Experimental evidence against clausal reduction as the only source of closest conjunct agreement

We developed an experiment involving interpretational sentence-picture matching to test the hypothesis that closest conjunct agreement [CCA] results from reduced clausal conjunction, as schematized in (1) (cf. Aoun et al. 1994; also Wilder 1997). Clausal coordination is appealing as it straightforwardly explains CCA as agreement of the verb with a non-conjoined subject in the clause whose content survives ellipsis and avoids various theoretically non-standard solutions, e.g. agreement occurring after syntax proper (e.g. Marušič et al 2015, Willer Gold et al 2016), or agreement as part of strictly ordered processes in the derivation (Murphy and Puškar 2018). Our experiments reject the clausal reduction hypothesis as far as South Slavic languages are concerned, thereby upholding the relevance of models developed to account for CCA within theories of agreement.

(1) *Oglasile   su   se   trube   i   o̶g̶l̶a̶s̶i̶l̶a̶   s̶u̶   s̶e̶   zvona.*
    sounded$_{F.PL}$ aux$_{PL}$ refl trumpet$_{F.PL}$ and sounded$_{N.PL}$ aux$_{PL}$ refl bell$_{N.PL}$
    'Trumpets and bells resounded.'   Bosnian/Croatian/Serbian [B/C/S]

In Slovenian and B/C/S preverbal subjects trigger both types of single conjunct agreement. Preverbal coordinated subjects trigger both First Conjunct Agreement [FCA] and Last Conjunct agreement, postverbal subjects typically only trigger FCA. FCA with postverbal subjects and Last conjunct agreement are both instances of CCA (cf Marušič et al 2015, Willer-Gold et al. 2016).

Marušič et al (2015) argue against the clausal reduction analysis of Slovenian preverbal CCA. Following Munn (1999), they show CCA is available also with collective predicates as in (2). The idea is that if the underlying structure of the sentences with single conjunct agreement involved clausal conjunction, a violation should emerge when their predicate is collective (e.g. 'grazed together'; (6b)).

(2) a. *Krava   in   teleta   so   se   pasla   skupaj.*
     Cow$_{F.SG}$ and calves$_{N.PL}$ AUX$_{PL}$ REFL   graze$_{N.PL}$ together
     'A cow and her calves were grazing together.' (*Slovenian*)

   b. **Krava   se   je   pasla   skupaj in teleta   so   se   pasla   skupaj.*
     cow.F.SG REFL AUX.SG grazed.F.SG together and calves.N.PL AUX.PL REFL grazed.N.PL together

Robust cases of CCA in South Slavic are reported for gender agreement with two plural conjuncts. Diagnostics with a collective predicate are not ideal for such contexts as potential individual clauses are still grammatical when their subject is plural. Thus, it seems necessary to demonstrate that within the presence of two conjoined plurals (e.g. *sailboats and ships*), a predicate like *passing by* is interpreted as applying to the conjunction (ships passing by sailboats; a *mixed-event* reading) as opposed to each conjunct separately (ships passing by ships and sailboats passing by sailboats).

Following this logic that biclausal sentences involve crucially different semantics from monoclausal sentences (i.e. 1-event *vs* 2-event readings), we designed an experiment and performed them in three sites testing 90 participants (30 undergraduate students per site, mean age = 20). Participants were shown two pictures and a sentence and were asked to pick the better-matching picture for a given sentence. Sentences were either monoclausal sentences with a coordinated subject and CCA, (3a), or else overtly biclausal sentences as in (3b) (with both conditions embedded under a matrix verb). A further variable was the *type of predicate* with the values collective or non-collective. The experiment consisted of 64 randomly ordered experimental items 32 of which were fillers.

(3) a. *Znamo   da   su   se   po   nekom kanalu mimoilazile   lađe   i*
     know$_{1.PL}$ that AUX$_{PL}$ REFL over some   canal   passed_by$_{F.PL}$ ship$_{F.PL}$ and
     druga   plovila.
     other   vessel$_{N.PL}$
     'We know that some ships and other vessels passed each other in some canal'

   b. *Znamo   da   su   se   po   nekom kanalu mimoilazile   lađe*
     know$_{1.PL}$ that AUX$_{PL}$ REFL over some   canal   pass_by$_{F.PL}$ ship$_{F.PL}$
     i   da   su   se   po   nekom kanalu mimoilazila   druga plovila.
     and   that AUX$_{PL}$ REFL over some canal   passed_by N.PL   other vessel.N.PL
     'We know that some ships passed each other in some canal and that some other vessels passed each other in some other canal.'

