

Person mismatch agreement*

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1. Introduction

Resolution agreement containing PERSON mismatches typically follows a PERSON hierarchy of the form $1 \succ 2 \succ 3$ (Zwicky 1977), that is conjoined arguments with different PERSON features will lead to agreement with the argument which contributes the highest PERSON feature specification. Czech provides a subject-verb agreement pattern which strictly obeys the PERSON hierarchy, see the paradigm in (1).

(1) *Resolution in Czech (Petr Biskup, p.c.)*

- a. Můj otec a já zůstaneme doma.
my father and I will.stay.1PL at-home
- b. Tvůj otec a ty zůstanete doma.
your father and you will.stay.2PL at-home
- c. Já a ty zůstaneme doma.
I and you will.stay.1PL at-home
'{My father and I} {your father and you} / {you and I} will stay home.'

German subject-verb agreement, however, does not act in accordance with the PERSON hierarchy: the 2PS+3PS conjunction in (2b) allows for both 2PL and 3PL agreement (see Findreng 1976, Corbett 1983, Timmermans et al. 2004, Fuß 2014). None of the judgements change if the conjuncts switch places or if one of the conjuncts is marked as plural.¹

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¹The pattern carries over to lexical verbs and modals, and is not affected by tense.

(2) *Resolution in German*

- a. Ich und mein Freund sind eingeladen.
I and my friend are.1PL invited
- b. Du und dein Freund seid/sind eingeladen.
you and your friend are.2PL/are.3PL invited
- c. Ich und du sind eingeladen.
I and you are.1PL invited
'{Me and my friend} / {you and your friend} / {me and you} are invited.'

This paper aims at answering two questions: (i) why is it that the majority of languages resolves PERSON mismatches in conjoined noun phrases following the hierarchy 1 > 2 > 3? (ii) what makes German different so that it can diverge from the PERSON hierarchy? The analysis will be spelled out in the framework of *Distributed Morphology* (Halle & Marantz 1993) using post-syntactic processes such as *Impoverishment* (Bonet 1991, Halle & Marantz 1993). The next section provides an overview of previous approaches to PERSON mismatch resolution and offers arguments against a *set intersection* approach. Section 3 explores different underlying features systems with respect to set union and their capability to derive strict PERSON hierarchy effects for PERSON mismatch resolution. Privative PERSON feature systems turn out to be most capable of deriving strict hierarchies, the proposal of which will be developed in section 4. Consequently, if languages show a different resolution paradigm, their PERSON feature system must be binary. A case in point is German(ic) which requires the subfeature [–HEARER] on independent grounds, in order to capture 1/3 syncretisms. Section 5 works out the German resolution patterns. Supporting evidence for the cross-linguistic split in underlying feature systems comes from the resolution pattern emerging in the Dutch reflexive pronoun system, which is identical to the German verbal pattern. Section 6 concludes.

2. Resolution mechanisms

PERSON hierarchy effects for resolution contexts have been argued to require external, universally specified, *resolution rules* (Corbett 1983), cf. also Fuß (2014) who argues for a post-syntactic repair operation, triggered by contradicting feature sets. Verbal resolution agreement in German, thus, poses a problem since it suggests that resolution rules ought to be made language-specific. The current proposal provides an alternative view based on underlying feature structures without the need to postulate external resolution rules.

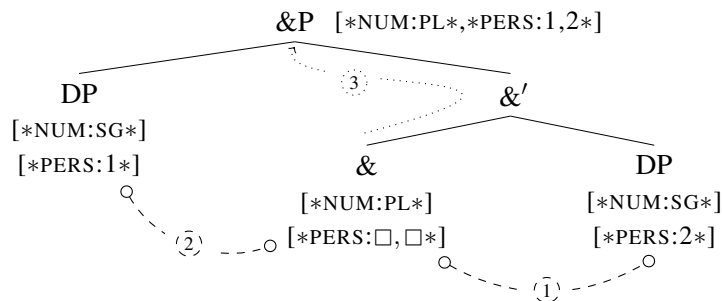
Two types of set operations have been proposed to overcome PERSON feature mismatches: *set union* (Dalrymple & Kaplan 2000, Bhatt & Walkow 2013) and *set intersection* (van Koppen & Rooryck 2008, Franks & Willer-Gold 2014, Marušič et al. 2015). The semantics of the coordinator provides a strong argument against a *set intersection* approach to resolution agreement. Plurality-forming conjunctions have long been accepted to exist alongside standard sentence conjunction (Link 1983, Schwarzschild 1996), modeled either as *set union* (flat sets) or as *set formation* (nested sets). A further advantage of set union/formation stems from the fact that these representations are already made use of in

