Case marking and concord

Stabler 2011-10-07 16:41

• Background assumptions
  ⋆ Consensus about language structure
  ⋆ Performance: some simple models

• Beyond the convergence: Syn-PF interface
  ⋆ Phrasal stress, domain strengthening
    ⇒ Case and concord at PF
  ⋆ Chinese numbers at PF
    ⇒ Cf 'timing' accts of case and concord

Consensus: Points of convergence

(0) Merge and move

CP

Lexicon, Merge

↓

LF

←−

• C
  • • race
  • • which
  • • horse
  • they

Example 1

S(xzyw): -AC(x, y), BD(z, w)
AC(xz, yw): -A(x), C(y), AC(z, w)
AC(x, y): -A(x), C(y)
BD(xz, yw): -B(x), D(z), BD(y, w)
BD(x, y): -B(x), D(y)

A(a)B(b)C(c)D(d)
S(abbcdd)
AC(a,c)
A(a)
C(c)
BD(bb,dd)
B(b)
D(d)
BD(b,d)

(1) Generalized CFGs: MCFGs

[which horse] [did [John race]]
CP(which horse did John race)
C+wh(did)
TP-wh(John race, which horse)

(2) Comparing MGs and generalized CFGs, more carefully

• Pronounced, interpreted order ≠ order of derivation tree leaves

Lexicon, Stress

\[ \text{Example 1} \]

\[
\begin{align*}
\text{S(xzyw)}: & \ -AC(x, y), BD(z, w) \\
\text{AC(xz, yw)}: & \ -A(x), C(y), AC(z, w) \\
\text{AC(x, y)}: & \ -A(x), C(y) \\
\text{BD(xz, yw)}: & \ -B(x), D(z), BD(y, w) \\
\text{BD(x, y)}: & \ -B(x), D(y) \\
\end{align*}
\]

\[ A(a)B(b)C(c)D(d) \]
\[ S(abbcdd) \]
\[ AC(a,c) \]
\[ A(a) \]
\[ C(c) \]
\[ BD(bb,dd) \]
\[ B(b) \]
\[ D(d) \]
\[ BD(b,d) \]

<table>
<thead>
<tr>
<th>Points of convergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case marking and concord</td>
</tr>
<tr>
<td>Consensus: Points of convergence</td>
</tr>
<tr>
<td>Pronounced, interpreted order ≠ order of derivation tree leaves</td>
</tr>
</tbody>
</table>

Example 1

\[
\begin{align*}
\text{S(xzyw)}: & \ -AC(x, y), BD(z, w) \\
\text{AC(xz, yw)}: & \ -A(x), C(y), AC(z, w) \\
\text{AC(x, y)}: & \ -A(x), C(y) \\
\text{BD(xz, yw)}: & \ -B(x), D(z), BD(y, w) \\
\text{BD(x, y)}: & \ -B(x), D(y) \\
\end{align*}
\]

\[ A(a)B(b)C(c)D(d) \]
\[ S(abbcdd) \]
\[ AC(a,c) \]
\[ A(a) \]
\[ C(c) \]
\[ BD(bb,dd) \]
\[ B(b) \]
\[ D(d) \]
\[ BD(b,d) \]
We define a mapping $\text{MGs} \rightarrow \text{MCFGs}$, such that we always have this map between derivations:

- $\epsilon ::= V + \text{wh} C$
- race ::= $D = D V$
- which ::= $N D - \text{wh}$
- horse ::= $N$
- they ::= $D$

$\langle 0, C \rangle$ (which horse they race)
$\langle 0, + \text{wh} C, - \text{wh} \rangle$ (they race, which horse)
$\langle 1, \epsilon \rangle$ (\epsilon)
$\langle 0, V, - \text{wh} \rangle$ (they race, which horse)
$\langle 0, D - \text{wh} \rangle$ (which horse)
$\langle 1, N D - \text{wh} \rangle$ (which)
$\langle 1, N \rangle$ (horse)
$\langle 1, D \rangle$ (they)

This translation always works – every MG strongly equiv to MCFG (3).

Thm. 'External convergence' (Vijay-Shanker, Weir & Joshi '87)

$\text{FSG} \subset \text{CFG} \subset \text{TAG} = \text{CCG} \subset \text{MG} = \text{MCFG} = \text{MCTAG} \subset \text{PMCFG} \subset \text{CS}$

(4)

HLs are 'weakly and strongly' MCS (Joshi '85)

Let's call the largest box in Thm 1, PMCFG, 'approx MCS' (5).

Thm. 'Internal convergence' (Michaelis '01, '02; ...)

