

Phi-feature resolution under coordination outside of the grammar: A view from Polish

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ABSTRACT

It is commonly assumed that the person/number/gender (phi) features of a coordinate structure are computed grammar-internally from the phi-features of its conjuncts. For example, traditional instructions for grammatical gender resolution in Polish state that a conjunction that contains [MASCULINE HUMAN] formal features controls virile agreement on the verb, and non-virile elsewhere. Given the existence of multiple exceptions, the instructions represent a robust empirical tendency, rather than a categorical rule. Based on this behavior, as well as conceptual considerations, the paper argues that resolution is a grammar-external mechanism: it is the architecture of the grammar that conspires to not provide a possible locus of resolution internally. Instead, the external systems need to handle the under-determined output of the grammatical derivation.

KEYWORDS resolution · coordination · agreement · grammar

1 INTRODUCTION

Speakers of many dialects of English typically agree that *are* is the correct or ‘natural-sounding’ form of a copula in a sentence with coordination like (1), while *is* and *am* are not:

- (1) Pat and Mat are/*is/*am fixing the roof.

Is this knowledge part of a system that is unique to language, i.e., the grammar (aka Faculty of Language, off-line domain-specific knowledge)? It may appear that with speakers’ robust behavior and relatively well-developed theories of what properties of the grammar comprise this empirical domain (e.g., agreement, coordination), we could, and should, conclude that this knowledge is itself part of the grammar. In other words, we have grammar-internal theories for agreement and we have grammar-internal theories for coordination; thus, putting those two phenomena together as in (1), the resultant explanation should be grammar-internal as well. However, if we did not have a compelling grammar-internal explanation for how speakers arrive at the choice of the copula form, we could look for an explanation outside of the grammar. After all, it is commonly assumed that surface language is a composite of multiple systems. This composite includes the grammar and some other systems, e.g., memory, sociocultural norms, physiology. In light of this complexity, when we are investigating surface language data, how do we know if we are building a theory of the grammar proper or a theory of its interaction with other systems? Studying the behavior of agreement with coordination serves as a playground for such a question. We will see that the robustness of speakers’ behavior in this empirical domain is limited. In many languages, as one departs from the simple cases of coordination, speakers’ behavior ceases to follow clear-cut rules:

- (2) There is/are a cat and a dog in the yard. (Sobin 1997)

As speaker variability enters the picture, capturing it may come at a cost of sacrificing

some common principles of the grammatical theory. While revising theory is part of any science, it is worth our time to assess whether in each case such a revision is justified.

The paper revisits a notorious challenge for the grammar: coordination, with a focus on agreement. One goal is to assess whether agreement with a coordinate structure can be a typical grammar-internal phenomenon like agreement with a *non*-coordinate structure. As a higher-level objective, this investigation aims to contribute to our understanding of how grammar-internal and grammar-external systems interact. This paper uses Polish as a case study for the following reason. Polish, compared to languages like English, has a rich enough phi-feature representation and associated morphology to study different combinations of such features and their computation, so-called *resolution*. In particular, I focus on gender, where there are five categories and, in most scenarios, they can be mixed and matched freely. Although there are certainly languages with an even larger number of categories (e.g., famously Bantu languages), even narrower data turn out to present a challenge for the existing descriptions: data seem to vary in a way that resists neat generalizations.

The paper is structured as follows. In §2, I discuss the hypothesis space for locating computation of phi-features under coordination in a broader language system that consists of modules of the core grammar like syntax and semantics but also links to grammar-external systems. In §3, I present data from gender agreement with coordination in Polish, which can be split into two categories. On the one hand, there are data conforming to what is taken to be the dominant tendency. On the other hand, there are data that seem to constitute exceptions to this tendency. §4 revisits some of the analyses addressing both the main tendency and (some of) the apparent exceptions. I show that these analyses are successful in modeling more data than just the analyses focusing on the main tendency. Yet such revised analyses need to expand grammatical theory significantly, while still setting aside some of the empirical data reported. In §5, I propose that the lesson we learn from these attempts at revising analyses of resolution in Polish is that resolution resists grammatical approaches. I argue that this essentially null result is due to our narrow focus on robust tendencies in resolution, especially in some languages. Nevertheless, when coupled with the investigation of resolution in other languages, a picture emerges where resolution is highly unsystematic in a way that warrants investigation into extra-grammatical models of resolution. §6 sets out future directions for this line of research.

1.1 NARROWING DOWN

There are a number of phenomena and problems closely related to the current topic of investigation that, nevertheless, I would like to put aside for now as they fall outside the main scope of this paper. Since the focus of this paper is on resolution, i.e., a computation of phi-features of *all* conjuncts, there is limited discussion of the phenomenon of single conjunct agreement, i.e., agreement that expones phi-features of only one conjunct (McCloskey 1986, Aoun et al. 1994, Citko 2004, van Koppen 2007, Benmamoun et al. 2009, Bhatt & Walkow 2013, Willer Gold et al. 2018, a.o.). More specifically, the data from single conjunct agreement is provided only to inform modeling of resolution rather than the modeling of single conjunct agreement itself.¹

The paper also focuses on verbal (or participial) agreement only and does not directly consider concord on modifiers. First, it is possible that there are distinct mechanisms giving rise to verbal agreement vs. modifier concord (Norris 2014). Second, it has also been observed that on the surface, resolution behaves quite differently in the two scenarios (e.g., Willim 2012, Zbróg 2012 for Polish, and Heycock & Zamparelli 2005 for a number of other European languages). The paper also does not consider pronominal resolution, again, given the possibility of a distinct type of phenomenon that can take

¹Resolved agreement is also sometimes called *full* agreement to contrast it with *partial* or single conjunct agreement (Ruda 2011, Prazmowska 2016).

place across clausal boundaries.

Finally, I set aside structures that are not a typical list-like conjunction. While clearly related to the topic of conjunction, pseudo-coordination and comitative structures (Camacho 1996) display a distinct-enough behavior to warrant a separate investigation. Similarly, while disjunction is often assumed to have an identical syntactic structure to conjunction (Han & Romero 2004, den Dikken 2006, Hong 2013, Smith et al. 2018), I put it aside given its unique characteristics.

2 POSSIBLE LOCI OF RESOLUTION

Before delving into the empirical part of the paper in §3, I set the stage for the relevance of the reported Polish data to the broader cross-linguistic theory. In this section, I consider different modules of grammar for locating the computation of phi-features under coordination. The goal of this exercise is to make explicit the reasoning behind and the consequences of committing to any of the modules – consequences both for the analysis of resolution and also for the theory of the language architecture.

Let us return to the sentence in (1) exemplifying the phenomenon under investigation:

- (3) Pat_{3SG} and Mat_{3SG} are_{3PL}/*is_{3SG}/*am_{1SG} fixing the roof.

We can descriptively state that, when determining their preferred form of a copula in this sentence, native speakers identify the controller/goal for agreement. Here it is a coordination of two conjuncts, i.e., *Pat and Mat*. They consider the phi-features (Chomsky 1981) on these conjuncts, i.e., the nominal features like person, number and noun class/grammatical gender, here [3SG] and [3SG]. In a way, this is a surplus of information, as far as the needs of the rest of the clause are concerned. Just because the agreement controller is a coordinate structure, there are not suddenly more agreement slots on the verb or auxiliary with which to express the phi-features of the controller. Therefore, the overabundance of phi-features in a coordinate structure needs to be somehow reduced. A common type of reduction of such overabundance is one where the features of both conjuncts are taken into consideration, i.e., they are resolved. This *resolution*, a computation of the relevant set of phi-features, results in exponence in the form of agreement, here [3PL] rather than, for example, a matching [3SG]. Below I provide a working definition of this phenomenon:²

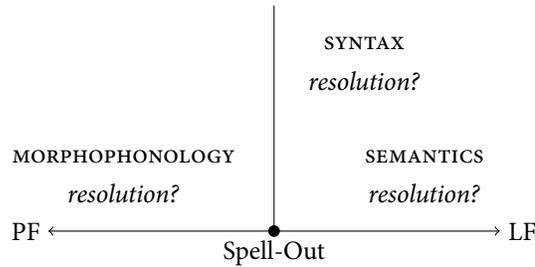
- (4) Resolution (working definition):
Computation of phi-features (nominal features like person, number, grammatical gender/noun class) of conjuncts in a coordinate structure that results in one set of phi-features expounded as an agreement morpheme.

It is worth pointing out that the elements of this computation, i.e., phi-features, coordinate structure and agreement, are commonly argued to be grammar-internal phenomena. This is what this paper assumes as well. However, the question that I consider here is whether the very resolution, i.e., the computation part of the interaction of phi-features, itself takes place inside the grammar or outside of it.

