Gender Agreement with Exclusive Disjunction in Slovenian[*]

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Abstract

This paper addresses two issues: 1. Empirically, we report novel experimental data on agreement with exclusively disjoined subjects in Slovenian; 2. Theoretically, we look into the nature of attested agreement strategies with coordinated NPs. In particular, we investigate how these strategies behave under coordinators with different semantics, i.e. exclusive disjunction and conjunction. Based on the elicitation results, we argue that closest conjunct agreement, resolved agreement, and highest conjunct agreement are all present under exclusive disjunction to different extents, which suggests a uniform set of agreement strategies under disjunction and conjunction despite the semantic difference. Further, we argue against the presence of default agreement under both disjunction and conjunction in Slovenian, and argue for a particular set of gender resolution rules.

1 Introduction

Recent years have seen a rise in experimental investigation of conjunction agreement in Slavic languages, in particular Slovenian and Bosnian-Croatian-

Serbian (BCS) (see Marušič et al. 2015; Willer-Gold et al. 2016, 2018; Arsenijević et al. 2019 among others). Four agreement strategies have been identified including Closest Conjunct Agreement (CCA), Highest Conjunct Agreement (HCA), Resolved agreement (RES) and Default agreement. Despite the increase in research on agreement with conjoined subjects, *disjunction* agreement has not been looked into to the same extent in these languages. Focusing on gender agreement, this paper presents, to our knowledge, the first experimental investigation of agreement with exclusive disjunction in Slavic languages. Many aspects of the experiment are designed to parallel previous experiments on conjunction agreement, so that the results can be more directly compared.

Empirically, we will show that both CCA and RES are attested under exclusive disjunction and we will speculate that HCA is present too, but to a much smaller degree. CCA is attested more frequently under exclusive disjunction than conjunction, which results in RES and HCA being harder to detect due to their consequent lower frequencies. Additionally, we will argue that Slovenian does not have default agreement under either conjunction or disjunction.

Given the rich set of conjunction agreement strategies in Slovenian and BCS, a handful of intricate proposals have been made regarding feature specification of coordinators, feature resolution, and structure of sentences with coordinated subjects (Marušič et al., 2015; Willer-Gold et al., 2016, 2018; Arsenijević et al., 2019); direct comparison of disjunction and conjunction agreement can shed new light on these issues, especially the role different coordinators play in agreement patterns.[1]

In particular, our findings contribute to the theoretical debate in the following ways:

1. The availability of resolved agreement (and potentially also highest conjunct agreement) shows that sentences with disjoined subject cannot be derived by clausal ellipsis exclusively.

2. The availability of resolved agreement shows that this agreement strategy does not rely on the inclusive reading of the coordinated subjects.

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[1]It is important to note that there are accounts that are supported primarily by informal acceptability judgments, for example, see Bošković (2009) and Murphy and Puškar (2018). Since this study will compare elicitation data with previous experiments, discussion of accounts without elicitation data will be left aside in this paper. Further, this study focuses on gender agreement, leaving number agreement in disjuncton for the future.

Section 2 lays out the background on agreement in Slovenian, structures of sentences with disjoined subjects, and previous research on disjunction agreement in Slovenian. Section 3 reports the set-up and results of the experiment. Section 4 concludes.

2   Background

2.1   Agreement and coordination in Slovenian

Participles in Slovenian show gender and number agreement. When a feminine NP and a neuter NP are conjoined as in (1), the participle can show F agreement with the highest/first conjunct (HCA), N agreement with the second/closest conjunct (CCA), or M agreement which we will now descriptively label as resolved agreement (RES).

(1)   Knjige   in   peresa   so   se
       books.F.PL and pens.N.PL AUX.PL REFL
       podražil-i/e/a.
       become.more.expensive-M.PL/F.PL/N.PL
       'Books and pens have become more expensive.'

On top of the three genders, Slovenian also has three numbers: singular, dual, and plural. Table 1 summarizes the agreement paradigm for the participles.

	AUX[iliary]	F[eminine]	N[euter]	M[asculine]
Singular [SG]:	*je/bo*	-*a*	-*o*	-∅
Dual [DU]:	*sta/bosta*	-*i*		-*a*
Plural [PL]:	*so/bojo*	-*e*	-*a*	-*i*

Table 1: Auxiliaries and agreement endings on the Slovenian past participle. For auxiliaries: past AUX/future AUX

Regarding the structure of sentences with coordinated subjects like (1), two analyses have been proposed in the literature: ellipsis and NP coordination. The ellipsis approach claims that it is not subject noun phrases but two clauses that are coordinated. The verb phrase in the first clause undergoes ellipsis, sparing only the subject. This analysis is schematized in (2) and illustrated in (5).

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(2) [Knjige ~~so~~ se ~~podražil-e~~] in
[book.F.PL ~~AUX.PL~~ REFL ~~become.more.expensive-F.PL~~] and
[peresa so se podražil-a].
[pens.N.PL AUX.PL REFL become.more.expensive-N.PL]
'Books and pens became more expensive.'

In this structure, the agreement target on the surface, the participle, is in the second clause and only ever agrees with the second subject. Consequently, out of the agreement patterns shown in (1), only CCA can be derived, while RES and HCA cannot. Recent experimental research by Arsenijević et al. (2019) shows that even for CCA ellipsis cannot be the only structure. The ellipsis structure predicts that CCA would not be compatible with collective interpretation where the two conjuncts interact with each other. For example, (3) is predicted to only have the distributive interpretation and not the collective interpretation. Arsenijević et al. (2019) used a picture matching task to show that CCA in Slovenian and BCS is acceptable with collective interpretations, which indicates that a non-elliptical structure is necessary.

