Gender features as formal features: some remarks

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ABSTRACT: This squib raises three matters: first, it discusses the conditions under which it is necessary to posit gender features, as opposed to gender being a facet of 'lexical' / encyclopaedic content. Second, it looks into how we can use gender features to describe the cross-linguistic generalisation that there exist no completely arbitrary gender systems, by appealing to their structural positions and their interpretability. Finally, it brings to focus evidence from Modern Greek suggesting that exponent insertion of nouns factors in semantic gender, albeit not in an always successful way.

1. The category of gender

Gender features present us with a well-understood puzzle whose solution remains at best elusive. This puzzle is succinctly encapsulated in Corbett's magisterial survey of the gender category: "Gender always has a basis in semantics" (Corbett 1991, 63). Of course, the crux here is "basis": as Corbett explains in chapters 2 and 3, very few gender systems are purely semantic, i.e. very few gender systems are organized exclusively along the lines of a semantic categorization.

Such languages include English, where masculine nouns fetch concepts about animate male entities, feminine nouns fetch concepts about animate female entities, and where all other nouns are by default neuter. However, in most languages with gender systems, once we move beyond the semantic basis, we have thousands of nouns, typically the majority of them, getting assigned to this or that gender category arbitrarily. So, "[s]urely, mothers are feminine and he-goats are masculine in language after language, but 'answers' in German and 'tables' in Romance are feminine, whereas 'walls' in Greek and the German 'moon' are masculine" (Panagiotidis 2018, 186).

Gender is intriguing as a grammatical category because it falls between strictly grammar internal arrangements such as the ones accorded by declension and inflectional class, and categories that are predominantly conceptually transparent, such as Tense or Number. It is indeed the case that gender systems, including some purely semantic ones, are used to classify nouns; at the same time the semantic basis for gender entails that at least some members of a gender, say 'feminine' or 'edible', do belong to the respective conceptual

category of females or edible things. In the cases where gender is conceptually transparent, gender can have a prominent role in the semantic interpretation of expressions. Such is the oft-cited case of the feminine gender on pronouns like *she*, where it restricts the set of possible referents (Heim 2008).

So, in gender the classifying function and the semantic interpretation seem to co-exist, making the gender category look like it is of a hybrid status. In this squib I will first try to show that this is not the case and that gender emerges as an aspect of lexical meaning, semantic gender features, and grammatical gender features. At the same time, I will use gender features as a testing ground for some concepts regarding the nature of formal features. I will then look at how formalising gender can help us better approach its puzzling nature. Finally, I look at a case where semantic gender and grammatical gender may clash, leading to morphological ineffability.

2. Gender without gender features

Features are used in a large part of the linguistic literature as a virtual synonym of 'properties' – and of meaning postulates in more specific cases. To wit, most informal descriptions of Turkish would happily acknowledge that a noun like *erkek* ('man') bears a masculine gender feature, whereas a noun like *kadın* ('woman') bears a feminine gender feature. Essentially the features [masculine] and [feminine] informally posited here only describe a particular aspect of lexical meaning. This understanding goes back to at least Katz and Fodor (1963), whose approach was to decompose meaning into distinctive features. To wit, other aspects of the lexical meaning for words like *erkek* ('man') and *kadın* ('woman') could be 'adult' or [-familiar], if *notated* as features. Still, what we are dealing with in the case of *erkek* ('man') and *kadın* ('woman') is simply meaning postulates; expressing meaning postulates as features is unnecessary. In any case, regarding *erkek* ('man') the following meaning postulates hold:

(1) $\forall x$, ERKEK$(x) \rightarrow$ MALE(x)
 $\forall x$, ERKEK$(x) \rightarrow$ ADULT(x)
 $\forall x$, ERKEK$(x) \rightarrow \neg$FAMILIAR(x)

The fact that roughly sixty years after Katz and Fodor we are still inclined to think of the first meaning postulate in (1) as the workings of a feature, although not so for the other two, is simply a notational preference: 'gender' is easier to pass as a grammatical feature than are adulthood or familiarity for reasons that are bound to remain obscure if features are treated pretheoretically. Hence, without a proper theory of what features are, features will remain nothing more than a shorthand, convenient notations which combine a formal look with minimal explanatory value.

