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Optimizing gender

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Abstract

This paper develops *optimal gender assignment theory*, an approach to gender assignment couched within the formalism of Optimality Theory [Prince, Alan, Smolensky, Paul, 1993. *Optimality Theory: Constraint Interaction in Generative Grammar*. Rutgers University and University of Colorado, Boulder] and drawing on Steinmetz' [Steinmetz, Donald, 1985. *Gender in German and Icelandic: inanimate nouns*. In: Faarlund, J.T. (Ed.), *Germanic Linguistics. Papers from a Symposium at the University of Chicago*. IULC, Bloomington, IN, pp. 10–28; Steinmetz, Donald, 1986. *Two principles and some rules for gender in German: inanimate nouns*. *Word* 37, 189–217] insights into the nature of gender assignment. We focus on cases of gender assignment conflict, i.e., cases in which a noun is within the domain of competing gender assignment principles. A typological of such conflicts is proposed, distinguishing *balanced* from *imbalanced* conflicts, and a formalism is developed. We argue that features relevant for gender assignment contribute equally to that process, such that there is no priority of principles sensitive to semantic features, contra Corbett [Corbett, Greville, 1991. *Gender*. CUP, Cambridge]. In the context of Optimality Theory, *optimal gender assignment theory* provides an example of crucial equal ranking, a formal option allowed but unexplored by Prince and Smolensky (1993).

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The assignment of a noun to a grammatical gender category follows from the meaning and shape of the noun along with a theory of the interaction of these criteria (Comrie, 1999; Corbett, 1991; Steinmetz, 1986). The present article advocates a particular theory of such

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interactions focusing especially on the resolution of conflicts between the principles responsible for gender assignment. An optimality theoretic approach to conflict resolution is pursued.¹

Languages frequently present nouns that show surface violation of their gender assignment principles. This gives the superficial appearance of gender assignment *tendencies* – rather than *absolutes* – and may cast doubt on the enterprise of gender category prediction. In this paper, we demonstrate that mere tendencies on the surface do not indicate the absence of reliable gender assignment principles. Instead, tendencies are simply the expected consequence of resolution among conflicts between violable constraints. Several languages are considered to illustrate the basic issue of constraint conflict in gender assignment.

By deploying Optimality Theory (Prince and Smolensky, 1993) to mediate conflict among gender assigning principles, we not only cast new light on gender assignment, but also illustrate a previously underexplored option in OT, namely crucial nonranking. To establish the context for this approach, we argue that there is no type-wise ranking of gender assignment constraints, explicitly refuting the claim that semantic principles outrank shape-based principles (Corbett, 1991). Furthermore, we demonstrate that individual gender assignment constraints cannot be ranked with respect to one another, showing that strict domination cannot be maintained in this case. Instead, these constraints operate as an equally ranked block – formalized logically as constraint disjunction – which in turn dominates a markedness hierarchy. The paper thereby enhances our understanding of systems of grammatical gender as well as illustrating within OT a principled instance of crucial nonranking.

The paper is organized as follows. In the first section, we present data from a variety of languages and motivate a few gender assignment principles in each one. After motivating the principles, we look at seeming exceptions, and claim that these are the result of conflicts in gender assignment. In this way, we highlight one of our central points, namely that a theory of gender assignment must include a strategy for resolving conflicts. The first section also introduces the notions of *balanced* and *imbalanced* conflicts and gives a brief preview of how these kinds of conflicts will be resolved.

Section 2 presents *optimal gender assignment theory*, covering the markedness hierarchy, and the interaction of the markedness hierarchy with the gender assignment constraints. This theory gives a formally unified strategy for resolving gender assignment conflicts, and illustrates crucial nonranking in OT.

In the third section, we consider an alternative strategy for resolving some conflicts, namely the claim that conflicts are resolved in favor of the semantically based principles and at the cost of the shape-based ones. Highlighting the relevant points from our analysis of German, we demonstrate that this alternative strategy is untenable. Instead, we argue for the strong hypothesis that in all languages all constraints referring to gender-relevant features are equally ranked. Conflicts between them that are not decided by the constraints

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sensitive to gender features are mediated by ranked constraints implementing a markedness hierarchy. The paper concludes with a brief section drawing out the implications of the arguments presented here.

1. Principles in conflict

The following subsections present examples of gender assignment conflicts from a number of languages. The purpose here is not to present a complete analysis of gender assignment for any one language, but rather to motivate a small number of principles and then illustrate some instances of conflict involving these principles.

1.1. German

The shape of a German noun can be a good indicator of its gender. For example, nouns ending in *-e* tend to be feminine, as will be noted in any textbook of German. This claim is built on the basis of data such as those in (1), where we see nouns from a wide variety of semantic fields, all of which are assigned feminine gender in German due to their final *-e*. Note that this final schwa may be part of different morphemes, so we refer simply to the phonological structure: final schwa assigns feminine gender.²

- (1) Blume ‘flower’
Schule ‘school’
Bühne ‘stage (theater)’
Pfanne ‘pan’
Puppe ‘doll’
Säure ‘acid’
Tasse ‘cup’
Seite ‘side, page’
Latte ‘lathe’
Kurve ‘curve’
Kerze ‘candle’

It is also well known that German nouns beginning with the morpheme *Ge-* tend to be neuter. Example (2) gives a modest sampling of the many instances of this type seen in any German dictionary.

- (2) Gelüst ‘longing’
Geheul ‘howling’
Geschwätz ‘chatter’
Gespräch ‘conversation’
Gestolper ‘stumbling’

² Note that the reference to ‘shape’ may refer either to morphological or phonological material. The final *-e* in German is an example of a phonological property relevant for gender assignment while the final morpheme *-a* in Russian (marking the 2nd declension) – discussed below – is an example of a morpheme that is relevant for gender assignment.

Getränk ‘beverage’
 Gesicht ‘face’
 Gebein ‘bones’
 Gebüsch ‘shrubbery’
 Gefieder ‘plumage’
 Gefühl ‘feeling’
 Geläut ‘ringing, chimes’
 Geleit ‘escort’

Indeed, Plank (1986) notes that *Ge-* can be productively prefixed to give neuter results, as seen in (3).

- (3)
- der Ast ‘branch’
 - das Geäst ‘branches’
 - die Tafel ‘slab, table’
 - das Getäfel ‘panelling’
 - der Trank ‘drink’
 - das Getränk ‘beverage’
 - der Balken ‘beam’
 - das Gebälk ‘timbers’
 - der Stuhl ‘chair’
 - das Gestühl ‘seating’
 - der Stern ‘star’
 - das Gestirn ‘heavenly body’
 - die Schwester ‘sister’
 - das Geschwister ‘sibling’

When a noun has both an initial *Ge-* and a final *-e*, then it experiences what we call a balanced conflict since there is one reason to be each of two genders. Such words will be feminine, as with the examples in (4).

