

**Conjunct Agreement and Gender in South Slavic:  
From Theory to Experiments to Theory**  
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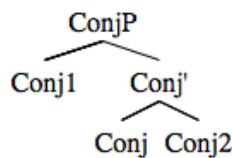
*Abstract:* Agreement with coordinated subjects in Slavic languages has recently seen a rapid increase in theoretical and experimental approaches, contributing to a wider theoretical discussion on the locus of agreement in grammar (cf. Marušič et al. 2007, Bošković 2009, Marušič et al. 2015). In this paper, we revisit the theoretical predictions proposed for conjunction agreement in a group of South Slavic languages, with a special focus on gender agreement. The paper is based on two experiments involving speakers of Bosnian/ Croatian/ Serbian (B/C/S) and Slovenian (Slov). Experiment 1 is an elicited production experiment investigating preverbal conjunct agreement, while Experiment 2 investigates postverbal conjunct agreement. The data provide experimental evidence discriminating between *syntax proper* and *distributed* agreement models in terms of their ability to account for preverbal Highest-Conjunct *agreement*, and present the need for a distinction between Default agreement (which has a fixed number and gender, independent of the value of each conjunct) and Resolved agreement (which computes number and gender based on the values of each conjunct, and must resolve potential conflicts). Focusing on the variability in gender agreement ratio across nine combinations, the experimental results for B/C/S and Slov morphosyntax challenge the notion of Gender markedness generally posited for South Slavic languages.

## 1. Introduction

Recent years have seen an emergence in the number of varied theoretical approaches aiming to successfully model conjunct agreement phenomena in a group of South Slavic languages: Bosnian/Croatian/Serbian (B/C/S) and Slovenian (Slov). This expanding debate is characterized by a question prominent in a much wider literature on conjunct agreement phenomena: what is the limit of syntax in computing the observed patterns?

Syntactic operations operate over hierarchically structured material, and *Agree* operating in syntax is no exception (Chomsky 2000). Therefore, it comes as no surprise that in subject-verb agreement the Probe's search domain is restricted to local and c-commanded Goal(s) (Chomsky 2000).<sup>1</sup> Applied to agreement with a coordinated subject, the Gender and Number features on participial inflection are predicted to be valued by matching features on the maximal projection ConjP (as shown in (1)), resulting in masculine agreement on the participle when both conjuncts are masculine or have mixed gender values, (2/3a). This latter pattern is also called Default agreement.<sup>2</sup>

(1)



When ConjP has no gender feature, and an asymmetrical structure for ConjP in (1) is assumed, the Closest or Hierarchically Highest Conjuncts are predicted to act as potential Goals in a postverbal order, as widely discussed in the literature on conjunct agreement, (2/3a) and (2/3b), respectively (cf. Aoun et al. 1994, 1999; Munn 1999, van Koppen 2005, Benmamoun et al. 2010, Bošković 2009, Bhatt and Walkow 2013, Marušič et al. 2015). This is by now familiar as postverbal Closest- and Hierarchically Highest-Conjunct agreement can comfortably find grounding in clausal ellipsis or other standard syntactic mechanisms (e.g. equidistance under particular definitions of c-command and locality).

(2) Slov:

- |    |                               |        |      |              |     |              |
|----|-------------------------------|--------|------|--------------|-----|--------------|
| a. | Podražili                     | so     | se   | knjige       | in  | peresa.      |
|    | become-more-expensive.MASC.PL | AUX.PL | REFL | books.FEM.PL | and | pens.NEUT.PL |
| b. | Podražile                     | so     | se   | knjige       | in  | peresa.      |
|    | become-more-expensive.FEM.PL  | AUX.PL | REFL | books.FEM.PL | and | pens.NEUT.PL |
| c. | *Podražila                    | so     | se   | knjige       | in  | peresa.      |
|    | become-more-expensive.NEUT.PL | AUX.PL | REFL | books.FEM.PL | and | pens.NEUT.PL |
- “Books and pens have become more expensive.”

(3) B/C/S:

- |    |                 |        |      |                |     |              |
|----|-----------------|--------|------|----------------|-----|--------------|
| a. | Oglasili        | su     | se   | trube          | i   | zvona.       |
|    | sounded.MASC.PL | AUX.PL | REFL | trumpet.FEM.PL | and | bell.NEUT.PL |

<sup>1</sup> Two terminological pairs are represented in the literature to refer to the two items involved in agreement: the controller and the target of agreement and the Goal and the Probe of agreement, for the item on which a certain feature is specified, and the item which receives this specification, respectively. Since our paper does not directly depend on the technical aspects of different frameworks, we interchangeably use both pairs of terms.

<sup>2</sup> The term ‘Resolved’ agreement is also used, sometimes interchangeably with Default agreement. We stick to Default agreement in the text until Section 4, at which point we make a principled distinction between these two terms (and mechanisms).

- b. Oglasile su se trube i zvona.  
sounded.FEM.PL AUX.PL REFL trumpet.FEM.PL and bell.NEUT.PL
- c. \*Oglasila su se trube i zvona.  
sounded.NEUT.PL AUX.PL REFL trumpet.FEM.PL and bell.NEUT.PL  
'The sounds of trumpets and bells resounded.'

In preverbal order, *partial* agreement (i.e. agreement with a single conjunct) is predicted to obtain with the Hierarchically Highest but not with the Linearly Closest conjunct, as in (4/5b) and (4/5c), respectively. However, it is exactly this latter option of Closest-Conjunct agreement<sup>3</sup> that Corbett (1983a) (cf. Corbett 1983b, 1991) first observed in a data sample collected on the basis of B/C/S and Slov grammars and literary scripts. By showing that Closest-Conjunct agreement can obtain in *preverbal* structures where the agreed-with conjunct is not hierarchically highest, he provides evidence for the claim that agreement can be calculated based on the linear order of sequential elements.

(4) Slov<sup>4</sup>:

- a. Knjige in peresa so se podražili.  
books.FEM.PL and pens.NEUT.PL AUX.PL REFL become-more-expensive.MASC.PL
- b. Knjige in peresa so se podražile.  
books.FEM.PL and pens.NEUT.PL AUX.PL REFL become-more-expensive.FEM.PL
- c. Knjige in peresa so se podražila.  
books.FEM.PL and pens.NEUT.PL AUX.PL REFL become-more-expensive.NEUT.PL  
'Books and pens have become more expensive.'

(5) B/C/S:

- a. Trube i zvona. su se oglasili.  
trumpet.FEM.PL and bell.NEUT.PL AUX.PL REFL sounded.MASC.PL
- b. Trube i zvona. su se oglasile.  
trumpet.FEM.PL and bell.NEUT.PL AUX.PL REFL sounded.FEM.PL
- c. Trube i zvona. su se oglasila.  
trumpet.FEM.PL and bell.NEUT.PL AUX.PL REFL sounded.NEUT.PL  
'The sounds of trumpets and bells resounded.'

Therefore, agreement with the closest or linearly local conjunct in preverbal contexts, in (4/5), is what forces us to reconsider the strictly syntactic notion of Agree, as it proves to be insufficient to account for the conjunct agreement possibility documented in (4/5c). Consequently, existing theoretical approaches to conjunct agreement in South Slavic have focused their attention on successfully resolving the problem of Closest-Conjunct agreement in B/C/S and Slov either by relying on a more enriched set of assumptions about syntactic operations to maintain Agree in Narrow syntax – the *syntax proper agreement* accounts (cf. Bošković 2009, Franks and Willer Gold 2014, Puškar and Murphy 2015), or by deriving a second step of Closest-Conjunct agreement in post-syntactic component – the *distributed agreement* account (Marušič, Nevins, and Badecker 2015, Aljović and Begović this volume). Interestingly, the status of agreement with Hierarchically Highest-Conjunct in preverbal order has only recently been addressed (Marušič et al. 2007/2015, Bošković 2009, Franks and Willer-Gold 2014, Puškar and Murphy 2015).

<sup>3</sup> To maintain consistency in terminology through this paper, we have substituted Corbett's (1983a) original term Nearest-Conjunct agreement by Closest-Conjunct agreement.

<sup>4</sup> This example is adapted from Corbett (1983a, pp. 101, ex. 18) for the purposes of argumentation.

In what follows, we set to investigate how experimentally robust and homogeneous the three patterns of agreement, Default, Highest-Conjunct agreement (HCA) and Closest Conjunct agreement (CCA) are in a subset of South Slavic languages. To this aim we report on an experimental study, comprised of two elicited production experiments, with native speakers of varieties of B/C/S and Slovenian, undertaken at six locations across four countries.<sup>5</sup> This provides a unique opportunity for one of the first large-scale experimental studies on the uniformity of agreement strategies, enabling us to experimentally confirm the previously reported data, and to re-evaluate the nature of conjunct agreement strategies within a single language family.

At times, variation among native-speakers' intuitions can fuel a large array of theoretical accounts, and arguably stand in the way of an objective assessment of their theoretical power.<sup>6</sup> Within the context of South Slavic and B/C/S more specifically, disagreements about the data patterns among linguists could potentially have two sources: the specific methodology and stimuli employed to collect the patterns, and the specific native language variety of the judgement-providers in question. Therefore, our goal is to hold the methodology constant across locations to see the extent to which the phenomenon in question is subject to regional variation, as well as which agreement patterns are attested among non-linguist speakers of the varieties.

We focus our investigation on addressing three issues that are of equal interest to theories of agreement: (1) Can one obtain a dataset for conjunct agreement that is unified and stable across a subset of South Slavic languages? (2) What is the rate of occurrence of each conjunct agreement strategy in B/C/S and Slov, preverbally and postverbally? (3) How well does experimental data fare with native speakers' judgements in providing evidence to re-evaluate existing theoretical models of conjunct agreement?

In section 2, we present in more detail two existing accounts of Conjunct Agreement in B/C/S and Slov and the respective data sets they were based on. In section 3, we present the two experiments, their motivation, methodology and results. In section 4, we discuss these results in light of existing accounts, and elaborate on further insights provided by the two experiments as they feed back into further theoretical developments. We conclude in section 5.