In order to set up some sort of theoretical framework for features, let us assume the following with hardly any discussion:

(2) Features in general are "instructions to the interfaces" (Chomsky 1995).

The above statement covers all sorts of features: they have to be interpreted either as instructions to the articulators and to the perceptual systems (phonological features) via the relevant interface with language (the 'Phonological Form', PF, of old) or to the conceptual and intentional systems (*other* features) via the relevant interface with language (the 'Logical Form', LF, of old).

Now, those other features are divided into formal and (inert) semantic features in the following way (see also Zeijlstra 2008):

(3) A formal feature is such "if the grammar crucially refers to it in any way. In the case [of formal features] it is not enough to show that the semantic content of a feature is present in the encyclopedic meaning of some lexical item; […] it must be involved in inflectional paradigms, or trigger syntactic movement or agreement, or play some other demonstrably formal role." (Cowper and Hall 2014, 146)

If grammar does not 'refer to it in any way', then a feature readable by the conceptual and intentional systems (C-I systems) is an inert semantic feature.

Apparently, Turkish gender would be a case of semantic features, such that grammar does not refer to them in any way. Indeed, the inflectional paradigms of Turkish (including pronouns, quantifiers etc.) make no distinction for gender anywhere, there is no instance of gender-related movement or any gender agreement and – in general – gender plays no formal role whatsoever in the grammar of this language. This stands in contrast with Person and (possibly) Number, which are involved in Turkish inflectional marking and agreement.

This brings us to the question of whether we need to posit a semantic feature for gender in Turkish, i.e. a grammatically inert feature that is still readable by the C-I systems. As implied in the brief exposition of such features as notational variants of meaning postulates in (1), it would be parsimonious to answer 'no'. Semantic decomposition has both a long history and some rather solid arguments against it, with the classic paper by Fodor, Fodor and Garrett (1975) featuring prominently among such arguments. Instead of getting into the heart of the matter, I will side with Panagiotidis (2021) in taking aspects of lexical meaning that are irrelevant for grammar as not involving features at all. Lexical meaning, and its facets, is a matter of matching structures built around a root with entries in an Encyclopaedia, or similar. Hence,

(4) Grammatically inert features do not exist.

In the words of Cowper and Hall (2014, 146) cited in (3), the identification of "semantic content […] present in the encyclopedic meaning of some lexical item" is not enough to make a feature. Features *must* be grammatically active; otherwise nothing would prevent us

in (1), in the context of the Turkish noun *erkek* ('man'), from also positing all 'purely semantic' features such as [±adult] or [±familiar], both of which are simply aspects of the noun's lexical ('encyclopaedic') meaning.

Thus, we understand non-phonological features as exclusively *formal*, i.e. both as instructions to the C-I systems, as per (2), and as grammatically active, as per (3). This brings with it an added advantage, namely limiting the range of concepts associated with (formal) features: it has been observed that features that are active in grammatical representations and that trigger grammatical operations represent only a limited set of features (Emonds 2011; Cinque 2013; Golston 2018; 2019a; 2019b).

Following this up, if formal features are the stuff functional categories are made of, then we have a way to distinguish between lexical adjectives like *whole* and the universal quantifier, or the lexical adjective *available* and a possibility operator: only the quantifier and the operator would be made of formal features. Roberts and Roussou (2003, 221) frame this subtle but indispensable distinction very clearly, formally defining functional categories precisely as those terms that are purely *logical*, i.e. "invariant under isomorphic structures" (their (45)). If functional categories are composed exclusively of formal features, which would be the zero hypothesis, then formal features would exclusively express "the logical content [which is] independent of the external factors, or in von Fintel's (1995) words, insensitive to facts about the world".[1]

Up to this point we have argued that gender is not a formal feature in languages like Turkish, where the category is grammatically inert. We also followed a restrictive understanding of formal features as both instructions to the C-I and grammatically active, tentatively following Roberts and Roussou (2003, 221) in that they must have purely logical content. This last claim might be too restrictive, but it certainly poses the question of what the content of gender features is in the languages in which, unlike in Turkish, it is indeed a formal feature.