- (4)
- Gebärde ‘gesture’
 - Gemeinde ‘congregation’
 - Geschichte ‘story, history’
 - Genüge ‘enough’
 - Gerade ‘straight line’

The data in (4) are typical illustrations of gender assignment conflict. These nouns are in the domain of a principle that leads to neuter assignment, but they are in fact feminine. The resolution of conflicts leads to violation of principles, which in part motivates the decision to build an optimality theoretic approach to gender assignment, given the central role of violable constraints in that theory.

Our formal treatment of data such as those in (4) will build on the idea that when two constraints are in conflict, the noun is assigned to the least marked of the conflicting categories. Neuter is the most marked category in German, such that when a noun has one principle militating for feminine and one for neuter, then the noun will be feminine.

The examples in (4) show conflict between two principles referring to relevant shapes of the noun, in this case initial *Ge-* and final *-e*. There can also be conflict between shape and meaning.³ Indeed, conflicts between shape and meaning are those that have received the greatest attention in the literature. In the theory developed below, the kind of feature (meaning or shape) that a gender assignment principle refers to is irrelevant for the solution of the conflict. Some effort must be made to argue against the view that semantic principles win over shape-based ones, since this view has been advocated elsewhere. Resolution of the type of conflict seen in (4) goes largely unaddressed in the literature.⁴

Zubin and Köpcke (1986) argue that German nouns denoting superordinates are neuter; they ground the notion *superordinate* in the work of Rosch et al. (1976). Neuter nouns such as those in (5) form the basis for this claim.

- (5) Obst 'fruit'
 Glied 'limb'
 Vieh 'livestock'
 Korn 'grain'
 Tier 'animal'
 Wild 'game'
 Metall 'metal'
 Werk 'work, creation'
 Element 'element'
 Gut 'goods'
 Objekt 'object'
 Teil 'part'
 Zeug 'implement'
 Instrument 'musical instrument'

Yet not all superordinates are neuter, as seen with the examples in (6), which are feminine.

- (6) Pflanze 'plant'
 Waffe 'weapon'
 Wette 'bet'
 Frucht '(citrus) fruit'

Each of the nouns in (6) falls into the domain of two constraints, one which assigns neuter to superordinates and one which assigns feminine to words with particular shapes, in this case final *-e* or final *-ucht*. Two constraints are again in conflict, and the noun again is assigned to the least marked of the two conflicting categories, in this case feminine.

³ Nouns that fall into the domain of two meaning-based principles will not be discussed here, although this is a logical possibility. For exploration of conflicts of this type and proposals about their resolution, see Nessel (in this issue).

⁴ One rare exception to this generalization is found in Plank (1986), who takes up exactly the kinds of cases seen in (4). His analysis is that an initial *Ge-* and final *-e* together constitute a single morpheme. He sees this morpheme even in the data in (3), explaining the umlaut as a realization of the final *-e*. But it is nonetheless the case that many final *-e*'s occur without an initial *Ge-*, and the approach therefore is unappealing on grounds of parsimony.

Nouns can even fall into the domain of three constraints. The neuter nouns in (7) begin with *Ge-*, they end with *-e* and they denote superordinates.

- (7) Gemüse ‘vegetable’
 Gewerbe ‘trade, occupation’
 Gewebe ‘fabric’
 Gebäude ‘building’
 Getreide ‘grain’
 Gelände ‘landscape, countryside, topography’
 Geschmeide ‘jewelry’

The nouns in (7) are not feminine, even though feminine is the least marked of the two conflicting categories. This is because the conflict here is an imbalanced one: Two constraints push the nouns towards neuter while one pushes them towards feminine. When the conflict is imbalanced, the noun is assigned to the category that is most vigorously advocated—in other words, majority rules. Since both initial *Ge-* and the denotation of a superordinate suggest neuter gender, the nouns are neuter. The relatively markedness of neuter and feminine does not play a role in the resolution of imbalanced gender assignment conflicts.

This brief discussion of a few German gender-assigning principles (or constraints, in anticipation of our OT analysis below) already illustrates several of the important issues in this paper. As is well established in the literature, both shape and meaning are relevant. Less well established is the claim evident here that when constraints are in balanced conflict, the noun is assigned to the least marked category. When the conflict is imbalanced, the majority wins.

The following two subsections present a smidgen of data from Dutch and Norwegian. These are based on the comprehensive analyses of these languages found in the literature, and included here as brief further illustrations of the notion of conflict in gender assignment.

1.2. Dutch

Like German, the initial *ge-* prefix in Dutch correlates with neuter gender (Donaldson, 1997; Steinmetz and Rice, 1989). Examples motivating this claim are given in (8).

- (8) gebaar ‘gesture’
 gebied ‘area’
 gevaar ‘danger’
 geduld ‘patience’
 geloof ‘belief’
 geheugen ‘memory’

Dutch nouns ending in *-nis* correlate with common gender, as seen with the examples in (9).⁵

⁵ The modern common gender of course corresponds to the earlier masculine and feminine categories; *-nis* marked feminine historically, as is still indicated in many Dutch dictionaries.

- (9) erfenis ‘inheritance’
 heugenis ‘memory, recollection’
 betekenis ‘sense, meaning’
 bekentenis ‘confession’

When nouns have both an initial *ge-* and a final *-nis*, they are common gender, as with the examples in (10).

- (10) gevangen_i ‘prison’
 gedachten_i ‘keepsake, memento, souvenir’
 geheimenis ‘secret, mystery’
 gestelten_i ‘condition’
 getuigen_i ‘testimony’
 geschiedenis ‘history, story’
 gelijken_i ‘resemblance, similarity’
 gebeurten_i ‘event’

The nouns in (10) show a gender assignment conflict that is balanced. The nouns have one reason to be neuter and one to be common gender. Both of these reasons are based on gender relevant shapes displayed by the nouns. The theory developed in the following section formalizes a conflict resolution strategy whereby the nouns are assigned common gender because it is the least marked of the two categories in a balanced conflict.

1.3. Norwegian

Norwegian is like German and Dutch insofar as neuter is the most marked category (Trosterud, 2001). The illustration here is drawn from Trosterud (2001).⁶ The data in (11) show nouns ending in *-gd*, which tend to be feminine.

- (11) bragd ‘something to brag about’
 bygd ‘village’
 høgd ‘hill, height’
 lengd ‘length’

Yet a word ending in *-gd* might nonetheless be assigned masculine gender, as in (12).

- (12) Egd ‘person from Agder’

Obviously, with such a small group, one could wonder whether *Egd* might be treated as exceptional. But the point here is that there is no need to do that. Nothing extra need be said

⁶ Trosterud (2001) treats Norwegian as a three-gender system, which is indeed true of all varieties of *nynorsk* ‘new Norwegian’. This is also true of many varieties of *bokmål* ‘Dano-Norwegian’, although there are also varieties of *bokmål* that have just two genders, and some which have an extremely limited use of feminine, cf. Fretheim (1985).

to correctly assign gender in (12). That noun is a surface exception to the generalization motivated in (11), but this is easily understood as a consequence of gender assignment conflict. The balanced conflict in (12) has a noun with one reason to be feminine and one to be masculine, since nouns ending in *-gd* are feminine while those denoting biological males are masculine. Masculine is the least marked of the two conflicting categories, and the noun is therefore assigned masculine gender.