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different parts of grammar. They are a side product of a probe agreeing with more than one goal under the assumption that feature bundles are either flat (Adger 2010) (set union), or structured (set formation). Set union can also be modeled as a post-syntactic operation, *fusing* structured sets, see Deal (2015) and Zimmermann (2017) for recent applications. We will present fused sets for the remainder of the paper, but note that the account does not depend on whether feature sets are structured or flat.

A few syntactic assumptions are needed to ensure that resolution agreement can take place. As is shown in (3), the conjunctive coordinator heads its own projection and takes the conjuncts as its arguments. This coordinator bears a PERSON probe with separate unvalued agreement slots that gather the PERSON features of its arguments in a cyclic fashion (see also Béjar & Řezáč 2009). The NUMBER feature enters the derivation already valued for plural.

(3) Agreement within the coordinate phrase



3. Strict hierarchies and underlying feature systems

There are two PERSON feature systems presently on the market: *speaker-hearer* and *author-participant*. PERSON hierarchies – who have been argued to be at work in *PCC contexts* (Nevins 2007) and *agreement displacement* phenomena (Béjar & Řezáč 2009) – serve as viable diagnostics to detect underlying feature systems, in addition to clusivity and syncretism patterns.

Binary feature systems have been argued to be decomposed into either [\pm SPEAKER] and [\pm HEARER] (Frampton 2002, Müller 2006, Wechsler 2010, Albright & Fuß 2012) or [\pm AUTHOR] and [\pm PARTICIPANT] (Halle 1997, Nevins 2007, Arregi & Nevins 2012, Harbour 2016).² While the former can group 1PS and 3PS together against 2PS, the latter is designed to group 1PS with 2PS against 3PS.

$$(4) \left[\begin{array}{lcl} +\text{SPEAK}, -\text{HEAR} & \leftarrow 1 \rightarrow & +\text{AUTH}, +\text{PART} \\ -\text{SPEAK}, +\text{HEAR} & \leftarrow 2 \rightarrow & -\text{AUTH}, +\text{PART} \\ -\text{SPEAK}, -\text{HEAR} & \leftarrow 3 \rightarrow & -\text{AUTH}, -\text{PART} \end{array} \right]$$

²Accounts like Harbour (2016) are very different from the conjunction approaches discussed above and therefore require a separate discussion. See also Ackema & Neeleman (2013) for a privative account along these lines.

Neither of those systems can derive the $1 \succ 2 \succ 3$ hierarchy under set union/formation, without any further assumptions about the language-specific encoding of vocabulary items. For an illustration consider (5), where the resolution contexts for 1PS conjoined with 2PS are shown for both systems, respectively. Neither of those contexts straightforwardly predicts the insertion of 1PS. Resolution contexts including 3PS equally predict languages to diverge from the hierarchy.

$$(5) \quad 1 \cup 2 = \left. \begin{array}{l} [+AUTH, +PART, -AUTH] \\ [+SPEAK, -HEAR, -SPEAK, +HEAR] \end{array} \right\} \neq 1$$

Further problems arise with clusivity: while a speaker-hearer system can provide a $1^{st} \textit{incl}$ form: $[+SPEAK, +HEAR]$, an author-participant system cannot. Hence, Nevins (2007) proposes a hybrid system which decomposes into a binary author-participant system + privative hearer. While this addition enables a clusivity distinction, where $[+AUTH, +PART, HEAR]$ encodes $1^{st} \textit{incl}$, it does not lead to a strict hierarchy in resolution contexts.