To elaborate on the question further, consider a commonly assumed family of models of linguistic derivation, where distinct modules of the grammar like syntax, semantics, morphology, phonology, etc., interact with each other (e.g., the so-called inverted Y model (Chomsky & Lasnik 1977) or Single-Output Syntax (Bobaljik 1995, 2002)), as in (5):

²This working definition may appear too narrow—after all, the term is used for a seemingly similar phenomenon in ATB-questions and free relatives. However, as stated in 1.1 my focus here is only on agreement with conjunction, while staying agnostic about other parts of grammar. Thus, in order to not give an appearance of arguing for the analysis of resolution in i.e., free relatives, I maintain this narrow working definition.

(5) Single-Output Syntax model of linguistic derivation and possible loci of resolution



Already in the definition of resolution it is stated that a consequence of resolution is the choice of the agreement form, i.e., some surface form. It is necessary then that the output of resolution is accessible to the module that expones the surface forms, i.e., morphophonology. Under a model like Single-Output Syntax, this fact narrows down the possible loci of resolution to syntax and morphophonology while ruling out semantics – there is no direct link between morphophonology and semantics that bypasses syntax such that the output of some operation in semantics could be then passed on to morphophonology.³

There is, nevertheless, a possibility that semantics is the module responsible for the ultimate (un-)acceptability judgments in a sentence like (1). It could be the case that for such a sentence, syntax generates multiple structures with differently resolved phi-features (possibly all logically possible sets of phi-features). Each structure is accordingly read off by morphophonology and semantics. Such a scenario allows for a possibility of either of these modules *filtering* (rather than generating) the output of resolution. In that sense, semantics could be involved in accounting for the data. However, it is still syntax that computes the phi-features of conjuncts in a coordinate structure. This analytical possibility requires a hypothesis regarding how the syntactic outputs of resolution map onto semantics such that they can be filtered out based on some semantic property. We will see in the overview of the gender features in Polish in §3.1 and in the discussion of its resolution in §4 that the correspondence between syntax and semantics is rather non-trivial. While the complex mapping is expected (otherwise a redundant system would not help with explaining distinct roles of the two modules), we have yet to identify its exact mechanism in a non-post-hoc way.

Consider now the interaction of agreement form and binding in Polish. In some configurations, both resolved and single conjunct agreement are acceptable:⁴

- (6) Do pokoju weszł- $\{i/a\}$ Maria i Piotr.
 into room came- $\{3PL/3SG\}$ Maria and Piotr
 'Into the room came Maria and Piotr.'

Witkoś (2008) observes that while resolved agreement feeds binding of a reflexive *swoimi* in Polish (7-a), single conjunct agreement bleeds it (7-b):

³There are other models of linguistic competence where there is a direct link between phonology and semantics without mediation of syntax, e.g., Parallel Architecture in Jackendoff (1997:et seq.) or at least a relation where semantics feeds the module that determines the surface forms, as in Sauerland & Alexiadou (2020). Given the criticism of the former approach (e.g., Irurtzun 2009) and pending an in-depth assessment of the latter approach, I continue to assume that there is no path for semantics to inform phonology while bypassing syntax.

⁴Here and throughout the rest of the examples I ignore a morphophonological or phonotactic alternation of the form of the verb stem. Polish does not allow a sequence that corresponds to the orthographic *li*, thus when suffixing agreement morphology to a past participial verb stem like here, *l* becomes *l*; see that alternation in examples (7-a) and (6), see Gussmann (2007:p.136) for more detail on this phenomenon.

- (7) a. Za swoimi₂ przyjaciółmi do pokoju weszli [Maria₁ i Piotr]₂.
 behind self's friends into room came.3PL Maria₁ and Piotr
 'Following her friends into the room came Maria and Piotr.'
- b. ??Za swoimi_{??1/*2} przyjaciółmi do pokoju weszła [Maria₁ i Piotr]₂.
 behind self's friends into room came.3SG Maria and Piotr
 Piotr
 'Following her friends into the room came Maria and Piotr.' (Witkoś 2008)

Based on the morphophonological nature of resolution described earlier, as well as the contrast in (7), Willim (2012) concludes that (at least number) resolution is syntactic – both morphophonology and semantics must have access to the output of resolution.⁵ This is not the only possible interpretation of the data in (7); we could be dealing with an ambiguous coordinate structure (Citko 2004) such that the coordinate structure in (7-b) is not a licit antecedent for the reflexive. Such a structure has consequences for agreement but agreement itself does not feed or bleed binding in any way. In sum, as of yet we have found no definitive evidence for the locus of resolution; current proposals depend heavily on one's assumptions about other phenomena involved in resolution.

2.1 MORE FINE-GRAINED CONSIDERATION

The picture becomes even more complicated when we consider some of the recent advances in modeling agreement. For the rest of the section, I provide a more fine-grained theoretical consideration of the possible loci of resolution. A more data-oriented reader may choose to fast-forward to the following section for an empirical discussion of the problem at hand and come back to this subsection afterwards.

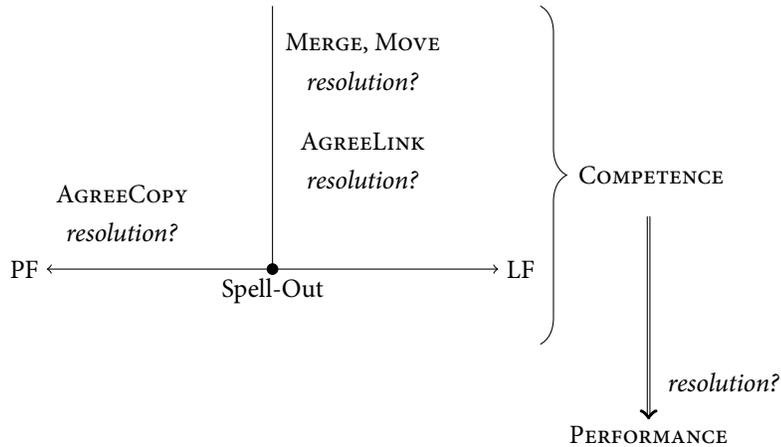
Following Arregi & Nevins (2012), I assume that agreement is a complex, two-step process with the first step AGREE-LINK in syntax, where AGREE probe finds an appropriate goal, and the second step AGREE-COPY in a post-syntactic, morpho(-phono)logical module, where the phi-features from the identified goal are copied onto (or shared with) the probe (or the node associated with the probe). Now consider more fine-grained possible loci of resolution:

⁵Both Witkoś (2008) and Willim (2012) also consider an interaction of resolved and single conjunct agreement and control but their reported judgments differ. They both rule out the possibility of control in single conjunct agreement as in (i-b) but Willim (2012) allows control by the entire coordination in resolved agreement sentences, while Witkoś (2008) does not, as indicated with % for the relevant difference in judgments in (i-a):

- (i) a. Do pokoju weszli [Maria₁ i Piotr]₂ żeby PRO_{*1/%2} nam się pokazać.
 into room came.3PL Maria and Piotr so-that us REFL show
- b. *Do pokoju weszła [Maria₁ i Piotr]₂ żeby PRO_{*1/*2} nam się pokazać.
 into room came.3PL Maria and Piotr so-that us REFL show
 'Maria and Piotr came into the room to show themselves to us.' (Witkoś 2008, Willim 2012)

Thus, Willim (2012)'s pattern of allowing control by the coordination in resolved agreement further supports the access to the output of resolution by semantics, while Witkoś (2008)'s opposite pattern would require further explanation as to why coordination cannot control PRO (which is orthogonal to the goal of this paper).

(8) Fine-grained possible loci of resolution within a Single-Output Syntax model



In such a model, syntax assembles a structure out of some building blocks via operations like *MERGE* and *MOVE*. These building blocks are specified for syntactic features, e.g., phi-features. It is logically possible that resolution could take place at this stage—if each conjunct is specified for phi-features, and a coordinate structure is built out of these conjuncts, there is a possible automatic result of resolution inherent to the operation of structure building itself.

Alternatively, resolution could take place elsewhere in syntax. Some of the building blocks in a syntactic structure are in a special *AGREE* relation with each other. Thus, in principle resolution could take place upon *AGREE-LINK* being established. There is one main consequence of locating resolution upon structure building versus upon *AGREE-LINK* that has to do with the relation of resolution and agreement. It could be the case that resolution does not take place without *AGREE*. If resolution was to take place in syntax and be driven by *AGREE*, it would need to be specifically the syntactic step of *AGREE-LINK* rather than the post-syntactic *AGREE-COPY*. In such a scenario, we would want to further explain why *AGREE-LINK*, whose task is to find a goal, but not copy that goal's phi-features, is in fact linked to an operation of resolving the goal's phi-features. In turn, if resolution was an inherent part of structure building like projection and labeling, we would expect it to take place even without an *AGREE* relation. Foreshadowing the data presented in §3.3, resolution is not nearly as systematic as agreement with non-coordinated noun phrases, even if such noun phrases are complex. In sum, there are two analytical possibilities of locating resolution within syntax that make distinct predictions as to the mechanism of resolution.