1.4. Russian

Research on the gender system of Russian reveals high degrees of correlation between shape and gender (Corbett, 1991). Nouns ending in the segmentable morpheme *-o* are neuter while those ending in the morpheme *-a* are feminine.⁷ Nouns ending in consonants tend to be masculine and indeclinables tend to be neuter. Yet none of these generalizations are absolute; for example, there are feminine nouns that end in consonants. There are also many masculine nouns ending in the segmentable morpheme *-a*, given that many hypocoristics of names of males have this ending. To illustrate this point, (13) shows a few familiar nouns that end in *-a* but which are nonetheless assigned masculine gender.

- (13) *djadja* ‘uncle’
 mal’čička ‘urchin’
 deduška ‘grandfather’
 Saša ‘hyp. of Alexander’
 Miša ‘hyp. of Mixail’

These nouns experience a conflict in gender assignment. On the one hand, the nouns end in segmentable *-a*, suggesting feminine gender, but on the other hand they denote males, suggesting masculine gender. The nouns are in fact masculine. In the theory developed below, assignment to the least marked category is the predictable consequence of a balanced conflict. When one principle militates for masculine and another for feminine, the noun will be masculine.

Although it is not our purpose to provide a complete analysis of gender assignment in Russian, but rather to focus on an example of gender assignment conflict, the gender system of Russian is fairly straightforward. The shape-based principles given above along with a few simple semantic principles assigning masculine to nouns denoting biological males and feminine to nouns denoting biological females probably accounts for over 90% of the Russian lexicon (Corbett and Fraser, 2000). More detailed discussion of additional conflicts in Russian is found in Rice (in press).

The data in (13) have a prominent place in arguments that semantic principles outrank morphological ones, cf. Comrie (1999), Corbett (1982, 1988, 1989, 1991) and Nessel

⁷ I emphasize that I am not claiming that nouns ending in *-a* are feminine. The claim is rather that the segmentable *-a* indicates feminine (i.e., the *-a* marking the nominative singular), a claim which I take to be a notational variant of the claim that nouns of the 2nd declension are feminine. These variant approaches to stating this fact about gender assignment simply reflect different views about the lexical information to be associated with a noun. Exploring these differences further is not the focus of the present paper and is therefore left as a topic for future research.

(2001). This is the alternate approach to conflict resolution that we will argue more thoroughly against in Section 3. While it is correct that the nouns in (13) are assigned the gender correlating with the relevant semantic feature, the argument is weak because of the very properties of the Russian system. Using an analysis in which masculine is the default category, the shapes that require explicit principles for gender assignment are those giving the marked categories feminine and neuter. When such a shape is in conflict with a semantically based gender assignment principle yielding masculine – e.g., the principle requiring nouns denoting males to be masculine revealed above – then there are two possible analyses of how the noun is assigned masculine gender. Either the noun is assigned masculine because the semantic feature trumps the shape feature, or the noun is assigned masculine because the unmarked masculine trumps the more marked feminine. Either analysis gives the correct result.

To select one of these analyses over the other, we must find cases of balanced conflict with a mismatch between feature type (meaning or shape) and category markedness. Specifically, we must find cases in which the shape correlates with a less marked category while the meaning correlates with a more marked category. We would have such a case in Russian if we found data which end in segmentable *-a* but which have a meaning that arguably suggests neuter. If semantic features always outrank shape features, then such nouns are expected to be neuter. But if such nouns are assigned to the least marked of the conflicting categories, then they should be feminine. Unfortunately, this prediction cannot be tested in Russian as there are no such nouns in the language. Analyses of Russian are therefore inconclusive on the question of semantic priority. The only way to resolve the matter is by viewing gender assignment in Russian as an instance of gender assignment in natural language more broadly. The strong hypothesis must be that the interaction of gender constraints is constant across languages. In short, the dispute about Russian can only be resolved by looking at other languages because Russian itself does not provide the material for clarifying the matter.

1.5. French

To illustrate the notion of conflict in gender assignment with data from French, we introduce three specific constraints relevant for gender assignment. The first two are proposed on the basis of data gleaned from Juilland's (1965) reverse dictionary and refer to the shape of the noun, while the third one is sensitive to a semantic feature. French polysyllabic nouns ending in nasalized [ɛ̃] are assigned masculine gender. This ending can be spelled in various ways in French, e.g., *-aim*, *-ein*, *-in*, etc. Examples are given in (14).

- (14) vaccin 'vaccine'
 coussin 'cushion'
 vagin 'vagina'
 bassin 'pond, pool, basin'
 andain 'swath'
 étain 'tin'
 instinct 'instinct'
 essaim 'swarm'

Another rule in French is that words ending in the morpheme spelled *-ier* are masculine. These include the examples in (15).

- (15) carrier ‘quarryman’
 guêpier ‘trap, wasp’s nest’
 calendrier ‘calendar’
 papier⁸ ‘paper’
 fessier ‘ass’

French assigns feminine gender to nouns having a primary concrete meaning denoting roads or paths, as in (16).⁹

- (16) rue ‘street’
 sente ‘footpath’
 route ‘road’
 allée ‘lane, pathway, avenue’
 piste ‘track, trail’
 voie ‘way, road’
 avenue ‘avenue, drive’
 chaussée ‘causeway’

However, some nouns denoting roads or paths are in fact masculine as in (17).

- (17) chemin ‘path, lane, track’
 sentier ‘path’

The nouns in (17) are masculine due to a balanced conflict that arises between shape-based and meaning-based features. Both of the nouns in (17) are in the semantic class demonstrated to be relevant for feminine gender assignment in (16). But *chemin* also has the shape of the nouns in (14) while *sentier* has the shape of those in (15). Both of these shapes lead to the assignment of masculine gender, as seen above. Hence, the nouns in (17) have one reason to be feminine and one to be masculine, and their assignment to masculine follows straightforwardly in a theory which resolves balanced conflicts in favor of the least marked category, while it is problematic for a theory resolving conflict in favor of the gender suggested by the meaning.¹⁰

⁸ Although *papier* is diachronically monomorphemic, it may be considered synchronically bimorphemic. We may assume analysis of a stem *pap* on the basis of its appearance in words such as *paperasse* ‘official papers’, *papeterie* ‘stationery, paper mill’, *papetier* ‘paper maker’, *papillote* ‘curling paper’, *paperassier* ‘pen pusher’, etc.

⁹ This generalization does not extend to words with secondary or abstract meanings along these lines, such as *trajet* ‘trajectory’.