## 2. Existing Accounts of Conjunct Agreement in B/C/S and Slov

Coordination offers a rich territory for investigating the limits of agreement (cf. Aoun et al. 1994, 1999, Sobin 1997, Munn 1999, van Koppen 2005, van Koppen and Rooryck 2008, Benmamoun et al. 2010, Bošković 2009, Bhatt and Walkow 2013, Marušič et al. 2015). South Slavic languages are especially pertinent for this discussion. Their three-gender system (masculine, feminine, and neuter) crossed with the two (or three in Slovenian) values of number (singular, (dual) and plural) allows one to identify the agreement controller based on the gender-number combination morphologically marked on the participle. The suffix *-i* marks masculine(plural), *-e* feminine(plural) and *-a* neuter(plural). As we show below, non-masculine mixed gender conjuncts allow for an unambiguous differentiation, postverbally and preverbally, of two general principles guiding conjunct agreement: hierarchical and linear proximity. Therefore, it is not surprising that agreement with conjoined subjects has recently seen a rapid increase in theoretical and experimental work in South Slavic language family, and in particular, in B/C/S and Slov (cf. Bošković 2009, Franks and Willer Gold 2014,

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<sup>5</sup> Bulgarian and Macedonian, also South Slavic languages, were not included in the study as they do not show gender distinctions in the plural.

<sup>6</sup> Here, we note in particular the variation in degree of acceptance of preverbal Highest-Conjunct agreement in B/C/S in data presented in Bošković (2009) compared to Franks and Willer-Gold (2014, fn. 31) and Puškar and Murphy (2015).

Murphy and Puškar 2015, Arsenijević and Mitić this volume, Aljović and Begović this volume (for B/C/S); Marušič et al. 2007, Marušič and Nevins 2010, Marušič et al. 2015 (for Slov)).

Our discussion here focuses on two theoretical accounts that stand in maximal contrast with respect to the locus of conjunct agreement, namely purely syntactic vs. distributed approaches. Bošković (2009) refers to universal as well as language internal constraints on syntactic operations that interact with a particular take on a feature-checking system in order to account for conjunct agreement in B/C/S. Marušič et al. (2015), based on the experimental data they report for Slov, argue for a morpho-syntactic account of conjunct agreement with an emphasis on two-step Agree and a non-gender computing Conj head. The language components that are argued by the two theoretical accounts to be the locus of conjunct agreement as well as the respective datasets based on which the arguments were derived are summarized in Table 1, where checkmarks refer to predicted grammaticality, two checkmarks refer to two intensionally distinct, but extensionally converging general principles, crosses refer to predicted ungrammaticality, and question-marks mean the predictions are not clear.

Table 1.

Locus of Conjunct Agreement	Theoretical Account	Datasets					
		PreverbalConjAgr: SV			PostverbalConjAgr:VS		
		Conj P	Conj1	Conj2	ConjP	Conj1	Conj2
Syntax proper	Bošković	✓	X	✓	?	✓	X
Distributed	Marušič et al.	✓	✓	✓	✓	✓✓	X

In the next two subsections, we provide a more detailed overview of these two accounts.

### 2.1. Bošković (2009)

Bošković argues for a syntax proper account of conjunct agreement based on B/C/S data. In this account, gender agreement is driven by an adapted feature checking system, and is restricted by language internal constraints on Move: Left-Branch Extraction (LBE) interacting with the Coordinated-Structure Constraint (CSC). In this model, preverbal and postverbal Distant conjunct agreement are reported to be ungrammatical as in (6a) and (6a') while preverbal and postverbal Default agreement are reported not to have the same status; compare (6b) and (6b'), respectively.

- (6) a. \*Sva sela i sve varošice su (juče)  
all.NEUT.PL villages.NEUT.PL and all.FEM.PL towns.FEM.PL AUX.PL (yesterday)  
uništena.  
destroyed.NEUT.PL
- a'. \*Juče su uništene sva sela i sve  
yesterday AUX.PL destroyed.FEM.PL all.NEUT.PL villages.NEUT.PL and all.FEM.PL  
varošice.  
towns.FEM.PL
- b. Sva sela i sve varošice su (juče)  
all.NEUT.PL villages.NEUT.PL and all.FEM.PL towns.FEM.PL AUX.PL (yesterday)  
uništeni.  
destroyed.MASC.PL

- b'. ?Juče su uništeni sva sela i sve varošice.  
 yesterday AUX.PL destroyed.MASC.PL all.NEUT.PL villages.NEUT.PL and  
 all.FEM.PL towns.FEM.PL  
 'All villages and all towns were destroyed yesterday.'
- c. Sva sela i sve varošice su (juče) uništene.  
 all.NEUT.PL villages.NEUT.PL and all.FEM.PL towns.FEM.PL AUX.PL (yesterday)  
 destroyed.FEM.PL
- c'. Juče su uništena sva sela i sve varošice.  
 yesterday AUX.PL destroyed.NEUT.PL all.NEUT.PL villages.NEUT.PL and  
 all.FEM.PL towns.FEM.PL  
 'All villages and all towns were destroyed yesterday.'

Bošković aims to unify the derivation of what he refers to as Last-Conjunct Agreement (LCA) and First-Conjunct Agreement (FCA) in syntax proper, shown in (6c) and (6c'), respectively, by establishing the domain of Agree to be within syntax. Following Chomsky (2000), Bošković assumes Agree to consist of Probing, Matching and Valuation. Importantly, Matching subsumes two conditions: (i) feature identity, and (ii) locality under c-command.

Postverbal FCA results when the probe ParticipleP (PartP), searching for a goal to value its number and gender features, finds an active number feature on ConjP/BoolP (specified only for number) and an active gender feature on the first conjunct (asymmetrically c-commanding the second conjunct). Accordingly, FCA is the result of a disjoint valuation, where the number and gender features are valued by two independent but equidistant local XPs: by the maximal projection ConjP and by Conj1, respectively. These two valuators that are the output of Primary Agree in instances of postverbal FCA, as we show next, are the cause of failure to derive preverbal FCA, as in (5b).

To derive Preverbal LCA, Bošković assumes Move triggered by EPP features on PartP to apply after Primary Agree. Bošković follows Chomsky in assuming that Move is decomposed into Match, Value and Pied-Piping (Match and Value overlap in the case of Agree and Move). Crucially for Bošković, unlike Agree, Move does *not* tolerate a split Phi-probe, and, hence, Move cannot apply if the output of Agree produces two options for movement (the entire Conj or Conj1 alone). Resorting to LBE independently claimed for B/C/S, Bošković argues that Conj1 and ConjP are equidistant from PartP and hence both are potential targets for pied-piping under Move. To avoid failure, and for Move to apply to a single unambiguous target, the gender features of Conj1 must become invisible (deleted) in order for Agree to apply for the second time, to successfully match and value the gender feature of Conj2. Conj2 cannot be extracted out of ConjP (it would induce a CSC violation), hence this time, there is no ambiguity, leaving ConjP to be the unique target for movement. The resulting conjunct agreement is preverbal LCA, as in (5c).

In sum, Bošković establishes the locus of conjunct agreement in syntax proper. The complexity of his account lies in the aim to restrict preverbal conjunct agreement to LCA (henceforth CCA). To account for the putative failure of preverbal FCA (henceforth HCA), Bošković makes reference to language specific constraints on Move; and, to account for preverbal LCA, to an adapted feature checking system and application of Secondary Agree as a ultimate escape route to avoid a derivational crash under ambiguous pied-piping motivated by the EPP on the Participle.

## 2.2. Marušič, Nevins, and Badecker (2015)

In their experimental study on conjunct agreement grammars, Marušič et al. elicit production of agreement with native speakers of Slovenian in five different experiments. The study draws on this rich gender system to create a 3\*3\*2 factorial design of uniform and mixed gender conjuncts in two word orders, consequently providing production data for all nine possible gender combinations: M+M, F+F, N+N, M+F, M+N, F+M, F+N, N+M, N+F, in preverbal and postverbal subject position. The results of the gender agreement with conjoined subjects in the Slovenian study provide data for HCA and CCA in preverbal and postverbal order, in (4b) and (4c) and (2b), respectively; in addition, they find evidence of preverbal and postverbal Default agreement, (4a) and (2a). They model the observed intra- and inter-individual optionality in terms of three distinct grammars (or grammatical strategies), each of which delivers a potentially different agreement result.

Marušič et al. argue that Conj head can, on the basis of its two conjuncts, compute its own number, but not necessarily its gender. As ConjP has no gender features, the derivation has the following two options: Default gender is inserted at the ConjP level, or Agree looks inside ConjP to find a suitable Goal; compare (4/5a) to (4/5b) and (4/5c).

Default agreement results from a “No-Peeking” grammar, whereby the Probe in its first attempt to Agree and be Valued by its Goal’s gender features agrees with ConjP (BoolP). As ConjP has value for number, but not for gender, the default gender value is inserted on ConjP before it is copied onto the Goal.

To accommodate for the co-existence of HCA and CCA grammars with native speakers of Slovenian, Marušič et al. assume a Two-Step Agree operation: Agree-Link, which operates in syntax, and Agree-Copy, which can operate in syntax or in the post-syntactic component (see also Arregi and Nevins 2012; Bhatt and Walkow 2013). The two partial conjunct agreements result from “No-Default” grammars, whereby after ConjP fails to provide gender feature value, the Probe continues its search for a Conjunct<sub>1/2</sub> Goal inside the ConjP. HCA complying with Hierarchical proximity is found if both Agree-Link and Agree-Copy are fully processed in syntax proper over hierarchically structured ConjP material. CCA is a result of the two-step Agree operation, whereby Agree-Copy operates in a post-syntactic component over sequential material *after* the coordinated subject has been linearized - thereby justifying the distributed agreement account. As such, the difference between HCA and CCA boils down to whether Agree-Copy takes place within syntax (where hierarchical, but not linear locality is present) or within PF (where linear locality is available and preferred).

Two theoretical advantages of a two-step Agree account can be observed. Firstly, by allowing for the second step of Agree to operate in two distinct components over hierarchical and linear material, the notion of feature Copy can be simplified to an operation that copies gender feature values from the most available conjunct irrespective of the probe and goal relation as the copied feature value identifies the locus of agreement. Secondly, this account not only derives Corbett’s dataset for Slov and B/C/S but also includes the availability of preverbal agreement with Conj1.

In summary, with respect to the locus or domain of application of Agree, by assuming Two-Step Agree and allowing for Agree-Copy to take place in the post-syntactic component, Marušič et al. simplify the account of the most prominent conjunct agreement strategy (CCA), while Bošković’s account benefits from phenomena independently postulated for these languages. With respect to gender computation, Bošković and Marušič et al. argue for a Conj head that can but doesn’t have to compute its own gender features, thereby allowing the Probe to peek inside ConjP.