For the sake of the further conceptual exercise let us set aside the arguments surrounding the binding data in (7), and consider modules other than syntax. Again, it is clear that resolution has consequences on the surface form, thus its output must be accessible to the module that is responsible for the choice of surface forms. Still, it is possible that resolution takes place in the morphophonological module. As we will discuss shortly, some of the proposed resolution rules resemble Vocabulary Insertion within morphophonology typical for the Distributed Morphology framework (see e.g., (21) and (31)). An analysis locating resolution in morphophonology would prohibit any syntactic or semantic process from referring to the output of resolution. Under the already-mentioned assumption that *AGREE-COPY* takes place in this module, analysis of resolution would also need to consider whether the two operations interact in any way. The second analytical fork in the road is whether the resolution takes place within the coordinate structure (e.g., at some maximal projection) or elsewhere, e.g., on the *AGREE* probe or the projection associated with that probe. The second variant is possible only if resolution takes place after *AGREE-COPY*, i.e. after the values are copied onto the probe.

In a nutshell, if we found evidence for resolution on the AGREE probe or the goal itself rather than the coordinate structure, it would point to the morphophonological locus of resolution. Under the Multiple (Simultaneous) Agree approach argued for by Citko (2018) for Polish coordination, AGREE does not hold between the probe and the entire coordinate structure at once, but rather with each conjunct separately. Thus, Multiple (Simultaneous) Agree coupled with a two-step AGREE-LINK-AGREE-COPY approach to coordination narrows down the possibility of resolution to morphophonology. In this scenario, we would need to reconsider the interpretation of the data in (7). We already observe that, after all, we have not reached a consensus regarding the nature of phi-feature resolution under coordination.

Our considerations of the locus of resolution do not end here. Crucially, a model like Single-Output Syntax is a model of linguistic *competence* that is distinct from *performance*. While these two parts of language often converge, there are also situations where we observe a mismatch, i.e., (un-)grammaticality illusions such as agreement attraction (Bock & Miller 1991) or self-embedding (Gibson 1998). A rich body of literature on the topic of such mismatches provides us with theories of how different grammar-external systems and phenomena such as memory, parsing, etc., interact with the grammar itself to result in performance that does not match the competence representations. The existence of such a division provides us with yet another logically possible locus of resolution—resolution as a grammar-external phenomenon. Foreshadowing the proposal, this is what the current paper argues for. Locating resolution outside of grammar has been proposed by Reis (2017) for German based on the unsystematic behavior of resolution. In this paper, I consider arguments for a similar proposal in Polish. A grammar-external analysis of resolution should eventually respond to arguments in favor of syntactic treatment of resolution discussed here. Thus, I will attempt to reconcile these seemingly opposing pieces of evidence.

To summarize, some of the literature on resolution in Polish argues that resolution is a syntactic computation whose output is accessed by both morphophonology and semantics. While this approach is indeed based on empirical evidence, I outlined some other logical possibilities for loci of resolution, particularly motivated by recent advances in the study of agreement, summarized in (9).

(9) Summary of the reasoning for the possible loci of resolution

hypothesized locus	counterevidence
syntax: upon MERGE	not as systematic as labeling and projection, see §3.3
syntax: upon AGREELINK	conceptually odd given the nature of AGREELINK
morphophonology: before AGREECOPY	not consistent with the Multiple Agree approach
morphophonology: after AGREECOPY	not consistent with the semantic-based behavior, see §3.3
semantics	ruled out under a Single-Output Syntax model
syntactic overgeneration + semantic filtering	no hypothesis regarding the correspondence between the syntactic and semantic features
grammar-external	no hypothesis regarding the exact systems involved

With this first attempt to reignite the examination of the locus of resolution, I now move to discuss the data both supporting and questioning the view of robustness in resolution.

3 RESOLUTION OF GRAMMATICAL GENDER IN POLISH

3.1 GRAMMATICAL GENDER IN POLISH

Let us begin with a description of grammatical gender in Polish, not only for the sake of reference but also to set the stage for the discussion of syntactic vs. semantic features. Consider the forms in (10):

- (10) Example of morphological forms in Polish exhibiting a distinction in grammatical gender categories

	masculine			feminine	neuter
	human	animal	inanimate		
DEM.ACC.PROX.SG ‘this’	<i>tego</i> _{MH/MA}		<i>ten</i> _{MI}	<i>ta/te</i> _F	<i>to</i> _N
DEM.NOM.PROX.PL ‘these’	<i>ci</i> _{VIR}	<i>te</i> _{NON-VIR}			

In singular number, only four distinct categories are observable in Polish, but in the plural number an additional split is manifested between [MH], referred to as [VIR], and everything else, referred to as [NVIR]. As a result, Polish is traditionally described as having a five-way grammatical gender description (Laskowski 1998, Willim 2012, Swan 2015) represented in (11):

- (11) Polish grammatical gender categories

	masculine			feminine	neuter
	human	animal	inanimate		
singular	MH and MA		MI	F	N
plural	MH = VIR(ILE)	MA, MI, F, N = N(ON-)VIR(ILE)			

While this is a description of formal features, the system correlates with the referent’s societal or biological humanness, animacy and gender (hence the labels like [M(ASCULINE)H(HUMAN)]).⁶ This means that referents which outside of grammar are (perceived as) male humans are often specified with a formal [MH] feature, female with [F], etc. However, as with many partially semantically-based gender systems, two notes are in order. First, inanimate referents are not specified with a single formal category but rather are distributed over several categories, including [F]. This means that the semantic tendency is a one-way correlation: most formally [F] noun phrases do not refer to or denote a female and most formally [MH] noun phrases do not refer to a male. Furthermore, even within human referents, some noun phrases do not conform to these semantics-like labels as features: *babsko* ‘nasty woman’ refers to a female human but formally behaves like a [N] (see (12) below). Thus, it is crucial to treat (11) as a formal description and keep it distinct from its semantic correlates.

As far as gender agreement in Polish is concerned, it is grammatical, not semantic gender that controls the morphology on the predicate. This is robustly observed with singular noun phrases:

- (12) T- $\{o/*a/*en\}$ *babsko* *spał*- $\{o/*a/*\emptyset\}$.
 DEM. $\{N/*F/*M\}$ *nasty.woman.N* *slept*- $\{N/*F/*M\}$
 ‘This nasty woman was sleeping.’

- (13) T- $\{o/*a/*en\}$ *chłopisko* *spał*- $\{o/*a/*\emptyset\}$.
 DEM. $\{N/*F/*M\}$ *big.man.N* *slept*- $\{N/*F/*M\}$
 ‘This big man was sleeping.’

In (12), it is not possible to use [F] morphology to agree with a noun phrase that refers to

⁶There is a plethora of terms that are used in the literature on this topic for what these other features actually are: semantic, interpretable, real-world gender/animacy, etc. Sometimes they are meant to represent formal categories, but at times it is not clear whether they need to or even could be formal entities. The question of the nature of these features will be discussed later in the paper.

a female if that noun phrase is formally non-[F]. The same grammatical-over-semantic gender in agreement applies to a noun phrase referring to a male in (13). This observation is not unique to some derivational morphology (e.g., *-sko* in (12) and (13)). A parallel example can be constructed for *babsztyl*, another term for ‘nasty woman’ but formally [MA]) or *dziecko* ‘child’ shown below:

- (14) T- $\{o/*a/*en\}$ dziecko spał- $\{o/*a/*\emptyset\}$.
 DEM. $\{N/*F/*M\}$ child.N slept- $\{N/*F/*M\}$
 ‘This child was sleeping.’ (regardless of the societal gender of the referent)

In plural, agreement with grammatical gender is somewhat less robust—some speakers occasionally do accept agreement that does not obey the mapping based on (11), where formal [MH] maps to [VIR] and everything else to [NVIR]:⁷

- (15) Chłopiska spał- $\{y/%i\}$.
 big.men slept- $\{NVIR/%VIR\}$.
 ‘Big men were sleeping.’
- (16) Dzieci spał- $\{y/%i\}$.
 Children slept- $\{NVIR/%VIR\}$.
 ‘Children were sleeping.’ (regardless of the societal gender of the referent)

It is worth pointing out that this agreement, which does not reflect a direct mapping between SG:PL grammatical gender categories, is somewhat marked. First, only some participants accept the variants marked with % in the examples above. Second, even such participants tend to reject an analogous agreement on modifiers:

- (17) $\{te/*ci\}$ chłopiska
 DEM $\{NVIR/*VIR\}$ big.men
 ‘these big men’
- (18) $\{te/*ci\}$ dzieci
 DEM $\{NVIR/*VIR\}$ children
 ‘these children’ (regardless of the societal gender of the referent)

What we do not know is whether, for such speakers, semantic gender agreement is exceptionally allowed (see e.g., Despić 2017 for such a view for Serbian noun phrases like *vojvoda* ‘duke’) or whether some grammatically [MA/MI/F/N] singular noun phrases can be grammatically [VIR] in plural (and [MH]:[NVIR]; see e.g., Corbett & Mtenje 1987 for an analogous many-to-many mapping between noun classes in singular and plural in Chichewa).