3. Semantic gender features

Let us begin with semantic gender features, which are not to be confused with the purported and discarded grammatically inert 'semantic features'. Semantic gender is the gender that strictly reflects animacy and sex distinctions. Languages like Tamil (Corbett 1991, 8–11) and English seem to possess semantic gender systems. More specifically, Tamil has three genders: masculine rational, feminine rational, and non-rational; English is similar, with masculine animate, feminine animate, and inanimate.

Semantic gender is clearly a formal feature: it is interpreted by the C-I systems and it is grammatically active: in Tamil it triggers agreement, whereas in English it is marked

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[1] More discussion of this can be found in Panagiotidis (2021).

(exclusively perhaps) on functional items, i.e. pronominals.[2] As for its interpretation, gender on pronouns, as is well known, restricts the set of their potential referents, with very interesting consequences (Heim 2008).

A generalisation that emerges by looking at Corbett's (1991) survey but also at more language-specific treatments like Ritter (2015) is that semantic gender seems to be closely associated with Animacy. Even more boldly, the presence of marked semantic gender appears to entail animacy in language after language. This is possibly more than just a fact about what kind of concepts natural language grammaticalises (cf. Emonds 2011; Cinque 2013; Nóbrega 2018; Panagiotidis 2021): Ritter (op.cit.) shows that in Algonquian the classification of both nouns (what she calls *Seinsart*) and of verbs (Aktionsart) is based on animacy, rather than the boundedness of sets (Individuation) and of temporal intervals (Aspect). It could be the case that the Animacy-Semantic Gender association goes indeed a long way, as one of the natural language major classificatory categories next to (event/set) boundedness.

In grammatical theory it has already been proposed that (semantic) gender features are hosted on a separate syntactic head situated between the noun (or the *n*P) and Number (Picallo 1991; Ritter 1993; Merchant 2014 et al.). Panagiotidis (2018) calls this head Animacy (or *Anim*), for reasons similar to those suggested above, and brings in some arguments from the behaviour of pronominals and from particular discourse strategies to support the independence of this head from *n*.

(5) Semantic (i.e. 'true') gender features are located on a dedicated functional head.

However, what makes gender features a puzzle is not the existence of semantic gender but the nature of grammatical gender instead.

4. Grammatical gender features

The vast majority of gender systems also contain members assigned arbitrarily to one of the classes available. So, in grammar after grammar with a gender system, the majority of nouns are sorted arbitrarily to one of the available gender slots. This is true for languages with two- or three-way systems all the way to Bantu languages, with their numerous and intricate noun classes. As already noted, next to feminine mothers and masculine he-goats – where gender is semantic and by hypothesis involves semantic gender features – we have feminine tables and masculine walls, each arbitrarily assigned to feminine and masculine genders respectively.

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[2] Given the absence of concord in English, it is not clear that gender distinctions on nouns in English (e.g. *actor-actress*, *duke-duchess*, *poet-poetess*) involve the semantic gender features. It could be the case that *-ess* and the like are actually roots carrying 'female' as part of their lexical content (De Belder 2011; Lowenstamm 2014; Acedo-Matellán and Real-Puigdollers 2014; Panagiotidis 2021).

The interesting fact here is that in a sex-based gender system, semantic gender features are only relevant for (some) nouns that are about animate concepts (humans, deities, significant animals), whereas grammatical gender is marked on *all* nouns of a language with no exceptions and with elaborate mechanisms of grammatical gender assignment e.g. for coinages or loanwords (Corbett 1991, chap. 7).

So, whereas in a purely semantic system like that of Tamil all nouns about inanimate (or non-rational) entities, including e.g. abstract concepts and artefacts, would be relegated to the non-rational gender, in grammatical gender systems these nouns are also arbitrarily assigned to masculine, feminine etc.