(3) Spears ~~collided in battle~~ and swords collided in battle.
Distributive interpretation: Spears collided with spears and swords collided with swords.
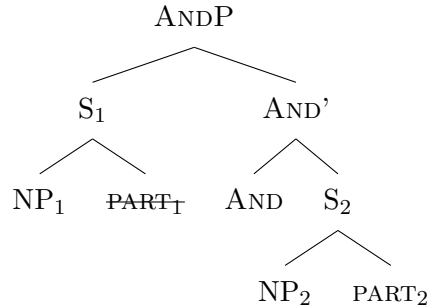Collective interpretation: Spears collided with swords.

On the other hand, the NP coordination analysis involves the structure in (4) and (6) where the subjects are coordinated, forming an AndP (see Munn 1993 among many others). The participle thus agrees with the AndP.

Marušič et al. (2015) and Willer-Gold et al. (2016, 2018) propose that all three agreement patterns can be generated in this NP coordination structure (see also Bošković 2009; Murphy and Puškar 2018). Under their analysis, it is assumed that the feature value on the AndP is unspecified. In this case, one option Slovenian has is to insert a default M feature to the AndP, which results in RES. Another option is for the participle to Agree-Link with the AndP but delay the copying of the feature value to PF. If copying occurs before linearization, the feature value from the hierarchically higher subject gets copied, resulting in HCA. If copying occurs after linearization, the feature value from the linearly closest subject gets copied, resulting in CCA.
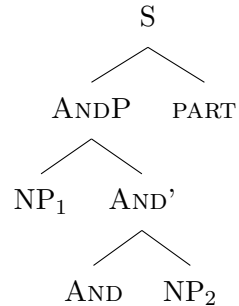
(4) [Knjige in peresa] so se
[_{AndP} book.F.PL and pens.N.PL] AUX.PL REFL

podražil-i/e/a.
become.more.expensive-M/F/N.PL
'Books and pens became more expensive.'