Bearing in mind that not all theoretical predictions can be confirmed or disconfirmed by conducting a single experimental study, our goal here is to overcome the problem of different empirical bases of the above presented analyses (see Table 1) and to establish an experimentally verified dataset as a unified baseline against which to re-evaluate this varied theoretical and data-driven debate. In what follows we report on an elicited production study

with native speakers of South Slavic varieties, B/C/S and Slov, replicating Marušič et al.'s Experiment 1 and 2 in an on-line task to verify the distribution of Hierarchical (HCA), Linear (CCA) and Default agreement preverbally and postverbally in B/C/S and Slov. The accounts presented here are consequently re-evaluated against the results in Discussion in Section 4, and in turn lead to refinement of further theoretical questions themselves.

### 3. Elicited Production Study

The large-scale experimental study to investigate conjunct agreement in B/C/S and Slov consisted of two on-line elicited production experiments conducted at six research institutions located at six comparably distant locations across four countries. Experiment 1 and Experiment 2 were designed to compare the variation in the array of agreement controllers when the exact coordination is placed preverbally (Experiment 1) and postverbally (Experiment 2). Experiment 1 and 2 replicate Marušič et al.'s (2015) 3\*3 factorial design using the uniform and mixed gender subject coordination paradigm in Table 2, to elicit agreement on the verb in a sentence completion task.

Table 2: 3\*3 Factorial design

NP1 \ NP2	NP2		
	M	F	N
M	MM	MF	MN
F	FM	FF	FN
N	NM	NF	NN

It is important to note that the independence of two conjunct controllers (Conj1 and Conj2) can unambiguously be confirmed solely in conditions where neither of the two controllers contributes to the value of Default gender agreement on the participle, i.e. masculine(plural). Hence, the clearest confirmation of the maximally rich array of agreement controllers in preverbal and postverbal position is expected to be observed in non-masculine mixed-gender (FN and NF) condition.

#### 3.1. Method and Materials

*Research institutions.* Experiment 1 and Experiment 2 were carried out at six research institutions chosen for their geographically comparable distances: University of Niš and University of Novi Sad, Serbia; University of Nova Gorica (tested also at University of Ljubljana), Slovenia; University of Sarajevo, Bosnia and Herzegovina; University of Zadar and University of Zagreb, Croatia. The experimental design and procedure were uniform across all six research institutions; however, materials for Slov varied from those for B/C/S (see below).

*Language.* The language variety chosen for Experiment 1 was the research institutions' local neutral dia-standard. A single set of materials was first created in the neutral dia-standard variety of Zagreb Croatian, to be consequently adapted to the target language variety, i.e. those of Zadar, Sarajevo, Niš and Novi Sad. The adaptations were mostly lexical and due to variation in gender of the local lexical items. A parallel set of material was created for Slovenian to avoid any gender mismatches that could have resulted from literal translation. To ensure strict uniformity across research locations, adaptations were minimal and did not diverge from the experimental conditions in the primary set of materials.

*Participants.* 30 first year students (sex (F=75%, M=25%), age (Mean=18.65)) participated in the experiments at each of the six research institutions. They were all native



speakers of the local language variety, attended the local secondary school and were not pursuing a university degree in the study of the local language. Their participation was either voluntary or they received course credits for their participation.

*Design and Materials.*

*Stimuli.* Three genders were entered in a 3\*3 factorial design with Conj1 (three levels: masculine, feminine, and neuter) and Conj2 (three levels: masculine, feminine, and neuter) as factors. This resulted in nine possible coordinated conjunct combinations used for stimuli. A set of six items per condition was created, amounting to a total of 54 stimulus items. The nouns used in coordinations were all inanimate nouns in plural number; no mass nouns were used. Plural number in both conjuncts was kept constant to ensure control over the number feature while manipulating gender. The choice of inanimates was to avoid any difference between neuter and non-neuter genders in terms of the real-world contributions of semantic or biological gender that would arise if animates had been used. The nouns in the conjunction were chosen from the same semantic field and each was compatible with the predicate in the model sentence on which the agreement would be expressed. Nouns did not form idiomatic coordinations or collocations with the verb or each other. In the experimental design, stimuli appeared as (conjoined) *substitute phrases* for the subject in the *model sentence* (see Procedure below).

A set of six model sentences (preambles) for each of the nine stimulus conditions was paired with the stimuli, amounting to a total of 54 model sentence items. Model sentences used as primes for the stimuli replacement phrases contained a simple non-conjoined masculine singular noun with a zero suffix, to reduce potential morphological priming by the model subject's affix. All model sentences contained an equal number and type of constituents: Subject(Noun), Aux + Participle, Preposition + Noun. The order of five constituents differed in Experiment 1 and Experiment 2. In Experiment 1, the subject noun phrase preceded the predicate: [Subject Aux+Participle Preposition+Noun]. In Experiment 2, the subject noun phrase followed the predicate: [Preposition+Noun Aux+Participle Subject]. Prepositional phrases (adjuncts) were added at the beginning or the end of the model sentence to fill in the slot in the intonation contour taken by the subject in the preverbal condition, and to make the postverbal condition sound natural. The adverbials were added in such a way so that the linear adjacency between the subject and the predicate was not disrupted.<sup>7</sup> Gender and number agreement was always expressed on the participle (suffix). Number agreement was also expressed on the auxiliary. The mean length in characters of the model sentence was the same across all nine conditions (Mean: 28 characters with spaces/10 syllables). The mean length in characters of the conjunction was the same across all nine conditions (Mean: 18 characters with spaces/ 8 syllables).

*Fillers.* Model sentences used as preambles for filler replacement phrases contained simple non-conjoined singular subjects of all number and gender combinations: Masc.Sg, Masc.Pl, Fem.Sg, Fem.Pl, Neut.Sg, and Neut.Pl. A set of nine model sentences was created for each of the 6 combinations. The total of 54 model sentences were paired, i.e. crossed and counterbalanced, with a set of three filler constructions. The three chosen filler constructions that appeared as replacement phrases for the subject in the model sentence (see Procedure below) were (i) Paucals (2, 3, 4) with the head noun in masculine singular (as Slovenian doesn't have paucal number, the numerals 2, 3, and 4 were used with regular dual and plural morphology on the noun), (ii) a hybrid feminine singular noun, and (iii) an object relative

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<sup>7</sup> Positioning the adverb so that it disrupts the adjacency between the subject and the verb would have provided further insight, and potentially a clear cut argument for the distributed approach; however, as the aim of this experiment was to obtain baseline data only two factors were manipulated in this study – the gender value and subject-verb order. Therefore, we leave the position of adverbial to be included in future experiments to help detect additional factors; see Peti-Stantić & Tušek 2016 for research in this direction.

clause with a head noun in neuter singular. In total, 54 model sentence-filler replacement phrase pairs were added to the list. A total of 108 model sentences paired with stimulus or filler replacement phrases were created for Experiment 1 and Experiment 2 for the six research locations.

*Comprehension questions.* 18 comprehension questions appeared after the replacement phrase in order to keep participants engaged (see *Procedure* for more detail). The number of comprehension questions was balanced across conditions.

*Randomization.* Two pseudo-randomization orders were created for the two sets of 108 items, for Experiment 1 and Experiment 2. The two orders were counterbalanced across 30 participants and two experimental sessions, for Experiment 1 and Experiment 2. In each experiment, each participant saw all 108 items, however, of the 30 participants at each location, fifteen participants were tested on the first randomization order in the first experimental session, and the other fifteen were tested on the second randomization order in the second session. The same randomization orders were used at all 6 research locations.

*Task description.* A variant of a sentence completion task was used in which the subject of the model sentence or preamble was replaced by a replacement phrase (stimulus or filler), when the entire sentence is re-produced aloud. A model sentence with a subject NP in bold was presented on the screen. Participants were asked to read the sentence out loud, to remember it, and then to advance by pressing a button. A replacement phrase in bold would then appear on the next screen. In Experiment 1, the replacement phrase in capital letters was followed by a line (underscores) and a dot to motivate the completion of the response sentence (based on the model sentence); in Experiment 2, the line preceded and the dot followed the replacement phrase in lower letters to induce the same effect. The participant's task was to complete the sentence based on the model sentence, i.e. to produce a response in which the subject of the model sentence is replaced by the replacement phrase presented on the screen. After producing the response sentence, the participant advanced to the next item by pressing the same button. The presentation of the model sentence and stimulus for Experiment 1 is exemplified in (7). Examples in (7) were chosen to provide an indication of the degree of dialectal variation.

(7)

**Niš**

*Model sentence:*

Prevod je overen kod beležnika.  
translation.MASC.SG AUX.SG authenticated.MASC.SG at registrar

*Replacement phrase:*

**Molbe i uputstva**\_\_\_\_\_.  
requests.FEM.PL and instructions.NEUT.PL

*Produced response:*

Molbe i uputstva su overen-i/-a/-e kod  
beležnika.  
requests.FEM.PL and instructions.NEUT.PL AUX.PL authenticated.MASC/NEUT/FEM.PL at  
registrar

**Novi Sad**

*Model sentence:*

Prevod je overen pečatom.  
translation.MASC.SG AUX.SG authenticated.MASC.SG by.seal

*Replacement phrase:*

**Molbe** i **uputstva**\_\_\_\_\_.

requests.FEM.PL and instructions.NEUT.PL

*Produced response:*

Molbe i uputstva su overen-i/-a/-e pečatom.  
requests.FEM.PL and instructions.NEUT.PL AUX.PL authenticated.MASC/NEUT/FEM.PL by.seal

### **Sarajevo**

*Model sentence:*

Prevod je ovjeren pečatom.  
translation.MASC.SG AUX.SG authenticated.MASC.SG by.seal

*Replacement phrase:*

**Molbe** i **rješenja**\_\_\_\_\_.

requests.FEM.PL and solutions.NEUT.PL

*Produced response:*

Molbe i rješenja su ovjeren-i/-a/-e pečatom  
requests.FEM.PL and solutions.NEUT.PL AUX.PL authenticated.MASC/NEUT/FEM.PL by.seal

### **Zadar and Zagreb<sup>8</sup>**

*Model sentence:*

Prijevod je ovjeren pečatom.  
translation.MASC.SG AUX.SG authenticated.MASC.SG seal

*Replacement phrase:*

**Molbe** i **rješenja**\_\_\_\_\_.

requests.FEM.PL and solutions.NEUT.PL

*Produced response:*

Molbe i rješenja su ovjeren-i/-a/-e pečatom  
requests.FEM.PL and solutions.NEUT.PL AUX.PL authenticated.MASC/NEUT/FEM.PL by.seal

### **Nova Gorica**

*Model sentence:*

Obrok je skuhan v menzi.  
meal.MASC.SG AUX.SG cooked.MASC.SG in kitchen

*Replacement phrase:*

**Malice** in **kosila**\_\_\_\_\_.

snacks.FEM.PL and lunches.NEUT.PL

*Produced response:*

Malice in kosila so skuhan-i/-a/-e v menzi.  
snacks.FEM.PL and lunches.NEUT.PL AUX.PL cooked.MASC/NEUT/FEM.PL in kitchen

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<sup>8</sup> These two locations minimally varied in model sentence items.