With this description of grammatical gender categories (and their correspondence to the semantic gender) in Polish, let us turn to the behavior of gender resolution under coordination.

3.2 TENDENCIES

Consider the sentence below, where speakers invariably accept [VIR] agreement form:

- (19) Gucio i Maja był- $\{i/*y\}$ na łące.
 Gucio.MH and Maja.F COP.PST- $\{VIR/*NVIR\}$ on meadow
 ‘Gucio and Maja were in the meadow.’

⁷A reviewer points out that there is also an issue of so-called *hybrid nouns* like *doktor* ‘doctor’ that display variable agreement depending on the societal gender of the referent without any change in derivational morphology on the noun itself (not to be confused with what Despić (2017) calls hybrid nouns in Serbian). I set these types of nouns aside, as depending on the analysis, they may or may not have ambiguous grammatical gender representation rather than a mismatch of formal vs. semantic features.

This agreement form may be described as resulting from a rule that states that when any conjunct in a coordination bears [MH], the computation of phi-features resolves them to [VIR] (when coordination is in a position to control agreement).⁸ Now consider what happens when there is no conjunct bearing [MH] anywhere in a coordination:

- (20) Tekla i Maja byl-*{*i/y}* na łące.
 Tekla.F and Maja.F COP.PST-*{*VIR/NVIR}* on meadow
 ‘Tekla and Maja were in the meadow.’

Here the behavior of resolution may be stated as a result of an elsewhere rule—if no conjunct in a coordination bears [MH], resolve to [NVIR]. These rules may be summarized as follows:

- (21) Traditional rules (tendencies) in grammatical gender resolution in Polish
 a. When conjoining [MH] or [VIR], resolve to [VIR].
 b. Else: [NVIR].

The literature on resolution in Polish abounds in similar well-behaving examples that adhere to the descriptive rules in (21). Later in the paper, I will discuss a recent revision to these traditional rules (Prażmowska 2016). In the meantime, based on the discussion so far, there are good reasons to posit that resolution is part of the grammar. First, the (apparently) robust speaker behavior with respect to resolution, i.e., the clear native speaker intuitions, seems typical for grammar-internal processes. Second, resolution involves grammar-internal components like agreement, and the descriptive rules in (21) could be fairly straightforwardly formalized using typical grammatical tools. For example, feature-geometric approaches to phi-features like Harley & Ritter (2002) coupled with feature percolation are not only off-the-shelf grammatical tools but also help explain cross-linguistic systematicity in resolution (Zwicky 1977, Corbett 2000). Given the lack of alternative analyses, it is reasonable to assume at this point that resolution is grammar-internal. However, the data presented so far turn out to be only a slice of the empirical landscape. The following subsection discusses further examples that do not fit into this basic description of resolution in Polish.

3.3 APPARENT EXCEPTIONS

Sentences that do not follow the tendencies described in 3.2 have been known since at least the 70’s. Despite not having a [VIR] conjunct, examples (22)-(24) display unexpected [VIR] agreement, counter to the elsewhere rule in (21), in addition to the expected [NVIR]:

- (22) Pani i dziecko szli ulicą.
 lady.F and child.N walked.VIR street.INST
 ‘A lady and a child were walking on the street.’ (Zagórska-Brooks 1973)
- (23) Pani i pies szli ulicą.
 lady.F and dog.MA walked.VIR street.INST
 ‘A lady and a dog were walking on the street.’ (Zagórska-Brooks 1973)
- (24) Mama, córeczka i wózek ukazał-*{y/i}* się nagle.
 mom.F daughter.F.DIM and stroller.MI appeared-*{NVIR/VIR}* REFL suddenly
 ‘A mom, a daughter and a stroller appeared suddenly.’ (Zieniukowa 1979)⁹

Furthermore, despite having a [MH] conjunct, (25) displays unexpected [NVIR] in addition to the expected [VIR]:

⁸I use the term ‘rule’ here even though all of the work on this topic recognizes that these are descriptions of tendencies or violable rules (e.g. Zbróg 2012).

⁹There are speakers for whom [VIR] is unacceptable (Marta Ruda, p.c.), speakers for whom [VIR] is preferred (Kopcińska 1977) in similar examples, but in the original source cited here, Zieniukowa (1979) reports optionality for most of the consultants.

- (25) Pługi i syn leż- $\{a\}y/eli$.
 Plows.MI and son.MH lie- $\{PST.NVIR/PST.VIR\}$
 ‘The plow and the son were lying.’ (Zieniukowa 1979)¹⁰

Before we proceed to describe these examples for their grammatical properties, a potential elephant in the room needs to be addressed, especially for readers having native judgments about these data. What the sources reporting these examples note is that speakers’ acceptability judgments differ vastly. Some speakers accept both [VIR] and [NVIR] forms of agreement, some prefer [VIR], some [NVIR], and finally, some speakers find these sentences ineffable and insist on rephrasing the entire sentence. The literature also reports that speakers change their mind when retested on the same sentence. We will return to discuss the significance of this behavior shortly. In the meantime, it is enough to keep in mind that all speakers accept at least some of the sentences that run against the traditional rules in (21). Examples like (25), where there is noticeable inter-speaker variability, are flagged appropriately.¹¹

There is no way to account for the traditional examples in 3.2 and all the apparently exceptional examples in (22)-(25) by simply revising the traditional rules in (21) that use the representation of grammatical gender in (11).¹² Furthermore, the apparent exceptions do not constitute an obvious natural class that would distinguish them from (or unite them with) the typical sentences in 3.2. Each of the examples shows a different combination of formal features and a different combination of properties of the referents. Nevertheless, looking beyond just the formal features, descriptively, we can identify three major trends in apparent exceptions:

- (26) A list of common types of exceptions to the traditional resolution rules in Polish
- a. Coordination with a formally [N] conjunct that refers to a human, e.g., (22)
 - b. Coordination with a conjunct that refers to an animal, e.g., (23)
 - c. Coordination where conjuncts differ in animacy, and the animate conjunct is feminine e.g., (24), or the animate conjunct is masculine, e.g., (25)

This diverse character of examples is one of the main empirical problems for any proposal that attempts to revise the ‘traditional’ rules in (21) and account for the apparent exceptions above. The list of types of exceptions in (26) makes reference to both formal features like [N] and real-world properties of the referent(s) of the conjuncts. Moreover, early descriptions of these apparent exceptions further suggest that these types of exceptions could be an effect of the factors in (27), but no systematic empirical studies are available to date (Zagórska-Brooks 1973, Buttler et al. 1976, Zieniukowa 1979):

- (27) Factors in (non-)adherence to the traditional resolution rules in Polish
- a. grammatical number on nominal conjuncts
 - b. the number of nominal conjuncts
 - c. (matching of) grammatical gender between conjuncts
 - d. (matching of) humanness between conjuncts
 - e. linear order of conjuncts

¹⁰Zieniukowa (1979: 126–128) notes that this and similar sentences with [NVIR] are “infrequent but significant” and that combinations of conjuncts with these formal features are avoided by consultants altogether.

¹¹A methodological note: the fact that we observe inter- and intra-speaker variability strongly suggests the need for targeted elicitation rather than relying only on pooling judgments or using corpora from different sources.

¹²It is possible that there are *some* speakers whose grammars are actually amenable to a rather simple revision. Marta Ruda (p.c.) observes that the apparent exceptions in Kopcińska (1977) might be modeled as resolution to [VIR] for all coordination of mismatching grammatical gender and animacy. Whether this is enough to capture the totality of that grammar would require further investigation. If such grammars indeed exist, it adds to the complexity of the investigated question of why such inter-speaker variability in the grammar, possibly not reducible to a single parameter, would exist.

At this juncture, we may conceive of three broad strategies of scientific inquiry. First, we could treat these examples as marginal, perhaps as speech or parsing errors, and ignore them all together. However, these examples seem to be persistent enough to warrant a more careful investigation. Thus, the second option would be to further identify what differentiates these examples from the ones reported earlier, in 3.2, hone the descriptive generalizations and assess whether the result is still formalizable using standard grammatical tools. If the second option fails, a third, radical option would be to abandon the attempt to maintain resolution within the grammar and come up with an analysis of resolution outside of the grammar. As has already been foreshadowed, the third option is indeed what the paper ultimately proposes; however, we have not discussed all of the arguments for a switch in that direction. What follows is an assessment of some of the existing proposals addressing apparent exceptions to the tendencies in resolution in Polish. While ultimately I reject them due to their empirical and theoretical shortcomings, they significantly advance our understanding of the complexity of the problem and provide an opportunity to investigate the desiderata for any future (possibly grammar-external) analyses of resolution.