(5) Ellipsis

```
                AndP
            ┌────┴────┐
           S₁        And'
        ┌───┴───┐   ┌──┴──┐
       NP₁   P̶A̶R̶T̶₁̶  And   S₂
                         ┌──┴──┐
                        NP₂  PART₂
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(6) NP coordination

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                S
            ┌───┴───┐
          AndP    PART
        ┌───┴───┐
       NP₁    And'
            ┌───┴───┐
           And    NP₂
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Our study looks into agreement patterns with exclusively disjoined subjects. Exclusive disjunction in Slovenian is expressed by a two part expression *ali … ali pa …* as is shown in (7), similar to *either … or …* in English.

(7) Ali knjige ali pa peresa so se
    or books.F.PL or PA pens.N.PL AUX.PL REFL
    podražil-i/-e/-a.
    become.more.expensive-M.PL/-F.PL/-N.PL
    'Either books or pens have become more expensive.'

Our working hypothesis is that both the ellipsis and the NP coordination structure are available in sentences with disjoined subjects, illustrated in (8). As stated above, the ellipsis structure in (8a) can only generate CCA, while the NP coordination structure in (8b) has the potential to derive all three patterns. Our experiment results show that, similar to conjoined subjects, the ellipsis analysis cannot be the only structure source for sentences with disjoined subjects, given the availability of RES and HCA (see Section 3.3). For detailed discussion of disjunction, see Larson 1985; Schwartz 1999; Dikken 2006.

(8) a. Ali [knjige s̶o̶ s̶e̶ p̶o̶d̶r̶a̶ž̶i̶l̶-̶e̶], ali
      or [books.F.PL AUX.PL REFL become.more.expensive-F.PL] or
      pa [peresa so se podražil-a].
      PA [pens.N.PL AUX.PL REFL become.more.expensive-N.PL]
   b. [$_{orP}$ Ali [$_{NP}$ knjige] ali pa [$_{NP}$ peresa]] so se podražil-i/-e/-a.

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2.2 The Role of Semantics in Agreement with Coordination

The current study focuses on probing agreement patterns with *exclusively* disjoined subjects (*either X or Y*), and comparing them with conjoined subjects. This section motivates the choice of exclusive disjunction over simple disjunction (*X or Y*).

Across languages, conjoined subjects tend to trigger resolved agreement more than disjoined subjects, while disjoined subjects tend to trigger CCA even in languages where conjoined subjects do not allow CCA. See (9) for an example in English.

(9)   a.   John and Mary are going to school.
        b.   John or Mary is/?are going to school.

At the same time, it is reported that resolved agreement is observed more with disjoined subjects with the *inclusive* interpretation as well as negative disjunction (*neither ... nor*). (10) is such an example of inclusive disjunction from Greek. (11) is an example of negative disjunction from German (Durrell 2002).

(10)   I   jineka   i to pedi   exun   protereotita ja to emvolio
        the woman.SG or the child.SG have.PL priority   for the vaccine
        kata   tis gripis.
        against the flu
        'The woman and child have priority for the vaccine against flu.' (Greek, Kazana 2011, ex. 84, orginal source: *To Vima* (Greek newspaper))

(11)   In Bonn waren sich weder   Kabinett noch
        in Berlin was.PL self neither Cabinet   nor
        Regierungsfraktionen   einig.
        parliamentary.party.PL united
        'In Berlin neither the cabinet nor the governing parties were agreed.' (German, Durrell 2002, p237, original source: *Zeit* (German newspaper))

Based on this pattern, Smith et al. (2018) claim that 'heads of coordinations that are consistent with a conjunction-like reading are better able to express resolved agreement.' Given the interpretative overlap between conjunction and simple disjunction (i.e. the inclusive reading), resolved agreement observed

with simple disjunction could result from the inclusive interpretation.

In order to see whether the inclusive reading is necessary to license RES, we choose to look into exclusive disjunction, which does not allow the inclusive reading, thus has no interpretative overlap with conjunction. Put differently, if RES under coordination is made possible by the inclusive reading, it is predicted that such agreement strategy should not be available under exclusive disjunction. Our results will show that RES is available to the same extent under conjunction and exclusive disjunction, thus indicating that feature resolution does not rely on the semantics of the coordinators.

2.3   Previous experiments on disjunction in Slovenian

Compared with the recent interest in conjunction agreement in Slavic languages, disjunction agreement has not been looked into as much. Arsenijević and Mitić (2016) use experiments to test disjunction and conjunction agreement in BCS but did not separate the two in the reported data, thus it is hard to isolate disjunction agreement, not to mention agreement with exclusive disjunction. Harrison (2009) reports a series of experiments on Slovenian agreement including a direct comparison between gender agreement in conjunction and disjunction (her Experiment 9). However, only 2 genders, F and M, were included in the experiments, limiting the insights that can be obtained from the results. Moreover, the disjoined NPs in the experiments were singular, which introduces the need to resolve number features on top of gender agreement. It has been observed that number and gender agreement interact in complicated ways in Slovenian (see Experiment 3a and 3b in Marušič et al. 2015).[2] In order to zero in on gender agreement, we believe it is crucial to keep all subjects plural and avoid interference from number agreement. Lastly, only simple disjunction is used in Harrison 2009, which allows inclusive interpretation. As discussed in the last section, the role of the semantics of the coordinator is better studied with exclusive disjunction.

As is shown in the next section, the current study includes all three genders to maximize the empirical scope. All our coordinated NPs are plural, so that interference from number resolution is avoided. We use exclusive disjunction to isolate the role the semantics of coordinators plays in deciding

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[2]Marušič et al. (2015) report that two singular subjects under conjunction show masculine dual agreement across all conditions. With subjects with mismatching number, only the plural subject decides the gender on the participle.

the agreement strategies. To our knowledge, our study is the first experimental investigation of gender agreement under exclusive disjunction in Slovenian.

3 Experiment

3.1 Methods

3.1.1 Participants

