

The Grammars of Conjunction Agreement in Slovenian

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Abstract. In this paper we report on the results of five experiments documenting the existence of three distinct grammars of conjunct agreement in Slovenian, found both within and across individuals: agreement with the highest conjunct, agreement with the closest conjunct, or agreement with the Boolean Phrase itself. We show that this variation is constrained and that some of these mechanisms can be blocked and/or forced depending on the properties of the conjuncts. Finally, we offer the suggestion that the presence of intraindividual variation arises because of ambiguous properties of the primary linguistic data.

1. Introduction

Agreement has taken on an increasingly important role in shaping grammatical theory, providing evidence about constraints on structural, morphosyntactic, and other relations (e.g., interactions between agreement and case; anti-agreement; and the syntactic locality and scope of agreement operations), about the functional properties or projections of phrasal heads (e.g., Baker 2008), and about the interface between syntax and morphology (e.g., whether agreement is confined to syntactic or morphological components or is distributed across multiple components of the grammar; e.g., Bobaljik 2008).

In this paper we address three issues that are of fundamental interest to the theory of agreement, including (1) What role do syntactic hierarchy, linear contiguity, and featural markedness play in the calculation of agreement (either in general or in the special circumstances that conjoined phrases create)? (2) How does Agree function with regard to the unity versus independence of inflectional features (e.g., do the mechanisms that probe arguments for number and gender features operate jointly or independently, and are these alternatives mutually exclusive for a language; Béjar 2003)? (3) To what degree is syntactic variability attributable to how grammars strike a balance between competing grammatical mechanisms? The data we focus on

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derives from a controlled experimental study of the morphosyntax of agreement between conjoined subjects and participles in Slovenian.

We focus on what Slovenian speakers do when confronted with scenarios such as computing participial agreement given a conjunction that mixes feminine plural and neuter plural:

- (1) Radirke in peresa so se prodajal-? najbolje.
 erasers_{F,PL} and pens_{N,PL} AUX_{PL} REFL sold-? the best
 ‘Erasers and pens sold the best.’

Languages in which verbs and/or participles agree with their subjects in both gender and number vary somewhat in how they calculate the agreement properties of conjoined phrases. This variation occurs both across languages and within (Aoun, Benmamoun & Sportiche 1994, 1999; Corbett 1991, 2000; Johannessen 1998; among others). Although prescriptive grammars of Slovenian (e.g., Editorial Board 1947:270, Remic-Jager 1980:122) list particular “resolution rules” for such constructions (e.g., default masculine agreement), it has been noted since Bajec 1955 and Corbett 1983 that Slovenian speakers may opt for partial agreement, whereby only a single element of the conjunction, say the feminine noun phrase ‘erasers’ in (1), controls participial agreement. Quite often, one and the same speaker allows multiple options (as noted also in Bajec 1955). In corpus studies conducted by Marušič, Nevins & Saksida (2007), it was observed that partial agreement—both in preverbal and postverbal position—is a well-attested option in Slovenian grammars:

- (2) a. **Radirke** in peresa so se prodajal-**e** najbolje.
 erasers_{F,PL} and pens_{N,PL} AUX_{PL} REFL sold-F.PL the best
 b. Radirke in **peresa** so se prodajal-**a** najbolje.
 erasers_{F,PL} and pens_{N,PL} AUX_{PL} REFL sold-N.PL the best
 ‘Erasers and pens sold the best.’

In this paper we report the results of our attempts to understand variability in elicited production by conducting experimental syntax with Slovenian adults. Our methodology includes the following elements (cf. Schütze 1996, Cowart 1997, Featherston 2007, Goodall 2011):

- (3) a. Nonlinguist study participants
 b. A clearly defined task
 c. Factorial design for the construction of stimuli
 d. Quantitative results

We report on five experiments conducted in Nova Gorica, Slovenia, that were designed to understand the possible and impossible options when speakers engage in elicited production. The dependent variable in all of our studies was the form of agreement on verbal participles, which we focus on because finite verbs or finite auxiliaries do not show gender distinctions, whereas participles agree in Gender and

Table 1. Participle endings and the third-person auxiliaries.

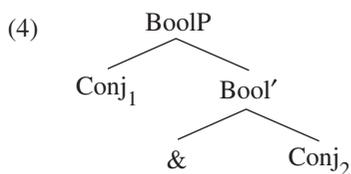
Number	Masculine	Feminine	Neuter	Third-Person Auxiliary
Singular	∅	-a	-o	je
Dual	-a	-i	-i	sta
Plural	-i	-e	-a	so

Number. Slovenian has three genders and three numbers, the morphological endings of which are shown in table 1.

In addition to this three-way number distinction, auxiliaries also show person, but because we are only looking at agreement with nouns, first- and second-person auxiliaries are not important for the present discussion. Given its nine possible morphosyntactic combinations of gender and number categories, Slovenian is a rich language to study conjunct agreement in which one can compute the combinations of two conjoined noun phrases. Moreover, the existence of three genders allows us to study conjoined genders while avoiding mixed conjuncts that already contain the default gender. As virtually all languages that display agreement with conjuncts have a default or resolution strategy involving picking a particular gender, Slovenian allows one to conjoin neuter and feminine and observe the results on participial agreement while being sure that any masculine that arises is truly due to a resolution strategy and not to the presence of any masculine DP within the conjunction.

The prescriptive tradition in Slovenian grammars dictates that whenever the gender of conjuncts is mixed, the default is to resort to masculine. However, in reality this is far from what speaker always do. Like many other Slavic languages with relatively free word order, Slovenian allows the subject to either precede or follow the participle. Given this freedom, we will find it useful to speak in terms of two types of partial agreement strategies that are used. *Closest-conjunct agreement* means agreement with the first conjunct when the subject is postverbal, and agreement with the last conjunct when the subject is preverbal. *Highest-conjunct agreement*, on the other hand, means agreement with the first conjunct, regardless of the relative placement of the conjunct with respect to the verb.

We adopt the following structure of conjunctions (Munn 1993, among others), which are X' structures headed by a Boolean Phrase, which can be either Conj^0 or Disj^0 (in the case of disjunctions headed by *or*). In these X' structures, the highest conjunct asymmetrically c -commands the second conjunct, and the phrase as a whole is headed by the Boolean operator (e.g., Conj^0):



We argue that in Slovenian, a verbal participle seeking an agreement controller can choose from three logically possible feature-bearing XPs: Conj₁, Conj₂, or BoolP. We report on the results of experiments showing that all three options may be found in Slovenian. Before proceeding further, we will point out that studies of partial agreement within conjunctions must take care to demonstrate that the language in question is not one in which such agreement is uniquely the result of conjunction reduction or clausal ellipsis. Marušič, Nevins & Saksida (2007) and Marušič & Nevins (2010), using diagnostics discussed in Munn 1999, found that Slovenian partial agreement can occur when such elliptical operations would clearly not be at play:

- (5) Krava in njena teleta so trčila druga ob drugo.
 cow_{F.SG} and her calves_{N.PL} AUX_{PL} collided_{N.PL} other into another
 ‘A cow and her calves collided with each other.’
- (6) Nonet je sestavljalo pet moških in štiri ženske.
 nonet_{SG} AUX_{SG} formed_{N.SG} five men and four women
 ‘A nonet is formed by five men and four women.’
- (7) Štiri ženske in pet moških je sestavljalo nonet.
 four women and five men AUX_{SG} formed_{N.SG} nonet_{SG}
 ‘Four women and five men formed a nonet.’

In examples like (5), (6), and (7), collective predicates show partial agreement with one conjunct, but semantically they must be predicated of the entire conjunct. The collision crucially involved both the cow and her calves in (5) and one obviously needs nine people to compose a nonet, as in (6) and (7). Nonetheless, the closest conjunct controls agreement in all three examples (quantified noun phrases trigger nominative-singular agreement, as discussed in section 6). Having shown that partial agreement is the result of the agreement process rather than ellipsis operations, we see that this raises a number of intriguing theoretical issues, listed in (8).

- (8) Theoretical issues raised by conjunct agreement:
- a. Tradeoffs between hierarchical, linear, and relativized closeness
 - b. Default status among gender features
 - c. Asymmetric dependence of gender agreement on number agreement

As indicated in (8a), closeness can be measured in a number of ways: hierarchically, a highest conjunct in the specifier of a BoolP in the specifier of a verb phrase is closer to the verbal head than the second conjunct, but speakers may nonetheless opt for the second conjunct, which is linearly closer. By contrast, choosing the BoolP head itself may be the closest element of the *relevant type*, namely the head of the entire phrase. The choice of an agreement controller thereby must negotiate these distinct types of locality, an issue to which we return in section 4. Even when both options may be

equally available, the choice between agreement controllers may be biased as a result of their inherent gender, with masculine being the unmarked gender in Slovenian, a factor that plays a role in our results. Finally, choice of an agreement controller may be primarily determined by the number of the XP, with gender as a secondary factor, thereby reflecting a distinction and dependence among these features.

We conducted five experimental studies, with the goal of first establishing the range of grammatical variation possible in mixed-gender conjuncts both pre- and postverbally and then successively manipulating the internal structure of the conjunctions to curtail certain grammatical options. The structure of the experiments is as follows:

(9) Summary of experimental investigation of Slovenian conjunct agreement

Experimental study 1: Effects of mixing genders

Experimental study 2: Effects of directionality

Experimental study 3: Effects of mixing numbers

Experimental study 4: The curious case of 5&Ups

Experimental study 5: Closest-conjunct agreement vs. attraction with modified NPs

Section 2 provides an overview of the methodology used to study these issues, and sections 3, 5, 6, and 7 describe the experimental results.

In experiment 1, described in section 3.1, we investigated the effects of mixing genders. Experiments 1a and 1b compare the results of two plural conjuncts when the two are of the same gender and when they are of different genders. The findings are that three patterns of responses are attested, which correspond to the grammatical options of choosing the highest conjunct, the last conjunct, or the BoolP as a whole as an agreement controller.

Whereas experiment 1 focuses on preverbal and postverbal conjoined subject DPs of the same gender and different genders, experiment 2, described in section 3.2, looks at the result of postverbal conjoined subjects of different genders and at cases of conjoining more than two noun phrases. Experiment 2a looks at postverbal BoolPs and finds no instances of true furthest-conjunct agreement, and experiment 2b looks at preverbal BoolPs consisting of three conjoined DPs and finds no instances of medial-conjunct agreement.

In section 4, we develop a model of the results of experiments 1 and 2 in terms of choosing agreement controllers. We establish two main grammatical options, whose locus of variability involve tradeoffs between agreement with a DP that has a lexically specified gender and a pressure to establish Agree only once with the hierarchically highest projection of the BoolP. Because the BoolP is hierarchically highest and can compute its number semantically (though a DisjP could not), it will have a number value to furnish for the participle. But, as we will argue, BoolP will have no gender feature. We thus develop a model in which there are two grammatical strategies: agreement with BoolP or agreement with a conjunct.

In experiments 3 and 4 we find ways to block one of these strategies. Experiment 3, described in section 5, introduces singular conjuncts. We posit a Consistency principle that renders agreement with an individual conjunct impossible when the

number of BoolP as a whole is not matched. Experiment 4, described in section 6 and in the supplementary online material, uses numerically quantified noun phrases, which are ϕ -defective. We argue that the presence of ϕ -defective conjuncts renders BoolP unable to compute its own number, thereby forcing closest-conjunct agreement. Experiment 5, in section 7, establishes that this is not an “attraction” phenomenon, patterning differently from results of production studies involving linear agreement with an NP modifier. Section 8 offers a suggestion of what other language-internal properties may give rise to closest-conjunct agreement, and section 9 concludes.

2. Methodology and Overview of the Experiments

We conducted two types of studies, written elicitation and spoken elicitation, in five experiments. In this section, we provide the details of the methodology and experimental design, necessary preliminaries before turning to the theoretical model developed successively in each section.

All participants were native speakers of Slovenian, approximately 90% of which were from the wider Nova Gorica region of Slovenia. The participants in the written-elicitation study were high school students with no background in linguistics, and the participants in the spoken-elicitation study were first-year university students with limited-to-no background in linguistics.

The studies involving written elicitation of participial agreement (experiments 1a, 1b, and 2a) were conducted using a fill-in-the-blanks style of questionnaire, administered in parallel to a large group of high school students ($n = 31$). There were three versions of the questionnaire, and for each participant, the order of sentences was randomized. The questionnaire consisted of 224 examples (144 test examples in each of the three questionnaires, composed of 72 examples with preverbal conjoined noun phrases and 72 examples with postverbal conjoined noun phrases). These 72 examples consisted of 4 examples for each condition, where the 18 conditions were: 9 conjoined singulars and 9 conjoined plurals, with all 3 genders crossed. In total, the factors were: 3 genders of highest conjunct \times 3 genders of second conjunct \times 2 possibilities (both singular or both plural) \times 2 possibilities (preverbal or postverbal) \times 4 items = 144 test items. The 80 fillers had simple nonconjoined subjects of all genders and all numbers.

The studies involving elicited production of spoken agreement (experiments 2b, 3a, 3b, 4, and 5) involved the following procedure. On each trial, the participant sees a model sentence on the screen, with a masculine singular noun phrase as the subject. The participant then sees a new replacement noun phrase at the bottom of screen, and their task is to produce an utterance in which they replace the subject of the model sentence with a new noun phrase. Conditions (i.e., different combinations of conjuncts) are randomized, and the experiment contains irrelevant fillers with no conjunction in the replacement noun phrase. Responses were digitally recorded and tabulated afterwards according to their agreement endings.

Experiments 2b, designed to test the effects of three conjuncts, and experiment 3b, designed to test the effects of mixed-number conjunctions, the results of both of

which are reported separately below, were tested together, involving a total of 10 conditions, with 6 items per condition, yielding 60 test examples, alongside 60 fillers of all genders and all numbers, yielding a total of 120 sentences. The conditions for experiment 2b involved four different combinations of three conjuncts, which were N.PL+F.PL+N.PL, F.PL+N.PL+N.PL, N.PL+M.PL+N.PL, F.PL+F.PL+N.PL, whereas the conditions for experiment 3b involved different conjunctions of mixed number (i.e., one singular and one plural), and were M.SG+F.PL, M.SG+N.PL, N.PL+M.SG, F.PL+M.SG, N.SG+F.PL, F.PL+N.SG. Participants were tested individually (n = 18).