Figure 1: Experimental items consisted of a series of pairs of pictures like the two to the right, where one depicted mixed-event and the other split-event interpretations.
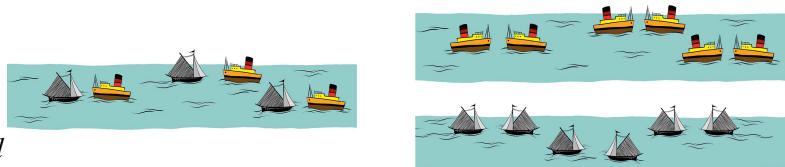
This, however, requires more than a mere acceptability judgement along the lines of (6). Sentences like (6b), with a singular NP within the conjunction and a collective predicate, immediately trigger a reaction of unacceptability, even without context provided. Sentences with two conjoined plurals, however, 'sound acceptable' unless a context is provided, and as such require a richer context in order to determine whether speakers are allowing or ruling out the mixed-event or split-event reading in the presence of CCA, and precisely this context is better furnished in an experimental picture-matching task of the kind we report on below.

As shown in figure 2, monoclausal sentences with CCA yield exactly the inverse patterns of the biclausal ones. For the biclausal conditions, the participants chose the two-event picture in over 90% of cases, and for the surface-monoclausal conditions in less than 10% of cases. The results thus reject the clausal reduction analysis. The fact that we found no effect for the *predicate-type* variable might be a consequence of the observed strong contrast between the monoclausal and the biclausal condition as there was simply no room for strengthening by the variable *predicate type*.

Figure 2: Picture choice per condition: a two factor repeated measure ANOVA test shows that the effect of the factor clause size is highly significant ($p < 0.001$; $F = 1880.599$), while the effect of the factor predicate type does not approach significance ($p = 0.83238$; $F = 0.04563$). No interaction between the two factors is attested either ($p = 0.88777$; $F = 0.02028$).
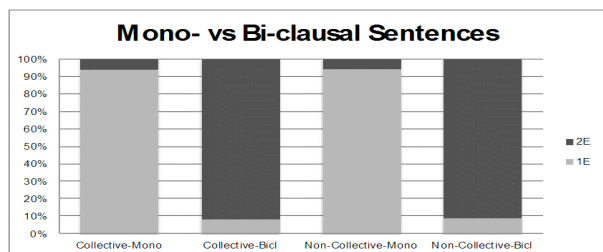
We will discuss further reasons to reject the clausal reduction analysis, to which we can only point here: (a) some languages that display CCA have different coordination heads for phrasal vs. clausal coordination (e.g. Xhosa, cf. Mitchley 2015); (b) the availability of clausal reduction analysis in a language is in principle dependent on the existence of an ellipsis operation that deletes everything but the subject; as shown in (4), such an operation is not otherwise found in South Slavic (c) Mendes and Ruda (2019) discuss verb-echo answers to structures with CCA, the fragment result of which cannot be straightforwardly analyzed if one derives CCA from clausal coordination, as it would mean non-constituent ellipsis, (5b), or else a CSC violation, (5c).

(4) *Mislim, da so se tukaj pasle krave in vem   da <so se tukaj pasle > ovce. (Slo.)
    think-I that aux refl here grazed cows and know-1sg that   sheep
    Intended: 'I think that cows grazed here, and I know that sheep.'

(5) a. Ali so kupljene radirke   in ravnila? Kupljene.
        Q   aux bought$_{F.PL}$ erasers$_{F.PL}$ and rulers$_{N.PL}$ bought$_{F.PL}$
        'A: Were erasers and rulers bought?' 'B: Yes, they were bought.'
    b. [[Kupljene ~~so radirke~~] ~~[in [kupljena so ravnila]]~~.   Non-constituent ellipsis
        bought$_{F.PL}$ aux erasers$_{F.PL}$ and bought$_{N.PL}$ aux rulers$_{N.PL}$
    c. Kupljene ~~[[*t* so radirke] [in [kupljena so ravnila]]]~~.   CSC violation
        bought$_{F.PL}$ aux erasers$_{F.PL}$ and bought$_{N.PL}$ aux rulers$_{N.PL}$

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