We tested 13 native Slovenian speakers (10 males, 3 females) at a high school in Ljubljana. All of them were 18 years old and participated in the experiment as part of a course they attended. The experiment took place on the premises of their high school in an empty classroom. The subjects were mandated to go take the experiment by their teacher, but were not forced to take the actual experiment once they made it to the experimental classroom. They were all monolingual Slovenian speakers and came from various parts of Slovenia, most of them from Ljubljana.

3.1.2 Procedure

We used a guided elicitation task similar to previous experiments on Slovenian conjunction agreement (Marušič et al. 2015; Willer-Gold et al. 2016, 2018). The participants saw a model sentence on the screen, e.g. (12a), with a masculine singular noun phrase as the subject. Then they saw a new replacement noun phrase of disjunction at the bottom of screen (12b).

(12)   a.   <u>Oreh</u>   bo   posajen   za   hišo.
                walnut.M.SG AUX.SG planted.M.SG behind house
                'A walnut will be planted behind the house.'
      b.   Ali grmi   ali pa večje   rože
                or   shrub.M.PL or PA bigger flowers.F.PL
                'either shrubs or large flowers'

The participants were then asked to produce an utterance in which they replaced the subject of the model sentence with the new noun phrase. Their typical response is given in (13). Their responses, i.e. the entire sentences they produced, were recorded and recordings subsequently tabulated. Two people listened to each recording when they were tabulated to minimize mistakes in the recognition/determination of the used agreement.

(13)   Ali grmi   ali pa večje rože   bojo   posajene
       or shrub.M.PL or PA bigger flowers.F.PL AUX.PL planted.F.PL
       za   hišo.
       behind house
       'Either shrubs or large flowers will be planted behind the house.'

The experiment was hosted on IbexFarm (Drummond, 2011).

3.1.3 Materials

Since the task was to replace the subject of the model sentence with a replacement subject, the stimuli in this experiment are NPs connected with exclusive disjunction. In Slovenian, the exclusive disjunction is marked by *ali ... ali pa ...* as is shown in (14).[3]

(14)   ali NP$_1$ ali pa NP$_2$
       or   or PA
       'either NP$_1$ or else NP$_2$'

The model sentences as well as the NPs used in the disjunction were adapted from previous experiments targeting conjunction agreement in Slovenian. Consequently, both animate and inanimate NPs are included in the test items.

To control for the possible number resolution effect, all NPs contained in the subjects are PL. Slovenian allows both the subject-verb order and the verb-subject order. In all items in the experiment, the subject precedes the verb, i.e. only the SV order was tested. To make the sentences with disjunctive subjects pragmatically felicitous, the auxiliary for the future tense '*bo*' is used as in (12a).

Given the three-gender system of Slovenian (M[asculine], F[eminine], N[euter]), 9 possible combinations were planned: MorM, ForF, NorN, MorF, ForM, MorN, NorM, ForN, and NorF. Five examples of each

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[3]The particle *pa* could in principle be left out as the conjunction *ali ... ali ...* is also compatible with the exclusive disjunction interpretation in Slovenian. As we wanted to test exclusive disjunction we chose the *ali ... ali pa ...* which unambiguously gives exclusive disjunction interpretation. An alternative setup is to have the *ali ... ali ...* construction in an exclusive context (see Hartmann and Himmelreich 2021 for German). The difference between these two manipulations is itself an interesting question, which we do not address here. We thank a reviewer for pointing this out.

condition were prepared (5 x 9 = 45). However, due to a coding error, the NORF condition was not included in the experiment. Consequently 40 test items were included in the experiment of the conditions: MORM, FORF, NORN, MORF, FORM, MORN, NORM, FORN.[4]

In addition to the test items, each list included 45 filler items which were identical across participants. Filler items were all non-coordinated subjects of all three genders and numbers. The task with the filler items was the same as with the experiemental items. At the beginning of each list, the participants finished 6 practice items. As a result, each list includes 91 items (40 test items+45 fillers+6 practice items). All experimental items are available in the project's OSF repository (DOI: 10.17605/OSF.IO/AGSM7).

It is worth noting that many aspects of the experiment design, including the methodology, the materials, and the statistics analysis, were comparable to previous experiments on conjunction agreement in Slavic languages, esp. Marušič et al. (2015); Willer-Gold et al. (2016), so that the results can be compared directly.

3.2   Results

All of the 13 participants scored above 89% on the filler items and were thus included in the analysis.

Table 2 shows the percentage of different forms of participles the participants produced. As shown in Table 1 above, there are 8 different agreement combinations of the auxiliary and the participle in Slovenian: 3 different genders in 3 different numbers with only FDU and NDU having syncretic agreement: *sta/bosta . . . -e.* Producing agreement randomly would arguably result in each of the 8 possible auxiliary-participle combinations being used 12.5% of the time. Thus we take anything above 12.5% to be undisputedly a regular grammatical option. We ran Wilcoxon rank sum test statistics to determine whether the patterns that received less than 12.5% show statistically significant differences with the patterns that were clearly used in error (e.g. F agreement in the MORN condition).[5] Contrasting with a clearly

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[4]In the remainder of the paper, conditions of conjunction agreement will be labeled as GenderANDGender, e.g. MANDM; conditions of disjunction agreement will be labeled as GenderORGender, e.g. FORF; combinations of genders regardless of the coordinator will be labeled as Gender+Gender, e.g. N+N.

[5]Following a reviewer's comment, we ran a Shapiro-Wilk test to see whether our data are normally distributed. As they aren't we used the Wilcoxon rank sum test rather than

ungrammatical pattern in order to determine the availability of a pattern is also used in previous experimental studies on conjunction agreement in Slovenian (Marušič et al., 2015, p.56).

We report all the relevant statistics in the Appendix. Figure 1 shows the ratio of participles with different genders in each condition. The patterns that are significantly different from the "ungrammatical" options are boldfaced in Table 2. Patterns that turn out to be unavailable (that are below the chosen grammaticality benchmark of 12.5% and are not statistically different from the clearly ungrammatical patterns) are in shaded cells.