Privative feature systems have mostly been suggested for author-participant decompositions (Béjar 2003, Béjar & Řezáč 2009, Preminger 2011, Ackema & Neeleman 2013), shown in the middle column in (6). For a set of languages (Nishnaabemwin among others), Béjar (2003) and Béjar & Řezáč (2009) propose a minimally different version of their system where AUTHOR is replaced by ADDRESSEE, leading to the right column in (6).

$$(6) \quad \left[\begin{array}{ccc} \text{SPEAK} & \leftarrow 1 \rightarrow & \text{AUTH, PART} & \leftarrow 1 \rightarrow & \text{PART} \\ \text{HEAR} & \leftarrow 2 \rightarrow & \text{PART} & \leftarrow 2 \rightarrow & \text{ADD, PART} \\ & \leftarrow 3 \rightarrow & & \leftarrow 3 \rightarrow & \end{array} \right]$$

Neither of the author/addressee-participant systems can provide an inclusive form since, depending on the PERSON hierarchy detectable in the language, either author or addressee is present. A speaker-hearer system, in contrast, can encode $1^{st} \textit{incl}$ form as $[SPEAK, HEAR]$. Note that privative systems generally have no problem resolving PERSON mismatch contexts involving 3PS towards the highest person since 3PS is radically underspecified. The only problematic context is the one in which 1PS conjoins with 2PS. It turns out that author/addressee³-participant systems provide exactly the right underlying structure to derive the PERSON hierarchy, while speaker-hearer systems fail to do so, see (7).

$$(7) \quad 1 \cup 2 = \begin{array}{ll} [ADDR, PART] & = 2 \\ [AUTH, PART] & = 1 \\ [SPEAK, HEAR] & \neq 1 \end{array}$$

Let us turn to proposals specifically designed to deal with either strict resolution hierarchies, shown on the left (Dalrymple & Kaplan 2000), or clusivity, shown on the right (Harley & Ritter 2002) in (8).

³The reason why languages, like e.g. Nishnaabemwin, are assumed to have the feature system shown in the right column in (6) is that they exhibit a $2 \succ 1 \succ 3$ hierarchy in their direct/inverse marking. Under the assumption that this hierarchy is at work in resolution contexts as well, 2PS is the correctly predicted outcome for $1 \cup 2$.

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$$(8) \quad \left[\begin{array}{ccc} \text{SPEAK,HEAR} & \leftarrow 1 \rightarrow & \text{AUTH,PART} \\ \text{HEAR} & \leftarrow 2 \rightarrow & \text{ADDR,PART} \\ & \leftarrow 3 \rightarrow & \end{array} \right]$$

While the author-addressee-participant system, proposed by Harley & Ritter (2002) for languages with a clusivity distinction, can encode 1st*incl* as [AUTH,PART,ADDR], it cannot, however, derive the correct resolution contexts for 1+2 contexts. Dalrymple & Kaplan (2000) derive the person hierarchy by gradually increasing the specificity of the PERSON features – a decomposition that seems “more analytically convenient than theoretically justified” (van Koppen & Rooryck 2008, 3). 1 ∪ 2 resolution contexts are given in (9) for both systems.

$$(9) \quad 1 \cup 2 = \begin{array}{ll} [\text{AUTH,PART,ADDR}] & \neq 1 \\ [\text{SPEAK,HEAR}] & = 1 \end{array}$$

Dalrymple & Kaplan (2000) additionally offer a way to distinguish 1st*incl* from 1st*excl* by encoding the former as [SPEAK,HEAR], identical to 1st person in three-way systems, and the latter as [SPEAK]. While this set-up works nicely for languages with a clusivity distinction, it causes problems for the interpretation of 1st person in tripartite systems. The decomposition of 1st person into [SPEAK,HEAR] forces an inclusive interpretation for 1st plural pronouns, running counter to the observation that 1st plural pronouns are reported to be ambiguous between an inclusive and an exclusive reading.

4. Proposal: strict hierarchies through impoverishment

As was shown in the previous section, no system is capable of deriving a strict person hierarchy on the one hand and providing (interpretable) feature combinations for a clusivity distinction on the other hand. Feature systems that can provide an inclusive form are: (i) the binary speaker-hearer systems in (4), (ii) the privative speaker-hearer systems in (6), (iii) the Harley & Ritter (2002) privative system in (9). Of the three, the binary system runs into problems for every resolution context. The latter two privative systems, however, are only problematic for 1+2 contexts, repeated in (10), in that they predict optionality between 1PS or 2PS to occur as agreement markers.

$$(10) \quad 1 \cup 2 = \left. \begin{array}{l} [\text{AUTH,PART,ADDR}] \\ [\text{SPEAK,HEAR}] \end{array} \right\} = 1 \text{ or } 2$$

While these resolution contexts make the wrong prediction for languages *without* an inclusive-exclusive distinction, they constitute suitable contexts for languages *with* a clusivity distinction. They predict insertion of 1st*incl* forms, shown for Fula in Dalrymple & Kaplan (2000, 782), and given here in terms of possessor agreement for Tamil (11) and Angami (12).

