--------|--|-----------|---|
| chuir: | Tense : past Pred : <i>put</i> Subj : Obl _{dir} : [] | me feinn: | Emph : + Per : 1 Num : Sing Pred : <i>pro</i> Index : i |
|--------|--|-----------|---|

21

Irish verbal forms: LFG

Failure!

| | | | |
|-------------|--|-----------|---|
| chuirfeinn: | Tense : past Pred : <i>put</i> Subj : Obl _{dir} : [] | me feinn: | Emph : + Per : 1 Num : Sing Pred : <i>pro</i> Index : i |
|-------------|--|-----------|---|

22

Irish verbal forms: LFG

A different kind of failure. No failure of unification, but no index is specified anywhere, so the structure is “incomplete”, and this is ruled out by a principle within the theory of LFG.

| | | | |
|--------|--|--------|----------|
| chuir: | Tense : past Pred : <i>put</i> Subj : Obl _{dir} : [] | feinn: | Emph : + |
|--------|--|--------|----------|

23

Irish verbal forms: HPSG

| | |
|--------|--|
| chuir: | Tense : <i>past</i> Subcat :< PP[Dir : +] NP[NForm : Norm] > |
|--------|--|

| | |
|-------------|--|
| chuirfeinn: | Tense : <i>past</i> Subcat :< PP[Dir : +] NP[NForm : Null] > |
|-------------|--|

24

Irish verbal forms: HPSG

me fein: $\left[\begin{array}{l} \text{Emph : } + \\ \text{Per : } 1 \\ \text{Num : } \text{Sing} \\ \text{Nform : } \text{Norm} \end{array} \right]$

fein: $\left[\begin{array}{l} \text{Emph : } + \\ \text{Nform : } \text{Null} \end{array} \right]$

25

Irish verbal forms: HPSG

Success!

chuir: $\left[\begin{array}{l} \text{Tense : } \textit{past} \\ \text{Subcat : } < \begin{array}{l} \text{PP}[\text{Dir : } +] \\ \text{NP}[\text{NForm : } \text{Norm}] \end{array} > \end{array} \right]$

me fein: $\left[\begin{array}{l} \text{Emph : } + \\ \text{Per : } 1 \\ \text{Num : } \text{Sing} \\ \text{Nform : } \text{Norm} \end{array} \right]$

26

Irish verbal forms: HPSG

Failure!

chuir: $\left[\begin{array}{l} \text{Tense : } \textit{past} \\ \text{Subcat : } < \begin{array}{l} \text{PP}[\text{Dir : } +] \\ \text{NP}[\text{NForm : } \text{Norm}] \end{array} > \end{array} \right]$

fein: $\left[\begin{array}{l} \text{Emph : } + \\ \text{Nform : } \text{Null} \end{array} \right]$

27