Two cells in Table 2 need some extra explanation. Masculine agreement in the FORN condition is above the 12.5% benchmark, yet the difference between these 17% and a manually constructed ungrammatical 0.01% is at the margin of statistical (in)significance (which is why it isn't boldfaced), and below this margin if compared with feminine agreement in MORN. Masculine in FORN is also statistically significantly different from Masculine in MORN. Feminine agreement in FORN is below the benchmark and is statistically not different from the ungrammatical options like the feminine agreement in the MORN condition, but it is lightly shaded as it is at the same time also not statistically different from masculine agreement in the same condition, which we take to be an available agreement option.

	M	**F**	**N**
MORM	**100%**	0%	0%
FORF	5%	**95%**	0%
NORN	6%	0%	**94%**
MORN	**39%**	2%	**60%**
NORM	**94%**	0%	6%
MORF	**46%**	**54%**	0%
FORM	**94%**	3%	3%
FORN	17%	9%	**74%**

Table 2: Results for participial agreement of disjoined subjects preverbally. Responses were collected using verbal elicitation (n=13).

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more commonly used Student's t-test to determine whether two sets of data are statistically different from each other.
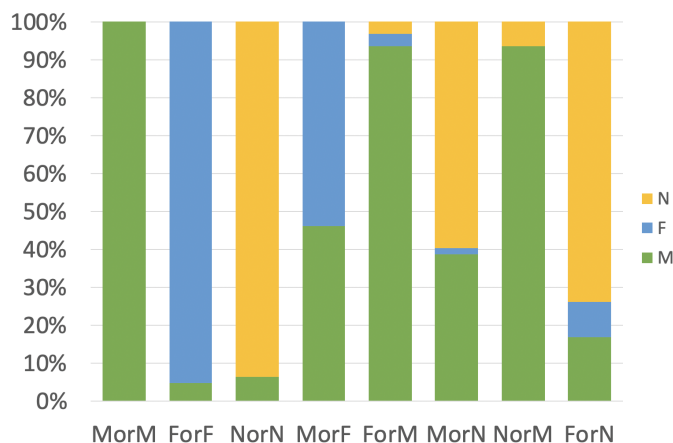
Figure 1: Ratio of gender agreement under exclusive disjunction in Slovenian. Two genders are disjoined preverbally, such as F or N V. All subjects are in plural. Results were obtained using an elicited spoken production experiment (n = 13).

3.3 Discussion

Having shown the elicitation results of gender agreement under disjunction, this section categorizes the results into the known agreement strategies and compares the ratio of each strategy with previously reported patterns of conjunction agreement. As is discussed above, the known agreement strategies with coordinated subjects include Closest Conjunct Agreement (CCA), Highest Conjunct Agreement (HCA), Resolved Agreement (RES), and default agreement.

3.3.1 CCA

The participants produced the participle forms that agree with the linearly closest disjoined subject in all conditions. However, it is important to note that a given form of participle may potentially result from multiple agreement strategies. For example, M in NorM could result from CCA or RES or both; and F in ForF could result from CCA, HCA, RES, or any combination of the three. The definitive evidence for each strategy comes from unambiguous cases where the form can only result from one strategy. The unambiguous cases of CCA comes from F in MorF, N in MorN, and N in ForN. The

	Marušič et al. 2015	Willer-Gold et al. 2016 (SLO)	Disjunction
F in M+F	22%	35%	54% ↑
N in M+N	31%	40%	60% ↑
N in F+N	54%	68%	74% ↑

Table 3: CCA in Slovenian disjunction and conjunction

relevant forms are attested in all three conditions: F in MORF takes up 54% of the responses, N in MORN 60%, and N in FORN 74%. This result indicates that CCA is a stable option for disjunction agreement. CCA has been noted to be a viable agreement strategy for disjunction by various authors since 1970s (Morgan 1972, 1984; Haskell and MacDonald 2005; Keung 2017 among many others). Our experimental results confirm these claims with elicitation data.

Comparing with conjunction agreement, CCA is attested to a bigger extent under disjunction. Table 3 compares the ratios of F in M+F, N in M+N, and N in F+N from the current experiment and the Slovenian conjunction data in experiments reported in Marušič et al. 2015; Willer-Gold et al. 2016.[6] The feminine participle under M+F is chosen 54% under disjunction compared to 22% - 35% under conjunction; the neuter participle under M+N is chosen 60% under disjunction compared to the 31-40% under conjunction; the neuter participle under F+N is chosen 74% under disjunction compared to 54-68% under conjunction.

While CCA is a more frequently attested strategy under disjunction than under conjunction, it is not clear what drives such difference. Given the two structures proposed for disjunction discussed in Section 2, it is possible that the ellipsis structure is entertained more often under disjunction (which itself could be linked to factors like prosody). Another possibility (for the NP coordination analysis) is that Agree-Copy tends to be delayed to a point after linearization in sentences with disjoined subjects.[7] It could also be the combination of these two possibilities. We leave verifying these possibilities

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[6]Results published in Willer-Gold et al. 2016 are the combination of experiments at 5 BCS sites and 1 Slovenian site (see Section 3.3.3 for more discussion). Since this paper focuses on Slovenian, it makes the most sense to compare our results with the results from the one Slovenian site. We are grateful that this data is made available to us by the authors of Willer-Gold et al. 2016. Throughout this paper, the source language of the data cited from Willer-Gold et al. 2016 will be explicitly labeled as SLO or BCS+SLO and described in the text.

[7]We thank a reviewer for pointing this out.

for future research.

3.3.2 HCA

Highest Conjunct Agreement (HCA) with preverbal subjects refers to agreement with the first subject in the disjunction as it is assumed that the first disjunct is structurally higher than the second disjunct. This agreement strategy is observed to a lesser extent compared to CCA. The unambiguous cases are N in NORM, observed 6%, F in FORM (3%), F in FORN (9%). In none of these three conditions did we get a result that is statistically different from the obviously ungrammatical patterns (or from the manually constructed ungrammatical 0.01%). This general low attested rate of HCA under disjunction is in line with the fact that HCA tends to be the weakest option under conjunction, especially when the lower conjunct is masculine (possibly due to the 'default' status of the masculine gender discussed in Marušič et al. 2015 footnote 4).

Despite the similar low ratio under disjunction and conjunction, the HCA option in F+N under disjunction is attested even less than that in conjunction. Table 4 shows results under the F+N conditions from the current experiment on disjunction and previous experiments on conjunction. N agreement results from CCA, F results from HCA, and M results from RES. As is shown, HCA decreases to 9% under disjunction compared with 12-22% under conjunction. At the same time, we can see that the RES ratio stays relatively the same under disjunction and conjunction between 17% and 20%. On the other hand, the CCA ratio increases to 74% under disjunction compared with 52%-68% under conjunction.

F+N	Marušič et al. 2015	Willer-Gold et al. 2016 (SLO)	disjunction