4 REVISITING GRAMMAR-INTERNAL ANALYSES

There are a handful of proposals that address both the tendencies described in 3.2 and (some of) the apparent exceptions to them in 3.3 (Ruda 2011, 2010, Prażmowska 2016, Matushansky 2021). What they all share is an appeal to broadly-construed semantic gender and animacy and its interaction with formal features (see fn. 6). For example, Prażmowska (2016) proposes that besides the formal gender system in Polish, there is also another (sub-)system of semantic gender:¹³

(28) Prażmowska's (2016) semantic gender (sub-)system in Polish with examples¹⁴

interpretable gender		uninterpretable gender	
masculine (<i>iM</i>)	feminine (<i>iF</i>)	human (<i>uH</i>)	non-human (<i>uNH</i>)
<i>syn</i> 'son'	<i>pani</i> 'lady'	<i>dziecko</i> 'child'	<i>krzesło</i> 'chair'

The entire gender system in Polish cannot be reduced to (28) as it would not account for why e.g., inanimate noun phrases control different agreement forms (outside of coordination):

- (29) a. Wózek spadł.
'A stroller fell.'
b. Miotła spadła.
'A broom fell.'
c. Krzesło spadło.
'A chair fell.'

If all inanimate nouns in Polish were simply represented as uninterpretable non-human gender, as per the system in (28), we could not explain the difference in agreement

¹³For the sake of concrete illustration, I focus here on discussing the details of this particular work by Prażmowska (2016). Nevertheless, as mentioned, since works by Ruda (2011, 2010), Prażmowska (2016) and Matushansky (2021) all share some parts, the commentary applies accordingly. I choose to focus on Prażmowska (2016) since it is the most fleshed out proposal and it analyzes specifically the phenomenon of resolution in Polish rather than additional problems of full vs. partial agreement like Ruda (2011) or multiple languages like Matushansky (2021).

¹⁴A reviewer asks why *dziecko* 'child' is labelled as *uH* and not interpretable gender. In Prażmowska (2016)'s proposed system, a noun can be either interpretable gender or human but the two categories do not intersect. Given the data we will discuss shortly, *dziecko* 'child' has to be distinct from both *iM* and *iF*, (see the rules referencing these features and their distinct outcomes in (31)), but it is unclear why it cannot be e.g., *iN*. In fact it is *iF* that behaves just like *uNH* and the categories could be collapsed. It is unclear to me what the role of the [\pm human] feature is, but I suspect it might have to do with the behavior of the *uH* group of nouns outside of coordination (despite the fact that this sub-system itself is proposed for coordination-only). Nothing in the following discussion hinges on this possible revision to the system.

morphology with inanimate nouns in (29).

Semantic gender is used to model phenomena other than resolution under coordination, e.g., pronominal phi-matching that spans clausal boundaries (see also subsection 1.1):¹⁵

- (30) a. To babsko₁ spał-o. Ona₁ nie chciał-a wstać.
 DEM.SG.N nasty.woman slept-SG.N 3SG.F NEG wanted-3SG.F rise
 b. *Ta babsko₁ spał-a. Ona₁ nie chciał-a wstać.
 DEM.SG.F nasty.woman slept-SG.F 3SG.F NEG wanted-3SG.F rise
 c. To babsko₁ spał-o. ?Ono₁ nie chciał-o wstać.
 DEM.SG.N nasty.woman slept-SG.N 3SG.N NEG wanted-3SG.N rise
 ‘This nasty woman was sleeping. She did not want to get up.’

As already discussed with respect to the data in (12), *babsko* ‘nasty woman’ is formally [N] as indicated by the form of verbal agreement (and modifier concord) in (30-a). Nevertheless, in the same example, we observe that in a following sentence a pronoun that refers to the same individual as the noun phrase *babsko* has a [F] form, thus matching the societal gender of the referent, not the grammatical gender.

Equipped with a subsystem like (28), Prazmowska (2016) codifies the description of resolution with the following set of revised rules:

- (31) Prazmowska’s (2016) revised gender resolution rules¹⁶
- An interpretable masculine gender feature on any conjunct always makes a coordinate subject eligible only for [VIR] agreement, regardless of the features of the other conjunct(s). This rule trumps all the remaining rules.
 - An interpretable feminine gender feature on any conjunct makes a coordinate subject eligible for [NVIR] agreement.
 - An uninterpretable gender and the [+human] feature on any conjunct make a coordinate subject eligible for both [VIR] and [NVIR] agreement.
 - An uninterpretable gender and the [-human] feature on any conjunct make a coordinate subject eligible for [NVIR] agreement.

Note that the first rule in (31-a) is the ‘trumping’ rule, the other rules are not—the eligibility for [VIR] form of agreement is the only eligibility that this rule allows for, even when another rule is in principle applicable due to referring to the features found on another conjunct. In other words, even though e.g., rule (31-b) introduces eligibility for [NVIR], in a coordination where (31-a) applies, (31-a) trumps the eligibility for [NVIR] stemming from (31-b). On the other hand, other rules can co-apply. For example, (31-b) introduces eligibility for [NVIR] while (31-c) does so for both [VIR] and [NVIR], but the former does not trump the latter; the net effect is eligibility for both.¹⁷

¹⁵However, given the lack of mainstream consensus on the representation of semantic gender categories in Polish (cf. Saloni 2009, Ruda 2011), it is possible that the particular semantic gender representation in (28) is only used for resolution. For example, it is not clear whether *babsko* ‘nasty woman’ from the examples in (30) is meant to be classified as *IF* along with *pani* ‘lady’ or as *UH* along with *dziecko* ‘child’ (or other). If the system in (28) was indeed restricted to resolution, it would raise the question of learnability. As we will see shortly, a child needs to learn that the feature [human] is only found with uninterpretable gender, not with interpretable gender noun phrases like *syn* ‘son’ or *pani* ‘lady’. It therefore remains to be explained whether a child can acquire this system based on the primary linguistic data or whether it is some property of the feature architecture where [human] feature is incompatible with interpretable gender.

¹⁶Note the concept of *eligibility*. Since Prazmowska (2016) does not provide any explicit discussion of this concept (or a framework where it would be a standard concept), I will assume that eligibility is no different than a regular output or results of any grammatical process like MERGE or AGREE.

¹⁷Note that there is no elsewhere rule. Indeed, there is no clear evidence for [VIR] nor [NVIR] being an elsewhere (or unmarked or default or underspecified) form (but see Ruda (2011) who proposes [MH] to be a default in coordination but ¬[MH] to be an underspecified form in this context). While this lack of an elsewhere option would make these grammatical rules quite unusual (cf. Vocabulary Insertion rules in Distributed Morphology), it might be that they are intended to cover the entire logical space of

The interaction of these rules can also be visually represented for a conjunction of two nominals in the form of the following table:

(32) Combination of features in (28) and their output of coordination per (31)

	interpretable masculine (<i>iM</i>)	interpretable feminine (<i>iF</i>)	uninterpretable +human (<i>uH</i>)	uninterpretable -human (<i>uNH</i>)
<i>iM</i>	VIR	VIR	VIR	VIR
<i>iF</i>	VIR	NVIR	VIR, NVIR	NVIR
<i>uH</i>	VIR	VIR, NVIR	VIR, NVIR	VIR, NVIR
<i>uNH</i>	VIR	NVIR	VIR, NVIR	NVIR

We now turn to assessing this revision against the aforementioned empirical data.

4.1 EMPIRICAL (RE-)TESTING

Recall the traditional rules of resolution in Polish along with the types of exceptions to such rules:

- (33) Traditional rules (tendencies) in grammatical gender resolution in Polish (repeated from (21)).
- When conjoining [*MH*] or [*VIR*], resolve to [*VIR*].
 - Else: [*NVIR*].
- (34) Types of exceptions to (33) (repeated from (26))
- Coordination with a formally [*N*] conjunct that refers to a human, e.g., (36)
 - Coordination with a conjunct that refers to an animal, e.g., (39)
 - Coordination where conjuncts differ in animacy, and the animate conjunct is feminine e.g., (43), or the animate conjunct is masculine, e.g., (45)

Starting with (34-a), let us go through a specific example to illustrate how the revised rules successfully capture the observed form of agreement:

- (35) Pani i dziecko szli ulicą.
 lady.*iF* and child.*uH* walked.*VIR* street.*INST*
 ‘A lady and a child were walking on the street.’ (Zagórska-Brooks 1973)

The example above was reglossed to reflect the semantic gender system proposed by Prazmowska in (28). According to the revised rules in (31), and more specifically for this example, the rule in (31-b) governing the contribution of *iF*, and the rule in (31-c) governing the contribution of *uH*, we expect the eligibility for both [*VIR*] and [*NVIR*] agreement form. Thus, (22) is generated successfully as well as its tendency-following minimal counterpart. Both variants are exemplified below as (36):¹⁸

- (36) Pani i dziecko szł-*{i/y}* ulicą.
 lady.*iF* and child.*uH* walked-*{VIR/NVIR}* street.*INST*
 ‘A lady and a child were walking on the street.’

coordination possibilities, thus not needing an elsewhere form. According to these rules, the surface forms are also in a rather unusual blocking/competing relation, e.g., [*VIR*] from (31-a) technically blocks [*VIR*] from (31-c).

