Coordinate structure constraint and conjunction agreement

Zheng Shen

National University of Singapore

- Hierarchical structure plays a central role in syntax.
- The role of linear order, on the other hand, is less clear.
- To understand what role linear order plays in syntax, we look at phenomena that make reference to linear relations like precedence.
- Case study today: conjunction agreement.

Gender agreement with conjunction in Bosnian-Croatian-Serbian

- (1) SV: [C1 and C2] PART_{Masc/C1/C2}
 - a. Sva odela i sve haljine su juče prodati. [All suits.N.PL and all dresses.F.PL] are yesterday sold.M
 - b. Sva odela i sve haljine su juče prodata. [All suits.N.PL and all dresses.F.PL] are yesterday sold.N
 - c. Sva odela i sve haljine su juče prodate. [All suits.N.PL and all dresses.F.PL] are yesterday sold.F "All suits and all dresses were sold yesterday."
- (2) VS: $PART_{Masc/C1/*C2}$ [C1 and C2]
 - a. Juče su prodati sva odela i sve haljine. yesterday AUX sold.M [all suits.N.PL and all dresses.F.PL]
 - b. Juče su prodata sva odela i sve haljine. yesterday AUX sold.N [all suits.N.PL and all dresses.F.PL]
 - c. *Juče su prodate sva odela i sve haljine.
 yesterday AUX sold.F [all suits.N.PL and all dresses.F.PL]
 "All suits and all dresses were sold yesterday."

Sentences taken from Murphy & Puškar (2018). See also Bošković (2009); Marušič et al. (2015): Willer-Gold et al. (2016): Willer Gold et al. (2018):

Conjunction agreement in BCS



- Resolved agreement
- Highest conjunct agreement
- Closest conjunct agreement
- No second conjunct agreement unless C2 is also the closest.

Linear approach

Bhatt & Walkow 2013, Marušič et al. 2015 among others

- Agreement = Agree-Link + Agree-Copy
- Agree-Link
 - establish feature dependence
 - only in narrow syntax, i.e. hierarchy only
- Agree-copy
 - copy feature value from goal to target
 - can be postponed to PF, before or after linearization





Grammar 1: MASC insertion ightarrow resolved agreement with VS



(5) $PART_{[MPL]}$ [&P C1_[FPL] and C2_[NPL]]

Grammar 1: <code>MASC</code> insertion ightarrow resolved agreement with SV

- 1 Insert default [+MASC] to $\& P \rightarrow [MPL]$ on & P
- 2 Agree-Link between &P and PART
- **3** Agree-Copy from &P to Part \rightarrow [MPL] on Part
- 4 Linearization in PF



- Marušič et al. (2015): resolution is available in both S-V and V-S orders
 - Willer-Gold et al. (2016): resolution is not available in the V-S order

Grammar 2: no [MASC] insertion, Agree-Copy before linearization \rightarrow Highest conjunct agreement + VS

- \blacksquare Agree-Link between &P and PART \rightarrow No value on &P
- 2 enters PF
- (3) Agree-Copy from the **highest** conjunct (C1) to PART \rightarrow [FPL] on PART
- 4 Linearization



Grammar 3: no [MASC] insertion, Agree-Copy after linearization \rightarrow Closest conjunct agreement + VS

- \blacksquare Agree-Link between &P and PART \rightarrow No value on &P
- 2 enters PF
- Linearization
- **@** Agree-Copy from the **closest** Conjunct (C1) to PART \rightarrow [NPL] on PART



• CCA due to linear order.

$$(8) \quad \text{Yesterday} \quad \text{Aux} \quad \text{Part}_{[N]} \quad \begin{bmatrix} \\ \&^P \end{bmatrix} \stackrel{\text{Cl}_{[N]}}{\longleftarrow} \quad \& \quad \text{C2}_{[F]} \end{bmatrix}$$

• *C2 agreement with VS due to C2 being neither the highest nor the closest.