CCA (N)	52%	68%	74% ↑
HCA (F)	22%	12%	9% ↓
RES (M)	20%	18%	17%

Table 4: Comparison of different strategies under F+N in Slovenian

Based on these findings, we argue that this correlation of increased CCA and decreased HCA under disjunction indicates that the low ratio of HCA does not necessarily entail ungrammaticality of HCA in disjunction, but is at least partially driven by the increased preference of CCA. The correlation

comes from the nature of the elicitation task we used. In the elicitation task adapted here and in previous studies including Marušič et al. 2015; Willer-Gold et al. 2016, the speakers were asked to provide only one sentence with one form of participle. A necessary consequence is that as a strategy is chosen more often, other options are bound to be chosen to a lesser extent, even if multiple options are in principle available in their grammar. As is mentioned in the previous section, CCA is chosen more frequently under disjunction than conjunction. Given the nature of the task, this increase entails a decrease in other agreement strategies. The data in Table 4 shows that it is HCA rather than RES that undergoes the decrease. The choice of HCA rather than RES could result from the general 'weakness' of HCA as an agreement strategy under coordinated subjects. Thus we make a tentative suggestion here that HCA is available under disjunction despite the low ratio and the statistical analysis that argues for the contrary.

3.3.3 Resolved and Default Agreement

Having looked at both HCA and CCA above, this section discusses what is labeled as default and resolved agreement.

Default agreement Marušič et al. (2015) and Willer-Gold et al. (2016) propose that M can be inserted to the AndP in Slovenian and BCS, which is labeled as the *default* agreement. When the participle agrees with the AndP rather than either of the conjunct, the participle shows M agreement (cf. Murphy and Puškar 2018). The evidence comes from the M agreement observed in conditions where there are no M in the conjunct, i.e. FandF and NandN.[8] Willer-Gold et al. (2016) reports that M takes up 15% of responses in the FandF condition, 12% in the NandN Condition, 36% in FandN across the 6 experiment sites including 5 where BCS is spoken and 1 where Slovenian is spoken.

As we can see from the result section above, disjunction in Slovenian shows a different pattern. M amounts to 5% in ForF and 6% in NorN, neither of which is significantly different from ungrammatical patterns. M in ForN amounts to 17%, which is the only condition where it is different from the

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[8]For Marušič et al. (2015), M under mismatching conditions like FandN also results from default agreement. For Willer-Gold et al. (2016), on the other hand, M under FandN results from both default agreement and feature resolution.

ungrammatical patterns.[9] Based on these different results under disjunction and conjunction, one could argue that default agreement is not available under disjunction in Slovenian, unlike under conjunction. However, we argue for a stronger proposal: default agreement is not an option in Slovenian at all, under either coordinator (cf. Citko 2018 for a similar claim about Polish).

As mentioned above, the data from Willer-Gold et al. (2016) comes from 5 BCS sites and 1 Slovenian site. As a result, it puts more weight on the BCS data and less on Slovenian, which could potentially mask the differences between BCS and Slovenian. Indeed, if only data from the Slovenian site is considered, it shows that M takes up only 4% in FandF, 3% in NandN, and 18% in FandN under conjunction. Putting Slovenian data together in Table 5, we can see that default agreement shows similarly low ratio under conjunction and disjunction in Slovenian: under F+F or N+N conditions there is no evidence for default agreement, at the same time, M is attested under F+N conditions.[10] Willer-Gold et al. (2016) acknowledge that default agreement is attested less in Slovenian, which they argue to be due to a general dispreference of default agreement. It seems that the argument for default agreement is largely driven by the theoretical unification of BCS and Slovenian. Instead of proposing a default agreement strategy and a dispreference for the strategy, we propose that default agreement is not an option in Slovenian to begin with.

	Willer-Gold et al. 2016 (SLO)	disjunction
M in F+F	4%	5%
M in N+N	3%	6%
M in F+N	18%	17%

Table 5: Comparison of different strategies under F+N in Slovenian

Resolved Agreement   Unlike default agreement which is predicted to appear in all conditions, resolved agreement (RES) appears in conditions where feature mismatches need to be resolved. Willer-Gold et al. (2016)

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[9]See 3.2 for discussion of the status of M in ForN condition.

[10]Marušič et al. (2015) report that M takes 14% of the responses in FandF condition and 16% in NandN condition in Slovenian. This data differs from the Slovenian data from the experiments in Willer-Gold et al. (2016) and follow up experiments by Franc Lanko Marušič and is thus not compatible with our proposal here. We will leave the variation across different experiments aside for now.

propose that in addition to default agreement, RES is needed for conjunction agreement in Slovenian and BCS.

Despite the absence of M in F+F and N+N conditions, M in F+N conditions is attested and is significantly different from noise/error as explained above: 18% under conjunction (Slovenian data from Willer-Gold et al. 2016) and 17% under disjunction (current experiment), whereas M in F+F and N+N amounts to 3%-6%. Given the absence of the default agreement in our system, we propose that the M agreement here results from feature resolution, i.e. resolved agreement. In particular, we argue that mismatched gender features are resolved to Masculine in Slovenian under both conjunction and disjunction. (15) summarizes the proposed resolution rules, all mismatches are resolved to M.

(15)   a.   M+F = M; F+M = M
        b.   M+N = M; N+M = M
        c.   F+N = M; N+F = M

The first argument for resolution rules in (15) is the presence of M in F+N conditions with the reasoning mentioned above. The default agreement and the resolved agreement differ in the conditions they are predicted to apply. The former predicts the default value (here M) to be inserted in all conditions including F+F and N+N where not only neither conjunct is M but also there is no feature mismatch. The resolved agreement, on the other hand, is predicted to only appear in the context of feature mismatch. The pattern observed in conjunction and disjunction agreement in Slovenian is predicted by resolved agreement and not default agreement.