¹⁸However, compare with the judgment from Ruda (2011) for a parallel sentence with a coordination of *iF*&
uH:

- (i) Matka i dziecko kochal-*{i/*y}* się bardzo mocno.
 mother.*iF* and child.*uH* loved-*{VIR/*NVIR}* REFL very much
 ‘A mother and a child loved each other very much.’

Again, we are possibly facing dialectal and/or idiolectal variation.

Thus, these revised rules are well-suited to generate more outputs of resolution compared to the descriptive rules covering the tendencies in (33). Specifically, they do so by carving out two distinct categories absent from the traditional representation of grammatical gender in (11): the category of *iF* and the category of *uH*. They create these categories by referring to the properties of the referents of the noun phrases (humanness and interpretable gender).

Although not explicitly, the revision also makes it possible to account for the well-known fact that not all coordination in Polish results in either [VIR] or [NVIR] agreement forms:

- (37) Sześciu czarodziejów i pięć czarownic spał-{*y/*i/o}.
 six wizards.*iM.GEN* and five witches.*iF.GEN* slept-{*NVIR/*VIR/3SG.N}
 ‘Six wizards and five witches were sleeping.’
- (38) To, że Bolek jest wyższy i to, że Lolek nosi szelki
to COMP Bolek is taller and *to COMP* Lolek wears suspenders
 pozwalał-{*y/*i/o} ich rozróżnić.
 allowed-{*NVIR/*VIR/3SG.N} 3PL.GEN distinguish
 ‘That Bolek is taller and that Lolek wears suspenders made it possible to distinguish them.’

We can assume that the features proposed by Prazmowska in (28) must be accessible to the operation giving rise to morphological form of agreement for the revised rules in (31) to be able to apply at all. Otherwise, a default agreement arises.¹⁹

Despite these successes, there are still empirical gaps that the revised rules do not cover. None of the recent revisions to resolution rules explain examples that contain conjuncts referring to animals like (39) (repeated from (23)), or (40) below:

- (39) Pani i pies szli ulicą.
 lady.F and dog.MA walked.VIR street.INST
 ‘A lady and a dog were walking on the street.’ (Zagórska-Brooks 1973)
- (40) Pies i kot jedli/jadły.
 dog.MA and cat.MA was.eating.VIR/NVIR
 ‘A dog and a cat were eating.’ (Zieniukowa 1979)

According to the traditional rules, the lack of formal [MH] feature in coordination should yield resolution to [NVIR], yet we often observe [VIR] agreement as well. It is not enough to invoke the role of context in which a speaker knows that one of the conjuncts is real-world male (or *iM* in Prazmowska’s terms in (28)). First, [VIR] agreement appears even in the absence of such contextual information. Second, curiously, for many speakers who accept (40), [VIR] agreement is not acceptable when the noun phrases are pluralized (even in the context where all of the animals are male):

- (41) Psy i koty *jedli/jadły.
 dogs.MA and cats.MA *eat.PST.VIR/eat.PST.NVIR
 ‘Dogs and cats were eating.’

Note that it would not suffice to subsume animal-referring noun phrases under the category of *uH* as at least some plural *uH* still allows variability in agreement form:

¹⁹What remains to be explained is the empirical and analytical status of examples where one conjunct has a feature that in principle is accessible for agreement and falls under a rule in (31), while another conjunct does not:

- (i) Czarodziej i pięć czarownic przyleci-{??eli/*ały/*ało} do zamku.
 wizard.*iM* and five witches.*iF.GEN* fly-{??PST.VIR/*PST.NVIR/*PST.3SG.N} to castle.GEN
 ‘A wizard and five witches flew in to the castle.’

- (42) Dwoje dzieci i kobieta szl- $\{i/y\}$ ulicą.
 two children.*UH* and woman.*IF* walked- $\{VIR/NVIR\}$ street.*INST*
 ‘Two children and a lady were walking on the street.’ (adapted from Ruda 2011:
 p.9)

Let us turn now to the final type of apparent exceptions listed under (34-c). There is currently no explanation of examples like (43) (repeated from (24)), or (44) below:

- (43) Mama, córeczka i wózek ukazał- $\{y/i\}$ się nagle.
 mom.*F* daughter.*F.DIM* and stroller.*MI* appeared- $\{NVIR/VIR\}$ REFL suddenly
 ‘A mom, a daughter and a stroller appeared suddenly.’ (Zieniukowa 1979)
- (44) Bratowa i tort był- $\{y/i\}$ już w drodze.
 sister-in-law.*F/IF* and cake.*MI/UNH* COP.PST- $\{NVIR/VIR\}$ already in way.*LOC*
 ‘The sister-in-law and a cake were already on their way.’ (Zieniukowa 1979)

What unites the examples in (43) and (44) is that they have a coordination of formally [F] conjuncts, which are *IF* according to the classification in (28), plus a formally [MI] conjunct, which is *UNH*. Both according to the traditional rules in 3.2 and the revised rules in (31), we expect [NVIR] agreement form, yet the examples above show parallel acceptability of a [VIR] form.

Finally, recall that the first revised rule, (31-a), stipulates that it trumps all other rules, i.e., it does not allow for other eligibilities. Thus, it predicts that the presence of a conjunct with an interpretable masculine feature would always and only yield eligibility for [VIR] agreement. However, recall that there are some examples reported to do the opposite, like example (45) (repeated from (25)), or (46) below:

- (45) Pługi i syn leż- $\{a/y/eli\}$.
 Plows.*MI* and son.*MH* lie- $\{PST.NVIR/PST.VIR\}$
 ‘The plow and the son were lying.’ (Zieniukowa 1979)
- (46) Laski i ojciec mokł- $\{y/i\}$.
 sticks.*MI* and father.*MH* got.wet- $\{NVIR/VIR\}$
 ‘The sticks and the father were getting wet.’ (Zieniukowa 1979)

Some of the work on resolution notes that examples where the animacy of the conjuncts mismatches are the ones with the most rampant inter- and intra-speaker variability, including behavior like ineffability and hesitation (Zieniukowa 1979, Ruda 2011). As far as the revised rules are concerned, some intra-speaker variability is predicted (in cells with both [NVIR] and [VIR] in (31)) but not in the entire paradigm (not in cells with either just [NVIR] or just [VIR] in (31)). We have not made meaningful progress on explaining this facet of resolution. While inter-speaker variability can be accounted for with differences in dia- or idiolects, intra-speaker variability remains a puzzle. Linguistic theory allows some degree of tolerance for such variability due to the third factor (grammar-external properties like memory), but systematic studies of speakers’ behavior with respect to resolution, like Zieniukowa (1979), reveal that the variability is quantitatively and qualitatively different from, e.g., variability in agreement in spontaneous speech. We will return to this problem in §5.

4.2 CONSIDERATIONS OF THEORETICAL PARSIMONY

It is worth examining also how revisions to the resolution rules that refer to semantic gender fit into the larger theory of grammar. Recall a standard assumed model of competence modules like Single-Output Syntax in (5). There is no direct link between a semantic module and a (morpho-)phonological module. Thus, whatever is observable in the phonology, i.e., the choice of the surface form, must have been either generated in that module or the module that is the input to phonology, i.e., syntax. In other words, the form that is observable on the surface cannot be based on the output of some process

restricted to a semantic module. This would require these seemingly semantic features to be accessed during a syntactic computation alongside the formal syntactic gender features. The two sets of features on our noun phrase present in syntax is not necessarily a basis for questioning the revised rules. However, recall that so far we have found no link between the exact representation of the semantic features and any other linguistic process than resolution. In other words, the semantic feature representation is exclusively used in resolution. Thus, unless we posit that this semantic feature representation is somehow language-universal, a speaker of Polish would need to learn it from the surface data that specifically involves resolution. Whether this is borne out in the acquisition data remains to be tested.