Experiment 3a—designed to investigate the effects of conjunction of two singular conjuncts—involved 48 test examples, based on 4 examples per condition, with 12 different conditions. These 12 conditions were: 3 uniform gender conjunctions of singulars (e.g., F.SG+F.SG), 3 uniform gender conjunctions of plurals (e.g., F.PL+F.PL), and 6 mixed gender conjunctions of singulars. They were randomized, along with 64 fillers of all genders and numbers, all of which were nonconjoined. This yielded a total of 112 sentences. Participants were tested individually (n = 12).

Experiment 4—described in fuller detail in the supplementary online material—was designed to test the effects of conjunction of numerically quantified noun phrases, involved 36 test examples and 66 fillers, yielding a total of 102 sentences. There were six examples for 6 conditions, where the conditions all compared numerically quantified noun phrases (so-called 5&Up) with lexical neuter singulars. The conditions were: conjunction with a M.PL or F.PL in highest-conjunct position and 5&Up or N.SG in second position, plus two cases of self-conjunction (5&Up+5&Up, N.SG+N.SG). Fillers were all genders and all numbers plus 5&Ups pre- and postverbally, plus cases of quantified noun phrases (QNPs). Participants were tested individually (n = 10).

Experiment 5, designed to compare closest-conjunct agreement with attraction effects, involved 42 test examples and 68 fillers, yielding a total of 110 sentences. The 42 test examples were composed of the following conditions: N.SG+F.PL (6 items), M.SG+F.PL (6 items), F.PL+5&Up (6 items), F.PL+N.PL (4 items), M.DU+F.DU (4 items), M.SG+N.PL (4 items), M.SG+F.PL with a possessor (4 items), and M.SG+ 5&Up with a possessor (4 items), and 5&Up+F.PL with a possessor (4 items). This wide range of condition types was designed to elicit attraction using nouns syncretic for nominative and oblique case, as discussed in section 7. Each condition had half of its items as attraction configurations and half as conjunction configurations. There were two versions of the experiment, with the same items appearing as PP modifiers in one list and as conjuncts in the other list. Five participants were tested individually for each list (total n = 10).

We emphasize the importance of elicited production in exploring intraindividual variation. A speaker of a language may have certain preferences when judging a sentence metalinguistically that can be more sharply defined when presented with a clearly defined task of producing a sentence, under controlled conditions. Nonetheless, like all experimental tasks with written or spoken production of more than 100 sentences, fatigue effects may arise. In what follows, we report on the results of the studies with a specific focus on their theoretical implications, step-by-step, steering a particular eye toward accounting for the existence of inter- and intraindividual

variation and alongside the cases in which this grammatical variability is greatly reduced or nonexistent. Given that experimental noise in production tasks is par for the course, we largely focus on response types that constitute approximately 10% or more for that condition or are otherwise statistically distinguishable from either the null hypothesis or clear instances of noise. We affirm that this is a principled choice in experimentally informed theory construction, because one does not want to overfit the data by designing a theory that can easily handle the weakly attested response patterns. We present the results with bar graphs to facilitate ease of comparison between response patterns.

3. Initial Experiments: The Basic Cases

3.1. Conjuncts with Mixed Genders

Recall example (1), in which a N.PL and F.PL noun phrase were conjoined, and the question was which possibilities for gender agreement are actually found on the participle. Before we can proceed to an investigation of participial agreement of *mixed-gender* conjunctions, however, we must first understand the possible patterns with *uniform-gender* conjuncts. In what follows, we focus on coordinations in which both conjuncts are plural.

Experiment 1a contained sentences such as (10)–(12), in which participants' written productions of the auxiliary and participial endings were elicited for uniform gender conjuncts occurring pre- and postverbally.

- (10) a. Zvezki in učbeniki ___ se podražil-___ že
 notebooks_{M,PL} and textbooks_{M,PL} AUX REFL raised-price-___ already
 drugič letos.
 second time this year
 'Notebooks and textbooks got more expensive already for the second time this year.'
- b. Sredi ceste ___ ležal-___ ključi in kovanci.
 middle road AUX lay-___ key_{M,PL} and coin_{M,PL}
 'Keys and coins were lying in the middle of the road.'
- (11) a. Gledališča in plesišča ___ se zaprl-___ ob devetih zvečer.
 theater_{N,PL} and dance-hall_{N,PL} AUX REFL closed-___ at nine evening
 'The theaters and dancehalls have closed their doors at nine in the evening.'
- b. Največkrat ___ se zgubil-___ šestila in ravnila.
 the-most-times AUX REFL lost-___ compass_{N,PL} and ruler_{N,PL}
 'Compasses and rulers were lost most frequently.'
- (12) a. Nedelje in srede ___ namenjen-___ spanju.
 Sundays_{F,PL} and Wednesdays_{F,PL} AUX meant-___ sleeping.
 'Sundays and Wednesdays are meant for sleeping.'

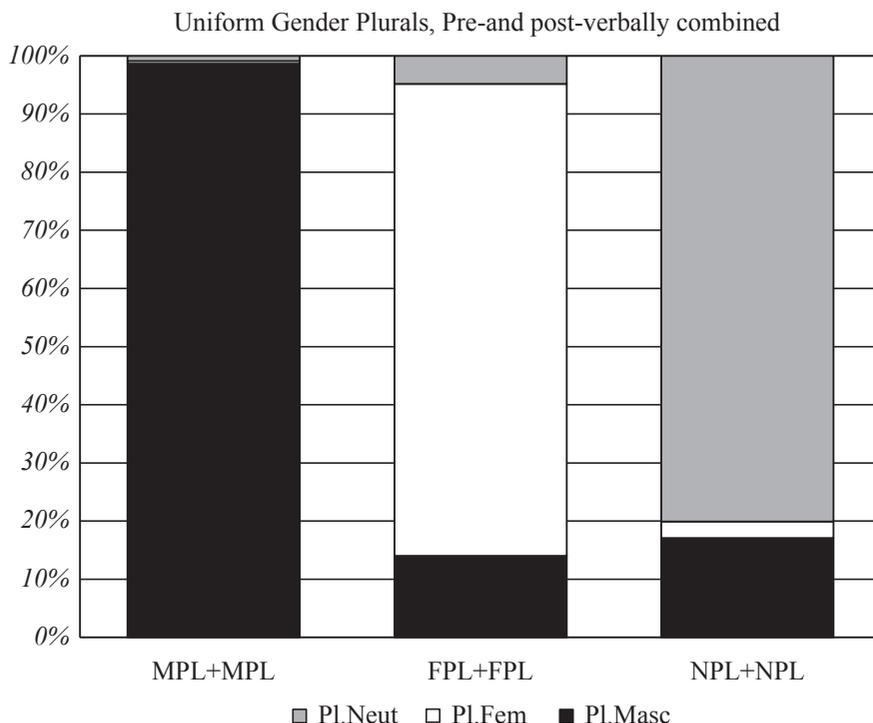


Figure 1. Experiment 1a results for participial agreement of conjoined uniform genders, preverbally and postverbally. Responses were collected using written elicitation (n = 31). Examples for the three conditions presented with the vertical bars are shown in (10)–(12).

- b. Najmanj ___ znal-___ labradorke in doge.
 the-least AUX knew-___ Labrador_{F,PL} and Great Dane_{F,PL}
 ‘Labrador retrievers and the Great Danes knew the least.’

The results are presented in figure 1, where each bar represents a total of 248 potential responses (31 participants × 4 items per condition × 2 verb-conjunct orders); missing or uncodable responses are not included in the counts in figure 1.

As expected, figure 1 shows that uniform-gender plural conjuncts largely elicit participial agreement that corresponds to the gender of the two conjuncts, such as Fem in the case of _{F,PL}+_{F,PL}.¹ However, these results also show instances in which gender agreement with the BoolP rears its head. In particular, default masculine

¹ When looking at uniform gender combinations, we focus largely on cases in which at least one of the conjuncts is plural, in order to focus on the competition between conjunct agreement and agreement with BoolP. However, we treat the conjunction of uniform-gender singular conjunctions to some extent in section 7, where _{N,SG}+_{N,SG} are combined.

agreement occurs even when both conjuncts are the same gender, showing that the resolution rule of masculine agreement for all conjunctions is attested even in uniform-gender conjunctions. The average percentage of masculine plural responses in both the $F.PL+F.PL$ (14%; $t(30) = 5.54, p < 0.001$) and $N.PL+N.PL$ (16%; $t(30) = 6.09, p < 0.001$) conditions were significantly different from the null hypothesis, which in these two conditions for masculine we take to be zero. The difference between masculine responses with $F.PL+F.PL$ conjuncts and $N.PL+N.PL$ conjuncts is not significant ($t(30) = 0.79, p > 0.1$).² Anticipating our theoretical model in section 4, we take the case of default agreement to be the result of establishing agreement with the BoolP node rather than with one of the individual conjuncts.³

Having established that resolution to default masculine is a live option in even uniform-gender conjunctions, we then examined the effects of mixed-gender conjunctions, which have six possible combinations, given the three genders of Slovenian. To test the range of possible participial agreement productions with mixed-gender conjuncts, experiment 1b presented example stimuli such as those in (13)–(18), in which both conjuncts were plural and the conjunction occurred preverbally.

- (13) Steklenice in vrči ___ se razbil-___ med pranjem.
bottles_{F,PL} and jugs_{M,PL} AUX REFL broken-___ during washing
'Bottles and jugs broke during washing.'
- (14) Društva in zbori ___ se pritožil-___ predsedniku.
societies_{N,PL} and choruses_{M,PL} AUX REFL complained-___ president
'Societies and choruses complained to the president.'
- (15) Čolni in ladje ___ se gnetl-___ v pristanišču.
boats_{M,PL} and ships_{F,PL} AUX REFL crowded-___ in port
'Boats and ships were crowding the port.'
- (16) Prebivalci in okrožja ___ sklenil-___ dogovor.
residents_{M,PL} and counties_{N,PL} AUX made-___ agreement
'Residents and counties made the agreement.'

² Calculation of statistical significance was done throughout the paper with a two-tailed t-test on percentages of responses of a particular agreement distributed across the participants. The charts represent the total sum of all responses by all individuals.

³ The sporadic instances of feminine plural agreement occurring with $N.PL+N.PL$ and neuter plural agreement occurring with $F.PL+F.PL$ would seem to constitute clear instances of noise but are statistically different from the null hypothesis, which we take to be zero in this case (2%; $t(30) = 2.27, p = 0.05$ for $F.PL$ agreement with $N.PL+N.PL$; 5%; $t(30) = 4.05, p < 0.01$ for $N.PL$ agreement with $F.PL+F.PL$). On the other hand, both agreements occur significantly less frequent than chance, which is 1:5, given the five distinct agreement endings; $t(30) = 16.06, p < 0.001$ for $F.PL$ agreement with $N.PL+N.PL$ and $t(30) = 13.3, p < 0.001$ for $N.PL$ agreement with $F.PL+F.PL$. The computation of chance is 1:8 if number on the auxiliary is taken to disambiguate (but see section 8 for discussion), yielding $t(30) = 9.18, p < 0.001$ for $F.PL$ agreement with $N.PL+N.PL$ and $t(30) = 6.8, p < 0.001$ for $N.PL$ agreement with $F.PL+F.PL$. We have no explanation for these apparently task-related performance effects, which do not occur in the $M.PL+M.PL$ condition, and must leave these questions for future investigation.

- (17) Drevesa in cvetlice ___ zacvetel-___ petega maja.
 trees_{N,PL} and flowers_{F,PL} AUX bloomed-___ fifth May
 ‘Trees and flowers bloomed on the fifth of May.’
- (18) Sadike in zrna ___ pognal-___ le v črni zemlji.
 seedlings_{S,F,PL} and grain_{N,PL} AUX sprouted-___ only in black soil
 ‘Seedlings and grains sprouted only in black soil.’

The results of this experiment are presented in figure 2, where each bar represents a total of 124 potential responses (31 participants × 4 items per condition); missing or uncodable responses are not included in the counts in figure 2.