The second argument for (15) is the higher ratio of M in M+F and M+N conditions, compared to F or N in conditions where they are the highest disjunct. As is discussed in the previous section, HCA is attested at a low ratio in NorM (N = 6%), ForM (F = 3%), and ForN (F = 9%). However, conditions where the highest conjunct is masculine, i.e. M+F and M+N, see a much higher ratio of M: M = 46% in MorF, M = 39% in MorN. We follow the intuitive assumption that all else being equal, the ratio of HCA and CCA should be constant across different features. In other words, the ratio of HCA in M+F should be similar in F+M conditions as well. Given the absence of default agreement, this 33% - 37% additive M responses in MorF and MorN is accounted for by the resolved agreement strategy.

Similarly, when the last disjunct is masculine, the M responses are higher

than F or N responses when they are the last disjunct. As is shown in (16) and (17), M takes up 94% of the responses in NorM and ForM, where as F and N only take up 54% to 60%. Assuming that CCA is chosen more or less to the same extent across all conditions, the 40% additive M responses in these conditions provide evidence for resolution rules in (15).

(16)　　a.　M in NorM: 94%　　(17)　　a.　M in ForM: 94%
　　　　b.　N in MorN: 60%　　　　　　b.　F in MorF: 54%

In addition to disjunction, the generally high ratio of M responses compared to F and N is observed under conjunction by Marušič et al. (2015) and Willer-Gold et al. (2016) among others. We thus conclude that feature resolution in (15) is available in the context of feature mismatches in Slovenian.[11]

So far in this section we have argued for the absence of default agreement and the feature resolution rules in (15) in Slovenian. We will end the discussion with a brief comparison between our system and an alternative system proposed in Willer-Gold et al. 2016. Based on their elicitation experiments on conjunction agreement (at 5 BCS sites and 1 Slovenian site), Willer-Gold et al. (2016) proposes a system in (18) in addition to HCA and CCA. First, they propose that there is default M agreement in BCS and Slovenian, but this option is dispreferred in Slovenian (see discussion above). Second, they argue for a set of feature resolution rules in (18) in addition to the default agreement. Note that their resolution rules differ from our proposal in that all the mismatches involving N are resolved to N in (18) whereas all mismatches are resolved to M in our system in (15).

(18)　　Willer-Gold et al. 2016
　　　　a.　default agreement = M
　　　　b.　MandF = M; FandM = M
　　　　c.　MandN = N; NandM = N
　　　　d.　FandN = N; NandF = N

Here we present an argument for the resolution rules in (15) and against the ones in (18). Willer-Gold et al. (2016) conducted two experiments, one with

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[11]Along with a reviewer, one might wonder whether RES is available for conjuncts/disjuncts with *matching* features, e.g. Fand/orF and Nand/orN. Our results reject a version of RES where Fand/orF and Nand/orN are resolved to M. However, whether resolution rules like Fand/orF = F, Nand/orN = N are operational in Slovenian is left open, as the products of RES in these rules overlaps with HCA and CCA.

preverbal subjects and one with postverbal subjects, schematized in (19). It is observed that there is a lower rate of M overall with postverbal subjects than preverbal subjects. The authors accounted for it by proposing that feature resolution is not available with post-verbal subjects. As a result, the M in preverbal agreement has two sources: default agreement and feature resolution; whereas M in postverbal agreement has only one source: default agreement. The lost source for M would account for the lower rate.

(19)   a.   [NP_1 and NP_2] PART (M↑) (M = DEF + RES)
        b.   PART [NP_1 and NP_2] (M↓) (M = DEF only)

However, according to (18c-d), feature resolution produces N rather than M in conditions like FANDN and NANDF. As a result, in these conditions, the source for M is restricted to default agreement only, regardless of the word order. The system in (18) thus predicts there to be no lower rate of M in these conditions. This prediction is not borne out. As we can see in (20) (Willer-Gold et al. 2016 BCS+SLO), M decreases under NANDF and FANDN conditions in the postverbal subject experiment.

(20)   a.   Preverbal: M in FANDN: 36%; M in NANDF: 46% (M = DEF only, according to Willer-Gold et al. 2016)
        b.   Postverbal: M in FANDN: 5%; M in NANDF: 5% (M = DEF only, according to Willer-Gold et al. 2016)

The feature resolution rules in (15), on the other hand, correctly predicts this pattern in (20). Following the same assumption that feature resolution is not available with postverbal subjects, M is predicted to decrease in all mismatching conditions including N+F and F+N.

On the other hand, there is also evidence for (18). Willer-Gold et al. (2016) observe that N is more frequent than F when they are the first or the last conjunct. Looking at the data from preverbal subjects in BCS and Slovenian, Table 6 shows that N is chosen 17%–20% more often than F as CCA and 5% to 7% more often as HCA. This difference between N and F motivated the resolution rules in (18c)-(18d) where the features are resolved to N.

	CCA		HCA	
N	45% (MANDN)	53% (FANDN)	8% (NANDM)	18% (NANDF)
F	25% (MANDF)	36% (NANDF)	3% (FANDM)	11% (FANDN)
N minus F	20%	17%	5%	7%

Table 6: N and F as HCA and CCA in BCS+Slovenian

Looking at Slovenian data from the experiments by Willer-Gold et al. (2016) on its own as shown in Table 7, the difference between N and F reduces but still exists numerically. We note that this difference between F and N is not accounted for in our proposal in (15), which requires further research.[12]

	CCA		HCA	
N	40% (MANDN)	68% (FANDN)	6% (NANDM)	19% (NANDF)
F	35% (MANDF)	51% (NANDF)	2% (FANDM)	12% (FANDN)
N minus F	5%	17%	4%	7%

Table 7: N and F as HCA and CCA in Slovenian

In sum, the current proposal where there is no default agreement and all feature mismatches are resolved to M can account for:

1. the lack of M in F+F and N+N under both conjunction and disjunction;

2. the decreased M in postverbal subjects under conjunction.

However, it cannot account for the difference between N and F ratios as CCA and HCA under conjunction. The proposed system in Willer-Gold et al. (2016), on the other hand, cannot account for 1 or 2 but does predict the difference between N and F.

4 General Discussion

This study uses elicitation methods to investigate gender agreement under exclusive disjunction in Slovenian and compares the findings with previously obtained data from conjunction agreement. Empirically, three agreement

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[12]An anonymous reviewer points out that the difference between N and F could result from the morphological paradigm of the participles in Slovenian illustrated in Table 2. We thank the reviewer and acknowledge that it is a promising direction to pursue.