¹⁰ Johan Rooryck draws my attention to yet another example of this type, namely the masculine noun *boulevard*. Like the nouns in (16), the primary meaning of *boulevard* is to denote a road. And like *chemin* and *sentier*, it has a masculine shape. Specifically, polysyllabic nouns ending in nonmorphemic [ar] will be masculine; this includes word-final shapes such as [var] and [zar] and others. This claim is based on a study of the *Dictionnaire inverse de la langue française*. *Boulevard* then has two features in conflict, and the conflict is resolved in favor of the least marked category, namely masculine, which is the category suggested by its shape.

While the illustration of a conflict in French invokes a very few nouns, this actually is to be expected. When we take the view that gender assignment is not random but principled, the challenge becomes to identify the relevant principles. Presumably, large portions of the lexicon of any language will be accounted for by relatively few principles, as suggested above for Russian. The subtle challenges are in small groups and especially in dealing with seeming exceptions. Given the basic perspective that gender is predictable, the data in (16) require an analysis. We argue that those data are not feminine because of their shapes. For example, the feminine *voie* ‘way, road’ is nearly homophonous with the masculine noun *foie* ‘liver’. So, the assignment *voie* to the feminine category cannot be motivated by its shape alone. Therefore, a principle account must appeal to a semantic feature, as reflected in our approach here. The seeming exceptions in (17) require no ad hoc treatment or lexical specification; they simply fall out from already established gender assignment principles and a theory of the resolution of gender assignment conflicts.

The examples seen in this section from German, Dutch, Norwegian, Russian, and French show that well motivated principles for gender assignment can come into conflict with other well-motivated principles. When an equal number of principles militate for assignment to different categories – a situation we dub balanced conflict – the noun is assigned to the least marked of the conflicting categories. When a different number of principles militate for one category as opposed to another – imbalanced conflict – then the noun is assigned to the category making the strongest showing. Ideally, the difference between balanced and imbalanced conflicts should not be a principled one requiring different theoretical treatments. Instead, these two types of conflicts should both fall out from a properly formalized theory about gender assignment and the resolution of gender assignment conflicts. In the same way, it is well established that both meaning and shape can contribute to gender assignment. The interaction of conflicts between two principles based on shape or between one based on meaning and one based on shape are not different in any fundamental way, and all of these conflicts and resolutions should fall out from the properties of the theory. The following section develops a formal model for this approach to gender assignment that achieves these desiderata.

2. Optimizing gender

The discussion in Section 1 makes it clear that any theory of gender assignment must explicitly formulate a strategy for mediating conflicts. Mediation necessarily results in the violation of one of the principles; when two principles are in conflict, they cannot both prevail. Given this situation, we propose formalizing gender assignment within a theory designed specifically to mediate conflicts between violable constraints, namely Optimality Theory. The present paper thereby constitutes the proposal and defense of *optimal gender assignment theory*, a theory built on Steinmetz’ (1985, 1986, 1997, et seq.) fundamental insights into gender systems. The development of optimal gender assignment theory not only brings gender assignment into the mainstream of linguistic theory, but also enhances our understanding of the phenomenon and raises issues related to the architecture of Optimality Theory, thereby contributing to its further refinement.

2.1. Markedness

A markedness hierarchy of gender categories is crucial for successful gender assignment in cases of balanced conflict. The simplest case of balanced conflict in gender assignment is when a noun falls into the domain of no gender rules. This is a conflict because the same number of rules – in this case, zero – are competing to get the noun into each category. In a three-gender system, for example, there would be zero principles attracting the noun to masculine, zero attracting it to feminine, and zero attracting it to neuter. Without a strategy for mediating this conflict, we would expect a random distribution of such nouns across the three categories, a situation which no language seems to show. A zero-zero-zero conflict is instructive with respect to markedness because it reveals the least marked category of the language.

Assuming a system with three genders, the markedness constraints may be represented as in (18). These are represented according to the standard OT formalism for markedness constraints, such that the relevant property is forbidden.

- (18) *MASCULINE: A noun is not assigned masculine gender.
 *FEMININE: A noun is not assigned feminine gender.
 *NEUTER: A noun is not assigned neuter gender.

A markedness hierarchy is then represented by a ranking of these constraints, in typical OT fashion. For a system like German, in which masculine is the least marked category, followed by feminine and then neuter, the ranking of these constraints will be as in (19). In this ranking, the prohibition against neuter is the highest ranked. Assigning a noun to the neuter category is thereby represented as being more costly than assigning it to either feminine or masculine.

- (19) *NEUTER \gg *FEMININE \gg *MASCULINE

Given the ranking in (19), the German noun, *Herbst* ‘autumn’, in the domain of no gender principles, will in fact be assigned to the masculine category. We consider three potential surface candidates of this noun: the masculine *der Herbst*, the feminine *die Herbst*, and the neuter *das Herbst*. As seen in (20), the neuter candidate (c) and the feminine candidate (b) violate more highly ranked constraints than does the masculine candidate (a). Given the hierarchy, the violation of *NEUTER by candidate (c) and of *FEMININE by candidate (b) are indicated as fatal violations by including an exclamation mark after the asterisk, following established OT conventions.¹¹ With these violations, the masculine candidate (a) emerges as optimal, as indicated by \gg . The fact that candidate (a) violates the markedness constraint *MASCULINE illustrates the typical situation in OT whereby even the optimal candidate violates some constraint. Optimal candidates in OT are not perfect; they are simply best.

¹¹ I follow McCarthy (2002) and leave aside another (redundant) OT convention, namely shading of cells to the right of the one with the fatal violation.

(20)

	<i>Herbst</i>	*NEUT	*FEM	*MASC
a.	der <i>Herbst</i>			*
b.	die <i>Herbst</i>		*!	
c.	das <i>Herbst</i>	*!		

As stated in (19) and illustrated in (20), German has the ranking $*NEUT \gg *FEM \gg *MASC$. In this system, neuter is the most marked category since violating $*NEUT$ is worse than violating $*FEM$. Masculine is the least marked category since the constraint prohibiting masculine is low ranked. Giving masculine this status in German is suggested by the preponderance of masculine nouns; approximately two-thirds of the monosyllabic nouns of German are masculine (Köpcke, 1982). As a precaution, however, we emphasize that the unmarked category is not necessarily the one with the most members, an issue that becomes important when considering systems with more categories, e.g., classifier systems with a dozen categories. Another indicator that masculine is unmarked in German is that the number of principles required to cover all the nouns in this category is far greater than the number of principles needed for neuter, as is made clear by Köpcke’s (1982) thorough study of German gender. The rich inventory of rules that would be required to account for all masculine nouns can be replaced with a single rule, namely assignment to masculine by default. We should therefore expect that the default gender category will be generally less homogeneous than the marked categories. The use of a default, or the definition of categories as relatively *more* or *less* marked fundamentally distinguishes the approach seen here and in Steinmetz (1985, 1986, et seq.) from the approach taken by Köpcke (1982) and Zubin and Köpcke (1986).