The four leftmost columns in figure 2 all contain a masculine plural conjunct. These cases, therefore, potentially involve both partial agreement (agreement with the masculine conjunct itself) or default agreement (masculine agreement as a result of agreement with BoolP). However, as shown in the rightmost two columns in figure 2,

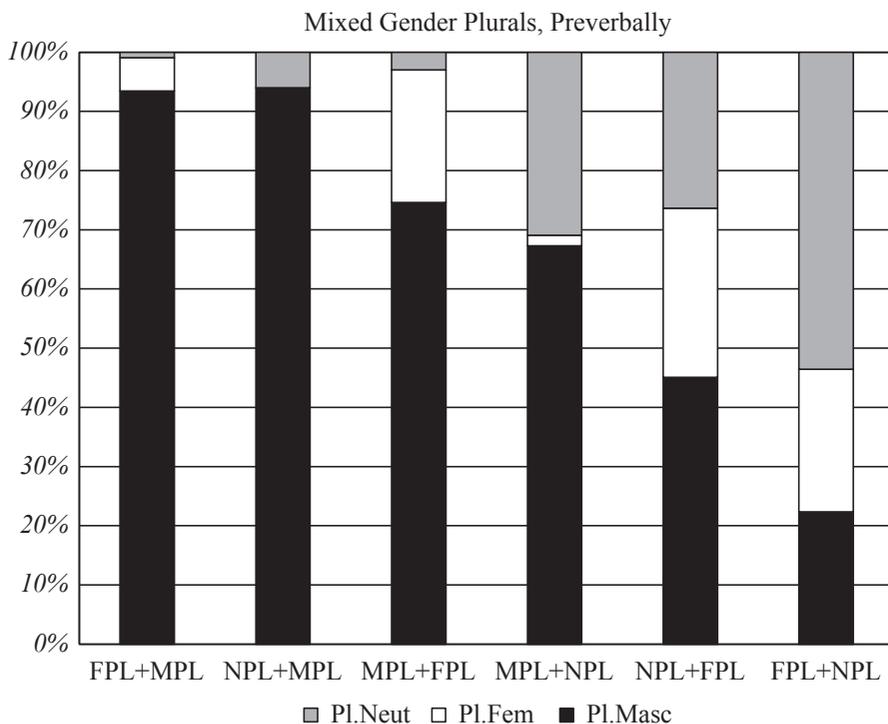


Figure 2. Experiment 1b results for participial agreement. Mixed genders conjoined preverbally, such as [[neuter.plural & feminine plural]_{BoolP}... V]. Responses were collected using written elicitation (n = 31). Examples for the six conditions presented with the vertical bars are shown in (13)–(18).

we found three patterns of agreement: M.PL agreement, N.PL agreement, and F.PL agreement, which are all but one significantly different from chance (as explained above, 12.5%): the average percentages in the N.PL+F.PL condition are M.PL: 39%; $t(30) = 5.18$, $p < 0.001$; F.PL: 26%; $t(30) = 3.13$, $p < 0.01$; N.PL: 26%; $t(30) = 2.71$, $p < 0.05$; and in the F.PL+N.PL condition M.PL: 20%; $t(30) = 1.79$, $p < 0.1$; F.PL: 22%; $t(30) = 2.30$, $p < 0.05$; N.PL: 52%; $t(30) = 6.83$, $p < 0.001$.⁴

Once we note that masculine agreement with a [M+non-M] conjunction is ambiguous, as it could be either default agreement or highest-conjunct agreement, it becomes apparent that taken in tandem with the results of the [N+F] and [F+N] conditions there are three distinct response types:

- (19) Three ways of computing conjunct agreement
 - a. Maximal-projection-wise: default agreement
 - b. Hierarchically: highest conjunct
 - c. Linearly: closest conjunct

In other words, in examples such as (18), targeting the BoolP yields M.PL participle agreement, targeting the highest conjunct leads to F.PL agreement, and targeting the linearly closest conjunct yields N.PL agreement. As the rightmost two columns of figure 2 show, these are all robustly attested.

This pattern of results is inconsistent with the predictions of Bošković's (2009) analysis of partial agreement. Bošković, focusing on Bosnian/Croatian/Serbian, claims that agreement with the last conjunct in preverbal position is derived because of the two following factors. Once agreement has been established in the subject's base position, the uninterpretable features (i.e., gender) are deleted on the conjunct that entered into the agreement relation. Then, because of an ambiguous targeting for the pied-piping movement (either only the highest conjunct or the entire BoolP) the first valuation is cancelled, which results in a second instance of agreement, this time with the second conjunct, which allows the entire BoolP to move to the preverbal position. In short, whenever the BoolP moves to the preverbal position, only last conjunct agreement is predicted to exist (see Bošković 2009:(5c)). Bearing in mind that Slovenian might differ in significant respects from Bosnian/Croatian/Serbian, one would still predict that the grammatical mechanisms allowing agreement with the last conjunct in the two languages are comparable. Nonetheless, as the rightmost two

⁴ The relatively low numbers for highest-conjunct agreement in the first two columns where the second conjunct is M.PL is most likely a consequence of the additive preference for closest-conjunct agreement over highest-conjunct agreement; nonmasculine highest conjuncts triggered preverbal highest-conjunct agreement in 14% of cases, whereas nonmasculine second conjuncts triggered preverbal closest-conjunct agreement in 31% of cases ($t(30) = 4.33$, $p < 0.001$) and the masculine's status as the default gender.

Why there turns out to be more agreement with the closest conjunct and less default masculine agreement in the F.PL+N.PL condition than in the N.PL+F.PL condition remains an open question. Nonetheless, the difference between the lowest of the three responses attested in the last two columns—agreement with the highest conjunct (F.PL agreement in F.PL+N.PL and N.PL agreement in N.PL+F.PL)—and the amount of noise in the first four columns (N.PL agreement in the M.PL+F.PL and F.PL+M.PL conditions, and F.PL agreement in M.PL+N.PL and N.PL+M.PL conditions) is significant ($t(30) = 6.27$, $p < 0.001$).

columns of figure 2 show, we do find highest-conjunct agreement in the preverbal position in Slovenian.⁵

We adopt the position of Anttila (1997) that when there are multiple grammatical strategies that lead to the same surface result, that particular outcome may be greater numerically represented, as there are two distinct ways that essentially double the number of that outcome.⁶ For this reason, the four leftmost bars of figure 2 have an overwhelming proportion of M.PL responses, because there are two distinct grammatical mechanisms in (19) that result in the same surface agreement.

Having shown that Slovenian speakers have three different options for agreement in the case of mixed-gender conjunctions, the immediate question that arises is whether a single individual possesses all three grammars. That is, in the case of conjoined F.PL and N.PL (in either order), does a single speaker allow (and produce) all three options? Figure 3 shows the results by participant for experiment 1b, where each column represents a participant's eight responses. As shown in figure 3, only 3 of 31 participants have a "single grammar": most of them show intraindividual variation between two or three of the options in (19).

Having established these three strategies both across and within speakers, we wish to show that there are indeed three, and only these three. We will argue that although syntactic optionality clearly exists in this domain, it is not unconstrained, and certain logically imaginable options are simply unattested in speakers' productions. In experiment 2, we turn to the effects of directionality, investigating both postverbal conjunctions and conjunctions with three noun phrases.

⁵ The Slovenian data present at least two other problems for Bošković's (2009) analysis. First, Bošković claims that uninterpretable gender features are deleted on the NP, whereas the interpretable number features remain present even after valuation. He proposes, however, that unlike gender on inanimate nouns, gender on animate nouns is an interpretable feature that does not delete at Match/valuation but remains in the derivation and even blocks agreement with the last conjunct. This prediction was not borne out in our results. In case of the condition F.PL+N.PL, tested in experiments 1b and 2b, the ratio between highest- and last-conjunct agreement was 23%:52% with inanimate conjuncts and 25%:36% when the highest conjunct was a [+animate] noun. In both cases last-conjunct agreement was more frequent than highest-conjunct agreement.

Furthermore, Marušič, Nevins & Saksida (2007) report examples where the coordinated subject is sandwiched between two verbal elements and can trigger different agreement on the two probes, such that the verbal element preceding the conjunction agrees with the highest conjunct, whereas the verb following conjunction agrees with the last conjunct, as in (i); see also Bhatt & Walkow 2013 for a similar pattern in Hindi. Bošković (2009) cannot derive these patterns. Last-conjunct agreement is a consequence of feature deletion on the highest conjunct. But if the highest conjunct is to have no features, it cannot trigger agreement on the higher verbal element.

(i) Včeraj so **bile** [krave in teleta] **prodana**.
 yesterday AUX been_{F,PL} cow_{F,PL} and calf_{N,PL} sold_{N,PL}
 'Yesterday cows and calves were sold.'

Finally, as pointed out to us by Ezekiel Panitz (personal communication), Bošković's proposal overgenerates furthest-conjunct agreement in such cases. When BoolP moves to the preverbal position it is already without the uninterpretable gender features on the highest conjunct, so the second verbal element (which is merged higher than the subject) would not agree with the highest conjunct but only with the second conjunct—resulting in the unattested furthest-conjunct agreement.

⁶ These results may also be compatible with weighted versions of Optimality Theoretic constraints that allow for stochastic ranking outputs, such as those of Goldwater & Johnson 2003, Jäger 2007, and Keller 2006.

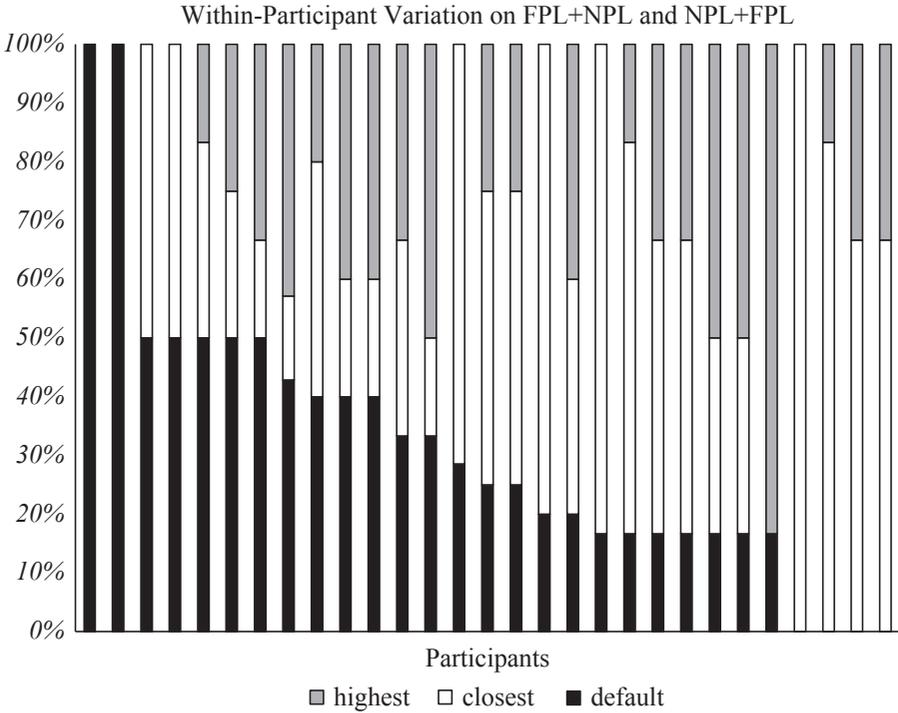


Figure 3. Experiment 1b results of mixed feminine and neuter plurals, by participant (n = 31). Each column represents a participant and the proportion of three possible agreement endings produced.

3.1. Experiment 2: Effects of Directionality

We argued that there is highest-conjunct agreement and closest-conjunct agreement within the grammars of Slovenian. Importantly, the latter of these converge in postverbal contexts: the highest conjunct *is* the closest conjunct. The particular statement of these grammatical possibilities, therefore, rules out two other mechanisms of agreement-controller choice: literal last-conjunct agreement and literal second-conjunct agreement. If highest-conjunct agreement and closest-conjunct agreement are the only possibilities, then a postverbal conjunction will not allow agreement with the second, last, or farthest conjunct. In other words, preverbal conjunction has richer possibilities than postverbal conjunction, owing to the fact that two strategies converge in the latter. The three options are represented in (20)–(23), where (20) and (21) show that three possibilities exist when the conjunction is preverbal, but only two possibilities exist when the conjunction is postverbal, as in (22) and (23).

- (20) [Krave in teleta] so odšla/odšle/odšli na pašo.
 cow_{F,PL} and calf_{N,PL} AUX_{PL} went_{N,PL/F,PL/M,PL} on graze
 ‘Calves and cows went grazing.’

- (21) [Teleta in krave] so odšla/odšle/odšli na pašo.
 calf_{N,PL} and cow_{F,PL} AUX_{PL} went_{N,PL/F,PL/M,PL} on graze
 ‘Calves and cows went grazing.’
- (22) Včeraj so odšla/*odšle/odšli [teleta in krave] na pašo.
 yesterday AUX_{PL} went_{N,PL/*F,PL/M,PL} calf_{N,PL} and cow_{F,PL} on graze
 ‘Yesterday calves and cows went grazing.’
- (23) Včeraj so *odšla/odšle/odšli [krave in teleta] na pašo.
 yesterday AUX_{PL} went_{*N,PL/F,PL/M,PL} cow_{F,PL} and calf_{N,PL} on graze
 ‘Yesterday cows and calves went grazing.’

In experiment 2a, we compared the six mixed-gender conditions of experiment 1b (in which they were preverbal) with their corresponding postverbal positions, as shown in (24)–(29).

- (24) Pred leti __ se močno postaral-__ babice in dedki.
 before years AUX REFL highly aged-__ grandmothers_{F,PL} and grandfathers_{M,PL}
 ‘Years ago, grandmothers and grandfathers aged quickly.’
- (25) Zagnojil-__ __ se očesa in zobje.
 fester-__ AUX REFL eyes_{N,PL} and teeth_{M,PL}
 ‘Eyes and teeth became festering.’
- (26) Zadnjo večerjo __ predstavljajal-__ piščanci in ribe.
 last supper AUX presented-__ chicken_{M,PL} and fish_{F,PL}
 ‘Chicken and fish constituted the last supper.’
- (27) Zaradi vlage __ se pokvaril-__ avtomobili in kolesa.
 because humidity AUX REFL broke-__ cars_{M,PL} and bikes_{N,PL}
 ‘Cars and bikes broke down because of humidity.’
- (28) Najbolj __ bolel-__ prekletstva in rane.
 most AUX hurted-__ curses_{N,PL} and wounds_{F,PL}
 ‘Curses and wounds hurt most.’
- (29) Lansko leto __ se zgradil-__ igralnice in igrišča.
 last year AUX REFL built-__ casinos_{F,PL} and playgrounds_{N,PL}
 ‘Casinos and playgrounds were built last year.’

The results of this experiment are presented in figure 4, where each bar represents a total of 124 potential responses (31 participants × 4 items per condition); missing or uncodable responses are not included in the counts in figure 4.