Each pair of items was separated by a blank screen. Every sixth model sentence-replacement phrase pair was followed by a comprehension question. Participants advanced by pressing the null (0) key on the keyboard or left button on the mouse. The experiment was split into 3 parts separated by two pauses; each part contained 36 paired items. To familiarize participants with a procedure, a practice block of six items and two comprehension questions was presented before the experiment. The practice items had the structure of the conditions for stimuli and fillers used in the experiment.

*Procedure.* Participants were tested individually. Each participant was seated in a sound isolated or quiet room. Examples were displayed on a monitor in black on a white background in 12-point font size. Materials were presented on the screen using IbxFarm (Drummond 2011), a free on-line experimental tool and platform. Instructions specified the need for a loud and clear pronunciation and encouraged the production of responses at a natural pace. Response production was recorded by Audacity, using a built-in microphone, onto the computer in a .wav format. The consent form and a comprehensive biographic questionnaire aimed to obtain information about the participants' native language variety were administered off-line. On average, one experimental session, including the introduction, task description, experiment and administration of the biographic questionnaire and consent form lasted between 30 and 40 minutes per participant. Each participant was tested individually on Experiment 1 and Experiment 2 in two experimental sessions one week apart, with the exception of Slovenian, for logistical reasons having to do with participant recruitment.

*Transcription.* The digitally recorded responses were hand-coded by native speakers according to their agreement endings and agreement features. Responses were coded as correct responses when the model sentence was correctly repeated and contained the inflected participle, the exact participle used in the model sentence or a semantically similar one. Any second production of an inflected participle that differed from the first one as a result of auto-correction was transcribed but these were not considered in the analysis. Responses were coded as agreement errors when the sentence produced met all the above criteria for correct responses but the participant produced ambiguous or unintelligible agreement. Responses were coded under miscellaneous responses when incorrect words were produced, the sentence was interrupted, word order was changed, or when no response was provided. Uniquely correct responses were considered in the analysis.<sup>9</sup>

### **3.2. Results**

The first round of statistical analysis was executed in R (lme4) using mixed-effects models with country (SLO, BOS, CRO, SRB) and research institutions (NG, NI, NS, SA, ZD, ZG) as predictors and conjunct gender combination and word order as fixed variables, to determine the degree of diversity for conjunct agreement phenomena at four countries and six locations. No statistically significant difference was found for data collected at five B/C/S locations (NI, NS, SA, ZD, ZG), and therefore the results from these five locations for Experiment 1 and Experiment 2 have been aggregated to create a single data set on which further analysis presented below was conducted. A statistically significant difference was found when SLO ( $p < .001$ ) and NG (NI:  $p < .001$ , NS:  $p < .001$ , SA:  $p < .001$ , ZD:  $p < .001$ , ZG:  $p < .001$ ) was taken as baseline. As this difference can be accounted for by parallel sets of materials being created for Slov and B/C/S, and the observed minimal difference in agreement strategies (see below), the two datasets have been aggregated and are henceforth referred to as B/C/S+S.

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<sup>9</sup> Responses for item 6 in the FM Condition and item 1 in the NM Condition in Experiment 1 for 5 B/C/S locations had to be discarded due to stimulus error. These responses were coded as no-response and as such were not included in the statistical analysis.

In the following two sections, in order to assess and compare the ratio by which each of the three controllers contributes to the agreement on the predicate, the results for each agreement controller for each of the nine preverbal and postverbal conditions are shown in terms of percentages, and p-values for two-tailed, two-sample unequal variance t-tests are provided for statistically significant results.

### 3.2.1. Experiment 1 Results

The combined results for agreement on the participle with preverbal subject coordination, with uniform and mixed gender conjuncts, are presented in Figure 1. The percentage for each data point is given in Table 3.

Figure 1:

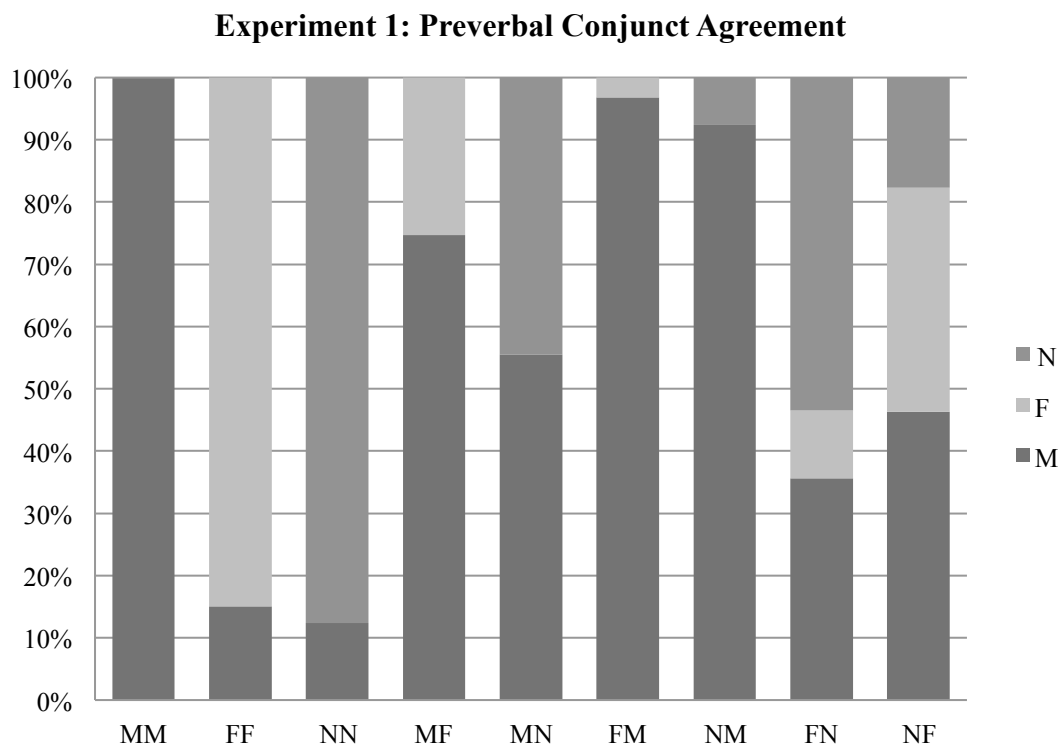


Table 3: Experiment 1: Preverbal Conjunct Agreement.

SV	M	F	N
<b>MM</b>	100%	0%	0%
<b>FF</b>	15%	85%	0%
<b>NN</b>	12%	0%	88%
<b>MF</b>	75%	25%	0%
<b>MN</b>	55%	0%	45%
<b>FM</b>	97%	3%	0%
<b>NM</b>	92%	0%	8%
<b>FN</b>	36%	11%	53%
<b>NF</b>	46%	36%	18%

*ConjP*: Default agreement, i.e. masculine agreement on the predicate, can be unambiguously observed in conditions where neither of the two conjuncts is masculine –

FF(M:15%), NN(M:12%), FN(M:36%) and NF(M:46%). A t-test shows a statistically significant difference between default agreement in uniform and non-masculine mixed conjuncts ( $p < .001$ ). Further comparison of the proportion of default agreement observed for uniform and mixed gender conditions suggests a high preference for uniform gender conjunct (FF and NN) to elicit agreement that corresponds to the gender of the two conjuncts, F(85%) and N(88%), over default agreement. In mixed gender conditions, while the NF condition shows that agreement is more often controlled by ConjP than the closest conjunct (M(46%) and F(36%), respectively), while the FN condition shows a stronger preference for CCA over Default agreement (N(53%) and M(36%), respectively), a difference significant in a t-test ( $p < .001$ ). Therefore, the combination with a stronger effect on default agreement is the NF condition. We return to the difference for default agreement in the FF/NN and FN/NF conditions in Section 4.2, where we raise the issue of status of masculine on ConjP in these non-masculine conjunct conditions, and elaborate on two distinct mechanisms - Default and Resolved agreement.

*Conj2: Closest conjunct agreement.* CCA, i.e. gender of Conj2 on the predicate in the SV order of Experiment 1, can be transparently observed in mixed gender conditions where the second conjunct is not masculine: MF(F:25%), MN(N:45%), FN(N:53%) and NF(F:36%). Firstly, we observe that unlike ConjP, Conj2 is a more stable controller as it is more equally distributed across all four conditions. Secondly, we observe an increase in the preference for Conj2 to control agreement on the predicate when the first conjunct is not masculine; compare MF/MN (25%/45%) and NF/FN (36%/53%). A t-test shows that there is statistically significant difference between CCA conditions with a masculine and non-masculine first conjunct ( $p < .001$ ). Finally, we can observe that N is a better predictor of CCA than F; compare MF-NF (F:25%-36%) and MN-FN(N:45%-53%), ( $p < .01$ ) and ( $p < .01$ ) respectively. A t-test shows a statistically significant difference between CCA when conditions with Conj2 F and N are compared ( $p < .001$ ). Overall, the predictor with a stronger positive effect on closest conjunct agreement is N gender. We address the observed variation in agreement with N and F in Section 4.3.