$$(9) \quad \text{Yesterday Aux } \mathsf{PART}_{[F]} \qquad \begin{bmatrix} \ _{\&P} \ \mathsf{C1}_{[N]} & \& \ \mathsf{C2}_{[F]} \end{bmatrix}$$

Non-linear approach

Murphy & Puškar 2018

- Hierarchical structure only, no linear order involved.
- Starting from & head, the order of MERGE (of the conjuncts), $\uparrow AGR\uparrow$, and $\downarrow AGR\downarrow$ are free.
- Two cycles: &P internal and subject-verb agreement.
- The order of <code>↑AGR↑</code> and <code>↓AGR↓</code> are the same in both cycles in one derivation.
- Upward movement of the subject is driven purely to feed *\AGR*.
- (10) a. MERGE $\gg \uparrow AGR \uparrow \gg \downarrow AGR \downarrow$
 - b. $MERGE \gg \downarrow AGR \downarrow \gg \uparrow AGR \uparrow$
 - C. $\uparrow AGR \uparrow \gg MERGE \gg \downarrow AGR \downarrow$
 - d. $\downarrow AGR \downarrow \gg MERGE \gg \uparrow AGR \uparrow$
 - e. $\uparrow AGR\uparrow \gg \downarrow AGR\downarrow \gg MERGE$
 - f. $\downarrow AGR \downarrow \gg \uparrow AGR \uparrow \gg MERGE$

Resolved agreement + SV

$\mathrm{MERGE} \gg \uparrow \mathrm{AGR} \uparrow \gg \downarrow \mathrm{AGR} \downarrow$



Closest conjunct agreement + VS



• Flexible orders generate all the attested patterns,

order	outcome
$MERGE \gg \uparrow AGR \uparrow \gg \downarrow AGR \downarrow$	resolved agreement with SV
$MERGE \gg {\downarrow} AGR {\downarrow} \gg {\uparrow} AGR {\uparrow}$	resolved agreement with VS
\uparrow AGR \uparrow \gg MERGE \gg \downarrow AGR \downarrow	C2 agreement with SV (CCA)
\downarrow AGR $\downarrow \gg$ MERGE \gg \uparrow AGR \uparrow	C1 agreement with VS (CCA)
\uparrow AGR \uparrow \gg \downarrow AGR \downarrow \gg MERGE	C1 agreement with SV (HCA)
\downarrow AGR $\downarrow \gg \uparrow$ AGR $\uparrow \gg$ MERGE	C1 agreement with VS (CCA)

• and not the unattested one: C2 agreement with VS.

• linear effect accounted for without referring to linear order.

(11) Yesterday AUX
$$PART_{[N]}$$
 [$_{\&P}$ C1_[N] & C2_[F]]

• *C2 agreement with VS not derivable.

(12) Yesterday Aux
$$PART_{[F]}$$
 $\begin{bmatrix} & C1_{[N]} & C2_{[F]} \end{bmatrix}$

- Both the linear and non-linear approaches are empirically adequate for agreement patterns in BCS (and Slovenian).
- I will present one argument from CSC-violating movement in BCS for the non-linear approach.

CSC-violating movement and agreement

CSC violating movement in BCS

- Coordinate Structure Constraint (CSC): extraction of a conjunct is banned in many languages.
 - (13) *What_i did Marko buy [t_i and movies]?
- But not in BCS:
 - (14) ?Knjige_i je Marko [t_i i filmove] kupio.
 books is Marko [and movies] bought
 'Marko bought books and movies.' (Bošković 2009)
- I will label the movement of the conjunct as CSCV (CSC-violating) movement. (See Bošković 2009; Stjepanović 2014, 2017; Oda 2017; Arano & Oda 2019; Arsenijević et al. 2020a; Gračanin-Yuksek & Arsenijević 2017)
- It turns out that the agreement patterns of (15) can tease apart the two approaches to CCA.