As shown in figure 4, the existence of three possibilities in neuter + feminine combinations (in either order) decreases drastically, to the point where agreement

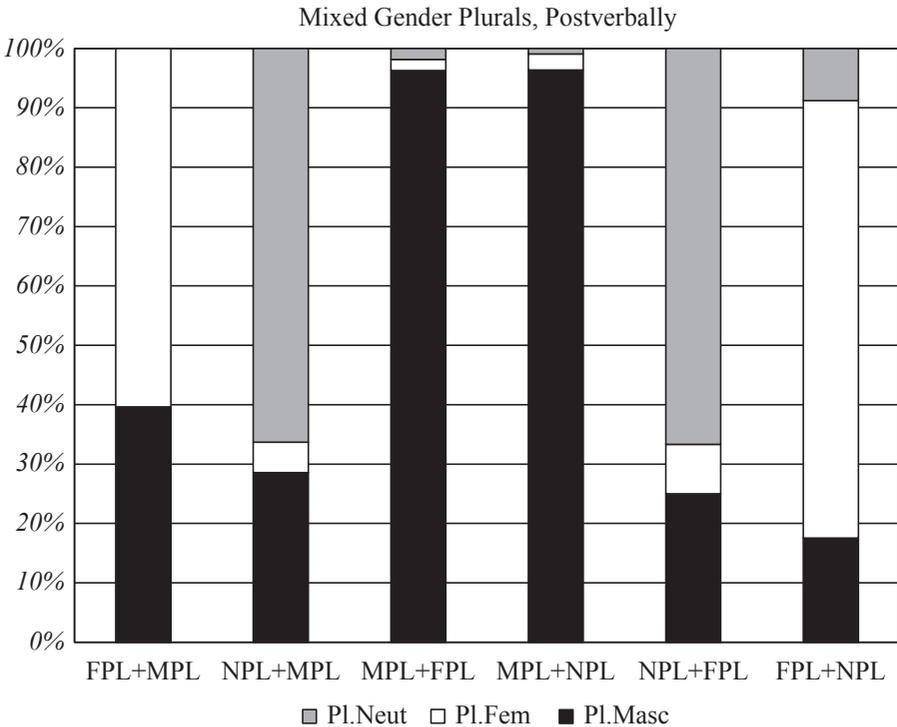


Figure 4. Experiment 2a results for participial agreement. Mixed genders conjoined postverbally, such as [V... [neuter plural & feminine plural]_{BooP}]. Responses were collected using written elicitation ($n = 31$). Examples for the six conditions presented with the vertical bars are shown in (24)–(29).

with the farthest conjunct (i.e., the second conjunct in a postverbal conjunction) is negligible in the middle two bars (cf. the first two bars of figure 2). Furthest conjunct agreement in the postverbal $M.PL+F.PL$ and $M.PL+N.PL$ conditions is statistically undistinguishable from zero (2%, $t(30) = 1.42$, $p > 0.1$ for $F.PL$ agreement in $M.PL+F.PL$; 1%, $t(30) = 1$, $p > 0.1$ for $N.PL$ agreement in $M.PL+N.PL$) and from the co-occurring noise with essentially the same means ($N.PL$ agreement in $M.PL+F.PL$ and $F.PL$ agreement in $M.PL+N.PL$). Although furthest-conjunct agreement is found to some extent in the postverbal $N.PL+F.PL$ and $F.PL+N.PL$ conditions, even here it seems to be noise as it is not significantly different from uncontroversial instances of noisy responses, as a representative of which we take $F.PL$ agreement in the postverbal $N.PL+M.PL$ condition ($t(30) = 1.78$, $p = 0.09$ for 10% of $F.PL$ agreement in $N.PL+F.PL$; $t(30) = 0.83$, $p > 0.1$ for 7% of $N.PL$ agreement in $F.PL+N.PL$). These results show that whereas (19) appears to allow many options, there is no mechanism of “context-free” last-conjunct agreement: agreement with the rightmost conjunct can only occur when it is linearly closest to the verb.

If highest and closest are indeed the only accessible conjuncts, then in preverbal contexts with three conjuncts (assuming a recursive Boolean phrase structure), the medial conjunct, being neither highest nor closest to the verb, will be inaccessible for agreement. Therefore, what about true second-conjunct agreement? To test this, we conjoined three noun phrases and used the spoken-elicitation procedure described in section 2. In this procedure, a model sentence appears with a masculine singular subject noun phrase (and hence no overt ending on the participle). Thereafter, a replacement noun phrase containing a coordination appears, and the participant must produce aloud the sentence as a whole containing the new subject noun phrase (thereby having to adjust the verbal agreement).

To give medial conjunct agreement its best chance, we wanted to compare cases with no masculine noun phrases in the conjunction, thereby minimizing the influence of the default. Additionally, because feminine agreement shows a slight tendency to be more robust in partial agreement than neuter, based on experiment 1, we wanted to make the putative medial conjunct controlling agreement a feminine noun phrase, flanked by two neuters. We thus compared sentences such as (30), where the replacement noun phrase is [N.PL+F.PL+N.PL], with cases in which a feminine plural noun phrase was found in the highest conjunct, as in (31)–(32), and with a case in which no feminine plural conjunct at all was contained, as in (33), to see if the rate of feminine plural agreement in (30) was indeed negligible.

(30) a. Model sentence: Grad je pogorel po koncu vojne.
 castle_{M.SG} AUX_{SG} burned-down_{M.SG} after end war.
 ‘The castle burned down after the end of the war.’

b. Target coordination: naselja, graščine in mesta
 villages_{N.PL} villas_{F.PL} and cities_{N.PL}

(31) a. Model sentence: Čaj mu je olajšal bolečine.
 tea him AUX_{SG} milder_{M.SG} pains
 ‘Tea made his pains milder.’

b. Target coordination: tablete, injekcije in zdravila
 pills_{F.PL} injections_{F.PL} and medications_{N.PL}

(32) a. Model sentence: Supermarket je počasi propadal.
 supermarket_{M.SG} AUX_{SG} slowly declined
 ‘The supermarket was slowly falling apart.’

b. Target coordination: trgovine, podjetja in društva
 shops_{F.PL} companies_{N.PL} and societies_{N.PL}

(33) a. Model sentence: Travnik se je počasi izsušil.
 lawn_{M.SG} REFL AUX slowly dried
 ‘The lawn slowly dried out.’

b. Target coordination: polja, travniki in močvirja
 fields_{N.PL} lawns_{M.PL} and swamps_{N.PL}

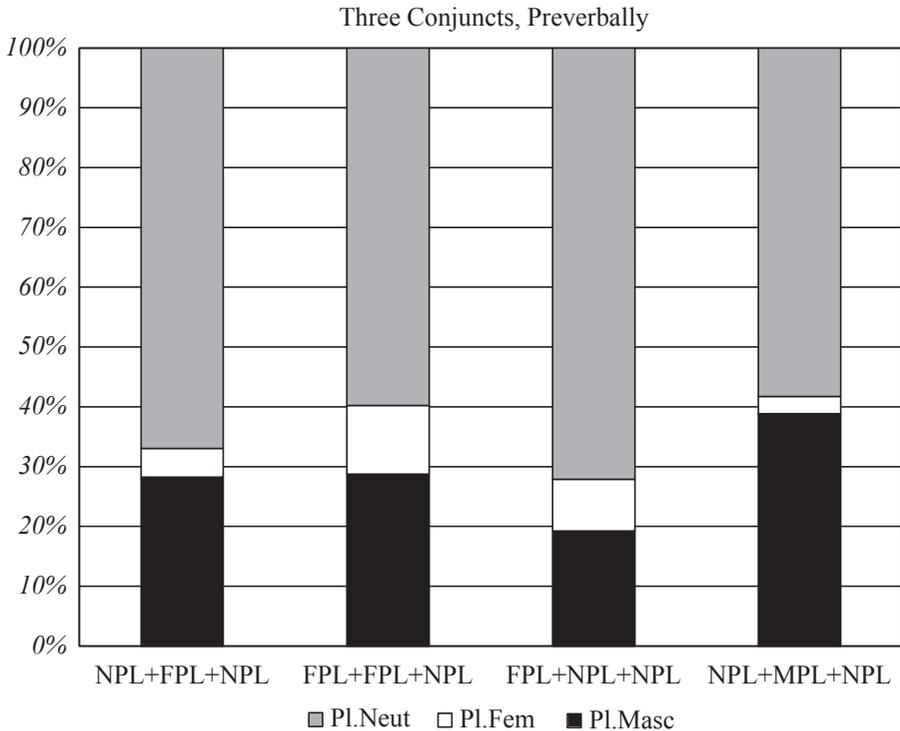


Figure 5. Experiment 2b results for participial agreement. Three mixed genders conjoined preverbally, such as [[neuter plural and feminine plural and neuter plural]_{BooIP} . . . V]. Results were obtained using an elicited spoken production experiment ($n = 18$). Examples for the six conditions presented with the vertical bars are shown in (30)–(33).

The results are shown in figure 5, where each bar represents a total of 108 potential responses (18 participants \times 6 items per condition); missing or uncodable responses are not included in the counts in figure 5.

As figure 5 shows, there is virtually no medial conjunct agreement, even when we gave it the best chance possible, in the leftmost column (N.PL+F.PL+N.PL). The results in this leftmost column are indistinguishable from the rightmost column, which contains no feminine noun phrase at all; the difference between the average percentages of F.PL agreement in these two conditions (5% in the N.PL+F.PL+N.PL and 3% in N.PL+M.PL+N.PL) is not significant ($t(17) = 0.64, p > 0.1$). By contrast, when the feminine noun phrase is the highest conjunct, as in the middle two columns, it becomes accessible for agreement. The average of F.PL agreement in the two middle columns (10%) is significantly different from the 3% of F.PL agreement in the rightmost column ($t(17) = 3, p < 0.01$). This comparison shows that, as (19) posited, there are three, but only three options for conjunct agreement in Slovenian, and “second” conjunct, defined in absolute terms, is not one of them.

To summarize so far, experiment 1b firmly established that Slovenian speakers produce agreement with only one of the conjuncts within a noun phrase, but that it is not a random grab: only the hierarchically highest or linearly closest conjunct is available. Experiments 2a and 2b ruled out the possibility of stating this option in other logically possible grammatical terms, such as “second” or “last.” We now turn to a theoretical model of the mechanisms underlying this restricted variation.

4. Grammatical Optionality in Terms of Derivational Steps of Agree

Having firmly established the existence of intraindividual and interindividual variation through experimental studies, we now turn to the question of the formal mechanisms underlying this variability. In particular, why should agreement with conjoined noun phrases be an area of the grammar that displays variation? We turn to a discussion of a theoretical model in terms of agreement that crucially capitalizes on the fact that conjunctions are headed by a Boolean phrase.

We assume that, as in all headed phrases, a Conj head projects its own values to BoolP, the maximal projection. A Conj head can deterministically compute its own number according to the number values of its two arguments. In particular, a Conj head is a function that requires inspecting the ϕ -features of both of its arguments. This function has the following specification in Slovenian, where we represent number in terms of the binary features [\pm singular] and [\pm augmented] (see Harbour 2006, Nevins 2011): the category singular is [+singular, –augmented], the category dual is [–singular, –augmented], the category plural is [–singular, +augmented], and the fourth combination of these features does not exist.

(34) Computation-of-number-feature by Conj head in Slovenian:

- a. If either one of its arguments is [–singular], its output is plural; otherwise, its output is dual.
- b. If one or both of its arguments lacks ϕ -features altogether, its output is undefined.

Computation-of-number by Conj thus represents a deterministic function based on the features of its two arguments. The case of (34a) arises in most conjunctions, although (34b) arises when one or both of the arguments is a numerically quantified NP—a so-called 5&Up, which by hypothesis, lacks ϕ -features and hence leads to no number feature on Conj.⁷ The consequences of no number feature on Conj are discussed later.

In contrast to its number feature, a Conj head cannot compute its own gender feature on the basis of the individual conjuncts. We argue, therefore, that BoolP has a number value according to the function specified above, but literally lacks a gender feature, as shown in (35).

(35) No computation-of-gender-feature by Conj head in Slovenian:

A Conj head in Slovenian cannot compute its own gender feature

⁷ The case of a ϕ -less argument of Conj can also arise when one of the arguments is a CP.

As a consequence, when the Agree process targets BoolP specifically, it will find a value for number but no value for gender. The default masculine gender that is found on the participle in such cases reflects, we argue, default insertion of this feature into the matrix of ϕ -features of the participle, as discussed in detail later.

Recall that when the Agree process targets BoolP specifically, it will find a value for number but no value for gender. One way of avoiding this last-resort, default insertion of ϕ -features that results from agreement with the BoolP itself—a projection that lacks gender features—is to instead carry out copying with one of the individual conjuncts, which of course do carry their own gender features. We propose that the ultimate source of variability within conjunction agreement therefore reflects an optionality between strategies of supplying gender features: either through default-value insertion or by targeting one of the individual conjuncts within the BoolP. In other words, both options (BoolP or a conjunct) are grammatically possible. We turn to a description of these strategies in more formal detail. The tradeoff between BoolP agreement and partial agreement (with a single conjunct) is discussed in sections 4.1 and 4.2, respectively. Section 4.1 provides the derivational steps in which BoolP is exclusively agreed with, even if that means copying default values. Section 4.2 provides the derivational steps in which agreement is attempted with BoolP first, but the Probe subsequently looks inside the conjunction and attempts agreement again with one of the individual conjuncts—either the highest or the closest.

4.1. *When Agreement Targets BoolP First (and Only)*

One of the grammars of Slovenian conjunct agreement may be characterized as a No-Peeking preference, in which the Probing head on the participle respects the hierarchical structure of BoolP and never looks inside at the individual conjuncts. The participle therefore initiates an *Agree* relationship with the subject noun phrase, which is headed by BoolP, attempting to copy both number and gender.

The number feature of Conj will be computed through the function in (34), but no gender feature will be computed (see (35)). For the purposes of Agree-Link, this means that Conj (the head of BoolP) will bear a specification [gender:___]. The No-Peeking grammar will thus have to insert features on BoolP by default. The default gender feature is [+masculine], and this is what must be inserted as a result of this sequence of steps, in which we propose that Number is valued before Gender. Furthermore, we follow the two-step approach to agreement (Robinson 2008:chap. 4 and Benmamoun, Bhatia & Polinsky 2010), in which agreement for a ϕ -feature between Probe and Goal and the copying of that value from Goal to Probe are two separate steps, which we denote with the letters *a* (for Agree) and *c* (for Copy) below. Note that other steps may intervene between establishment of Agree between *P* and *G* and copying of features from *G* to *P*.

- (36) No-Peeking: Number and Gender target BoolP; BoolP has a value for Number but none for Gender
 Step 1a. Agree: Participle, Number(BoolP)
 Step 1b. Copy-Value: Participle, Number(BoolP).