*Conj1: Highest conjunct agreement.* HCA, i.e. gender of Conj1 on the predicate, can be transparently observed in mixed gender conditions where the first conjunct is not masculine – FM(F:3%), NM(N:8%), FN(F:11%) and NF(N:18%). Overall Conj1 is the weakest controller out of the three controllers (ConjP, Conj1 and Conj2). In conditions where Conj2 is masculine, Conj1 is a weaker controller than ConjP in uniform gender conditions, at a statistically significant rate ( $p < .001$ ). In addition, a t-test shows there is statistically significant difference between HCA conditions with masculine and non-masculine first conjunct ( $p < .001$ ). Thirdly, we can observe that N is a stronger predictor of HCA than F; compare FM-FN (F:3%-11%) and NM-NF(N:11%-18%), ( $p < .001$ ) and ( $p < .001$ ) respectively. A t-test shows a statistically significant difference between HCA when conditions with Conj1 F and N are compared ( $p < .001$ ). Therefore, the predictor with a stronger positive effect on HCA is N gender in non-masculine mixed gender conditions. The results for the theoretically debated status of HCA are discussed in Section 4.1, and the observed prominence of N in Section 4.3.

*(Non-)default masculine agreement.* (Non-)default masculine agreement, i.e. masculine gender on one of the conjuncts contributes to masculine gender agreement on the predicate - MF(M:75%), MN(M:55%), FM(M:97%) and NM(M:92%). We can observe that Conj2 M is a more stable and stronger contributor to masculine agreement on the predicate than Conj1 M; a t-test comparing MF-MN(M:75%-55%) and FM-NM(M:97%-92%) obtained a statistically significant difference ( $p < .001$ ). It is worth noting that a t-test comparing masculine gender in MF and MN proved to be statistically significant ( $p < .001$ ), which is not

the case for masculine in FM and NM ( $p > .1$ ). We return to the issue of the provenance of (non-)default masculine agreement in Section 4.2.

The observations based on Experiment 1 are summarized in (i)-(iii):

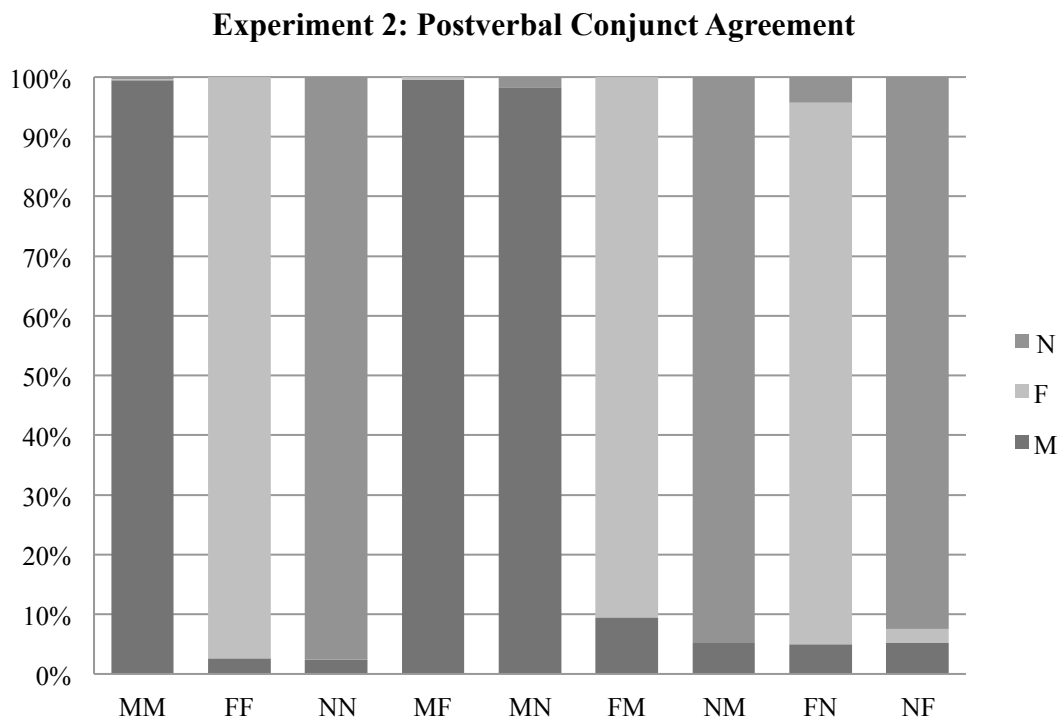
- (i) ConjP is a likely controller in non-masculine mixed conjuncts, but less so in uniform gender conjuncts.
- (ii) Conj2 is a stronger controller than Conj1.
- (iii) M is the strongest controller, while N is consistently a stronger controller than F.

In sum, the experimental data provides support for the theoretical models that posit *Default*, *CCA* and *HCA* preverbally in B/C/S and SloV.<sup>10</sup> Furthermore, the data raises the question of distinguishing two sources of default agreement when accounting for masculine agreement in non-masculine conjuncts, (i). In addition, the experimental data demonstrates that not all agreement controllers have equal agreement potential across all nine conditions. Therefore, in addition to the observed variation in the agreement potential of the three agreement controllers, (ii), we observe that the potential of each controller can in turn be further boosted by a value of its gender feature, (iii).<sup>11</sup> Consequently, any theoretical model of B/C/S and SloV conjunct agreement has to not only account for the variation in array of the agreement controllers with respect to their structural position in ConjP and their gender value, but equally to account for its interaction with the other conjuncts' gender values.

### 3.2.2. Experiment 2 Results

The results for agreement on the participle with postverbal coordinated subjects, with uniform and mixed gender conjuncts, are presented in Figure 2. The percentage for each data point is given in Table 4.

Figure 2:



<sup>10</sup> The total number of unambiguous instances for presented data are CCA (Conj2) = 1709 (59%), Def (ConjP) = 774 (26%) and HCA (Conj1) = 409 (14%).

<sup>11</sup> The total number of unambiguous instances for presented data are masculine = 5416 (57%), neuter = 2286 (24%) and feminine = 1718 (18%).

Table 4: Experiment 2: Postverbal Conjunct Agreement

VS	M	F	N
MM	100%	0%	0%
FF	3%	97%	0%
NN	2%	0%	98%
MF	100%	0%	0%
MN	98%	0%	2%
FM	10%	90%	0%
NM	5%	0%	95%
FN	5%	91%	4%
NF	5%	2%	93%

*ConjP: Default agreement*, i.e. masculine agreement on the predicate, can be unambiguously identified only in conditions where neither of the two conjuncts is masculine (otherwise it is confounded with masculine agreement with one of the conjuncts) – FF(M:3%), NN(M:2%), FN(M:5%) and NF(M:5%).

*Conj2: Distant-conjunct agreement*. Distant conjunct agreement, i.e. gender of Conj2 on the predicate, can be transparently observed in mixed gender conditions where the second conjunct is not masculine – MF(F:0%), MN(N:2%), FN(N:4%) and NF(F:2%).

*Conj1: Closest- and Highest- conjunct agreement*. CCA and HCA, i.e. gender of Conj1 on the predicate, can be transparently observed in mixed gender conditions where the first conjunct is not masculine – FM(F:90%), NM(N:95%), FN(F:91%) and NF(N:93%).

*Ambiguous masculine agreement*. *Ambiguous masculine agreement*, i.e. where it may be the result of both the default agreement and single-conjunct agreement - MF(M:100%), MN(M:98%), FM(M:10%) and NM(M:5%). A t-test shows there is a statistically significant difference between *masculine agreement* when Conj1 versus Conj2 is masculine ( $p < .001$ ), with a weak effect of masculine in the distant or last conjunct position.

Considered together, the results of the experiment on conjunct agreement production in postverbal position show an evident decrease in ConjP and Conj2's potential to control the gender agreement on the predicate with respect to the preverbal results and, consequently, an even higher and more stable overall dominance of the linearly closer conjunct (in this case Conj1) as the controller. While the low potential of Conj2 controller in *postverbal* order is predicted by all accounts, the observed asymmetry in stability of ConjP as controller is unexpected and will be addressed in section 4.2. Moreover, these data strongly argue in favor of approaches to conjunct agreement that analyze agreement with Conj1 in the postverbal position as a result of two agreement strategies: highest conjunct agreement and closest conjunct agreement, which display an additive effect, as observed for feminine in FM(F:90%) and neuter in NM(N:95%). The decrease in ConjP's agreement potential in the postverbal condition has to be incorporated in any comprehensive account of conjunct agreement. Finally, in the postverbal environment we do not observe the interaction of agreement controllers with different gender values. However, the dominance of linear agreement in the postverbal condition could be disguising the contribution of a conjunct's gender value in boosting agreement in mixed gender conditions.

### 3.2.3. Results across locations

Returning to whether there is any qualitative difference across locations with different regional varieties, in fact the overall patterns are largely similar across all six locations. In the four graphs below we show the proportion of agreement strategies for FN combinations



preverbally (where N agreement is widely found, but the other two strategies are as well) and NF combinations preverbally (where F agreement is widely found, with the other strategies found as well).

Figure 3.a.

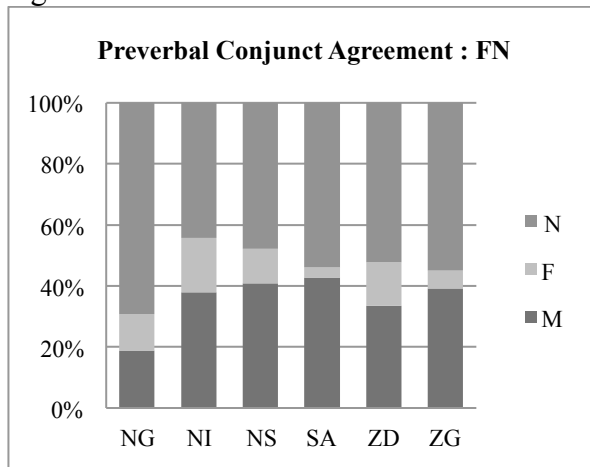
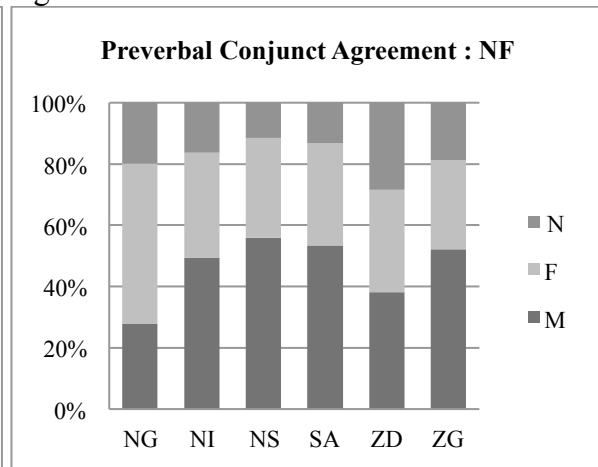


Figure 3.b.