2.2. Feature sensitive constraints

Since not all nouns in masculine default languages are masculine, there must be ways to override the markedness hierarchy. The constraints that refer to features relevant to gender assignment must dominate the constraints of the markedness hierarchy. To illustrate this, consider the following three constraints that are active in the grammar of German.

- (21) $*-E \Rightarrow$ MASCULINE, NEUTER: A noun ending in schwa is assigned neither masculine nor neuter gender.
- $*GE- \Rightarrow$ MASCULINE, FEMININE: A noun beginning in the morpheme *Ge-* is assigned neither masculine nor feminine gender.
- $*SUPERORDINATE \Rightarrow$ MASCULINE, FEMININE: A noun denoting a superordinate is assigned neither masculine nor feminine gender.

The three constraints in (21) implement sensitivity to gender-relevant features of a noun. They are crucially unranked with respect to one another, an important theoretical point that will be discussed in Section 3. The constraints in (21) are ranked as a GENDER FEATURES block above the markedness constraints. When a noun has none of the relevant features, no violations of the GENDER FEATURES constraints are incurred. An example of this is seen in (22) with the German masculine noun *der Weg* ‘road’. This noun does not end in *-e*, it does not begin with *Ge-* and it does not denote a superordinate, hence there are no violations of

the GENDER FEATURES constraints. The markedness constraints alone assign the least marked gender to this noun.

(22)

Weg		GENDER FEATURES				
		*-E⇒M,N	*GE⇒M,F	*SUP⇒M,F	*NEUT	*FEM
☞	a. der Weg					*
	b. die Weg				*!	
	c. das Weg			*!		

Since the constraints in (21) each forbid a noun with the relevant feature from being two of the three genders, any noun with just one of these features will have its gender determined by that constraint. Consider the tableau in (23) for the German feminine noun *die Straße* ‘street’. The gender feature constraint *-E ⇒ MASCULINE, NEUTER eliminates the masculine and neuter candidates, (a) and (c), from further consideration. The markedness constraints are irrelevant because the highly ranked GENDER FEATURES constraints have already settled the gender assignment of this noun; in this case, the noun is feminine.

(23)

Straße		GENDER FEATURES				
		*-E⇒M,N	*GE⇒M,F	*SUP⇒M,F	*NEUT	*FEM
	a. der Straße	*!				*
☞	b. die Straße				*	
	c. das Straße	*!		*		

As an example of a noun falling into the domain of two constraints from (21), the tableau for the German feminine noun *die Pflanze* ‘plant’ is given in (24). This noun has a final -e and it denotes a superordinate. Because of its final -e, the masculine candidate (a) and the neuter candidate (c) are each awarded a violation mark under *-E ⇒ MASCULINE, NEUTER. Because the noun denotes a superordinate, the masculine candidate (a) and the feminine candidate (b) are each awarded a violation under *SUPERORDINATE ⇒ MASCULINE, FEMININE. As a result of these two GENDER FEATURES constraints, candidate (a) has incurred two violations while the other two candidates have each incurred only one. The masculine candidate (a) is therefore eliminated from further consideration by the GENDER FEATURES block of constraints, such that the noun will not be assigned masculine gender.

A balanced conflict remains between the feminine candidate (b) and the neuter candidate (c), given that each candidate incurs one violation under GENDER FEATURES. The markedness hierarchy is needed to settle this balanced conflict. Candidate (c) is eliminated by its violation of the highest ranked markedness constraints, namely *NEUTER, leaving (b) as the optimal candidate, illustrating the principle of *the emergence of the unmarked* (McCarthy and Prince, 1994). In typical OT fashion, the violation of *FEMININE by candidate (b) is irrelevant; all other candidates violate more highly ranked constraints, hence the *FEMININE violation is not incompatible with candidate (b) being selected as optimal.

When considering the tableau in (24), bear in mind that the GENDER FEATURES constraints function as an unranked block of constraints. In logical terms, they function as disjunctive elements of one constraint, cf. work on constraint conjunction (Smolensky, 1995). For example, the placement of the constraint $*-E \Rightarrow \text{MASCULINE, NEUTER}$ to the left of $*\text{SUPERORDINATE} \Rightarrow \text{MASCULINE, FEMININE}$ is not to be interpreted as hierarchical dominance.

(24)

	Pflanze	GENDER FEATURES			*NEUT	*FEM	*MASC
		*-E⇒M,N	*GE⇒M,F	*SUP⇒M,F			
a.	der Pflanze	*	*!	*			*
b.	die Pflanze			*		*	
c.	das Pflanze	*			*!		

An imbalanced conflict is seen in (25) with the German neuter noun *das Gemüse* ‘vegetable’. This noun is in the domain of all three of the constraints from (21). The masculine candidate (a) violates all three constraints. The feminine candidate (b) violates the two constraints militating for neuter. The neuter candidate (c) violates only the constraint $*-E \Rightarrow \text{MASCULINE, NEUTER}$. Because the neuter candidate (c) violates only one of the GENDER FEATURES constraints, any candidate which violates two is eliminated from further consideration. In this example, this applies to both candidates (a) and (b), as indicated by the exclamation mark after the second GENDER FEATURES violation which each incurs. No two candidates violate the same number of GENDER FEATURES constraints, and the conflict is therefore imbalanced. In this tableau, the markedness hierarchy is irrelevant for selecting the optimal candidate since the hierarchically dominant disjunct of GENDER FEATURES constraints decides the matter in favor of the neuter candidate (c).¹²

(25)

	Gemüse	GENDER FEATURES			*NEUT	*FEM	*MASC
		*-E⇒M,N	*GE⇒M,F	*SUP⇒M,F			
a.	der Gemüse	*	*!	*			*
b.	die Gemüse		*	*!		*	
c.	das Gemüse	*			*		

¹² An anonymous reviewer objects that the approach developed here, especially as illustrated in (25), entails counting. Specifically, we must count three violations for candidate (a) and two for candidate (b) and know that this is more than the one violation in candidate (a). This concern about gradient violation is addressed in Prince and Smolensky (1993: 241) under the heading of the *cancellation lemma*. They propose a formalism whereby the comparison of candidates does not involve counting beyond one; the cells compared and a candidate with no violation is preferred to a candidate with a violation. If both candidates have a violation, one asterisk is removed from each cell, and we again look for the candidate with no violation. This is continued until the distinction between the candidates can be made, and requires no counting beyond being able to determine whether a cell contains an asterisk or not. For much more extensive discussion, cf. Prince and Smolensky. For discussion in the context of gender assignment, cf. Nessel (in this issue).