- Step 2a. Agree: Participle, Gender(BoolP) → No Value on BoolP
 Step 2b. Insert Masculine (Default [- singular → +masc]) on BoolP.
 Step 2c: Copy-Value: Participle, Gender(BoolP)

In (36), therefore, all of the action steps at BoolP: Number is computed as the result of a deterministic procedure by Conj, and Gender is inserted by default. If (34) is undefined, due to the presence of a 5&Up conjunct, then in this No-Peeking grammar, [-singular] must also be inserted by default.

- (37) No-Peeking: Number and Gender target BoolP; BoolP has no value for Number or Gender
 Step 1a. Agree: Participle, Number(BoolP)) → No Value on BoolP
 Step 1b. Insert Plural (Default [- singular, -augmented]) on BoolP.
 Step 1c. Copy-Value: Participle, Number(BoolP).
 Step 2a. Agree: Participle, Gender(BoolP)) → No Value on BoolP
 Step 2b. Insert Masculine (Default [- singular → +masc]) on BoolP.
 Step 2c: Copy-Value: Participle, Gender(BoolP)

The derivations in (36) and (37) differ only in Step 1b, which supplies a default value when Computation-of-Number by Conj (34) is undefined or not. The gender value remains default masculine in both derivations.

We now briefly turn to some evidence to support the claim that masculine is the default gender in the plural. In Slovenian, there are both feminine and masculine versions of the 1st, 2nd, and third-person plural pronouns as shown in (38), which trigger feminine and masculine verb agreement, respectively.⁸

(38) Gender in Slovenian plural pronouns

- | | | |
|--|---|--|
| a. i. Mi smo prišli. | ii. Vi ste prišli. | iii. Oni so prišli. |
| we _M AUX _{PL} came _{M,PL} | you _M AUX _{PL} came _{M,PL} | they _M AUX _{PL} came _{M,PL} |
| 'We came.' | 'You came.' | 'They came.' |
| b. i. Me smo prišle. | ii. Ve ste prišle. | iii. One so prišle. |
| we _F AUX _{PL} came _{F,PL} | you _F AUX _{PL} came _{F,PL} | they _F AUX _{PL} came _{F,PL} |
| 'We came.' | 'You came.' | 'They came.' |
| c. i. *Me smo prišli. | ii. *Mi smo prišle. ⁹ | |
| we _F AUX _{PL} came _{M,PL} | we _M AUX _{PL} came _{F,PL} | |

Importantly, feminine pronouns and feminine agreement can be used only for groups that consist of exclusively females. As soon as there is one single male in the group, masculine pronouns and masculine agreement have to be used. Furthermore,

⁸ Since Slovenian is a pro-drop language, the pronouns in (38) are not obligatory, but without the pronouns, the auxiliary clitic, being a second position element, would have to follow the verb (see Golden & Sheppard 2000 and Marušič 2008 for more details on Slovenian clitics).

⁹ Example (38cii) is acceptable for speakers who lack a version of the feminine first-person pronoun *me*, in which case it can only be used in reference to a group exclusively female.

Slovenian distinguishes between informal and formal ways of addressing in second-person singular. The polite form uses the second-person plural pronoun and second-person plural verb agreement, and in both cases, it is the masculine plural that is used for polite address, even if one is addressing a woman.

(39) Neutralization of gender to masculine in case of formal address

- a. Povabljeni ste na večerjo.
 Invited_{M.PL} AUX_{PL} on dinner
 ‘You are invited for dinner.’
 (Formal; singular addressee, male or female)
 ‘You all are invited for dinner.’
 ([In]formal; plural addressees; all male or mixed-gender group)
- b. Povabljene ste na večerjo.
 invited_{F.PL} AUX_{PL} on dinner
 ‘You are invited for dinner.’
 ([In]formal, only for a group of exclusively females)

The impossibility of feminine gender with a polite second-person plural form, as in (39a), and the impossibility of feminine gender in mixed-gender addressee groups, as in (38), support the assertion that masculine is the default gender for plural number.

In summary, the grammar in which a Probe looks at BoolP and no further inside the conjunction, even when it means that a default value must be supplied, exemplifies the ranking No Peeking > No Default; we take this ranking as a characterization of the derivational steps 1b and 2b in (36) and (37). As BoolP will never have its own gender (and sometimes may not have its own number), these two pressures are inevitably in conflict. We now turn to a grammar in which the conflict is resolved in the opposite manner.

4.2. *Agreement Targets BoolP First, and Then Looks at a Conjunct*

The second grammatical strategy involves the participial Probe looking at BoolP first, but instead of steps 1b and 2b in (36) and (37), rather than inserting a default value, the Probe continues searching within the conjunction. In this case, therefore, the participle probes for BoolP in a first step, but if no value exists, it enters into the conjunction phrase to choose one of the individual conjuncts for gender agreement. We propose that the choice of which conjunct to copy gender from can be determined by two types of locality considerations: either hierarchically (choose the highest conjunct within BoolP) or linearly (choose the conjunct that is linearly closest to the verb), and that there is true optionality between these two.

In the case where Computation-of-Number by Conj (34) is successful, only gender will require searching within the conjunction. The set of steps is depicted in (40). Clearly, this grammar of Slovenian conjunct agreement is one in which Number and Gender can probe separately, as proposed by Béjar (2003).

- (40) No-Default: Number and Gender target BoolP; BoolP has a value for Number but none for Gender
- Step 1a. Agree: Participle, Number(BoolP)
 - Step 1b. Copy-Value: Participle, Number(BoolP)
 - Step 2a. Agree: Participle, Gender(BoolP) → No Value on BoolP
 - Step 2b. Choose a Conjunct C_x .
 - Agree: Participle, Gender(Conjunct C_x)
 - Step 2c. Copy-Value: Participle, Gender(C_x)

However, in the case where Computation-of-Number by Conj (34) is undefined, both number and gender will require searching within the conjunction. Once a single conjunct C_x is chosen for Number, that must be the source for Gender features as well.

- (41) No-Default: Number and Gender target BoolP; BoolP has no value for Number or Gender
- Step 1a. Agree: Participle, Number(BoolP) → No Value on BoolP
 - Step 1b. Choose a Conjunct C_x .
 - Agree: Participle, Number(Conjunct C_x)
 - Step 1c. Copy-Value: Participle, Number(C_x)
 - Step 2a. Agree: Participle, Gender(BoolP) → No Value on BoolP
 - Step 2b. Agree: Participle, Gender(Conjunct C_x)
 - Step 2c. Copy-Value: Participle, Gender(C_x)

The derivation in (41) will occur when one of the arguments of Conj lacks ϕ -features, a scenario we return to in section 6.

The grammar described above is thus one in which default values are avoided even at the cost of the probe having to enter into the conjunction and re-initiate Agree, this time with one of the individual conjuncts.

4.3. Recap: The Mechanism of Variability

We have observed three strategies for agreement in experiments 1 and 2: agreement with BoolP, agreement with the highest conjunct, and agreement with the closest conjunct. The first of these three strategies is the result of the grammar in section 4.1, where Agree starts and ends with BoolP, even if it means insertion of a default value must take place. The second and third of these strategies are the result of the grammar in section 4.2, where Agree starts with BoolP but, rather than going for default-value insertion, looks at an individual conjunct and chooses the closest conjunct. The choice of whether the closest conjunct is the first (hierarchically closest) or the second (linearly closest) conjunct depends on the relevant timing of agree and conjunct-flattening under linearization. We follow Bhatt & Walkow (2013) in separating Agree into two steps—one of which is Agree-Link, based on hierarchy and intervention, establishing Probe-Goal relations, and one of which is Agree-Copy, which retrieves

the values to be copied onto the probe once a goal has been identified and a relation established (see also Robinson 2008, Benmamoun, Bhatia & Polinsky 2010, Arregi & Nevins 2012). This latter step, Agree-Copy, can be a postsyntactic operation. Our claim is that there is some variation in the order among postsyntactic operations. If Agree-Copy happens first, it looks at the hierarchically structured BoolP, in this case the closest (the most available) conjunct is the hierarchically closer highest conjunct. However, if Agree-Copy happens after conjunct-flattening (the recursive linearization procedure through which the internal constituency of BoolP is simply turned into a linearized set of terminals), then the closest—that is, the most available—conjunct is the linearly closer second conjunct. We assume BoolP is not a phase so that linearization of BoolP happens in the same cycle as the relevant Agree operation.

Whenever inter- and intraindividual variability is described within a formal model, such strategies must be boiled down to discrete mechanisms of grammatical choice. We have argued that the essential fact about Slovenian conjunctions that results in a choice point in the grammar lies in (34)—the fact that Conj can compute its own Number (unless there is a ϕ -less argument)—and (35)—the fact that Conj can never compute its own Gender. Since Boolean phrases have a hierarchical structure, the maximal projection of the head Conj will be the first encountered in a syntactic Probe-Goal relation. However, once the Agree relation encounters a missing value on BoolP (either for Gender or Number), there are two choices: No Peeking > No Default, which concretely involves the derivational step of default-value insertion, or No Default > No Peeking, which involves the derivational step of plunging further within the hierarchical structure of BoolP and initiating Agree with an individual conjunct for Gender (and Number, if necessary).

Given the fact that Computation-of-Num may be undefined when there is a 5&Up present in the conjunction, these two grammars result in four scenarios:

- (42) Scenarios resulting from choice of grammar and success/failure of Computation-of-Num:
- a. No-Peeking, Computation-of-Num succeeds: Number of BoolP (Dual/Plural), Default Masculine
 - b. No-Peeking, Computation-of-Num fails: Default Plural, Default Masculine
 - c. No-Default, Computation-of-Num succeeds: Number of BoolP (Dual/Plural), Gender of Conjunct C_x
 - d. No-Default, Computation-of-Num fails: Number of Conjunct C_x , Gender of Conjunct C_x

Arguably, the best confirmation for the existence of these specific mechanisms of choice will come from cases where we can show that one of these strategies is blocked. In other words, if copying the gender from an individual conjunct (42c) is blocked for some reason, then copying from BoolP will be the only option, and default agreement will be forced. Similarly, if BoolP cannot compute its own number, then copying from an individual conjunct (42b or 42d) will be forced as the only strategy possible. We turn to experimental investigations of these possibilities.

5. Experiment 3: The Effects of Mixing Numbers

In these studies, we found an interesting constraint on partial agreement (Grammar 4.2): the fact that it is largely unavailable when the conjunct in question is singular. We investigate whether the presence of nonplural conjuncts within the conjunction can force agreement with the BoolP maximal projection (Grammar 4.1).

We first set out to establish the facts about conjoining two singular noun phrases, in comparison with experiment 1b. Experiment 3a thus used the same conditions as experiment 1b (6 combinations, preverbally), but this time both noun phrases were singular. Examples (43)–(48) show the model sentences and replacement noun phrases designed to elicit agreement for these conditions.

(43) a. Model sentence:

Hladilnik je v času poplave priplaval mimo hiše.
 refrigerator_{M,SG} AUX_{SG} in time flood floated_{M,SG} past house
 ‘The refrigerator floated past the house during the flood.’

b. Target coordination: zmrzovalnik in korito
 freezer_{M,SG} and sink_{N,SG}

(44) a. Model sentence: Drevo je včasih stalo na jasi.
 tree_{N,SG} AUX_{SG} in-the-past stood_{N,SG} on meadow
 ‘The tree used to be in the meadow.’

b. Target coordination: hrast in breza
 oak_{M,SG} and birch_{SG}

(45) a. Model sentence: Avto se je zaletel v hišo na glavnem trgu.
 car_{M,SG} REFL AUX_{SG} hit_{M,SG} in house on main square
 ‘The car drove into a house on the main square.’

b. Target coordination: kolo in motocikel
 bicycle_{N,SG} and motorcycle_{M,SG}

(46) a. Model sentence: Flaškon je stal v kleti za vrati.
 demijohn_{M,SG} AUX_{SG} stood_{M,SG} in basement behind doors
 ‘The demijohn stood in the basement behind the doors.’

b. Target coordination: preša in sod
 wine-press_{F,SG} and barrel_{M,SG}

(47) a. Model sentence: Portret se je prodal za med.
 portrait_{M,SG} REFL AUX_{SG} sold_{M,SG} for honey
 ‘The portrait was sold for a lot of money.’

b. Target coordination: panorama in tihožitje
 panorama_{F,SG} and still-life_{N,SG}

- (48) a. Model sentence: Plesišče se je napolnilo z ljudmi.
 dance-floor_{N,SG} REFL AUX_{SG} got-filled_{N,SG} with people
 ‘The dance floor filled up with people.’
- b. Target coordination: igrišče in tribuna
 playing field_{N,SG} and stands_{F,SG}

If the study participants are going for agreement with BoolP, we should find largely dual agreement with the default masculine gender, where dual number is computed as a result of (34), as described in (42a). On the other hand, if they are going for agreement with a BoolP first for number, and then to an individual conjunct for gender (as described in 42c), we might find responses such as feminine dual or neuter dual (recall that these two genders are syncretic in the dual in Slovenian).

In fact, the overwhelming result of conjunction of two singulars is default masculine dual agreement. The results are shown in figure 6, where each bar represents a total of 48 potential responses (12 participants \times 4 items per condition); missing or uncodable responses are not included in the counts in figure 6.

In contrast to experiment 1b, therefore, experiment 3a shows virtually no agreement with the closest or highest conjunct for singular number. The few instances of singular agreement production were in two conditions (F.SG+M.SG and F.SG+N.SG) indistinguishable from zero (the 4% of singular agreement in the F.SG+N.SG condition has a value of $t(11) = 1.48$, $p > 0.1$; the 2% of singular agreement in the F.SG+M.SG condition has a value of $t(11) = 1$, $p > 0.1$) and in the one case that is borderline distinguishable from zero (9% of singular in the N.SG+M.SG condition $t(11) = 2.31$, $p = 0.04$), the result is not reliably different from the other two conditions in which singular agreement is vanishingly small and hence classifiable as noise (e.g., it is not significantly different from the occurrence of singular agreement in the F.SG+N.SG condition: $t(11) = 0.89$, $p > 0.1$). Recall from the discussion in section 4 that closest-conjunct agreement and highest-conjunct agreement are mechanisms largely for computing gender agreement. In other words, something must be disfavoring gender agreement with a conjunct that is nonplural.¹⁰

To address this question in sharper relief, in experiment 3b, we conducted a similar design but made only one of the conjuncts singular. The stimuli therefore consisted of mixed number conjuncts, as shown in (49)–(54).