Furthermore, note that the revised resolution rules cannot do away with formal gender representation as given above in the table in (11):

- (47) Kierowca i samochód został- $\{^*y/i\}$ przekazany $\{^*e/i\}$
 driver.MH and car.MI/UNH became- $\{^*NVIR/VIR\}$ handed-over- $\{^*NVIR/VIR\}$
 komendzie policji w Zakopanem.
 headquarters police in Zakopane
 ‘The driver and the car were handed over to the police headquarters in Zakopane.’
 (Prażmowska 2016)

In example (47), we have coordination of a conjunct *samochód* ‘car’ with with a formal [MI] and *UNH*, and a conjunct *kierowca* ‘driver’ with a formal [MH] whose interpretable gender can be either masculine or feminine (for many speakers feminine suffixes like *-(k)a*, *-yni* are blocked for this lexical item) or we could posit an uninterpretable human category here. According to the revised rules, depending on the gender category of *kierowca* ‘driver’, the results should be either [VIR] or [NVIR]. Nevertheless, this is not borne out by the data, [NVIR] is unacceptable according to (47). Referring to the invariable formal gender feature ([MH]) of *kierowca* ‘driver’ in this scenario is superior to (un)interpretable gender.

5 PROPOSAL: RESOLUTION IS GRAMMAR-EXTERNAL

Let us now take stock of the gains and costs of the revised analyses of grammatical gender resolution in Polish based on the concrete proposal in Prażmowska (2016). The main benefit is the expanded empirical coverage that can generate data, particularly data where the traditional rules would predict a more narrow set of agreement forms, e.g., (36). It achieves this goal thanks to the focus on semantic properties of referents and integrating them with the formal features of the denoting noun phrase.

On the other hand, we have noted that not all reported apparent exceptions to the traditional rules of resolution are covered by this revised proposal. Notably, it does not yet cover coordination with animal referents like (39), (40) and (41), coordination of a non-[MH] noun phrase that refers to a human and an [MI] noun phrase like (43) and (44), or coordination with unexpected [NVIR] like (45) and (46). It does not predict inter-speaker variability in some examples where such variability is observed, notably when conjuncts differ in animacy, as in (43), (44), (45), or (46). It is this particular type of example where Ruda (2011: p.11) acknowledges that “fragility of form and inter-speaker variation may suggest that unless there is [MH] noun (...), the grammatical system of Polish underspecifies the solution for gender computation.” We observe behavior of frequent hesitancy, avoidance, ineffability, inter- and intra-speaker variation as well as priming by previously chosen forms. A question that requires explanation then is why this particular corner of grammar: why resolution under coordination but not (i) under pronominal phi-matching or (ii) under coordination that does not control agreement or (iii) when one of the conjuncts is [MH]. Until (or unless) we find an explanatory answer to the question of why this corner, we may examine several adjustments to the theory of Polish grammar and grammar in general, that are necessary in order for the revised

proposal to apply.

5.1 BEYOND POLISH

Is it, then, a quirk of Polish grammatical gender resolution that resists an elegant grammar-based analysis? This apparent peculiarity does not seem to be limited either to Polish or to grammatical gender. Even scholars working on finding the tendencies in resolution behavior cross-linguistically acknowledge that the empirical landscape is rather complex. For example, Corbett (2006) states that “person resolution is not quite as simple as [descriptive] grammars often imply.” Resolution is not as systematic as it is sometimes taken to be, starting with English (Sobin 1997, McCloskey 1991), through German (Findreng 1976, Fanselow & Féry 2002, Timmermans et al. 2004, Reis 2017), French (Grevisse 1964), Dutch (Timmermans et al. 2004), Romanian (Croitor & Giurgea 2009), Albanian (Giurgea 2014), Bosnian-Croatian-Serbian (Arsenijević & Mitić 2016), Slovenian (Bajec 1955), Greek (Kazana 2011), Xhosa (Carstens 2019), Chichewa (Corbett & Hayward 1987), Zulu (Gormish 2021), and possibly more (Russian, Maria Polinsky and Polina Pleshak p.c.; Lebanese Arabic, Jad Wehbe pc.). Each of these reports has to be considered on its own, i.e., some of these may be true examples of structural ambiguity or dialectal differences, or it might be the case that more work will uncover a systematic pattern of resolution governed by grammar. Nevertheless, taking a bird’s eye view of resolution, we notice that resolution is in fact systematically unsystematic. In what follows, I provide my proposal for the source of this non-systematicity in 5.2, i.e., the grammar-external nature of resolution, as well as another interesting proposal suggested by the reviewer in 5.4, i.e., the possibility of competing grammars.

5.2 RESOLUTION IS GRAMMAR-EXTERNAL

The dual behavior of resolution of phi-features in German, which sometimes seems systematic and other times unsystematic, leads Reis (2017) to propose that resolution is grammar-external. In §3, I gave an overview of similarly unsystematic behavior of gender resolution in Polish. We might look for an explanation for this seemingly unexpected behavior in the architecture of the grammar. However, in §2, I discussed how the architecture of the grammar itself does not provide a clear place where resolution could occur. Let me first state a more cautious proposal:

- (48) Preliminary proposal
Resolution of gender under coordination in Polish is a grammar-external mechanism.

The data from gender resolution under coordination in Polish is indeed what most of the paper has focused on. However, in light of the discussion of unsystematicity of resolution of all types of features in world’s languages in §5.1, I pursue a stronger version of the proposal, namely that all resolution is extra-grammatical:

- (49) Final proposal
All resolution is a grammar-external mechanism.

In other words, resolution is not a grammar-internal mechanism like agreement, structure building, category selection, etc. The grammar-internal derivation handling agreement with coordination does not provide the type of output that could then be directly executed by the performance systems. Instead, the output of this derivation is under-determined with respect to the single set of agreement instructions, and grammar-external systems need to fill in this gap, i.e., perform resolution. Since grammar-external systems are not constrained in the same way that grammar-internal representations and processes are, on the surface we observe agreement with coordination that cannot be modeled using standard grammar-internal tools. More specifically, grammar-external systems may rely

on the frequency of a given phrase, some non-structural prominence of gender of a conjunct's referent, etc.²⁰ Given the lack of deterministic output from the competence system, along with the complexity or noisiness of the interacting grammar-external systems, on the surface we expect non-robust speaker behavior, i.e., hesitancy, intra-speaker variation, preference for rephrasing the sentence to avoid resolution all together.

A non-trivial consequence of this proposal is that the agreement morphology we observe when the goal of agreement is a conjunction is an outcome of a different mechanism than when the goal is not a conjunction. As discussed in §4.2, in principle, proliferating language mechanisms is not desirable from the perspective of theoretical parsimony, unless clearly justified. In this paper I have argued that such distinction in mechanisms is justified on empirical grounds. Now, let me also point out how resolution under coordination would be an outlier even without the above proposal. First, recall that the revised proposals for the resolution rules are already distinct from a vanilla agreement mechanism: the set of features proposed by Prazmowska (2016) in (28) is already distinct from the set of features targeted by agreement with non-coordination. In fact, this coordination-oriented set of features may not only be distinct from the non-coordination set, but from all other possible sets as well, i.e., it is unique to coordination. Second, the revised resolution rules also introduce, and crucially rely on, the notion of *eligibility*, which is a departure from the typical deterministic approach to (morpho-)syntactic agreement. Finally, surface agreement morphology with non-coordination also arises as an output of several distinct mechanisms, whether (again) bona-fide grammar-internal agreement or grammar-internal agreement 'gone astray', as in agreement attraction (Kimball & Aissen 1971, a.o.) or hyper-correction (Green 1985, a.o.) (see the following section for more discussion of the relevance of these phenomena for the current proposal).²¹ I am not suggesting that once we have a handful of diverse paths that result in surface agreement morphology, adding yet another one is cost-free. On the contrary, the following section discusses the possibility of investigating the mechanism that underlies phi-feature resolution under coordination against the backdrop of existing proposals for grammar-external mechanisms involved in agreement.

5.3 IDENTIFYING A GRAMMAR-EXTERNAL SYSTEM HANDLING RESOLUTION

Given the proposal above, a question that arises concerns the exact nature of the grammar-external system or systems that perform resolution. Based on the current investigation of agreement with coordination, we are able to study the characteristics of these grammar-external systems, but it is necessary to acknowledge that we are far from a conclusive identification. I believe that this is not a significantly different state of knowledge from the rest of syntactic (and broader linguistic) theory where we are currently trying to identify which components are domain-specific vs. which ones are domain-general – a motivation behind the Minimalist Program (Chomsky 1995, 2000, see also Pesetsky et al. 2020 for some recent reflections on the state of the program).

As a way of probing into the nature of the grammar-external systems behind resolution, we may consider other relatively well-studied and seemingly similar empirical domains that involve grammar-external factors obscuring the output of a grammar-internal derivation and resulting in performance that does not match competence, i.e., grammaticality illusions and prescriptive hyper-correction. To be clear, the proposal regarding resolution is quite different from what is hypothesized to be at stake in grammaticality illusions and prescriptive hyper-correction. I argued that in the former the output of the grammar-internal derivation is under-determined and some grammar-

²⁰A reviewer also points out that linearity seems to play a role in agreement with conjunction (see (27-e), as well as Willer Gold et al. 2018 for South Slavic) – a property resembling a grammar-external rather than the typical hierarchy-referring grammar-internal mechanism.