(15)
$$C1_{[N]}$$
 AUX Yesterday $PART_{[?]}$ $\begin{bmatrix} & t_{[N]} & C2_{[F]} \end{bmatrix}$

Predictions from the linear approach

- Grammar 1: insertion of M to $\& \mathsf{P} \to \mathsf{M}$ agreement
- Grammar 2: AGREE-COPY in PF before linearization \rightarrow C1 agreement
- Grammar 3: AGREE-COPY in PF after linearization \rightarrow C1 agreement
- C2 agreement: not the closest or highest, thus *
- - Grammar 1: insertion of M → M agreement (17) C1 PART_[M] [_[M] t_{C1} and C2]
 - Grammar 2: AGREE-COPY in PF before linearization → C1 agreement (HCA) (18) C1 PART [t_{C1} and C2]
 - Grammar 3: AGREE-COPY in PF after linearization \rightarrow C2 agreement (CCA) (19) C1 PART [t_{C1} and C2]
- predicted to be possible: C1, C2 and M agreement.

Predictions from the non-linear approach

(20) $C1_{[N]}$ AUX Yesterday PART $\begin{bmatrix} & & \\ & & e \end{bmatrix}$ & $C2_{[F]}$

• CSCV movement: when PART probes up, triggering movement of the subject to its Spec position, either &P or C1 can move and agree.



• 3 out of the 6 orders can derive CSCV:

(21) MERGE $\rightarrow \uparrow AGR \rightarrow \downarrow AGR \rightarrow$

Predictions:

- since CSCV movement is trigger by \AGR\, when C1 moves, only C1 can control the agreement.
- C2 or M agreement are predicted to be not available.

- (22) $C1_{[N]}$ AUX Yesterday PART $\begin{bmatrix} & & \\ & & e \end{bmatrix} = \begin{bmatrix} & & & \\ & & & e \end{bmatrix} \begin{bmatrix} & & & & \\ & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & & \\ & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & &$
 - Linear approach: C1, C2 and M agreement.
 - Non linear approach: C1, not C2 or M agreement.

Spoiler: predictions of the non-linear approach are borne out.

CSCV facts

Data reported here come from two sets of surveys:

- Survey 1: a google form with 30 participants from the facebook group *Kako biste VI rekli?* 'How would you say?'
- Survey 2: a series of short surveys distributed to 7-8 speakers.

Observation 1: CSCV is subject to considerable inter-speaker variation.

In Survey 1, 7 out of 30 participants gave sentences with CSCV in (23b)-(23c) a rating of 1, while giving (23a) a mean rating of 4.4 out of 5.

- (23) a. Danas se sudaraju sablje i koplja u bici. today REFL collide-3PL.PRES sabers.FPL and spears.NPL in battle 'Sabers and spears are colliding today.' (baseline w/o CSCV)
 - b. Sablje₁ se danas t₁ i koplja sudaraju u bici. sabers.FPL₁ REFL today and spears.NPL collide-3PL.PRES in battle
 'Sabers and spears are colliding today.' (CSCV scrambling)
 - Šta1 se danas t1 i koplja sudaraju u bici?
 what1 REFL today and spears.NPL collide-3PL.PRES in battle?
 'What and spears are colliding today?' (CSCV wh-movement)

Observation 2: CSCV can be scrambling but is much less acceptable as wh-movement.

With the remaining 23 participants who gave at least one of the sentences a rating above 1 in Survey 1:

- (24) a. Danas se sudaraju sablje i koplja u bici. today REFL collide-3PL.PRES sabers.FPL and spears.NPL in battle 'Sabers and spears are colliding today.' (baseline w/o CSCV: 4.7/5)
 - b. Sablje₁ se danas t₁ i koplja sudaraju u bici. sabers.FPL₁ REFL today and spears.NPL collide-3PL.PRES in battle 'Sabers and spears are colliding today.' (CSCV scrambling: 3.1/5)
 - c. Šta1 se danas t1 i koplja sudaraju u bici?
 what1 REFL today and spears.NPL collide-3PL.PRES in battle?
 'What and spears are colliding today?' (CSCV wh-movement: 1.5/5)

This is compatible with the existing examples in the literature. We will focus on CSCV scrambling.