- (49) a. Model sentence: Pisalo se je včeraj pokvarilo.
 pen_{N,SG} REFL AUX_{SG} yesterday broke_{N,SG}
 ‘The pen broke yesterday.’
- b. Target coordination: ekran in tipkovnice
 screen_{M,SG} and keyboards_{F,PL}

¹⁰ Some form of closest-conjunct agreement appears to be available with conjoined singulars, as shown by the feminine/neuter dual responses in the last two columns. Note that feminine and neuter duals are syncretic (and argued to be literally morphosyntactically identical as the result of an impoverishment rule in Nevins 2011), and these responses might thus constitute conjunction of uniform genders. We return to the issue of syncretism in section 8.

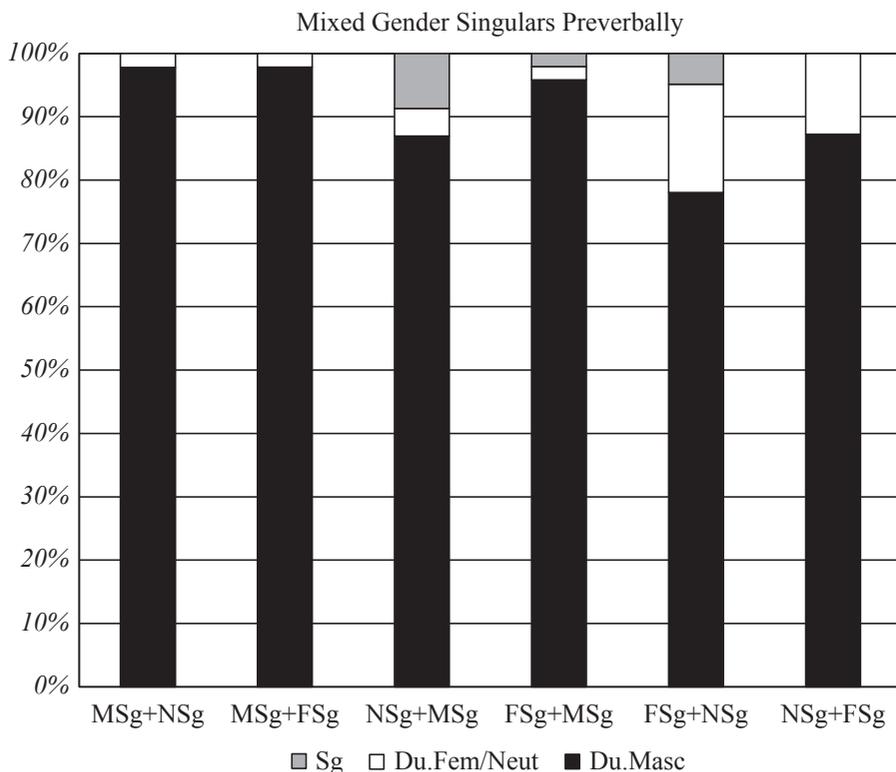


Figure 6. Experiment 3a results for participial agreement. Mixed-gender singulars conjoined preverbally, such as [[neuter sg and feminine sg]_{BooIP}. . . V]. Results were obtained using an elicited spoken production experiment (n = 12). Examples for the six conditions presented with the vertical bars are shown in (43)–(48).

(50) a. Model sentence: Kamijon se je pokvaril poleti.
truck_{M,SG} REFL AUX_{SG} broke_{M,SG} summer-time
‘The truck broke down in the summer.’

b. Target coordination: žerjav in dvigala
crane_{M,SG} and lifts_{N,PL}

(51) a. Model sentence: Sadje je hitro zgnilo.
fruits_{N,SG} AUX_{SG} quickly rot_{N,SG}
‘Fruits got rotten quickly.’

b. Target coordination: hruške in ananas
pears_{F,PL} and pineapple_{M,SG}

- (52) a. Model sentence: Vrtalni stroj je visel na steni.
 drilling machine_{M,SG} AUX_{SG} hang_{M,SG} on wall
 ‘The drilling machine was hanging on the wall.’
 b. Target coordination: kladiva in šraufciger
 hammers_{N,PL} and screwdriver_{M,SG}
- (53) a. Model sentence: Srnjak se je skrila za grmičevje.
 roebuck_{M,SG} REFL AUX_{SG} hid_{M,SG} behind shrubs
 ‘The roebuck hid behind the shrubs.’
 b. Target coordination: tele in krave
 calf_{N,SG} and cows_{F,PL}
- (54) a. model sentence: Šport mu je pomenil vse.
 sport_{M,SG} him AUX_{SG} meant_{M,SG} everything
 ‘Sports meant everything to him.’
 b. target coordination: medalje in priznanje
 medals_{F,PL} and award_{N,SG}

If closest-conjunct agreement is indeed available only with plural conjuncts, there should be no agreement with a singular conjunct. The results are shown in figure 7, where each bar represents a total of 114 responses (18 participants × 6 items per condition).

If partial agreement had been equally available with all conjuncts, we would expect to find equal number of F.PL and N.PL responses in the rightmost two columns,¹¹ but F.PL+N.SG and N.SG+F.PL yield very few instances of N.PL agreement. The 5% of N.PL agreement in the N.SG+F.PL condition are indistinguishable from zero ($t(17) = 2.05$, $p > 0.05$), and the 8% of N.PL in the F.PL+N.SG condition are not significantly different from the 4% of N.PL agreement in the F.PL+M.SG condition that constitute uncontroversial instances of pure noise ($t(17) = 1.06$, $p = 0.3$). F.PL agreement on the other hand is distinguishable from zero in all conditions with F.PL as one of the conjuncts (M.SG+F.PL, F.PL+M.SG, N.SG+F.PL, and F.PL+N.SG; $p < 0.05$ for all comparisons). The verbal probe cannot copy the gender values from a singular conjunct, neither when it is the higher nor when it is the closer conjunct. We propose that the principle in (55) is responsible for the lack of partial agreement with singular conjuncts, as reflected in the revised step 2b from (40).

(55) Consistency Principle

Partial Agreement in Gender is allowed only when the Agreement value registered by the targeted conjunct C_x matches the Number value already on the verb (acquired from BoolP).

Revised version of (40):

Step 1a. Agree: Participle, Number(BoolP)

¹¹ In figure 7, all M.PL agreement responses are reliably different from zero, even the lowest percentage of M.PL agreement in the M.SG+N.PL condition: 20%, $t(17) = 3.26$, $p < 0.01$).

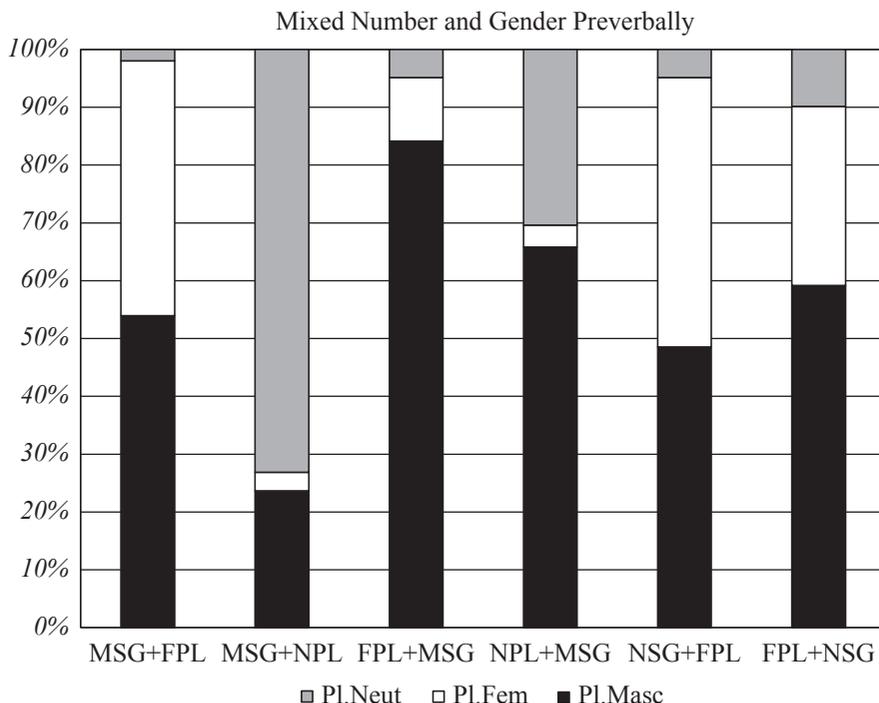


Figure 7. Experiment 3b results for participial agreement, such as [[feminine plural and neuter sg]_{BoolP} . . . V], with mixed-gender and number preverbally. Results were obtained using an elicited spoken production experiment (n = 18). Examples for the six conditions presented with the vertical bars are shown in (49)–(54).

- Step 1b: Copy-Value: Participle, Number(BoolP)
- Step 2a. Agree: Participle, Gender(BoolP)) → No Value on BoolP
- Step 2b. Choose a Conjunct C_x, **where Number(C_x) = Number(Participle)**
 Agree: Participle, Gender(Conjunct C_x).
- Step 2c: Copy-Value: Participle, Gender(C_x)

This principle explains why agreement with a single conjunct is blocked. Grammar 4.2 is not an option when one of the conjuncts has singular number but the BoolP (and hence the participle as a whole) has dual/plural number, and hence Grammar 4.1 is forced.

In experiment 3a, there are only singular conjuncts. Because of the Consistency Principle, none of the single conjuncts is an eligible agreement controller, because the verb already had its number valued as dual from the BoolP. In order to have its gender feature valued, verbal agreement resorted to the default strategy, as shown in figure 6. In experiment 3b, when one of the conjuncts has the same value for number as the

entire BoolP and the other does not, the plural conjunct can be the gender controller—whether it is the closer or the highest conjunct, as shown in figure 7—but the singular conjunct cannot. In this case, therefore, when Grammar 4.2 is chosen, the choice between which conjunct to agree with for gender is forced based on its number feature.

To conclude this section, we found that the three grammatical options of agreement controllers (highest conjunct, closest conjunct, BoolP) can become reduced depending on the number of the potential controller. As BoolP deterministically computes nonsingular number, the Consistency Principle excludes singular conjuncts as sources of gender agreement, leaving BoolP itself (or the other, nonsingular conjunct, if one is present) as the remaining options.

6. Experiment 4: The Curious Case of 5&Ups

In section 4, we raised the possibility that Computation-of-Number by Conj (34) would fail when one of its arguments was ϕ -less, thereby forcing number agreement to occur either by default insertion or through initiation of Agree with a single conjunct. The key here is to use numerically quantified noun phrases (5&Ups).

As in many other Slavic languages, numerically quantified noun phrases seem to trigger neuter singular agreement when the number is 5 or higher. The category 5&Ups includes also quantifiers like ‘many’, ‘some’, and ‘several’, but not numerals ending in 1 through 4, such as 101, 102, 103, 201, as these are composed as 100+1 and 100+2 and so forth (see Ionin & Matushansky 2006) and hence agree like 1, 2, 3, 4. In the online supplementary appendix, we provide examples of neuter singular agreement with 5&Ups.

What is relevant for the present discussion is the fact that conjunction of two 5&Ups still yields nominative singular agreement, whereas the conjunction of two regular neuters yields neuter dual agreement. This phenomenon was reported briefly in Franks 1994 and is discussed at length in Marušič and Nevins 2010. We confirmed this contrast in experiment 4, the stimuli and results of which are included in the supplementary online material. In this experiment, two conjoined lexical neuter singulars (e.g., *čistilo in razkužilo* ‘cleaner and disinfectant’) elicit neuter dual agreement. However, two conjoined 5&Ups (e.g., *pet bifejev in deset uradov* ‘five pubs and ten offices’) continue to elicit neuter singular agreement.

From this experiment, we can conclude that the nominative singular agreement with 5&Ups is not due to lexical specification of these features on numerals; instead, 5&Ups completely lack features on the D node. Given that external agreement with a DP sees only the ϕ -features at D, it will find no ϕ -features at all. Neuter singular reflects the default morphology on the participle, when no ϕ -bearing target for agreement is found, the specifics of which are discussed in greater detail in the supplementary online material.

We further checked the predictions of our model of agreement in combinations of a 5&Up with a non-5&Up, conducting elicited production that compared mixed coordinations where one of the conjuncts was either M.PL or F.PL and the other was either 5&Up or lexical N.SG. The stimuli consisted of four different combinations: M.PL

or *N.PL* in first position, and *5&Up* or lexical neuter singular in second position. Example stimuli are provided in the supplementary online material.

Recall that under the predictions of the Consistency Principle in (55), combinations of *M.PL* and a lexical *N.SG* will be unable to yield *N.PL* agreement on the participle, because the conjunct which is the source of neuter gender features will have a number feature that does not match the number of the coordination as a whole. These results are indeed borne out in the experimental results. For combinations of *M.PL/F.PL* and *N.SG*, neuter agreement on the participle was not reliably elicited.

The pattern of responses with *M.PL/F.PL* and a *5&Up*, on the other hand, is quite different. Because *5&Ups* lack ϕ -features at the D node, Computation-of-Num will be undefined. As a result, agreement with BoolP is not an option in such coordinations, and strategies (42b) or (42d) will be forced. In terms of results, this means that *M.PL/F.PL* and *5&Up* will either elicit singular agreement—something otherwise virtually unattested in coordinations of plural and nonplural, or agreement with the first conjunct, namely *M.PL* or *F.PL* agreement. On the other hand, *N.PL* agreement will have no way to be generated. The results are shown in the supplementary online material.

In summary, *5&Ups* are ϕ -less DPs, rendering Computation-by-BoolP impossible. When BoolP's computation fails, agreement must either be taken care of by default insertion (Grammar 4.1) or go for one of the individual conjuncts (Grammar 4.2). Speakers' grammars allow either Agreement with BoolP or Agreement with a single conjunct. Although these two basic strategies are in free variation most of the time, as we have shown in experiments 3 and 4, they can part ways. Under the No-Default grammar, agreement with a single conjunct is impossible when consistency with BoolP's number is not met, and forced when BoolP cannot compute its own number.