In Slovenian (NG on the graph), however, we notice an overall lower rate of default agreement, a point we discuss in Section 4.2.

For the postverbal conditions, CCA predominates in both NF and FN. The fact that the furthest conjunct is not a possible controller is understandable in terms of the fact that both HCA and CCA converge on the same controller, but the considerable decrease in default agreement is a point we return to in Section 4.2.

Figure 4.a.

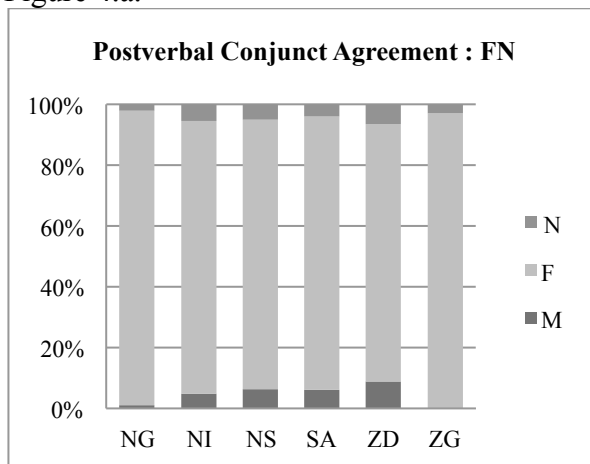
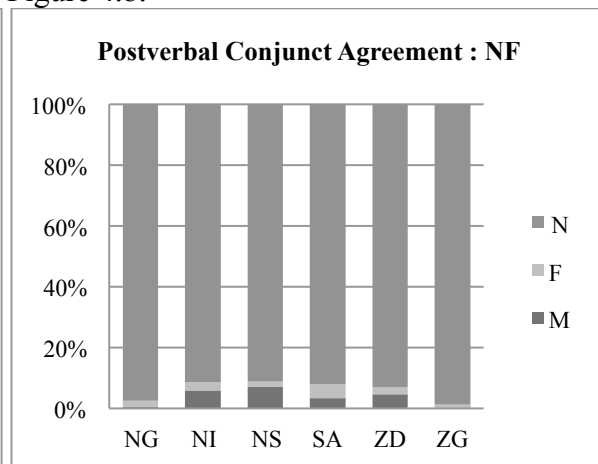


Figure 4.b.



In what follows, we discuss the interpretation of our results in terms of the possibilities of HCA, CCA, and default agreement as strategies, the nature of default agreement, and the interpretation of differences in N and F gender.

#### 4. Discussion

The results of Experiment 1 and Experiment 2 prove fruitful for discussing varied topics essential for any theory of conjunct agreement and of the gender system in South Slavic. In section 4.1, we re-evaluate the predictions of the theories discussed above, and address their experimental potential and viability. In section 4.2, we offer an explanation of why masculine agreement, as found robustly in preverbal NF and FN conditions, decreases so much postverbally, in terms of the distinction between Default and Resolution values. In section 4.3,

we further consider the difference in gender effects between N and F, and offer an outline of a gender system that would interact with the agreement controllers in the observed way.

#### 4.1. Theoretical baseline: B/C/S and Slov Conjunct agreement dataset

An intense research focus has been established to model the variability in agreement strategies within a restricted model of theoretical possibilities. The aim of Experiment 1 and Experiment 2 was to provide a baseline dataset for any future theoretical models. The results, in short, confirm that the three agreement strategies – default agreement, CCA and HCA, are attested by native speakers of B/C/S and Slov, and in addition, accentuate the high availability of *Linear agreement* in comparison to *Default* or *Hierarchical agreement*. Therefore, based on the provided data, we argue that Linear agreement – a theoretically critical phenomenon – is not an instance of a production or attraction error but a fully stable conjunct agreement strategy, and one that, to varying degrees, is even preferred to default agreement. The fact that Slovenian has the lowest rate of default agreement among these varieties may be related to differences in the extent to which it is prescriptively enforced, or perhaps to the overall higher amount of syncretism in Slovenian inflection given the inclusion of the dual, and the role of syncretism in facilitating partial agreement. It may also be related to the way two singulars are typically conjoined. Conjunctions of two singulars are the most frequent form of conjunction and trigger dual agreement in Slovenian but generally trigger masculine plural in B/C/S, when the conjuncts are masculine or of different gender. The clearest contrast comes from instances with neuter singular conjuncts, where in B/C/S Nsg+Nsg yields Mpl (Npl is ungrammatical), but in Slovenian yields Ndual.

The collected data are in line with Corbett (1983a), Marušič et al. (2015), Franks and Willer-Gold (2014:fn.31), Puškar and Murphy (2015), and are more comprehensive than the dataset considered by Bošković (2009). Bošković’s (2009) account provides a detailed theoretical model based solely on what surfaces as *linear* conjunct agreement. The model hinges on grammaticality intuitions that treat preverbal Last-Conjunct agreement and postverbal First-Conjunct agreement as grammatical. As detailed in section 2, to account for the failure of preverbal HCA in a purely syntactic agreement account, Bošković makes reference to language specific constraints (LBE and CSC) interacting with a three-step Move (Move-Match, Move-Value, Move-Pied-pipe). This decomposed Move proves to be one of the two key factors in predicting the strictly linear conjunct agreement pattern. The second key factor contributing to restricting preverbal conjunct agreement to LCA is a more elaborate model of a gender feature checking system. According to Bošković, valued and interpretable gender features can be either deleted or ignored by LF. Based on the intuitions he provides for (8a), Bošković argues that the latter option is what happens when Conj1 is masculine and that CCA in preverbal MN combinations is therefore unnecessary and underattested. The idea is, due to its default nature in B/C/S, the masculine feature is ignored by LF and hence escapes deletion. This has a direct effect on Secondary Agree in Gender with Conj2 and Movement of ConjP to a preverbal position (driven/motivated by EPP features on T), as both operations are blocked. Bošković makes a similar claim for interpretable (biological) genders in B/C/S, masculine and feminine, (8b).

- (8) a. ?\*Svi gradovi i sva sela su (juče)  
 all.MASC.PL towns.MASC.PL and all.NEUT.PL villages.NEUT.PL AUX.PL yesterday  
 uništena.  
 destroyed.NEUT.PL  
 ‘All towns and all villages were destroyed yesterday.’

- b. \* Sve žene i sva djeca su (juče)  
 all.FEM.PL women.FEM.PL and all.NEUT.PL children.NEUT.PL AUX.PL yesterday  
 došla.  
 came.NEUT.PL  
 ‘All women and all children came yesterday.’

Although we cannot directly evaluate the latter claim, due to the use of inanimate nouns in our experiment, the results of Experiment 1 and Experiment 2 clearly provide strong evidence for *linear agreement* in general, including the preverbal subject conditions, and the *MN condition* (N:45%) in particular. This brings into question Bošković’s elaborate motivation for the feature evaluation model and analytic inventory of Secondary Agree, and with it, potentially undermines this type of derivational account (based on movement and feature valuation in the case of preverbal last conjunct agreement). However, building on the proposed feature evaluation system, if feminine and neuter inanimate nouns’ gender features are unvalued and/or uninterpretable, Bošković’s account would predict advancement of deletion and application of Secondary Agree, with Movement to ConjP to SpecPart and, consequently, correctly predict a comparatively higher rate of preverbal *Closest-Conjunct* agreement, cf. MN (N=45%) and FN (N=53%).<sup>12</sup> In summary, Bošković’s account diverges from the current results on two data points, which has been evident in non-masculine mixed gender conditions. Firstly, it predicts contrary to fact that we should not observe preverbal HCA. Secondly, a high percentage of neuter in preverbal CCA in the MN condition suggests a reconsideration of the conditions for the application of Secondary Agree.

On the other hand, although Marušič et al. (2015) in general make valid predictions about the patterns of conjunct agreement in B/C/S and Slov, their account does not have the specific modelling power to explain the quantitative variation between the patterns of all nine conditions. It seems insufficient to assume that the ratio of this potential is solely predicted and restricted by general hierarchy and locality restrictions, as it equally seems to be sensitive to the gender combination of the two (competing) conjuncts and the potential default gender value on ConjP. In the next section, we discuss the preverbal versus postverbal asymmetry in terms of the availability of default agreement, and in section 4.3, we provide an outline of a gender system that would deliver the relevant asymmetry between F and N genders.

#### 4.2 The Decrease in Default Postverbally: Default vs Resolution

Given its relative robustness in preverbal position, a somewhat unexpected result is the significant decrease of *Default* agreement in the postverbal condition (e.g. NF and FN conditions). In the model of Marušič et al. (2015), this is simply because two of the three strategies – both HCA and CCA – gang up to yield the same result, and this overpowers the potential for default agreement. However, this alone would not explain the sharp decrease in default agreement postverbally, assuming an equal distribution of the three strategies. This is because Marušič et al. do not predict the restriction of the third grammar – *Default*, to preverbal conditions; see their checkmark for postverbal Default agreement as represented in Table 1.

One possibility that immediately arises is that VS structures with conjoined NP subjects always involve ellipsis of two clausally conjoined TPs. If so, there would be a drop-off of masculine agreement in NF and FN conditions because what looks like CCA or HCA is simply agreement of a verb with its single argument, plus conjunction reduction (and hence

<sup>12</sup> Though we do not discuss in more detail the predictions of blocking or facilitating effects of masculine in Conj1 or Conj2 position on agreement with the other conjunct, we refer the reader to recent work on gender mismatches under NP ellipsis (Bobaljik and Zocca 2010, Nunes & Zocca 2014, Merchant 2014, Sudo & Spathas to appear) as one line of possible inquiry into this issue.

deletion of the second verb). This possibility can be addressed empirically by looking at collective predicates that are incompatible with clausal coordination sources, and in the second phase of our current Experimental Morphosyntax of South Slavic (EMSS) project, we are testing this possibility using a picture-matching task. Pilot results suggest that it cannot be the case that all VS agreement with coordination comes from a clausal-coordination source, but the experiment has not been concluded, and so we put this line of discussion aside at the present moment.