In other words, semantic gender is only available for some nouns, possibly situated on an Animacy/Gender functional head, whereas all nouns of a language will bear grammatical gender. In other words, if something is a noun in a language with gender, it *will* bear grammatical gender. Following Lowenstamm (2008), Ferrari-Bridgers (2008), Kihm (2008), Acquaviva (2009; 2014), Kramer (2009), and Panagiotidis (2018) we will agree that

(6) Grammatical (i.e. 'classifying') gender features are located on the nominaliser *n*.

So far, the picture is as follows: languages may express gender distinction as an aspect of 'lexical' i.e. encyclopaedic meaning, e.g. Turkish. In these languages no gender features are involved. A number of languages, e.g. Tamil and English, have only semantic gender features, which by hypothesis are situated on a dedicated functional head, as per (5). Finally, most languages with a gender feature system possess grammatical gender features which are marked on all nouns, hence are situated on the nominaliser *n*, as per (6).

Therefore, as already discussed in Kramer (2009), Merchant (2014), and elsewhere:

(7) Semantic gender features (on *Anim*) are situated higher than grammatical gender features (on *n*): Anim > *n*.

5. The (un)interpretability of gender features

Now, the above are more or less part of a received account on gender, one that comes in very handy when we wish to explore matters like gender resolution or the competition between semantic and grammatical gender in concord (Atkinson 2015; Ihsane and Sleeman 2016 and elsewhere). There is however a major issue hidden right below these generalisations: the nature of gender features as formal features.

As already anticipated in Kramer (2015), only semantic gender features are interpretable and all grammatical gender features are uninterpretable. More specifically, semantic gender features are indeed formal features, as they are both involved in grammatical representations and operations, recall (3), and are true instructions to the C-I systems, as

required by (2). This second condition is hardly fulfilled by grammatical gender features, which are uninterpretable across the board.

Thus we have the following picture: there is an Animacy-related head bears semantic, i.e. *interpretable*, gender features that may take a descriptive *n*P as a complement, e.g. in cases of nouns like Spanish *madre* ('mother') and the like; this head may also be present in strong pronouns, i.e. exactly those pronouns that can take animate referents (Cardinaletti and Starke 1999), as discussed in Merchant (2014) and Panagiotidis (2018).

Worryingly, there are grammatical, i.e. *uninterpretable*, gender features on the nominaliser *n*. Not only are these features not instructions to the C-I systems, they are also borne by the nominaliser, a lexical head – conceding that only categorisers are bona fide lexical heads, as in Panagiotidis (2011; 2015). Moreover, the grammatical gender distinctions are identical to those of semantic gender in language after language, with the only caveat that descriptively 'neuter', 'inanimate' or 'non-rational' genders could simple be the absence of semantic gender but a valid grammatical gender.

Finally, unvalued gender features as Probes for concord make no distinction between semantic (on Animacy) and grammatical (on *n*) gender features. Moreover, the morphological exponence of semantic and grammatical gender is generally identical. This suggests that grammar treats identically the two classes of valued gender features: semantic / interpretable on Animacy and grammatical / uninterpretable on *n*.

The picture is puzzling. It looks like *n* hijacks features from an Animacy head, gender features, in order to set up a noun-classification system, possibly because of the absence of a fully-fledged Classifier head (Danniel Carvalho, p.c.). Crucially, recall that only the Animacy-based, semantic gender features qualify as formal features. But the interesting thing is that grammatical gender features are *never* found in the absence of semantic ones: recall once more that "Gender always has a basis in semantics" (Corbett 1991, 63).

Can we then claim that grammatical gender features, although by definition uninterpretable, are also formal features because Agree Probes cannot distinguish them from semantic (i.e. truly formal) features and may use them as Goals for the purposes of valuation? If this is on the right track, it is certainly worth exploring.