The tableaux presented in this section illustrate the mechanisms of optimal gender assignment theory. This approach is couched within the formalism of Optimality Theory and makes crucial use of a markedness hierarchy and a block of GENDER FEATURES constraints. In the context of OT, proposing a set of constraints entails a proposal about typology. For example, the three markedness constraints in (18) suggest a typology of six (3!) rankings. While more work remains to be done on the typology of gender systems, some preliminary results lend credibility to the typology suggested here. For example, the formal possibility that any of the three markedness constraints can be ranked lowest suggests that there should be languages of all three types. A number of Indo-European languages have masculine as their default category—including all of those discussed in Section 1. Some Indo-European languages also have neuter default, e.g., Icelandic (Steinmetz, 1985). We are currently unaware of any analysis of an Indo-European language for which feminine is proposed as the default category. However, feminine defaults have been identified elsewhere. For example, Corbett (1991: 11) reports Bani's (1987) claim that the Torres Straits Islands language Kala Lagaw Ya has a feminine default. This means that “nouns denoting males are singled out as masculine and all others are feminine.” To the extent that Bani's analysis is correct, the typological range predicted here is instantiated.

In addition to the predictions made by the factorial typology of the markedness constraints, additional systems are predicted when we consider the possible interleaving of the GENDER FEATURES constraints with the markedness constraints. In the examples seen above, the gender features constraints dominate all three of the markedness constraints. However, rerankings are also possible, and these should correspond to real systems. For example, imagine the reranking of GENDER FEATURES and *NEUTER. This would yield the ranking *NEUTER \gg GENDER FEATURES \gg *FEMININE \gg *MASCULINE. Such a grammar will assign a fatal violation to every neuter candidate, such that there are no circumstances under which the neuter candidate will be optimal. This grammar then predicts a language with no neuter nouns, which is a description of French, *inter alia*.

As a final point in this section, we emphasize that optimal gender assignment theory is crucially dependent on the equal ranking of the GENDER FEATURES constraints, and in this way illustrates a previously unillustrated formal option in Optimality Theory, a topic to which we now turn our attention.¹³

3. Consequences of constraint disjunction

Standard OT allows for the possibility that constraints be unranked with respect to one another. This is familiar, for example, for situations in which it is not possible to determine the ranking, i.e., when both possible rankings of two constraints yield the same result. Work

¹³ One aspect of the formalism left for future research involves compounds. Regardless of the gender-relevant features on a compound, it will be assigned the gender of its rightmost element. In an OT conceptualization, this means that the force of the rightmost element outranks any other relevant constraints. This will also be true of some morphemes which Steinmetz (1986) calls strong endings; these morphemes – such as the neuter assigning – *chen* diminutive suffix in German – will also outrank any other constraints sensitive to gender-relevant features. This is compatible with our proposal about crucial equal ranking, since these cases presumably do not require explicit reference to language specific material, but rather refer to a morpheme's status as a head.

on language variation has also explored the possibility of two constraints having either ranking as a way of explaining individual variation, i.e., the possibility of two well-formed results, (for an overview, see Müller, 1999). The proposal made in the preceding section differs from both of these. Different hierarchical rankings of the GENDER FEATURES constraints would give different results, i.e., the rankings are not indeterminate. Furthermore, only one result is attested. The proposal here is that constraints are *crucially* unranked with respect to one another. The constraints must be unranked in order to achieve the correct results. Forced equal ranking explicitly prohibits the dominance of one constraint over another. Violation of one constraint is neither better nor worse than violation of another within the crucially unranked block. The relative optimality of competing candidates is determined by considering the aggregate violations of some set of constraints functioning disjunctively as a block.

Crucial nonranking is not a radical modification of OT. Indeed, the formal option of crucially nonranked constraints was raised already in Prince and Smolensky's (1993) foundational work, where they note the following.

It is entirely conceivable that the grammar should recognize nonranking of pairs of constraints, but this opens up the possibility of *crucial* nonranking . . . for which we have not yet found evidence. (Prince and Smolensky, 1993: 55)

Optimal gender assignment theory offers the evidence Prince and Smolensky were unable to find.¹⁴ Ongoing research will determine how this proposal can be restricted, e.g., by limiting constraint disjunction to kindred constraints, in this case those which are sensitive to features relevant to gender assignment. In anticipation of such restrictions, we have referred to the block of constraints as though they are disjunctive elements of one GENDER FEATURES constraint, akin to the approach taken with constraint conjunction in which the conjunct of two constraints is itself a constraint. Here, the constraint GENDER FEATURES is the disjunct of all language specific constraints identifying features relevant for gender assignment. We take the strong position that constraints assigning gender on the basis of features operate disjunctively in all languages, and clarify the type of argumentation that would falsify this claim below.¹⁵

Before turning to specific argumentation that GENDER FEATURES constraints must operate in this way, some consequences of our view can be noted. The claim that all of these constraints are crucially unranked with respect to one another entails the claim that constraints sensitive to semantic features cannot be singled out. Here we aspire to refute the claim that constraints based on meaning necessarily outrank those based on shape (Corbett, 1989, 1991 and references therein, cf. discussion in Enger, 2001, 2002, and related points in Köpcke and Zubin, 1984; Doleschal, 2000). Instead, we support the view that all features

¹⁴ Other work exploring or employing the notion of crucial equal ranking includes Schmid (2001), Christensen (2003), Müller (1999) and Ní Chiosáin (1999).

¹⁵ Clearly, this approach invokes language specific constraints, e.g., *GE- ⇒ M, F, as will many OT analyses of morphology. This raises the possibility of restricting the formal option such that the universal constraint GENDER FEATURES can be reranked, e.g., with respect to the markedness constraints, such that the individual language specific components of GENDER FEATURES must function as a block. Future research based on many more examples of crucial equal ranking will be necessary to determine if crucial equal ranking may be related to language specificity.

relevant for gender assignment make equal contributions. Although we are unaware of the converse claim, the theory nonetheless has the merit of explicitly ruling out the possibility that shape-based constraints dominate meaning-based ones, a typological possibility implied by an OT perspective on the claim under scrutiny. Finally, the theory precludes the possibility of ranking individual gender-feature constraints with respect to one another, regardless of whether they refer to semantic or morpho/phonological features. Both of these claims are motivated in the following sections.

3.1. *Contra groupwise hierarchical ranking*

Many words, as established above, fall into the domain of conflicting gender rules, one of which refers to the meaning of the noun and the other of which refers to its shape. This has been noted above not only for German, but also Norwegian, Russian, and French. There are cases in which the noun is assigned the gender of the rule referring to the meaning and there are cases in which the noun is assigned the gender of the rule referring to the shape. The argument here is to illustrate that both types of conflict resolution exist, and to suggest that a constraint's reference to a semantic or to a shape-based feature does not determine the outcome of gender assignment or – to put this in terms of constraint ranking – does not compel a particular ranking. In the case of a balanced conflict, the outcome is predictable solely on the basis of the relative markedness of the conflicting categories. In the case of imbalanced conflict, the outcome is predictable on the basis of the very imbalance; the noun is assigned to the category with the fewest violations, following the logic of constraint disjunction.