(11) *Resolution in Tamil (Gurujegan Murugesan, p.c.)*

Naan-um nii-um nam-o:de vitt-ai tolachit-om.
 1SG-CONJ 2SG-CONJ 1PL[INCL]-GEN house-ACC lost-1PL
 ‘[Me and you]; lost our; house.’

- (12) *Resolution in Angami (Savio Megolhuto Meyase, p.c.)*
 Á mú nó āvó-kí k^hró.
 1SG and 2SG POSS.1DL[INCL]-house buy.PST
 ‘[Me and you]_i bought our_i food.’

How can we derive strict hierarchies in languages without a clusivity distinction? We propose an impoverishment rule, shown in (13) for each feature system, which accounts for the lack of a morphological distinction between 1st *incl* and 1st *excl*, as well as the resolution paradigm in PERSON mismatch coordinations. The rule in (13) is independently motivated by markedness requirements (Noyer 1992, Nevins 2011, Arregi & Nevins 2012), in that it constitutes a case of *markedness-targeted* neutralization (Nevins 2011): the marked category is neutralized towards its unmarked (less-specific) counterpart 1st *excl*.

- (13) *Impoverishment rule*
 a. [HEARER] → ∅ / [SPEAKER]____
 b. [ADDRESSEE] → ∅ / [AUTHOR]____

The rule in (13) is language-specific, i.e. it only applies in languages without a clusivity distinction. The relevant resolution contexts are shown below for both feature systems, after the impoverishment rule has applied.

- (14) *Resolution contexts for Harley & Ritter (2002) privative system*
 1 ∪ 2 = [AUTH,PART] ∪ [ADDR,PART] = [AUTH,~~ADDR~~,PART]
 (15) *Resolution contexts for speaker-hearer privative system*
 1 ∪ 2 = [SPEAK] ∪ [HEAR] = [SPEAK,~~HEAR~~]

If privative feature systems trigger strict hierarchies in resolution contexts, any divergence from the hierarchy must be due to an underlying binary feature system. Since PERSON mismatch coordinations cannot be argued to serve as the input for learners, the presence of a binary system must be independently motivated, e.g. by syncretisms a language consistently exhibits. The next section will explore such a case for German and Dutch.

5. The curious German(ic) pattern

Germanic languages provide independent evidence to decompose PERSON features into [±SPEAKER] and [±HEARER]. This feature set-up makes it possible to capture the often observed 1/3 syncretism in Germanic because it can single out 1PS and 3PS to the exclusion of the addressee (Frampton 2002). The fact that 1/3 syncretisms are cross-linguistically rare (Cysouw 2005, Baerman et al. 2005) provides an explanation as to why 2+3↔2,3 resolution patterns are so exceptional. A language like German requires a binary speaker-hearer system to account for 1/3 syncretisms, thereby creating the conditions to trigger 2+3↔2,3 resolution patterns. By switching to a binary feature system, languages ultimately become

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less predictable with respect to vocabulary insertion into PERSON mismatch resolution contexts, thus allowing them to potentially diverge from a strict PERSON hierarchy. Since German does not exhibit a clusivity distinction, the rule in (13) must be translated into the current feature system, see (16). The relevant resolution contexts are given in (17)-(19).

(16) *Impoverishment rule*

$$[+\text{HEARER}] \rightarrow \emptyset / [+ \text{SPEAKER}] ___$$

(17) $1 \cup 3 = [+ \text{SPEAK}, - \text{HEAR}] \cup [- \text{SPEAK}, - \text{HEAR}]$
 $= [+ \text{SPEAK}, - \text{HEAR}, - \text{SPEAK}]^4$

(18) $2 \cup 3 = [- \text{SPEAK}, + \text{HEAR}] \cup [- \text{SPEAK}, - \text{HEAR}]$
 $= [- \text{SPEAK}, - \text{HEAR}, + \text{HEAR}]$