CSCV + agreement

- (25) are base-line V-S sentences with no CSCV.
- (26) are the CSCV counterparts. Out of the 30 participants in Survey 1, 12 gave all three sentences in (26) a rating of 1. I take that these participants do not allow CSCV on top of mismatching subjects and agreement.
- For the remaining 18 participants:
- (25) a. Juče su se sudarile sablje i koplja u bici. (C1 = 3.9/5) yesterday AUX.PL REFL collided.FPL sabers.FPL and spears.NPL in battle
 - b. Juče su se sudarili sablje i koplja u bici. (RES = 4.1/5) yesterday AUX.PL REFL collided.MPL sabers.FPL and spears.NPL in battle
 - c. *Juče su se sudarila sablje i koplja u bici. (C2 = 2.1/5) yesterday AUX.PL REFL collided.NPL sabers.FPL and spears.NPL in battle
 'Sabers and spears collided in battle.' (examples modified from Arsenijević et al. 2020b)
- (26) a. Sablje su se juče sudarile t i koplja u bici. (C1 = 3.1/5) sabers.FPL AUX.PL REFL yesterday collided.FPL t and spears.NPL in battle
 - b. Sablje su se juče sudarili t i koplja u bici. (RES = 1.6/5) sabers.FPL AUX.PL REFL yesterday collided.MPL and spears.NPL in battle
 - c. Sablje su se juče sudarila t i koplja u bici. (C2 = 1.5/5) sabers.FPL AUX.PL REFL yesterday collided.NPL and spears.NPL in battle 'Sabers and spears collided in battle.' (examples modified from Arsenijević et al. 2020b)

• This pattern is also confirmed in a Survey 2 with 7 native speakers (7 point scale):

(27) No CSCV movement

- a. Juče su prodata sva odela i sve haljine. (C1 = 6.9/7) yesterday AUX sold.N [all suits.N.PL and all dresses.F.PL]
- b. Juče su prodati sva odela i sve haljine. (RES = 3.9/7) yesterday AUX sold.M [all suits.N.PL and all dresses.F.PL]
- c. *Juče su *prodate sva odela i sve haljine. (C2 = 2/7) yesterday AUX sold.F [all suits.N.PL and all dresses.F.PL]
 "All suits and all dresses were sold yesterday." (examples modified from Murphy & Puškar 2018)
- (28) CSCV movement
 - a. Sva odela₁ su juče prodata [t₁ i sve haljine] (C1 = 6.4/7) All suits.N.PL AUX yesterday sold.N [and all dresses.F.PL]
 - b. *Sva odela₁ su juče prodati [t₁ i sve haljine] (RES = 1.1/7) All suits.N.PL AUX yesterday sold.M [and all dresses.F.PL]
 - c. *Sva odela₁ su juče prodate [t₁ i sve haljine] (C2 = 1.1/7) All suits.N.PL AUX yesterday sold.F [and all dresses.F.PL] "All suits and all dresses were sold yesterday." (examples modified from Murphy & Puškar 2018)
 - Only C1 agreement is OK.

• C2 and Masc agreement are bad.

- (29) $C1_{[N]}$ AUX Yesterday PART $\begin{bmatrix} & & C2_{[F]} \end{bmatrix}$
 - Linear approach: C1, C2 and M agreement. (not supported)
 - Non linear approach: C1, not C2 or M agreement. (supported)

Alternatives

One alternative analysis to CCA+CSCV involves clausal ellipsis:

(30) [Sablje su se juče sudarile] i [koplja su sabers.FPL AUX.PL REFL yesterday collided.FPL and spears.NPL AUX.PL se juče sudarila]... REFL yesterday collided.NPL

The ellipsis analysis can account for the absence of RES and C2 agreement.

What if CSCV+CCA is derived from ellipsis?