strategies are attested to varying degrees. CCA is observed across all conditions and shows a higher ratio than conjunction agreement. Unambiguous cases of HCA are observed to a lesser extent (not clearly above the margin of significance), but we argue it to be (marginally) available. Moreover, we argue that RES is necessary to account for the full range of data.

In terms of methodologies, we chose the guided elicitation task which has been proven to be effective in probing attested even if dispreferred agreement options.[13] In our stimuli, we kept all the disjoined subjects plural in order to avoid interaction between number resolution and gender agreement. (cf. Harrison 2009) We kept other aspects constant with previous experiments of conjunction agreement in Slovenian (Marušič et al. 2015; Willer-Gold et al. 2016, 2018), which allows us to directly compare data from the current experiment with the previously reported data. We hope to have shown that formal experiments can offer information including the presence of preferences among available options and the size of preferences, which are hard to obtain with informal acceptability tasks.

Another important aspect of our materials is that we chose exclusive disjunction rather than simple disjunction which allows the inclusive interpretation. The main take-away from the comparison between conjunction and disjunction agreement is that despite the semantic difference between conjunction and exclusive disjunction, they share the same agreement strategies. This consistency shows that CCA, HCA and most notably, RES, are not of a semantic nature, but rather are syntactic operations. The existence of HCA and RES also shows that ellipsis cannot be the only structure for exclusive disjunction in Slovenian. Note that the current experiment does not provide evidence one way or the other regarding whether ellipsis can derive exclusive disjunction. Rather, we show that even if ellipsis can derive some of disjunction agreement, it cannot derive all the patterns. NP coordination is needed for disjunction, similarly to conjunction. In addition, the existence of HCA and RES under disjunction also argues against a theory where agreement under disjunction is decided exclusively by the linear order of the two disjoined NPs.

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[13]Acceptability judgment tasks applied to the materials are predicted to show that the preferred agreement strategies get higher ratings than the dispreferred ones and the ungrammatical patterns get the lowest ratings. We leave testing this prediction for future research.

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Appendix

Results of the Shapiro-Wilk normality test and the Wilcoxon signed rank test with continuity correction:

- Testing whether masculine is a valid agreement option in FORF by comparing it with ratio of a putative ungrammatical pattern: F in MORN.
  M agreement in FORF *vs.* F agreement in MORN.
  mean of x: 0.04761905 (Sh-W: W = 0.45777, p-value = 4.921e-06)
  mean of y: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  V = 1.5, p-value = 0.5862
  $\rightarrow$ M agreement in FORF is not statistically different from F in MORN, therefore not distinguishable from error.

- Testing whether masculine is a valid agreement option in NORN by comparing it with ratio of a putative ungrammatical pattern: F in MORN.
  M agreement in NORN *vs.* F agreement in MORN.
  mean of x: 0.06451613 (Sh-W: W = 0.56746, p-value = 3.477e-05)
  mean of y: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  V = 2, p-value = 0.3447
  $\rightarrow$ M agreement in NORN is not statistically different from F in MORN, therefore not distinguishable from error.

- Testing to see whether Neuter in NORM is a valid agreement option by comparing it with ratio of a putative ungrammatical pattern: F in MORN.
  F agreement in MORN *vs.* N agreement in NORM:
  mean of x: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  mean of y: 0.06349206 (Sh-W: W = 0.63025, p-value = 0.000121)
  V = 2.5, p-value = 0.2031

$\rightarrow$ N agreement in NorM is not statistically different from F in MorN, therefore not distinguishable from error.

- Testing to see whether Feminine in ForM (3%) is a valid agreement option by comparing it with ratio of a putative ungrammatical pattern: F in MorN.
  F agreement in MorN *vs.* F agreement in ForM:
  mean of x: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  mean of y: 0.03174603 (Sh-W: W = 0.44568, p-value = 4.025e-06)
  V = 4, p-value = 0.7728
  $\rightarrow$ F agreement in ForM is not statistically different from F in MorN, therefore not distinguishable from error.

- Testing to see if Feminine is a valid agreement option in ForN by comparing it with ratio of a putative ungrammatical pattern: F in MorN.
  F agreement in ForN *vs.* F agreement in MorN
  mean of x: 0.09230769 (Sh-W: W = 0.70925, p-value = 0.0006877)
  mean of y: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  V = 3, p-value = 0.1198
  $\rightarrow$ F agreement in ForN is not statistically different from F in MorN, therefore not distinguishable from error.

- Testing to see whether Masculine agreement in ForN is the same type of agreement as M in MorN?
  M agreement in MorN *vs.* M agreement in ForN:
  mean of x: 0.3870968 (Sh-W: W = 0.85864, p-value = 0.03696)
  mean of y: 0.1692308 (Sh-W: W = 0.7079, p-value = 0.0006664)
  V = 21, p-value = 0.03552
  $\rightarrow$ The difference is statistically significant, therefor Masculine agreement in these two conditions is not completely comparable (not the same thing).

- Testing to see if Masculine and Feminine plural agreement in ForN is different from each other.
  M agreement in ForN *vs.* F agreement in ForN
  mean of x: 0.16923077 (Sh-W: W = 0.7079, p-value = 0.0006664)
  mean of y: 0.09230769 (Sh-W: W = 0.70925, p-value = 0.0006877)

V = 19.5, p-value = 0.3929
→ The difference is statistically not significant.

- Testing to see if Masculine in FORN is a valid agreement option by comparing it with ratio of a putative ungrammatical pattern: F in MORN.
  M agreement in FORN *vs.* F agreement in MORN
  mean of x: 0.16923077 (Sh-W: W = 0.7079, p-value = 0.0006664)
  mean of y: 0.01612903 (Sh-W: W = 0.31101, p-value = 5.045e-07)
  V = 19.5, p-value = 0.07234
  → The difference is statistically not significant.

- Testing to see if Masculine in FORN is a valid agreement option by comparing it with a manually constructed ungrammatical value of 0.001%.
  M agreement in FORN *vs.* 0.001%
  mean of x: 0.001
  mean of x: 0.16923077 (Sh-W: W = 0.7079, p-value = 0.0006664)
  V = 15, p-value = 0.05676
  → The difference is borderline statistically (in)significant.