3.1.1. *Meaning beats shape*

We find several cases in which a noun is assigned the gender that correlates with its gender-relevant semantic feature, even though it also has gender-relevant shape features. A typical example of this would be a noun which denotes a male but which has a shape correlating with feminine gender, as seen in Russian. For example, the Russian nouns in (13) have these properties since they have the semantic feature [+male] and end in the morpheme *-a*. The nouns are masculine, which is the gender suggested by the semantic feature. German also shows this type of example, e.g., the noun *der Bote* 'messenger' which denotes a biological male and is assigned masculine gender, the feminine-assigning *-e* ending notwithstanding.

Continuing with German, Steinmetz (1985) and Nelson (1998) also argue that nouns denoting anxiety, fear and urgency tend to be feminine, noting examples such as *die Angst* 'fear', *die Hast* 'haste', *die Not* 'need' and many others. This holds also for *die Gefahr* 'danger' which also has initial *Ge-*, such that the balanced conflict between the feminine-assigning semantic feature and the neuter-assigning shape is resolved in favor of the gender suggested by the noun's meaning.

These cases show conflicts in which the nouns end up having the same gender as would be predicted by the meaning. These are precisely the kinds of cases that prompt the claim that semantics outranks morphology. However, these correlations are spurious. In every case, the relevant semantic feature happens to correlate with the least marked of the two conflicting categories. Therefore, there are two possible explanations for the resolution of

these conflicts, and neither can be compelling argued for on the basis of the data in this section. To settle the matter, we must look at examples in which the relevant semantic feature correlates with the more marked of the conflicting categories. Fortunately, such examples are not difficult to find.

3.1.2. *Shape beats meaning*

Examples in which the semantic feature loses a conflict are highlighted in this section. From German, we note examples such as *die Pflanze* ‘plant’ and *die Waffe* ‘weapon’. These examples were presented in Section 1 to illustrate conflict, and here the point is narrowed to the particular properties of the conflict. These nouns both end in *-e*, which leads to feminine assignment. But they both also denote superordinates, which leads to neuter assignment. The nouns are in fact feminine.

Nouns ending in *-ucht* are feminine, cf. *die Flucht* ‘flight’, *die Schlucht* ‘canyon’, *die Sucht* ‘addiction’ (Köpcke, 1982). This is also true of the noun *die Frucht* ‘fruit’ even though it, too, is a superordinate. A theory in which semantics outranks shape incorrectly predicts that *Frucht*, as well as *Pflanze* and *Waffe* would be assigned neuter gender because they are in the domain of a semantic principle (superordinate) which requires neuter gender.

There are additional semantic classes in German that correlate with neuter gender. Three examples of this drawn from Steinmetz’ work include functional hollows¹⁶ (e.g., *das Rad* ‘wheel’, *das Joch* ‘yoke’, *das Gesicht* ‘face’, *das Ohr* ‘ear’, *das Ei* ‘egg’), primary chest covering garments (e.g., cf. *das Hemd* ‘shirt’, *das Kleid* ‘dress’, *das Wams* ‘jerkin, waistcoat’, *das Mieder* ‘bodice’), and shorelines (e.g., *das Ufer* ‘shore’, *das Kap* ‘cape’, *das Kliff* ‘bluff’, *das Riff* ‘reef’).

In each of these categories, we can find examples of nouns that are not neuter. For example *die Uhr* ‘clock’ is a functional hollow which is assigned feminine gender. This noun also has a shape which is relevant for feminine, namely *-u(h)r*, as seen in *die Fuhr* ‘cartload’, *die Schur* ‘shearing season’, *die Tour* ‘tour’, *die Zensur* ‘censorship’ and many other nouns. The noun *die Weste* ‘vest’ is a primary chest-covering garment that is assigned feminine gender, arguably on the basis of its final *-e*. Among the nouns denoting shorelines we find *die Küste* ‘the coast’. This noun also has a final *-e* which leads to its feminine gender.

Of course, examples of this type are not restricted to German. We have seen that French gender assignment correlates the semantic class of roads or paths with the marked feminine category, while various endings are associated with masculine. These rules were shown to come into conflict with the nouns *chemin* ‘path’ and *sentier* ‘path’, which are masculine, as predicted by their shape, and not feminine, as predicted by their meaning.

¹⁶ Steinmetz (in this issue) defines functional hollows as follows: “A functional hollow refers to a disk or a complete or partial enclosure, whereby the hollow portions thereof are functional in that they are criterial for defining the object in question. A wheel, for example, is a wheel and not merely a disk precisely because it has a hollow component, the hub, by which it fits on an axle and can thus function as a wheel. The hollow of an egg is functional in that it contains the white and the yolk which make it an egg, etc.” The rule for functional hollows is also visible in other languages, e.g., Norwegian. In Norwegian, not only are nouns such as *ansikt* ‘face’ *øre* ‘ear’ and *egg* ‘egg’ neuter, but so is *ur* ‘clock’, supporting the claim that this noun falls into the domain of this principle. Steinmetz (in this issue) argues that this rule is active in the history of Slavic as well.


Summarizing Section 3.1.2, we have seen that conflicts in which semantic features correlate with a more marked category than the shape-based features will be cases in which semantics appears to lose to shape. To bring the two subsections of 3.1 together, we present this discussion as an argument that the resolution of a conflict between two gender-assigning principles cannot be predicted on the basis of the type of features that are in conflict. Semantically based gender rules as a group do not consistently beat shape-based rules. Shape based rules do not consistently beat semantically based rules. Ergo, there is no groupwise hierarchical ranking of these kinds of rules or constraints.

3.2. *Contra individual hierarchical ranking*

Given the untenability of groupwise ranking as a function of the nature of the gender-relevant features, the only other alternative to the proposed constraint disjunction of optimal gender assignment theory would be individual hierarchical ranking of the gender features constraints. Such an approach would be the standard starting point for an OT analysis, whereby one proceeds to identify constraints that are in conflict and then rank them such that the correct gender is assigned. The present subsection shows that this strategy cannot be successfully pursued. The attempt at individual ranking ultimately results in a ranking paradox.


If we begin with the German feminine noun *die Pflanze* ‘the plant’, we note that this noun is in the domain of two well-established gender constraints. One of these constraints assigns feminine gender to nouns ending in *-e*, and one assigns neuter gender to nouns denoting superordinates. Given that the noun is indeed feminine, we posit the ranking $*-E \Rightarrow \text{MASCULINE, NEUTER} \gg * \text{SUPERORDINATE} \Rightarrow \text{MASCULINE, FEMININE}$. This ranking correctly assigns feminine gender, as seen in the tableau in (26).

(26)

	Pflanze	*-E⇒M,N	*SUP⇒M,F
a.	der Pflanze	*!	*
 b.	die Pflanze		*
c.	das Pflanze	*!	


Recall that a noun such as *das Gemüse* ‘vegetable’ is neuter, even though it, too, has features relevant for the two constraints assigning gender to *die Pflanze* above. To assign neuter gender to *das Gemüse* will therefore require that the constraint $*GE \Rightarrow \text{MASCULINE, FEMININE}$ dominates the two constraints in the preceding tableau, such that $*GE \Rightarrow \text{M, F} \gg *-E \Rightarrow \text{M, N} \gg * \text{SUPERORDINATE} \Rightarrow \text{M, F}$. This ranking correctly assigns neuter gender to *Gemüse*, as seen in (27).