Before concluding the section it is worth making two points. First, when it comes to gender Pesetsky and Torrego's (2001; 2004) are vindicated: the full range of feature options are made available in the case of gender features:

(8) *All the flavours of gender features*
   a. Interpretable valued   semantic gender on Animacy
   b. Uninterpretable valued   grammatical gender on *n*
   c. Uninterpretable unvalued   gender features on adjectives, articles etc.
   d. Interpretable unvalued   N/A

The second point is that we currently have no theory to account for the parasitic but systematic presence of uninterpretable features on nominalisers, especially given that the canonical position of interpretable versions thereof is most likely in a higher functional head, Anim. The only comparable case I can think of is Acquaviva's (2008) discussion of lexical plurals like *scissors*, where one could say that the plural feature is not interpreted because it is subcategorial, hence within the domain of lexical idiosyncrasy caused by close association with the root (Marantz 1996; 1997; 2000; Panagiotidis 2011). The difference here is that grammatical gender cannot be located below the nominaliser *n*, as different grammatical gender *makes* different nouns, as illustrated by such well-known pairs as Spanish *libr-o* ('book') *libr-a* ('pound') or French *tour*MASC ('tour, round') *tour*FEM ('tower').

I will conclude my remarks by bringing in some data regarding the interaction between grammatical gender and semantic gender in a synthetic / fusional language like Modern Greek.

6. Inflectional troubles: a case study

Panagiotidis (2018, 196) very briefly presents how semantic gender interacts with grammatical gender in Modern Greek. The example used there, reproduced below, is that of the noun yatros ('medical doctor').

(9) A female doctor
   a. i   yatr-os
       the.FEM   doctor.MASC
   b. i   yatr-in-a
       the.FEM   doctor-FEM-FEM
   c. i   yatr-es-a
       the.FEM   doctor-FEM-FEM
   d. *o   yatr-os
       the.MASC   doctor-MASC

In the cases b. and c. above dedicated derivational suffixes *-in-* and *-es-* derive a noun meaning 'female doctor'. Thankfully for all parties involved, I am not going to zoom into the fine points of morphological analysis of the Greek nominal paradigm; here suffice it to say i) that these suffixes unambiguously mark the semantic gender of the nouns in b. and c. as

feminine, and ii) that the forms in b. and c. *also* bear grammatical feminine gender, as witnessed by the -*a* inflectional suffixes.

The interesting case is the one in a. The noun *yatros* bears grammatical masculine gender, as witnessed by its default use and concord patterns when e.g. discussing the property of being a doctor etc. When the noun is used to fetch the concept of a female doctor, it will keep its form (which is associated with masculine grammatical gender) but the feminine semantic gender is going to be unambiguously manifested via concord, indicated in (9) by using the article.

So, quite neatly, the form of the noun itself is decided in the example by the grammatical gender (masculine) but agreement, the concord pattern in this case, is decided by the structurally higher semantic (feminine) gender (Merchant 2014; Atkinson 2015; Ihsane and Sleeman 2016). It then looks like grammatical gender is restricted to deciding the morphology of the noun, to pure classification so to speak, whereas semantic gender decides the external grammatical behaviour of the noun.

Things can become slightly more complex, however. Again, despite still being committed to shielding the reader from too much exposure to the intricacies of Greek morphology, I have to invite them to look at the following examples. All the nouns below bear masculine grammatical gender and the articles are again supplied to indicate concord for feminine semantic gender. The twist is that the form for the oblique case, genitive, is also supplied below the nominative citation form:

(10) *The interaction between grammatical and semantic gender in Modern Greek noun declension*

a. i   yatr-os
   the.FEM   doctor.MASC
   tis   yatr-u
   the.FEM.GEN doctor.MASC.GEN
   'female doctor'
b. i   tami-as
   the.FEM   cashier.MASC
   *tis   tami-a
   the.FEM.GEN cashier.MASC.GEN
   'female cashier'

c.   i   grammate-as
       the.FEM   secretary.MASC
     *tis   grammate-a[3]
       the.FEM.GEN   secretary.MASC.GEN
       'female secretary'