²¹Another possible distinct path for agreement morphology to arise is when the goal is a *committee*-type noun phrase: Elbourne (1999), den Dikken (2001).

external system *repairs* that output; in the latter, it is argued that there is a well-formed output of the grammar-internal derivation but a grammar-external system overrides that output. In a nutshell, both scenarios involve a mismatch between competence and performance, but the grammar-internal outputs are of different kinds. Thus, it is not surprising that the behavior of resolution is not identical to the behavior of grammaticality illusions or prescriptive hyper-correction.

Consider first an example of one type of grammaticality illusion, i.e., agreement attraction (Kimball & Aissen 1971, Quirk et al. 1985, Bock & Miller 1991, Solomon & Pearlmutter 2004, Franck et al. 2006, Wagers et al. 2009, a.o.)

- (50) a. The key to the cabinets was rusty.
 b. The key to the cabinets were rusty. (Bock & Miller 1991)

The theory of phrase structure states that *key* (or some node(s) associated with that lexical item) projects and determines the phi-features of the entire complex phrase *key to the cabinets* in (50), i.e., [3SG]. The theory of agreement predicts that it is the phi-features of *key* that control agreement as in (50-a), which indeed many speakers find acceptable, but [3PL] agreement, as in (50-b), is also often accepted and produced by speakers. The literature on this topic argues that agreement arises either due to the way features and structures are represented during on-line processing or the way they are accessed (e.g., see the discussion in Wagers et al. 2009). In either case, the role of memory is invoked, and given advances in our understanding of this system, we can generate and test concrete predictions to examine how memory interacts with linguistic competence. One general prediction that seems to be borne out is that given enough time and cognitive capacity, speakers ultimately do reject the ungrammatical (50-b). In contrast, agreement with coordination does not seem to have a similar profile—with more time, speakers may start hesitating more rather than less as to their preferred agreement variant.²²

It is also well-known that prescriptive rules may override the output of the grammar (Emonds 1986, Schütze 2001, a.o.):

- (51) a. between you and me
 b. between you and I

Some speakers may hyper-correct a grammatical form of a pronoun under coordination like (51-a) and utter the ungrammatical (51-b). This hyper-correction is possibly an extension of prescribing *I* instead of *me* as a pronominal form in coordination in a subject position:

- (52) a. You and me will get along.
 b. You and I will get along

Such prescriptive pressure is also observed with agreement (Green 1985, Sobin 1994, 1997, a.o.).

- (53) There is/are a cat and a dog in the yard. (Sobin 1997)

Sobin observes that the acceptability of either variant is influenced by factors that are not typically modelled as influencing syntax. For example, if the two conjuncts differ in number, i.e., one is plural and one is singular, their relative order will influence the acceptability rating of the plural variant. This behavioral profile resembles the profile of resolution, especially when focusing on the factors listed in (27) involving number of

²²To be clear, memory is hypothesized to play a role in other grammaticality illusion phenomena like self-embedding (also called center-embedding) (Chomsky & Schützenberger 1963, Cowper 1976, Gibson 1998, Gibson & Thomas 1999, a.o.), even though its behavioral profile is very distinct from agreement attraction. Here, speakers report unacceptability of sentences that the theory predicts to be grammatical and only rephrasing (rather than more time) influences speaker behavior. Thus, memory cannot be ruled out in explaining resolution behavior – rather, the exact processing theory proposed for agreement attraction cannot be directly imported here.

conjuncts and linear order. However, it is unclear whether prescriptive rules are ever at play in gender resolution in Polish. Even a prescriptive source like the Polish Language Council (Bańko 2012) acknowledges that agreement with a coordinate structure is one of the most complex issues in Polish syntax, with many interacting factors (some still to be uncovered) and recognizes that there is no algorithm to determine the final form. Furthermore, while one could hypothesize a scenario in which there exists a grammatical output of gender resolution in Polish that then gets hyper-corrected, a prescriptive explanation also does not account for why resolution is unsystematic across so many languages, as discussed in §5.1.

In sum, it does not look like resolution behavior finds a perfect analogy in the behavior of some well-known grammaticality illusion, and thus, we cannot take an existing analysis off the shelf. Before I proceed to touch upon an alternative proposal that does not require reference to a grammar-external system, let me acknowledge that even though the current proposal is ultimately a *rejection* of a previous proposal, I consider this very step worth spending effort on. My immediate goal is to question a dominant and tacit assumption regarding agreement with conjunction. With this assumption in mind, empirical data from agreement with conjunction has been used for other theoretical claims. For example, Sauerland (2003) uses such data to make claims about the very nature of agreement; Adamson & Šereikaitė (2019) make claims about the structure of phi-feature systems; Munn (1993) argues for the structure of coordination. These claims based on data from the behavior of agreement with coordination are warranted only under the assumption I intended to question here. Without this assumption, such data can no longer be treated at face value.

5.4 UNSYSTEMATIC RESOLUTION DUE TO COMPETING GRAMMARS?

A reviewer for this paper suggested yet another possibility, i.e., competing grammars. There are two (non-mutually exclusive) variants of this scenario. Competing grammars in the sense of idiolectal variation (resulting in *inter*-speaker variation), and in the sense of multiple grammars maintained by a single speaker (resulting in *intra*-speaker variation). The former scenario is a plausible possibility and hinted throughout the paper citing such proposals throughout the literature (e.g., Ruda (2010)). While this possibility requires a careful methodological approach of keeping idiolects distinct (as mentioned in fn.11), this would not constitute a major challenge to the existing linguistic theory. Yet, such a possibility does not solve the entirety of the puzzle – it does not straightforwardly explain the intra-speaker variation and ineffability discussed throughout §3.3.

The latter scenario, i.e., multiple grammars within a single speaker, means that we would be dealing with underlyingly systematic and deterministic grammars that nevertheless on the surface give rise to non-systematicity when competing within an individual speaker's mind. (Under the Universal Bilingualism approach by Roper 1999 this could also be characterized as multi-dialectalism with dialectal code-switching.) This scenario, indeed, explains intra-speaker variation (and possibly some ineffability). In fact, Marušič et al. (2015) entertains this very possibility for agreement with conjunction in Slovenian. This curious possibility invites discussion of why some, in fact most, rules in grammar are categorical and non-competing (governed by one grammar within a speaker), while others are argued to allow multiple options. This question links to the problem of the poverty of stimulus and under-determinacy of the primary linguistic data. Why would a speaker, apparently capable of maintaining competing grammars, ever posit a categorical, non-competing representation? Perhaps there is only limited capacity for maintaining such competing grammars, and/or there exist acquisition biases, and eventually one grammar 'wins'. This, in turn, would suggest that the current variability is a snapshot of a change in progress. At least for Polish, we see that intra-speaker variability and ineffability in agreement with conjunction has been reported for the last

50+ years, i.e., more than a generation. While this possibility is not out of the question, taking a cross-linguistic perspective from §5.1 presents a challenge – why would so many unrelated languages seem to converge on a change in progress in the same empirical domain at the same time? The question does not become any simpler if one maintains that this variability is stable, rather than an ongoing change – why would so many unrelated languages converge on having multiple grammars in the same empirical domain? I leave these questions for future investigation.

6 CONCLUSIONS

This paper has revisited the topic of resolution of phi-features under coordination with a special focus on gender in Polish. I gave an overview of the different facets of resolution behavior. On one hand, gender resolution in Polish is systematic in a way that is amenable to clear grammar-internal modeling. On the other hand, there is a rich body of work listing multiple apparent exceptions to the dominant tendency and attempting to draw generalizations based on the reported data. Some but not all of these generalizations have been the subject of attempts at formalization within grammar. However, I showed that such formalizations have serious limitations—their empirical coverage is fairly limited despite added power through substantial changes to the theory of the grammar. I proposed that given the distinct speaker behavior with respect to resolution, frequent hesitations, ineffability and avoidance in seemingly simple sentences, in Polish and beyond, an investigation into grammar-external mechanisms of resolution is in order. I suggested that it might be the architecture of the grammar that conspires to not provide a possible locus of resolution internally. Instead, external systems need to handle the unresolved, under-determined output of the grammatical derivation. The exact system handling resolution is yet to be identified and I sketched some of the possible avenues of investigating it via comparison with grammaticality illusions and prescriptive hyper-correction.

ABBREVIATIONS

A	animal	M	masculine
COMP	complementizer	N	neuter
DEM	demonstrative	NEG	negation
F	feminine	PL	plural
GEN	genitive	PROX	proximal
H	human	REFL	reflexive
I	inanimate	SG	singular
<i>iF</i>	interpretable feminine	<i>uH</i>	uninterpretable human
<i>iM</i>	interpretable masculine	<i>uNH</i>	uninterpretable non-human
INST	instrumental	VIR	virile

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