7. Conjunct Agreement Is Distinct from Attraction

As reported in the literature, production experiments carried out across a range of languages reveal that participants often produce sentences with “ungrammatical,” linear agreement with a modifier-contained NP (e.g., part of a prepositional phrase), as in (56). Experiments by Bock & Miller (1991) and Vigliocco & Nicol (1998) found these attraction effects approximately 15% of the time.

(56) *The key to the cabinets are missing.

To determine if Slovenian closest-conjunct agreement could also be just an attraction effect in disguise, we compared pairs of examples where the two nouns were conjoined in one set of experimental sentences and in the other set, one was part of a PP modifier, as in (57). The two sets of sentences, each with an equal number of conjunctions and PPs were given to an equal number of participants. Because complements to prepositions are never in nominative case, we chose examples where the case required by the preposition is syncretic with nominative case, as in (58). Not all examples were of the same type; in some cases, the two forms were quite different

linearly closest NP would not differ across the two conditions ($t(9) = 5.29, p < 0.001$). The fact that we found no attraction effect at all might be surprising, because we would expect at least some attraction given that this occurs in approximately 15% of the cases in the experiments discussed. This may be in part due to differences in experimental design and mostly due to the fact that, unlike in English, case in Slovenian is expressed with overt morphology and only nominative nouns agree with the verb but, importantly, nominative NPs cannot be complements of prepositions. These factors may independently render attraction from within a PP modifier very rare—nonetheless, we gave it its best chance by using oblique forms syncretic with the nominative plural.¹²

The distinction between conjunct agreement and potential attraction effects in Slovenian were previously discussed by Marušič, Nevins & Saksida (2007), who provided examples (59) and (60), showing that it is not simply the closest NP inside the coordination that is the target of agreement but the closest of the two conjuncts.

(59) Šotori in postelje, na katerih so spala teleta, so smrdele/*smrdela.
 tent_{M,PL} and bed_{F,PL} on which AUX slept calves_{N,PL} AUX_{PL} stank_{F,PL}/*_{N,PL}
 ‘Tents and beds that were slept on by the calves stank.’

(60) Trditev, da je Peter odšel, je absurdna.
 claim_{F,SG} that AUX Peter_{M,SG} left_{M,SG} is absurd_{F,SG}
 ‘The claim that Peter left is absurd.’

The additional evidence from experiment 5 allows us to firmly conclude that conjunct agreement should be modeled in terms of the mechanisms proposed in section 4, rather than in terms a possible unification with attraction effects.

8. Why Only Slovenian (or Not)?

We have argued that Slovenian has three distinct strategies for computing gender and number agreement with conjoined noun phrase subjects, and demonstrated that the results of production experiments are limited to these strategies, which themselves are constrained depending on feature values. At this point, the reader may ask why only Slovenian appears to have partial agreement with preverbal conjoined subjects.

¹² A reviewer notes the existence of comitative constructions in Slovenian, such as (i).

(i) Midva z mamø sva šla domov.
 we_{DU} with mama_{NS} aux_{DU} gone_{M,DU} home
 ‘Me and my mother went home.’

In such cases, the prepositional phrase is a kind of appositional modifier to the pronoun *we*; however, it is not directly contributing to agreement, as the agreement remains dual without this modifier. See Vassilieva & Larson 2005 and Vassilieva 2005 for discussion.

As it turns out, Slovenian is not so exceptional. English exhibits a similar pattern with noun phrases headed by a disjunction. Recall that Slovenian BoolP can compute its own number but not its own gender (see (34)–(35)). As English does not show grammatical gender, there will be no opportunity to observe closest-conjunct agreement with conjunction. English Disj(unction)P, however, has no mechanism for computing its own *number*, as the disjunction of two singular or two plural noun phrases does not lead to any number value for the noun phrase as a whole. Consequently, whereas default agreement (analogous to Grammar 4.1) may be an option for many speakers, there is also strong evidence for the existence of single-conjunct agreement (analogous to Grammar 4.2) with one member of a disjunct, as shown in (61)–(64).

(61) [Neither that dog nor those cats] are housetrained.

(62) [Neither those cats nor that dog] is housetrained.

(63) Is [neither that dog nor those cats] housetrained?

(64) Are [neither those dogs not this cat] housetrained?

Cases of this sort were discussed by Morgan (1972:281). Among these, (63) shows linear agreement with the initial, first member of the disjunct, closest to the inverted auxiliary. Cases of this sort are routinely found on the internet, as shown in (65).

- (65) a. Why is neither ESOL nor routes into employment on the agenda?
 b. Why is neither Kevin nor any of his guest-posters interested in commenting on Kelo?

We therefore take the existence of partial conjunct agreement (Grammar 4.2) to be a general strategy employed for any phrase headed by a functional item that does not bear its own inherent ϕ -features and that under particular circumstances cannot deterministically compute such values.

As for closest-conjunct agreement in coordination, this phenomenon is reported to exist also in the closely related Bosnian, Croatian, and Serbian (Bošković 2009), in Hindi (Benmamoun, Bhatia & Polinsky 2010, Bhatt & Walkow 2013), in Hungarian (É. Kiss 2012), in Polish (Bogucka 2012), in Ndebele (Moosally 1998), and in Tsez (Polinsky 2009). We focus here on the last two of these. As reported in Moosally 1998, a verb in Ndebele agrees with the closest conjunct.

- (66) a. A-ba-lungu la-ma-bhunu a-yahleka.
 II.PL-whiteman CONJ-VI.PL-Afrikaaner VI.PL-laughing
 ‘The Englishmen and the Afrikaaners are laughing.’
 b. A-ma-bhunu la-ba-lungu ba-yahleka.
 VI.PL-Afrikaaner CONJ-II.PL-whitemen II.PL-laughing
 ‘The Afrikaaners and the Englishmen are laughing.’

Table 2. Ndebele agreement morphology.

Class	Singular	Plural
1/2	u-	ba-
3/4	u-	i-
5/6	li-	a-
7/8	si-	zi-
9/10	i-	zi-
11/12	lu-	zi-

Table 3. Tsez agreement morphology.

Class	Singular	Plural
I	∅-	b-
II	y-	r-
III	b-	r-
IV	r-	r-

(67) I-zi-nja la-bo-mangoye le-nyoni zi-nyamalele izolo.
 X.PL-dog CONJ-II.PL-cat CONJ-X.PL-bird X.PL-disappeared yesterday
 ‘The dogs, birds, and cats disappeared yesterday.’

In table 2, one sees that there is substantial syncretism among noun-class endings within the singulars and within the plurals. Importantly, however, there is also syncretism across singular and plural.

What this means is that a conjunction of class 9 and class 3 nouns, found with the verbal agreement *i-*, could in principle be due to agreement with the highest conjunct or with the second conjunct. A similar ambiguity can be found in another language reported to have closest-conjunct agreement, Tsez (Polinsky 2009). The Tsez agreement paradigm (table 3) also shows substantial cross-number syncretism.

Summarizing, one can see that Tsez, Ndebele, and Slovenian all have syncretism across singular and plural number columns. We contend that the correlation of closest-conjunct agreement with cross-number syncretism may not be accidental, and that variability in whether conjunct agreement is computed as resulting from a single conjunct or from BoolP as a whole is ultimately the result of the surface ambiguity, precisely due to this syncretism. Consider again Slovenian (table 4).

Table 4. Syncretism across number columns: Participle endings.

Number	Masculine	Feminine	Neuter
Singular	∅	-a	-o
Dual	-a	-i	-i
Plural	-i	-e	-a

Although the auxiliary should disambiguate which conjunct is being agreed with, if one looks at the participle alone, there will be primary linguistic data for the language acquirer, yielding ambiguities such as the following:¹³

- (68) Potential agreement controller ambiguities due to syncretic participial endings:
- M.SG+F.SG → *-a*: could be M.DU (BoolP) or F.SG (second conjunct)
 - M.DU+F.DU → *-i*: could be M.PL (BoolP) or F.DU (second conjunct)
 - N.PL+M.DU → *-a*: could be N.PL (highest conjunct) or M.DU (second conjunct)

Different learners may thus attribute different underlying mechanisms to these surface-ambiguous data, or may even take them as evidence for intraindividual variation. While it remains to be seen how general this explanation can be, and what other language-internal factors may be contributing to the presence of single-conjunct agreement strategies, we would like to propose that agreement with a single conjunct is available (though perhaps disfavored or a nondefault marked option) within Universal Grammar, and that given enough evidence (which the ambiguous syncretic endings provide), this option can be triggered.

9. Conclusion: Inter- and Intraindividual Syntactic Variation Lives

A number of distinct conclusions can be drawn from this work. Although increasing attention to the role of featural and linear factors in conjunct agreement has been found in the syntactic literature, very little of this work is experimentally based. Our production experiments allow us to focus not only on the existence of particular strategies for conjunct agreement but on the variability across and within speakers. The results show that true syntactic optionality exists and that speakers of “the same language” can indeed radically differ in how they compute agreement for conjoined noun phrases. Experiment 1 found that a single speaker can also vary in whether, for example, F.PL + N.PL conjunctions result in feminine (highest conjunct), neuter (closest conjunct), or masculine (default) agreement.

Despite this variability, however, our results point to the fact that not everything is possible. We have shown, for example, in experiment 2, that there is no true “last conjunct” or “medial conjunct” agreement, and we proposed a set of mechanisms that exclude such options from being generated. Additionally, we have shown that the variation is itself constrained. For example, in the interaction of closest-conjunct

¹³ The syncretism-based explanation may also extend to Bosnian/Croatian/Serbian, which have the following participle endings:

<u>Number</u>	<u>Masculine</u>	<u>Feminine</u>	<u>Neuter</u>
Singular	Ø	-a	-o
Plural	-i	-e	-a

In Bosnian/Croatian/Serbian, too, the combination N.PL+F.SG with an *-a* participial ending is ambiguous between highest- and second-conjunct agreement.

agreement with 5&Ups, we have shown that defectivity of one of the conjuncts renders agreement with BoolP impossible, thereby restricting one of the otherwise possible syntactic variants.

Why should syntactic optionality be found for conjunct agreement, as opposed to other phenomena? The core of our theoretical account relies on the premise that BoolP computes its own Number, but not its own Gender. As agreement is designed to furnish values of ϕ -features on predicates, other XPs within the BoolP may be chosen as a source of gender features. This fact can lead to an asymmetric dependence in agreement: Agreeing with a conjunct C_x for Gender can require that C_x have the same Number as the conjunct as a whole. Experiment 3 demonstrated just these effects: closest-conjunct agreement is not found with singular conjuncts. We have shown in experiment 4 that resolution itself can be blocked when BoolP cannot compute its own number, owing to the presence of a deficient DP within the conjunction, namely a 5&Up.

Finally, in answering the question of how this phenomenon may have arisen in Slovenian, we tentatively proposed that it is due to the substantial syncretism in participial endings across numbers interacting with the acquisition process. In more general terms, cross-number syncretism in the system may lead to ambiguity in the primary linguistic data, which we contend is the ultimate source of much of grammatical variability.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:
Appendix S1. The Grammars of Conjunction Agreement in Slovenian.

ONLINE SUPPLEMENT for

The Grammars of Conjunction Agreement in Slovenian

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Experiment 4: The Curious Case of 5&Ups

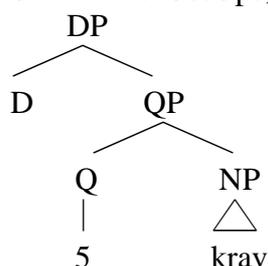
In section 4 we raised the possibility that Computation-of-Number by Conj (34) would fail when one of its arguments was phi-less, thereby forcing number agreement to occur either by default insertion or through initiation of Agree with a single conjunct. The key here is to use numerically quantified noun phrases, which we call 5&Ups as a shorthand.

Like in many other Slavic languages, numerically quantified noun phrases seem to trigger neuter singular agreement when the number is 5 or higher. The category ‘5&Ups’ includes also quantifiers like ‘many’, ‘some’, and ‘several’, but not numerals ending in 1-4, such as 101, 102, 103, 201, as these are composed as 100+1, 100+2 (see Ionin & Matushansky 2006) and hence agree like 1, 2, 3, 4. A couple of typical examples with 5&Up subjects are shown in (1).

- (1) a. Pet krav je odšlo na pašo.
Five cows_F AUX_{SG} went_{N.SG} on graze
‘Five cows went grazing.’
b. Triindvajset deklet je plesalo čačača.
23 girls AUX_{SG} dance cha-cha-cha
‘Twenty three girls danced the cha-cha-cha.’

We adopt Franks' (1994) analysis in which the QP headed by a numeral blocks percolation of the NP's phi-features to D (2), which results in DP being left without any phi-features. By hypothesis, verbal Agree with a DP is only accessible via D. Marušič and Nevins (2010) and references cited therein provide a discussion of the various options with respect to the analysis of the resulting default neuter singular agreement.

- (2) Structure of 5&Ups, in which a Q blocks phi-relations between D and NP:



The neuter singular morphology appearing on the verbs in the presence of 5&Ups is not the ‘real’ Nsg found as a consequence of agreement, as can be most clearly seen from the fact that a conjunction of two 5&Ups *still* yields Nsg agreement while the conjunction of two regular neuters yields neuter dual agreement. This phenomenon was reported briefly in Franks (1994) and is discussed at length in Marušič and Nevins (2010). We have confirmed this contrast in Experiment 4, conducted using the stimuli shown in (3-4).

- (3) a. model sentence: Metla je izginila iz omare.
 broom_{F.SG} AUX_{SG} disappeared_{F.SG} from cabinet
 'The broom disappeared from the cabinet.'
 b. target coordination: Čistilo in razkužilo
 cleaner_{N.SG} and disinfectant_{N.SG}
- (4) a. model sentence: Trgovina se je preuredila v igralnico.
 shop_{F.SG} REFL AUX_{SG} transformed_{F.SG} into casino
 'The shop transformed into a casino.'
 b. target coordination: Pet bifejev in deset uradov
 five pubs and ten offices

The results are shown in Figure sup_1, where each bar represents a total of 60 responses (10 participants x 6 items per condition).