To explain the pattern of reduced M agreement in FN and NF cases postverbally (i.e., the asymmetry with its robust rate preverbally), we begin with the following proposal: there are two sources for masculine agreement with MF combinations: Default or Resolution. Default is literally the value Masculine, as a property of the Conj head (though this can apparently vary crosslinguistically, as it is Neuter in Icelandic, even when MF are conjoined). Resolution, on the other hand, involves inspecting the contents of Conj, and based on each of their gender, computing a resolution value. What is the proof that Default and Resolution are distinct? A conjunction of Fsg+Fsg can yield either Fpl *or* Mpl. By hypothesis, Fpl is resolution and Mpl is default. Resolution results from unification (be it, say, via Multiple Agree by the Conj head with both of its arguments, and subsequent conflict resolution in case of clashing values), while Default is, simply, always a fixed value for ConjP.

Why is masculine agreement found less overall in Slovenian? If ConjP's default were Masculine Plural in Slovenian (as it is in B/C/S), we should find some masculine plural agreement when two singulars conjoin – but as mentioned above, we don't – it is masculine dual. On the other hand, the Resolution value, which inspects the features of its conjuncts, will be *Dual* (and whatever Gender arises as a property of resolution, in this case masculine). Combinations of two singulars in Slovenian, therefore, lead to incompatibility with the Default value for number (and perhaps in Slov there is no default value for number at all on ConjP, although one for in gender). This conflict may lead to an overall dispreference for plural as the result of default in Slovenian, and thus to a dispreference for masculine as the result of default, even in contexts where dual is not at stake. By contrast, both Default and Resolution can be employed with identical results in B/C/S (where in fact, Default, Masculine Plural is sometimes prescribed for all mixed conjuncts).<sup>13</sup>

Once we have in hand the difference between CCA and HCA as partial agreement strategies on the one hand, and Default and Resolution as ConjP-based strategies on the other hand, we may note that in cases of F+M, either Default or Resolution will yield Masculine. To account for the lower rate of masculine overall postverbally, we hypothesize that in postverbal position, only Resolution is available – and not default. If so, there is only one source for masculine agreement, and hence an overall lower rate. (In fact, the prediction, not tested within the current experiment, is that Fsg+Fsg should not yield Mpl/dual postverbally, as the resolution value is Fpl).

It now suffices to explain why only resolution, and not default, is available if ConjP is chosen as a controller postverbally. Taking the terms Default and Resolution as features of ConjP, we propose they can be likened to Index Agreement and Concord Agreement respectively, where Index agreement (as found in works such as Wechsler & Zlatić 2003, Landau 2015, and Smith 2016) is a fixed value of masculine for ConjP (referred back to by

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<sup>13</sup> We have not looked at all available prescriptive grammars, but want to suggest that prescriptivists typically go for clarity and uniformity of their rules, and as two singulars of different genders yield agreement in masculine plural (or dual in Slovenian), this rule often gets generalized to govern coordinations of any two noun phrases of different genders (cf. Editorial Board 1947:270, Remic-Jager 1980:122), especially if combinations of two plurals are not specifically mentioned in such grammars (as is the case in e.g. Barić et al. 1997). However, there are prescriptive works which generalize linearly closest conjunct agreement as the preferred option in both orders (Maretić 1899) or only with preverbal subjects (Stevanović 1974).

coreferent pronouns, for example), but Concord agreement is the result of a ConjP-internal computation, and is more local and morphosyntactically based. In Smith 2016, *committee*-nouns in British English are said to have an Index feature of plural, and a Concord feature of singular. For this reason, in an utterance like *This committee are/is here. They are ready*, the very local determiner shows concord agreement, the very long-distant coreferent pronoun shows index agreement, and the local verb shows either index or concord agreement. What Smith shows, interestingly, is that the possibility of Index agreement on the verb must vanish as soon as the subject is postverbal. Thus *\*There are a committee in the room* is out, for the same speakers who allow *A committee are in the room*. Smith (2016) proposes that the controller of Index agreement, being LF relevant, must c-command the target (an instance of surface Upward-Agree).<sup>14</sup>

Adopting Smith's proposal, VS configurations with conjoined subjects in South Slavic, as they no longer allow Index Agreement, will no longer allow Default Masculine. Only CCA, HCA, or Resolution is possible. In fact, we can now return to the existence of M agreement in the postverbal FM and NM conditions in Figure 2; these would be Resolution (and not Default agreement; and certainly not Last-Conjunct Agreement), and indeed there is less of it in NM than in FM. We have said above that Resolution delivers M for MF and FM configurations, but not what resolution delivers for FN and NF. We turn to this in the next section.

### 4.3 Towards a Gender System for Conjunct Agreement

Due to its resolution role in coordination, masculine is assumed to be the unmarked or least marked gender in conjunct agreement contexts. However, aside from coordination, Default M is found in similar contexts where the referent is underspecified for gender or the referent's gender is irrelevant, e.g. masculine plural agreement is used when pronouns refer to an exclusively male group or to a mixed group—composed of both males and females—(*Mi smo/Vi ste/Oni su došli* 'we/you/they AUX.PL came.M.PL'), while feminine agreement can be used only when the group referred to is homogeneously female. Based on this observation many have argued that masculine gender is *semantically* underspecified for a referent. Importantly though, this does not entail that M is the least marked gender in the B/C/S and Slov gender system in general (cf. Corbett 1983a,b, van Koppen and Rooryck 2008), as we discuss below.

A pattern of results that was much less expected, and about which an explanation must be offered is the observed prominence of N controllers eliciting a higher percentage of *Linear and Hierarchical agreement* than F controllers across all paired conditions (MF vs MN, FM vs NM, and in NF and FN). This is interesting as N is the least frequent gender, most constrained in its productivity and notorious for its general morphological markedness.<sup>15</sup> Interestingly, however, while N has a similar default potential as M outside of coordinated contexts, e.g. it occurs in impersonal sentences, in inanimate subject questions, and is the value for gender underspecified animate nouns (*djeca* 'children'), it does not seem that N is underspecified for gender in the same manner as M. If it were, we would expect N to have at least an equal potential as M in gender resolution – which is not the case. Another differentiating property is that N, but not M, is used as the agreement value when agreement is controlled by an element that fully lacks a gender feature, e.g. a complement clause, an adverbial or a numeral (see, for example, Marušić & Nevins 2010). Consequently, while we take M to be the least *semantically* marked gender (and hence the Index Value for ConjP), but

<sup>14</sup> See also Willer-Gold (2016) for a recent claim that LF-interpretable gender features must c-command their agreement target.

<sup>15</sup> See Arsenijević (2016) for new insights into the nature of neuter gender in South Slavic.

we take N to be the *syntactically* least marked or syntactically underspecified gender (cf. Kramer 2015, Franks and Willer-Gold 2014; Tsimplici and Hulk 2013). The syntactic underspecification of N can be also related to its semantic underspecification for biological gender, in contrast to lexical M or F in nouns that can be specified for biological gender.

In Marušič et al. (2015), it was suggested that the notion of default gender is relativized to the specific context of number: in the context of singular number, neuter is the unmarked gender, whereas in the context of non-singular (e.g. dual or plural) number, masculine is the unmarked gender. (Indeed, the extreme paucity of animate neuter plurals in South Slavic points to the fact that gender markedness must be considered within the context of number). Given this context-sensitive markedness, the existence of neuter singular in impersonal and non-agreeing contexts, the subject position in South Slavic pairs together these two unmarked features, whereas in plural contexts (e.g. mixed referents, conjunct agreement), masculine is the default. Nonetheless, this explanation alone cannot fully account for the asymmetries in the NF and FN conditions in our experiments in which both conjuncts were plural.

Let us then relate the two genders to F. To present the described B/C/S and Slov gender system in more formal terms, we adapt Kramer's (2015) feature model for three-gender systems in (9). Kramer (2015) argues for un/interpretable (u/i) gender features (which are interpretable only in the case they make a semantic contribution, as with animate nouns) to be syntactically located on a *n*- head that serves to nominalize category-neutral roots.<sup>16</sup> Neuter, by hypothesis, is a bare *n*- head with no value for [ $\pm$ fem], where [ $\pm$ fem] defines which feature is interpretable/uninterpretable:

- (9)
- |                      |           |
|----------------------|-----------|
| a. <i>n</i> - [+fem] | Feminine  |
| b. <i>n</i> - [-fem] | Masculine |
| c. <i>n</i> -        | Neuter    |

To account for why there is more N in FN than there is F in NF, we propose that the additional neuter responses come from resolution. Specifically we propose:

- (10) Resolution outcomes:
- |       |     |
|-------|-----|
| MF,FM | → M |
| MN,NM | → N |
| FN,NF | → N |

If N is the resolution value for FN/NF, the additional N responses come from not only HCA/CCA, but resolution. Similarly, there is more N as found in NM/MN than there is F in MF/FM. Why does resolution deliver N here? We propose that resolution involves deleting the features on one of the conjuncts in order to avoid a mismatch. Assuming the features are as shown in (9), this means that in MF/FM combinations, the more marked [+fem] will be deleted, leaving only [-fem] and yielding a resolution value of masculine for ConjP. Specifically, if [+fem] is deleted from the node that contributed F, then only the [-fem] feature on the M node will be present, and this will be the resolution value acquired by ConjP. On the other hand, in MN/NM/NF/FN combinations, either specified value of the non-neuter conjunct, i.e. [ $\pm$ fem], will be deleted (on either an M or F source) to avoid mismatch, thereby yielding an empty [ ] on all conjuncts and hence a resolution value of neuter for ConjP.<sup>17</sup>

<sup>16</sup> Smith's (2016) theory of semantically interpretable features also relies on a distinction between iF and uF.

<sup>17</sup> We leave open whether the deletion rules implementing resolution are achieved via the impoverishment operation of Distributed Morphology or a set of constraint-based neutralizations.