(27)

	Gemüse	*GE⇒M,F	*-E⇒M,N	*SUP⇒M,F
a.	der Gemüse	*!	*	*
b.	die Gemüse	*!		*
 c.	das Gemüse		*	

Having established this ranking, we might continue examining nouns with features to which these constraints are sensitive. Consider the noun *die Gemeinde* ‘congregation, community’ (cf. (4) above). This noun starts with *Ge-* and ends with *-e* but it does not denote a superordinate. The grammar motivated by *die Pflanze* and *das Gemüse* – as in (27) – leads us astray in the task of assigning gender to *die Gemeinde*, as illustrated in (28).


(28)

Gemeinde	* $GE- \Rightarrow M, F$	* $-E \Rightarrow M, N$	* $SUP \Rightarrow M, F$
a. der Gemeinde	*!	*	
b. die Gemeinde	*!		
 c. das Gemeinde		*	

The backwards hand by the neuter candidate (c) in the tableau in (28) indicates that the given grammar predicts that candidate (c) is optimal but that this prediction is incorrect. The hierarchically superior constraint $*GE- \Rightarrow M, F$ is violated by candidates which begin with *Ge-* but which are assigned either masculine or feminine gender. In this way, the masculine candidate (a) and the feminine candidate (b) incur fatal violations and the optimization of the neuter candidate (c) is achieved, albeit incorrectly.

Had we begun this section with a consideration of *die Gemeinde*, we would have concluded that $*-E \Rightarrow M, N \gg *GE- \Rightarrow M, F$ since those are the only two properties of this feminine noun which are relevant to gender assignment. Such a ranking would yield the tableau in (29), in which *Gemeinde* is correctly assigned feminine gender. (The argumentation from *die Pflanze* still requires the subranking $*-E \Rightarrow M, N \gg *SUPERORDINATE \Rightarrow M, F$, which is achieved by placing the latter lowest in the hierarchy.)

(29)

Gemeinde	* $-E = M, N$	* $GE- = M, F$	* $SUP = M, F$
a. der Gemeinde	*!	*	
 b. die Gemeinde		*	
c. das Gemeinde	*!		

Of course, this ranking will favor the feminine candidate (b) for all nouns with both a final *-e* and an initial *Ge-*. We have already demonstrated that this is incorrect for nouns which have both those properties as well as being superordinates. Therefore, the ranking in (29) is untenable, as is the ranking in (27). No ranking in which some gender features constraint strictly dominates another will yield correct results for the data presented here.

The logic of constraint ranking leads to incompatible subhierarchies when we pursue a strategy whereby individual constraints are ranked with respect to one another. Because of this, it is untenable and should be abandoned. The failure of groupwise and individual ranking as the basis for an OT model of gender assignment leads us to pursue the notion of logical disjunction, i.e., crucially equally ranked constraints. It is this approach, as

illustrated in Section 2, which returns a consistently successful model of gender assignment.

As a final comment on gender assignment conflict, we note that our discussion here has focused on conflicts between semantically based and shape based gender assignment principles. However, we have also seen cases in which there are conflicts between two different shapes, cf. the discussion of *die Gemeinde* above, or the Dutch example from Section 1. We aware of no theory of gender assignment that addresses conflicts of this type. In optimal gender assignment theory, all conflicts are treated the same and the correct resolution falls out regardless of the nature of the conflict.¹⁷

4. Conclusions

This paper explores the nature of gender assignment with a special focus on gender assignment conflict and proposes *optimal gender assignment theory*—an approach building on the insights of Steinmetz (1985, 1986, et seq.) within the architecture of Optimality Theory. Optimal gender assignment theory, as developed in Section 2, crucially relies on the notion of constraint disjunction, or crucial equal ranking. While Prince and Smolensky (1993) open the door to this formal development, the resolution of gender assignment conflict gives a clear example where the formal option must be pursued.

In this approach, the logical disjunction of the particular constraints sensitive to gender-relevant features is itself a constraint. In this way, the cumulative violations of the gender features constraints determine the gender of a noun in the case of imbalanced conflict. The GENDER FEATURES constraint does not successfully assign nouns to gender categories when the noun experiences a balanced conflict. In typical OT fashion, when a high-ranking constraint (in this case, GENDER FEATURES) is not decisive, then the optimal candidate is selected by the lower ranked constraints. The lower ranked constraints relevant for gender assignment are the constraints reflecting the markedness hierarchy for the categories. The result of this is that a balanced conflict will be decided in favor of the least marked of the conflicting categories.

The only alternative to the constraint disjunctive version of optimal gender assignment theory is an approach in which constraints are hierarchically ranked. The literature on gender assignment includes assertions that such rankings are carried out groupwise, with the (equivalent of the) constraints sensitive to semantic features dominating those sensitive to shape-based features. The attempt to formalize this claim as seen in Section 3 reveals its untenability for German. Another alternative would be to abandon groupwise ranking and simply allow the usual OT ranking of the individual constraints. This approach is also shown to be untenable for German.

¹⁷ A reviewer correctly notes that optimal gender assignment theory makes a prediction about the hypothetical situation in which a noun falls into the domain of four principles assigning feminine and three assigning neuter. The prediction is that such a noun will be feminine, and in the absence of a counterexample from the reviewer we stand by this prediction, and indeed consider it impeccable. In fact, however, it would be difficult to find such a noun. Gender assignment is sensitive to shapes at the beginning or end of the word, and to meaning. So, a noun in the domain of three gender-assigning principles has presumably exhausted its options; the theory correctly assigns gender in these cases.

Detailed arguments have therefore been made for the central role of constraint disjunction in optimal gender assignment theory, even if they have largely been restricted to data from German.

We demonstrated in Section 1 that the resolution of gender assignment conflict in Russian can indeed be achieved with groupwise ranking, whereby constraints sensitive to semantic features would dominate those sensitive to shape. However, we also showed that the conflicts in Russian can be resolved by assigning nouns to the least marked of the conflicting categories, as in optimal gender assignment theory.

Since the conflicts in Russian can be analyzed either by referring to the nature of the gender features or by referring to the relative unmarkedness of masculine, it follows that conflict resolution in Russian is fully compatible with optimal gender assignment theory as proposed in Section 2.

Given that groupwise ranking is not tenable for German, the strong hypothesis regarding the nature of grammatical gender assignment must be that groupwise ranking is not necessary in any language. The pursuit of cross-linguistic generalizations about typology must extend to the study of gender, and findings for one language must influence investigations of another.

The goal of research on gender assignment is to discover not only the specific properties of nouns which are relevant for gender assignment in various languages, but also to discover a theoretical understanding of the grammar of gender assignment – and gender assignment conflict resolution – which is universal. The claim here is that principles such as a markedness hierarchy and crucial equal ranking provide the basis for such a theory.

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