(19) $1 \cup 2 = [+ \text{SPEAK}, - \text{HEAR}] \cup [- \text{SPEAK}, + \text{HEAR}]$
 $= [+ \text{SPEAK}, - \text{HEAR}, - \text{SPEAK}]$

In order to capture the syncretisms of the verbal inflectional paradigm, shown in (21), we propose the vocabulary items in (20). Crucial for the exceptional German pattern is that both plural exponents, $-(\emptyset)n$ and $-t$, are compatible for the context in (18), while also being equally specific. Note that the optionality in (18) comes about as a result of resolution analyzed as set union/formation. These operations are uniquely qualified to create feature sets with identical features but conflicting feature values. Superimposing a feature hierarchy (e.g. number is more important than gender) to regulate vocabulary insertion between equally specific items will not resolve the conflict. This restricts optionality arising across the board via identical cardinality of feature sets.

(20) PERSON/NUMBER/TENSE⁵

VIs for verbal suffixes

- a. $/-t/ \leftrightarrow [- \text{SPEAKER}, - \text{HEARER}, - \text{PL}]^6$
- b. $/-t/ \leftrightarrow [+ \text{HEARER}, + \text{PL}]$
- c. $/-st/ \leftrightarrow [+ \text{HEARER}]$
- d. $/-(\emptyset)n/ \leftrightarrow [- \text{HEARER}, + \text{PL}]$
- e. $/-\emptyset/ \leftrightarrow []^7$

(21) *German verbal suffixes*

	SING	PLU
1ST	$-\emptyset/\emptyset$	$-(\emptyset)n$
2ND	$-st$	$-t$
3RD	$-t$	$-(\emptyset)n$

⁴Assuming contradicting feature bundles is not unprecedented, see Bhatt & Walkow (2013).

⁵The inventory ignores minor variation in past tense and strong vs. weak forms, see Müller (2006) for an analysis of the latter.

⁶Following the arguments in Albright & Fuß (2012), I assume that the German 2PL/3SG syncretism is the result of *accidental homophony*, hence (20a) and (20b), as opposed to e.g. the 1PL/3PL syncretism which is due to *morphological identity*.

⁷If there is no stem alternation from present to past (weak forms), the elsewhere marker is realized as $/-\emptyset/$, see also Müller (2006).

If 1/3 syncretisms are indicators of non-privative features systems we expect languages exhibiting this syncretism to diverge similarly from strict hierarchies in PERSON resolution contexts. Timmermans et al. (2004) report on a resolution agreement paradigm in Dutch that is identical to German but found on reflexive pronouns.

(22) *Resolution with Dutch reflexives (Cora Pots, p.c.)*

- a. Ik en mijn vriend vervelen ons.
I and my friend bore 1PL.REFL
- b. Jij en je vriend vervelen je/zich.
you and your friend bore 2PL.REFL/3PL.REFL
- c. Jij en ik vervelen ons.
you and I bore 1PL.REFL
'{Me and my friend} / {you and your friend} / {You and me} are bored.'

While Modern Dutch has only one syncretic plural form, Middle Dutch shows 1/3 syncretism in plural (Aalberse 2009). This syncretism is also reflected in past and plural forms in Dutch dialects (Aalberse & Don 2009) as well as for a closed class of modal verbs across dialects (Ackema & Neeleman 2013). Hence, there is reason to assume a binary speaker-hearer feature system for Dutch.

6. Conclusion

This proposal provides a new implementation for PERSON hierarchy effects in resolution agreement contexts, one that makes use of an inherent markedness motivated impoverishment rule languages use if they do not provide 1st *incl* forms. Together with the assumption that 3PS exponents are underspecified, we can derive an agreement pattern that strictly follows the PERSON hierarchy. If underspecification is achieved system-internally, e.g. by a privative author-participant system, strict hierarchy effects will occur throughout the language. If, however, underspecification is tied to exponents, divergence from the hierarchy is potentially expected to arise, as plural markers can have equally specific feature sets, giving rise to optionality. The latter option provides an explanation for German verbal agreement and Dutch reflexive pronoun agreement in resolution contexts. Due to 1/3 syncretisms that these languages show, they require binary speaker-hearer features – a system that provides exactly the right conditions to encode two equally specific plural markers. The exceptional character of the resolution pattern is thus tied to the cross-linguistic rarity of 1/3 syncretisms.

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