Given the idea of neuter as the least marked gender, it shows up as the result of HCA and CCA *or* as the result of resolution – these two distinct strategies having an additive effect. Its higher rate of partial agreement as a first conjunct in preverbal NF (compared to the rate of preverbal HCA in FN) and as a closest conjunct in FN (compared to the rate of preverbal CCA in NF) can be understood. However, we leave open the possibility that the higher overall rate of neuter agreement may be in part related to an experimental artifact of our design (one that still, nonetheless, has theoretical relevance): the fact that the subjects of the model sentences in elicited production were always masculine. Masculine and neuter show a high degree of syncretism across South Slavic, presumably reflecting the shared lack of a [+fem] specification. Supposing that there can be priming among gender not only for gender *categories* but even among decomposed gender *features* (see, e.g. Opitz et al. 2013), the presence of a non-feminine prime in the model sentence (namely a masculine) could have led to increased preference for a non-feminine response in FN and NF conditions. Investigating this source of neuter could be potentially addressed in future experimental designs.

To conclude, the three genders not only stand in an asymmetric relation to each other, with respect to their own potential to control agreement, they also interact with each other's potential when placed in coordination, where agreement is further regulated by the general constraints rating certain agreement patterns over others (preverbally *Linear, Default, Resolution, Hierarchical*; postverbally *Linear/Hierarchical, Resolution*).

## 5. Conclusion

Conjunct agreement has played an important role in fine tuning theoretical models of agreement, leading to subtle predictions requiring experimental arbitration. As multiple theoretically varied models have emerged from inconsistent datasets in South Slavic languages, we set out to experimentally provide a baseline against which to assess them. The results from the two elicited production experiments with native speakers of B/C/S and Slov find preverbally a high rate of CCA, a somewhat lower rate of default agreement and a low but non-negligible rate of HCA; and postverbally a high rate of CCA/HCA and low rate of default agreement. Going beyond these configurational factors alone, we have observed that the ratio of each agreement strategy can vary with respect to the gender of the controller, and the gender combination of the two conjuncts. While there is a clear preference for agreement strategies with respect to their controller potential (CCA > Default > HCA), their interaction with the gender system becomes evident when comparing the ratio of two genders in paired conditions (masculine > neuter > feminine). The experimental data thus suggests an asymmetric interaction of the three values of the gender system with the agreement strategies, calling for more refined theoretical developments in analyzing of gender markedness and the distinction between default and resolved agreement in B/C/S and Slov coordination structures.

## References

- Aljović, Nadira and Muamera Begović. This volume. Morphosyntactic Aspects of First Conjunct Agreement.
- Aoun, Joseph, Benmamoun, Elabbas, and Dominique Sportiche. 1994. Agreement, word order, and conjunction in some varieties of Arabic. *Linguistic Inquiry* 25.2: 195–220.
- Aoun, Joseph, Benmamoun, Elabbas, and Sportiche, Dominique. 1999. Further remarks on first conjunct agreement. *Linguistic Inquiry* 30.4: 669–681.
- Arregi, Karlos and Andrew Nevins. 2012. *Morphotactics: Basque auxiliaries and the structure of spellout*. Dordrecht: Springer.
- Arsenijević, Boban. 2016. Gender as a grammaticalized classifier system: the case of the Serbo-Croatian neuter. MS. University of Potsdam.

- Arsenijević, Boban and Ivana Mitić. This volume. The Logic of agreement: How agreement interacts with negation, disjunction and quantification.
- Barić, Eugenija, Mijo Lončarić, Dragica Malić, Slavko Pavešić, Mirko Peti, Vesna Zečević, and Marija Znika. 1997. *Hrvatska gramatika* [Croatian Grammar]. Zagreb: Školska knjiga.
- Benmamoun, Elabbas, Archana Bhatia, and Maria Polinsky. 2010. "Closest conjunct agreement in head final languages". In: Jeroen van Craenenbroeck (ed.), *Linguistic Variation Yearbook 2009*: 67–88.
- Bhatt, Rajesh and Martin Walkow. 2013. Locating agreement in grammar: an argument from agreement in conjunctions. *Natural Language and Linguistic Theory* 31/4: 951–1013.
- Bobaljik, Jonathan and Cynthia Zocca. 2010. Gender markedness: the anatomy of a counter-example. *Morphology* 2010: 1–26.
- Bock, Kathryn and Carol A. Miller. 1991. Broken agreement. *Cognitive Psychology* 23:45–93.
- Bošković, Željko. 2009. Unifying first and last conjunct agreement. *Natural Language and Linguistic Theory* 27: 455–496.
- Chomsky, Noam. 2000. Minimalist inquiries. In Roger Martin, David Michaels, and Juan Uriagereka (eds.), *Step by step: essays on minimalist syntax in honor of Howard Lasnik*. Cambridge: MIT Press, pp. 89–155
- Citko, Barbara. 2004. On Headed, Headless, and Light-Headed Relatives. *Natural Language and Linguistic Theory* 22: 95–126.
- Corbett, Greville. 1983a. *Hierarchies, Targets and Controllers. Agreement Patterns in Slavic*. London: Croom Helm.
- Corbett, Greville. 1983b. Resolution rules: agreement in person, number and gender. In: Gerald Gazdar, Ewan Klein and Geoffrey Pullum (eds.), *Order, concord and constituency (Linguistic Models, 4)*. Dordrecht: Foris. pp. 175–206.
- Corbett, Greville. 1991. *Gender*. Cambridge: Cambridge University Press.
- Drummond, Alex. 2011. *IbexFarm (Version 0.2.7) [Software]*. Available online at: <http://spellout.net/ibexfarm/>
- Editorial Board. 1947. *Slovenska slovnica* [Slovenian grammar]. Ljubljana, Slovenia: Državna založba Slovenije.
- Franck, Julie. 2011. Reaching agreement as a core syntactic process. Commentary of Bock & Middleton 'Reaching Agreement. *Natural Language & Linguistic Theory* 29(4):1071–1086.
- Franck, Julie, Lassi, Glenda, Frauenfelder, Ulrich. H., and Luigi Rizzi. 2006. Agreement and movement: A syntactic analysis of attraction. *Cognition* 101:173–216.
- Franck, Julie, Frauenfelder, Ulrich H., and Luigi Rizzi. 2007. A Syntactic Analysis of Interference in Subject–Verb Agreement. *Mit Working Papers in Linguistics* 53:173–190.
- Franks, Steven and Jana Willer-Gold. 2014. Agreement Strategies with Conjoined Subjects in Croatian. In Sylwester Jaworski and Jacek Witkos (eds.), *New Insights into Slavic Linguistics*. Peter Lang. pp.91–115.
- van Koppen, Marjo. (2005). One Probe - Two Goals : Aspects of agreement in Dutch dialects. LOT Dissertation.
- van Koppen, Marjo and Johan Rooryck. 2008. *Resolving resolution: Underspecification and the Law of Coordination of Likes*. Manuscript: LingBuzz – 000760.
- Kramer, Ruth. (2015). *The Morphosyntax of Gender*. Oxford University Press.
- Landau, Idan. (2015). DP-Internal Semantic Agreement: A configurational analysis. *Natural Language and Linguistic Theory*, published online: DOI 10.1007/s11049-015-9319-3.
- Maretić, Tomislav. 1899. *Gramatika i stilistika hrvatskoga ili srpskoga književnog jezika*. Zagreb: Kugli.



- Marušič, Franc and Andrew Nevins. 2010. Two types of neuter: Closest-conjunct agreement in the presence of '5&Ups'. In: Wayles Browne, Adam Cooper, Alison Fisher, Esra Kesici, Nikola Predolac, and Draga Zec (eds.), *Formal Approaches to Slavic Linguistics: The Second Cornell Meeting 2009*. Ann Arbor, Mich.: Michigan Slavic Publications. pp. 301–317.
- Marušič, Franc, Andrew Nevins, and Bill Badecker. 2015. The grammars of conjunction agreement in Slovenian. *Syntax* 18/1:39–77.
- Marušič, Franc, Andrew Nevins, and Amanda Saksida. 2007. Last-conjunct agreement in Slovenian. In Robert Compton, Magda Goledzinowska, and Ulyana Savchenko (eds.), *Formal Approaches to Slavic Linguistics 15, (The Toronto Meeting)*. Ann Arbor, Mich.: Michigan Slavic Publications. pp. 210–227.
- Merchant, Jason. 2014. Gender mismatches under nominal ellipsis. *Lingua* 151: 9–32.
- Munn, Alan. 1999. First conjunct agreement: Against a clausal analysis. *Linguistic Inquiry* 30.4: 643–668.
- Opitz, Andreas, Stefanie Regel, Gereon Müller, and Angela D. Friederici. 2013. Neurophysiological evidence for morphological underspecification in German strong adjective inflection. *Language* 89.2: 231–264.
- Peti-Stantić, Anita and Jelena Tušek. 2016. *First comes first or proximity for all in Croatian: Gender agreement*. 20th Biennial Conference on Balkan and South Slavic Linguistics, Literature and Folklore. University of Utah, 28-30.04.2016.
- Puškar, Zorica and Andrew Murphy. 2015. Closest Conjunct Agreement in Serbo-Croatian: A Rule-Ordering Account. In A. Assmann, S. Bank, D. Georgi, T. Klein, P. Weisser and E. Zimmermann (eds.). *Topics at InFL: Linguistische Arbeitsberichte (LAB) Vol 92*. Universität Leipzig.
- Remic-Jager, V. 1980. *Slovenski jezik [Slovenian language]*, 7th ed. Maribor, Slovenia: Založba Obzorja.
- Smith, Peter. 2016. The syntax of semantic agreement in British English. Ms., Goethe-Universität, Frankfurt am Main.
- Sobin, Nicholas. 1997. Agreement, default rules, and grammatical viruses. *Linguistic Inquiry* 28: 318–343.
- Stevanović, Mihailo. 1974. *Savremeni srpskohrvatski jezik [Contemporary Serbo-Croatian language]*. Beograd: Naučna knjiga.
- Sudo, Yasutada & Giorgos Spathas (to appear). Nominal ellipsis and the interpretation of gender in Greek. To appear in *Proceedings of Sinn und Bedeutung 20*.
- Tsimpli, Ianthi Maria and Aafke Hulk 2013. Grammatical gender and the notion of default: Insights from language acquisition. *Lingua* 137 : 128–144.
- Wechsler, Stephen & Larissa Zlatić. 2003. *The Many Faces of Agreement*. Stanford: CSLI.
- Willer-Gold, Jana. 2016. Obilježja imenice koja podliježe uklapanju u diskurs. *Jezikoslovlje*.