$\text{MG} = \text{MGH} = \text{MT} = \text{DMG} = \text{CMG} = \text{PMG} = \text{RMG} = \text{RMCMG} = \text{SMMG}$ (6)

Consequences

- Why are these convergences happening? (Mönich '10, & al)
- Performance models (for every grammar) (Stabler '11, & al)

⇒ Challenging strict MCS: Case marking (MCS)

TD is a very old idea (cf Frazier '78); now for all MGs, incl remnant movement (MCS: de la Clergerie '02, Mainguy '10, Stabler '11)

Example 1 continued

Init:

S(abbcdd)
A(c)
C(c)
BD(bb,dd)
B(b)
D(d)
BD(b, d)

input
memory
abbcdd
S

i.

S(abbcdd)
AC(a, c)
A(a)
C(c)
BD(bb, dd)
B(b)
D(d)
BD(b, d)

input
memory
abbcdd
S

ii.

S(abbcdd)
AC(a, c)
A(a)
C(c)
BD(bb, dd)
B(b)
D(d)
BD(b, d)

input
memory
abbcdd
A

iii.

S(abbcdd)
AC(a, c)
A(a)
C(c)
BD(bb, dd)
B(b)
D(d)
BD(b, d)

input
memory
abbcdd
A

Using a matching AKG→MG, each arc in the input graph is defined by four parts:

- The head of the arc
- The arc symbol
- The source node
- The target node

Structure built by merge except when internal:

An incremental performance model
D C

v. At no point is there any tree structure in parser memory

vi. At every point, connected partial tree attached to all predictions (incremental).

vii. Every point, connected partial tree attached to all predictions (incremental).

Stabler'10 (finite partition property)
The structure of the model:

- button push, eye move, etc
- integration, decision, reasoning

\[ P_1, P_2, \ldots, P_n \]

TD parse(G)

TD queue size

King and Just reading times

van Wagenen, Brennan & Stabler'11

At the interface: Ph

Boundary effects

- Whenever John walks # the dog is chasing him
- Whenever John walks the dog # the kids are chasing him

Whenever \[ \text{John} \text{ walk}\text{s} \text{the dog} \] \[ \text{the kids} \text{ are} \text{chasing} \text{him} \]

\[ 89 + 89 + 89 + 89 = \text{a lot} \]

\[ (89 + 89) \times (89 + 89) = \text{a lot} \]

Fougeron & Keating'97 Keating & al'04: /t/ VOT

the more brackets, the stronger the segmental effects

‘the acoustic properties VOT, total voiceless interval, %voicing during closure, nasal energy minimum, and to a lesser extent stop burst energy and voicing into closure, were found to vary with prosodic position . . . They could thus potentially provide cues to listeners about prosodic structure.’

\[ (p \land q) \lor (p \land r) \land (p \lor q) \lor p \land r \]

\[ 10 \]
At the interface: Case marking and concord

Case marking and concord

(13) local and 1-1?

T\[uCase:n\] vP he\[Case:n\] v\[uCase:a\] sees her\[Case:a\]

(14) one-to-many

◦ derthe.

n mutmaßliche presumed.

n Täter perpetrator.

n ◦ desthe.

g mutmaßlichen presumed.

g Täter perpetrator.

(15) many-to-one

◦ abuju-karra brother-g-i

mijil-ngunin net-i

(Kayardild: Evans’95, Round’10) ‘with brother’s net’ (both studies report Ss won’t stack more than 4)

◦ govei-iall

nigithe-

n sisxl-

n gigi

n blood-

n saxl-

n isa-

n house-

n m-

n isthe-

n Saul-

n is-

n Saul-

n g-

n g-

n (Old Georgian: Boeder’95) ‘all the blood of the house of Saul’

nb: mirror! but cf. Koopman’05, Evans’95, et al for anti-mirror, etc

map from Plank’95 . . . many more if

hidden stacking explains ‘default case’ etc

(16) Case marking/concord parameters of variation

• what cases spell out:

local only; . . . all stacked

• where cases spell out:

head; phrase edge; . . . complete

• how cases spell out:

mirror, anti-mirror, . . .

(17) Thm: stacked+complete case marking

[N1-K1][N2-K2][N3-K3]-K1-K2-K3 . . . [Nn-Kn]-K1- . . . -K1]

⇒ not MCS (Michaelis&Kracht’96; Kracht’02)

(18) Does stacked+complete marking ever happen?

◦ Kayardild? (Round’10, Evans’95 vs M&K)

◦ Old Georgian? (M&K vs Bhatt&Joshi’04)

. . . evidence not robust, but it is there

(19) How to get case marking/concord and variability?

3 options in literature:

(O1) merge, with complex feature ‘copying’, ‘percolation’ with variation in either (i) what is copied, or (ii) what is spelled out

(apparently cannot work without complex feature structures – vs. Sportiche’98, Adger’10)

(O2) new syntactic operations ‘multiple agree’, ‘polyvalent case’, etc.

(not head-head or head-phrase; requires infinite categorization; not ‘minimal requirement for intelligibility’)

(O3) case concord in spellout (with head movement, agreement, etc)

(20) (O3) formal model: MGSO.