- I report three tests in (31) to show that such analysis is not on the right track.
- Sentences in (31) were presented with Fig. 1-3 and the participants were asked if the sentences can describe the pictures truthfully.
- For the 16 participants who gave CSC+CSCV a rating above 1, 14 chose yes for (31a) and (31b) and 12 chose yes for (31c).
- (31) a. Sablje₁ su danas stavljene t₁ i koplja u 3 kutije ... Sabers.FPL AUX today put.PASSIVE.FPL and spears.NPL in three boxes 'Sabers and spears were put in three boxes today ...' ('Yes' - 14/16)
 - b. Sablje₁ su se juče sudarile t₁ i koplja u bici.
 Sabers AUX REFL yesterday collided.FPL and spears.NPL in battle
 'Sabers and spears collided in battle yesterday.' ('Yes' 14/16)
 - c. Sablje₁ su danas stavljene t₁ i koplja u različite kutije. Sabers.FPL AUX today put.PASSIVE.FPL and spears in different boxes 'Sabers and spears were put in different boxes.' ('Yes' - 12/16)



Figure 1: 3 boxes



Figure 2: collided (Figure 2 in Arsenijević et al. 2020b)



Figure 3: different

If CSCV occurs in the PF and follows Agree-Copy, the absence of C2 agreement is not evidence against the linear approach.

CSCV is unlikely to be PF movement (inspired by Despič in press)

- CSCV feeds bound variable reading, which is unlikely for PF movement.
- (34a): 'every general' does not c-command 'his soldier'.
- (34b): 'every general' undergoes CSCV and c-commands 'his soldier'.
- (35a) = bound variable reading
- (34) a. Njegovi vojnici vole svakog generala i svoju zemlju. his soldiers.nom love every.acc general.acc and self's country.acc
 - Svakog₁ generala njegovi vojnici vole t₁ i svoju zemlju. every.acc general.acc his soldiers.nom love and self's country.acc Bound variable reading: 'For every general, his soldiers love him and the soldiers' country.'
- (35) Čiji su vojnici? 'Whose soldiers are they?'
 - a. Generalovi 'The generals'' (bound variable reading)
 - b. Od nekog drugog. 'Someone else's.'

Out of 16 participants,

- 1 chose (35a) for (34a) when no CSCV = no bound variable reading
- 14 chose (35a) for (34b) when CSCV = yes bound variable reading

(36)
$$C1_{[N]}$$
 Aux Yesterday PART $\begin{bmatrix} & & C2_{[F]} \end{bmatrix}$

- Data from CSCV empirically supports the non-linear approach, making it more empirically adequate.
- More empirical evidence from Greek first conjunct clitic doubling (Lefteris Paparounas & Martin Salzmann)

The non-linear approach has a hard time accounting for CCA in RNR, while the linear approach can be extended to these cases straight-forwardly.

- (37) Anna beweerde dat wij nooit, maar Steven zei dat jij vaak, bedorven Anna claimed that 1PL never, but Steven said that 2SG often, spoiled vlees hebt/*hebben gekocht. meat have.2SG/*.PL bought 'Anna claimed that we never, but Steven said that you often, bought spoiled meat.' (Dutch; modified from (3) and (19) in the appendix of Kluck 2009)
- (38) Ramesh-ne ek baksaa aur Sitaa-ne ek thailii uthaa-yii th-ii Ramesh-ERG a box.M.SG and Sita-ERG a small.bag.F.SG lift-PERF.F be.PST-F.SG 'Ramesh had lifted a box and Sita had lifted a bag' (Hindi-Urdu; Bhatt & Walkow 2013)
- (39) Ten tall and one short student came from the U.S. (Shen 2018)

- It's possible that CCA with &P and CCA in RNR should not be analyzed in the same way:
- Maybe we don't have a uniform way to generate CCA patterns across constructions and languages.
- An obvious way to divide the pie is the non-linear approach for CCA with &P and the linear approach for CCA in RNR.

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