The above example illustrates that, in pure non-lexicalist style, the externally provided semantic gender, feminine, prevents the Morphology component from matching the features bundles in b. and c. with the expected genitive forms *tami-a* ('of the cashier') and *grammate-a* ('of the secretary') respectively. Of course, this is but a quirk of Modern Greek morphology, and of the particular inflectional class the unruly nouns belong to more specifically. The relevance of Greek morphological complexities becomes evident if one compares the lack of feminine genitives in (10b) and (10c) with the availability of *yatr-u* ('of the doctor') in a. Moroever, we have known at least since Corbett (1991, 34–43) about the close and intricate interaction between *grammatical* gender and inflectional classes, and declensions more specifically, in fusional / synthetic languages.

Still, the examples in (10) illuminate the quite unexpected relation between semantic gender and inflectional class. The neat state of affairs in which grammatical gender is restricted to deciding the morphology of the noun with semantic gender only looking outwards is not tenable here. The 'impossible' forms in b. and c. involve the failure to match a form with an AnimP structure that contains both a [feminine] semantic and a [masculine] grammatical gender feature but only for a particular declension and only in the context of genitive case.

Acquaviva (2018) offers an analysis for a similar data set in Italian. One of his premisses is that some forms that receive semantic gender have no grammatical gender of their own, a claim I am not sure can be made for Greek, which is more strongly synthetic and where matters are complicated by morphological case. Still, Acquaviva's treatment in terms of a neat structural account is worth exploring, something I leave it for later work. Kučerová and Szczegielniak (2019) offer a richer, root-based system to handle related paradoxes in Polish. Future work should seriously engage into a debate with both.

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[3] This example is supplied because it belongs to the -a- declension class, like *tamias* in (10b), but in different sub-declension. In learned registers, and as an avoidance strategy for the impossible combination **tis grammate-a*, nouns of this (and only this) subclass may avail to archaic genitives such as *tis grammate-os*.

7. Some generalisations

This short squib is an attempt to raise rather than make a number of points, as all of them must be thoroughly investigated on the basis of more empirical evidence.

The first point is that gender as a category involves formal features, i.e. gender features, only when it is relevant for grammatical representations and operations. We expect animacy, biological sex, and the like to be part of encyclopedic information language deals with, but it only makes sense to talk about a gender category only when gender is encoded on formal features.

A second point is that semantic gender features are possibly encoded in a structural position higher than *n*, say Animacy, which seems to be the locus of grammatical gender features. This is a familiar hypothesis, however it is enmeshed with three more observations:

    i)   valued semantic gender features are interpretable, unlike valued grammatical gender features,

    ii)   the presence of gender features on *n* (grammatical gender) is parasitic on the presence of gender features on *Animacy* (semantic gender),

    iii)   some nouns (may) associate with semantic gender, but all nouns bear grammatical gender.

Putting the three points together we arrive at

    (11) *The gender paradox*
    Uninterpretable gender features on *n* are obligatory for all instances of *n*, but their presence in a grammar presupposes interpretable gender features on a higher head.

The above is quite puzzling, as it reminiscent of something like the proposed C-T feature percolation in Chomsky (2001), although the generalised uninterpretability of grammatical gender features on *n* complicates matters. I have no more to offer on this issue at this point.

A third point is the one made in the context of the Greek data in Section 6. The consensus so far was that semantic gender is 'outward looking': it matters for interpretation and it competes with grammatical gender for concord and agreement, often winning (Lowenstamm 2008; Kramer 2009; Lazzarini Cyrino, Gabbai Armelin, and Minussi 2013; Kramer 2015; Merchant 2014; Atkinson 2015; Ihsane and Sleeman 2016; Panagiotidis 2018 and elsewhere). Especially the examples in (10) suggest that exponents (Vocabulary Items, if you wish) for nouns are not inserted at the level of the *n*P node, but at the AnimP node (or similar).[4]

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[4] Possibly by some version of spanning (Svenonius 2012; Merchant 2015).

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