Dual Agr for 5&Ups vs. Lexical Neuters

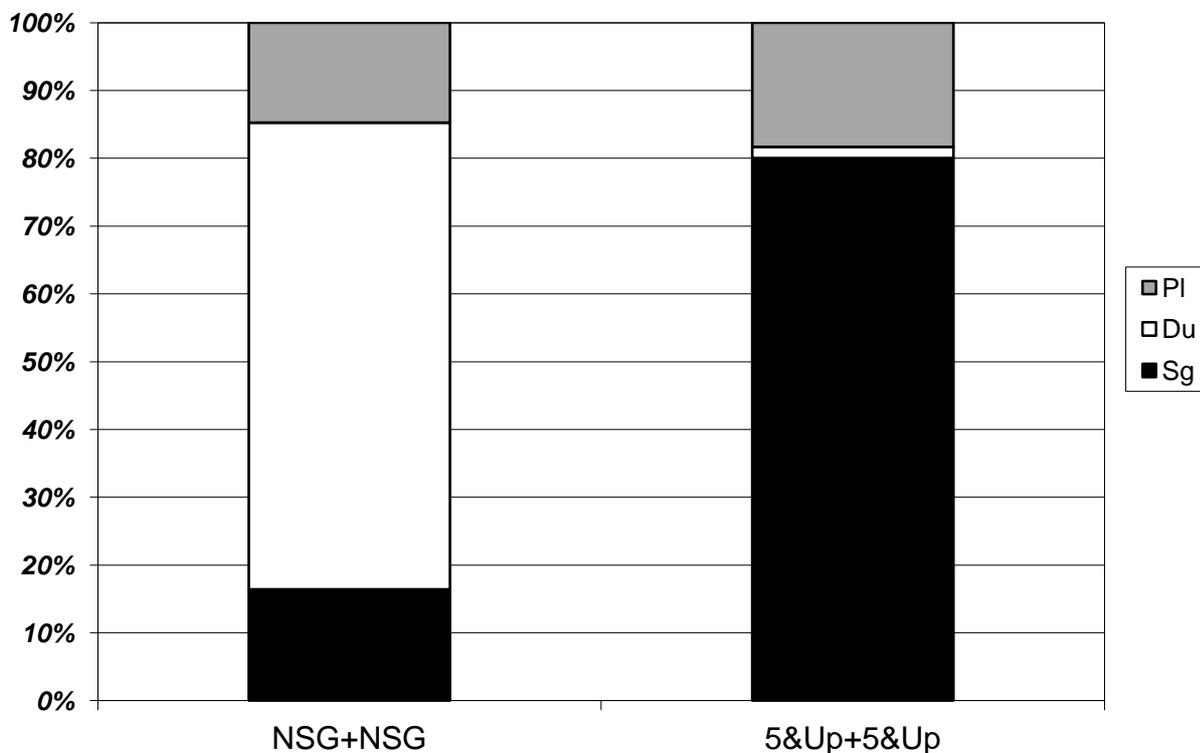


Figure sup_1: Experiment 4: Dual responses for 5&ups and lexical neuters. Elicited spoken production experiment. n=10.

The difference between Neuter singular agreement responses in the two conditions is highly significant ($t(9)=8.13$, $p<.001$). We can thus safely conclude that the Nsg agreement with 5&Ups is not due to lexical specification of these features on numerals. Instead, 5&Ups completely lack features on the D node. Since external agreement with a DP sees only the phi-features at D, it will find no phi-features at all. Neuter singular reflects the default morphology *on the participle*, when no phi-bearing target for agreement is found (5a). This outcome is also encountered when there is no nominative subject, as shown in (5b) with dative oblique subjects, in (5c) with sentential subjects, and in (5d) with weather verbs.

- (5) a. Default number on participle: [+singular] in the absence of any phi-features to Agree with
 Default gender on participle: [+singular] → [+neuter]
- b. Petru je ugajalo, da je Metka prišla na zabavo.
 Peter_{DAT} AUX_{SG} pleased_{N,SG} that AUX_{SG} Metka_{NOM} came_{F,SG} to party
 'It pleased Peter, that Metka came to the party.'
- c. Da je Peter pijan, je bilo zelo očitno.
 that AUX_{SG} Peter drunk_{M,SG} AUX_{SG} been_{N,SG} very obvious
 'It was very obvious that Peter was drunk.'
- d. Včeraj je deževalo.
 Yesterday AUX_{SG} rained_{N,SG}
 'It rained yesterday.'

Speakers who opt for the grammar in 4.2 will find themselves in scenario (42d), where both number and gender agreement are attempted with an individual conjunct. As this individual conjunct is phi-less, verbal agreement reflects its own context-sensitive default (5a), crucially distinct from default features inserted on BoolP itself under strategy (42b). Moreover, in the case of a conjunction of *two* 5&Ups, partial agreement with either conjunct will result in a phi-less participle, at which point default insertion on the participle (5a) results in neuter singular for configurations such as (4b).

We checked the prediction of combinations of a 5&Up with a non-5&Up for scenario (42d), conducting elicited production that compared mixed coordinations where one of the conjuncts was either MPL or FPL and the other was either 5&Up or lexical NSG. The stimuli consisted of four different combinations: MPL or NPL in first position, and 5&Up or lexical neuter singular in second position (6)-(7).

- (6) a. model sentence: Jakna se je na soncu takoj posušila.
 jacket_{F,SG} REFL AUX_{SG} on sun immediately dried_{F,SG}
 'The jacket dried immediately in the sun.'
- b. target coordination: Jopiči in osem kravat
 coat_{M,PL} and eight ties
- (7) a. model sentence: Reka je privabljala številne turiste.
 river_{F,SG} AUX_{SG} attracted_{F,SG} numerous tourists
 'The river attracted numerous tourists.'
- b. target coordination: Potoki in jezero
 streams_{M,PL} and lake_{N,SG}
- (8) a. model sentence: Knjiga se je tiskala počasi.
 book_{F,SG} REFL AUX_{SG} printed_{F,SG} slowly
 'The book was being printed slowly.'
- b. target coordination: Voščilnice in tristo razglednic
 greeting-cards_{F,PL} and 300 postcards
- (9) a. model sentence: Nevihta je povzročila veliko škode.
 storm_{F,SG} AUX_{SG} caused_{F,SG} a lot damage
 'The storm caused a lot of damage.'
- b. target coordination: Poplave in deževje
 floods_{F,PL} and rain_{N,SG}

The prediction is that 5&Ups and NSG will pattern quite differently, in that the former will elicit singular responses under strategy (42d), whereas the latter can only participate in strategy (42c), which is subject to the Consistency Principle, and hence cannot yield singular agreement. The results are shown in Figure sup_2.

5&Ups vs. Neut.Sg in Second Position

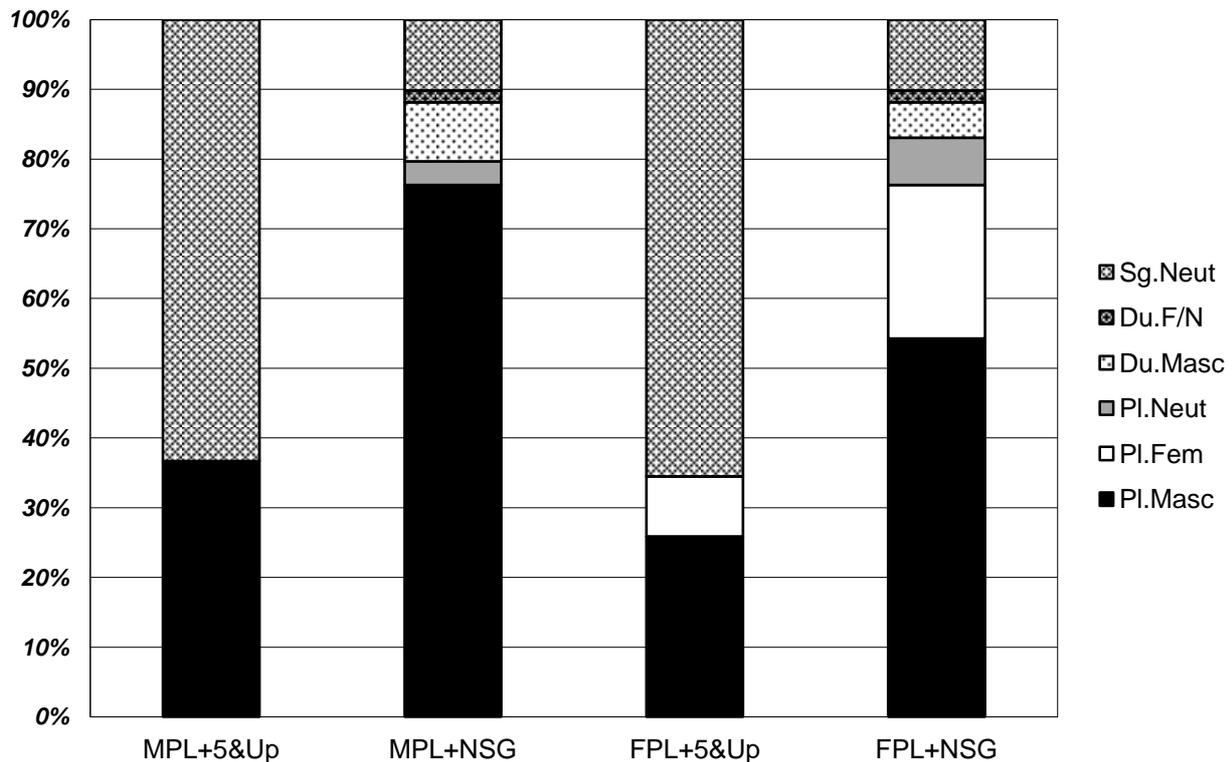


Figure sup_2: Experiment 4: Comparing 5&ups with Neut.Sg. in second position. Elicited spoken production experiment. n=10.

Figure sup_2 shows that 5&Ups and NSG pattern quite differently when they are the closest conjunct. The pattern is clear: true NSG elicits agreement with BoolP or with the other plural conjunct, but 5&Ups can elicit agreement directly with either conjunct, including the possibility of neuter singular. We repeat (42) below for ease of comparison.

(42, repeated) Scenarios resulting from choice of grammar and success/failure of Computation-by-Num:

- a. No-Peeking, Computation-of-Num succeeds: Number of BoolP (Dual/Plural), Default Masculine
- b. No-Peeking, Computation-of-Num fails: Default Plural, Default Masculine
- c. No-Default, Computation-of-Num succeeds: Number of BoolP (Dual/Plural), Gender of Conjunct C_x
- d. No-Default, Computation-of-Num fails: Number of Conjunct C_x , Gender of Conjunct C_x

In first and third bars on the left, we find evidence for strategy (42b) – resolution to Masculine Plural, with the highest conjunct, *as well as* strategy (42d), namely Highest Conjunct agreement in gender¹, or Closest Conjunct agreement with the 5&Up, resulting in neuter singular morphology on the verb. However, in the second and fourth bars (with a lexical neuter singular) only (42a) and (42c) are possible, and the latter excludes the option of Nsg due to the consistency principle,

¹ The instances of NPI, F/NDual, and MDual agreements are not distinct from zero (NPI in the MPL+NSG condition: 3%, $t(9)=1$, $p>.1$; NPI in the FPL+NSG condition: 7%, $t(9)=1.81$, $p>.1$; F/NDual in the MPL+NSG condition: 2%, $t(9)=1$, $p>.1$; F/NDual in the FPL+NSG condition: 2%, $t(9)=1$, $p>.1$; MDual in the FPL+NSG condition: 5%, $t(9)=1.41$, $p>.1$; MDual in the MPL+NSG condition: 9%, $t(9)=2.27$, $p=.05$). The 8% of FPI in the third column is not distinguishable from zero ($t(9)=1.86$, $p>.05$).

leaving only Feminine Agreement as a robust alternative to default agreement in the fourth column.²

In summary, 5&Ups trigger a great deal of *singular* agreement, something that true lexical neuter singulars are incapable of doing in conjunctions. We argue that this reveals a genuine difference not only between 5&Ups and lexical neuters, but in the grammatical strategies where Computation-of-Num fails, allowing an individual conjunct that is non-plural to be targeted, versus those in which Computation-of-Num succeeds, and as such agreement with an individual conjunct that is non-plural *cannot* be targeted.

5&Ups are phi-less DPs, rendering Computation-by-BoolP impossible. When BoolP's computation fails, agreement must either be taken care of by default insertion (Grammar 4.1) or go for one of the individual conjuncts (Grammar 4.2). In fact, similar patterns are found in Dutch³ with bare determiners, which are arguably phi-less, and thus trigger singular agreement *even when conjoined*:

- (10) Dit en dat is / *zijn te koop.
This_N and that_N is / *are on sale
'This and that is on sale.' (Dutch; van Koppen & Rooryck 2008)

Summarizing the entire set of results thus far, speakers' grammars allow either Agreement with BoolP, or Agreement with a single conjunct. While these two basic strategies are in 'free variation' most of the time, as we have shown in Experiments 3 and 4, they can part ways. Under the NO-DEFAULT grammar, agreement with a single conjunct is impossible when consistency with BoolP's number is not met, and forced when BoolP cannot compute its own number.

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² The minor percentage of neuter singular responses in the second and fourth column are borderline significantly different from zero in the MPL+NSG condition (10%, $t(9)=2.29$, $p=.05$) and distinguishable from zero in the FPL+NSG condition (10%, $t(9)=2.74$, $p<.05$), but the absolute numbers are small enough to be considered negligible.

³ As pointed out by a reviewer, parallel cases are also observed in Bosnian/Croatian/Serbian, Slovenian, and English, (i). While it remains to be seen how widespread the phenomena is, the cited analysis for Dutch remains viable.

- (i) a. Ovo i ono je naše. Bosnian/Croatian/Serbian
b. To in ono je naše. Slovenian
This and that is ours
c. ... but what they tell is that this and that is lacking.