Lex ⊆ Ph × F∗ × Mode, where Mode specifies spellout

▽ r spellout on r edge of overt heads in complement

✷ r spellout on r edge of complement

△ r spellout on r edge of all overt heads in complement

. . . more (see appendix for superset proposal)

E.g. to derive the first example in (15):

• nguni::=NIns

△

• karra::=NGen

△

brother::N

net::N

⇒

InsP

Ins

ǫ

N

GenP

Gen

ǫ

N

N

brother

Gen

karra

Ins

nguni

N

N

net

Ins

nguni

(21)

This takes us beyond MCS. ES conjectures these languages still ‘approx MCS’, PMCF.
At the interface: Chinese number names

(21) a. six million five thousand four
   b. *five thousand six million four

Suppose we did not have 'million' or 'billion', that 'thousand' was the largest number word. Then the language would have a largest number name unless it had some sort of recursive rule, like using 'thousand thousand' for 'million' and so on. Chinese has something like this (though the actual details of speakers' knowledge of these names is exceedingly complex, as it is for English speakers!).

(22) a. six thousand thousand, five thousand four
   b. *five thousand, six thousand thousand four

(23) $[N_1-\text{ThN}_2-\text{Th} \ldots N_n-\text{Th} \ldots]$ where $n_1 > n_2 > \ldots > n_n$

Notice that is essentially the same pattern as complete casemarking.

(24) Thm

This pattern is not MCS, but easily generated by MGSO (Radzinski'91)

$\text{th} ::= \text{ThTh}$

$\text{th} ::= \text{NmTh}$

$6 ::= \text{Nm}$

$(+) ::= \text{Nm} = \text{ThTh}$

in other words: $(1000 \times ((1000 \times 6) + 5)) + 4$

nb: merges shown here in Spec-Head-Comp order, unlike the literature

Contrast Ionin&Matushansky'06, etc.

Richards'07 on case and 'future spreading' in Lardil:

(25) a. Ngada
I ji-jarrieat-neg karnjin-iwallaby-acc
'I didn't eat the wallaby'

b. Ngada
I ji-neng-kureat-neg-fut karnjin-kurwallaby-fut
'I won't eat the wallaby'

. . . the direct objects of both sentences . . . are first assigned Accusative case by v, and Accusative case is then deleted, again by v. In (25b), the T head later assigns Future morphology to the direct object.

Brattico'11 on Finnish:

(26) a. [yksi one-nom mies]man-nom nukkuislept
'one man slept'

b. min¨ a I n¨ ainsaw [yhde-none-miehe-n]man-acc
'I saw one man'

(27) a. [kaksi two-mies-t¨ a]man-sg.prt nukkuislept
'two men slept'

b. min¨ a I n¨ ainsaw [kaksitwo-mies-t¨ a]man-acc
'I saw two men'

Multi-agreement makes it possible to have one probe assigning case to several goals . . . but it does

. . . the direct objects of both sentences . . . are first assigned Accusative case by v, and Accusative case is then deleted, again by v. In (25b), the T head later assigns Future morphology to the direct object.

Brattico'11 on Finnish:

(26) a. [yksi one-nom mies]man-nom nukkuislept
'one man slept'

b. min¨ a I n¨ ainsaw [yhde-none-miehe-n]man-acc
'I saw one man'

(27) a. [kaksi two-mies-t¨ a]man-sg.prt nukkuislept
'two men slept'

b. min¨ a I n¨ ainsaw [kaksitwo-mies-t¨ a]man-acc
'I saw two men'

Multi-agreement makes it possible to have one probe assigning case to several goals . . . but it does

Generating Copies: An Investigation into Structural Identity in Language and Grammar [32]

In the 2-step 'Derive+SO' models (cf page 1), it is natural to consider variations in SO, but if we allow anything like the SO functions defined in the 2-step 'Derive+SO' models (cf page 1), it is natural to consider variations in SO, but if we allow anything like the SO functions defined

The composition of complex cardinals.

A characterization of minimalist languages. In

O3 $\equiv$ O2 $\equiv$

Syntactic processing. The role of working memory.

The expression of featural makeup of the head'

Depend on unbounded structure

Simplest parsers discovered recently

`2 step' models: LF

$\cdot$ $\cdot$

$\cdot$

Transitive case-marking in progress

Transitive case-marking in progress

Notice 2 things about a. First, if higher cases are to be distinguished from lower ones (in order to spell them out in the right order), the "copying" must actually

Becker, T., Joshi, A. K., and Rambow, O.

Irrespective of (10) with optional tensed: O1=O2$\Rightarrow$O3

Pesetsky proposes:

Formulate the other options of (19) with expected result: O1 $\Rightarrow$ O2$\Rightarrow$O3

$\equiv$

$\cdot$

$\cdot$

$\cdot$

$\cdot$

Reference
A. Defining SO modes with tree transducers

...