

Gender as a mode of quantification: Evidence from Polish numerals

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Introduction. For a long time, the relationship between gender and classifier systems has been subject to extensive typological investigations. It is commonly argued that both systems play a similar role in grammar in that they reflect the classification of the nominal lexicon (Dixon 1982, Corbett 1991, Aikhenvald 2000). However, one function of classifiers that is commonly assumed not to be shared with gender is their behavior in languages such as Mandarin where they allow for numerals to modify nouns. In spite of that view, recent proposals suggest that gender in Arabic and Serbo-Croatian can be interpreted as a mode of quantification or a grammaticalized classifier system (Fassi Fehri 2016, Arsenijević 2016). In this paper, I provide novel evidence concerning the relationship between gender morphology and classifier semantics. The core evidence comes from the well-studied virile/non-virile alternation in Polish cardinal numerals (e.g., Miechowicz-Mathiasen 2011). The main claim is that Polish virile, i.e., marked, cardinals have a built-in classifier whereas non-virile, i.e., unmarked, cardinals do not.

Data. I start with an observation that Polish virile and non-virile numerals differ in their distribution in a way that cannot be reduced to syntactic agreement. Rothstein (2013, 2017) distinguishes between several semantic functions English numerals can have: i) nominal modifiers, ii) predicates, and iii) names of concept numbers. While in Polish both virile and non-virile forms can modify NPs and occur in predicate position, see (1), only non-virile cardinals can be used to name numbers, see (2-a), and do not fit contexts that clearly call for numeric arguments such as (2-b). Moreover, they cannot appear in a counting list. For instance, (3-b) cannot refer to abstract objects and presupposes counting male individuals.

- (1) a. Pięć dziewczyn / pięciu chłopców przyszło.
five_{NV} girls_{NV} / five_V boys_V came
b. Tych dziewczyn / chłopców było pięć / pięciu.
these girls_{NV} / boys_V was five_{NV} / five_V
- (2) a. liczba pięć/*pięciu
number five_{NV}/five_V
b. Dwa razy pięć / *pięciu równa się dziesięć.
two times five_{NV} / five_V equals REFL ten
- (3) a. jeden, dwa, trzy, cztery, pięć...
one_{NV} two_{NV} three_{NV} four_{NV} five_{NV}
b. #jeden, dwaj, trzej, czterej, pięciu...
one_V two_V three_V four_V five_V

Furthermore, non-virile cardinals used as names of number concepts exhibit distinctive properties. For instance, unlike nominal modifiers they resist adjectival modification (cf. Babby 1987), see (4), and are incompatible with the universal quantifier (cf. Gvozdanović 1999), see (5).

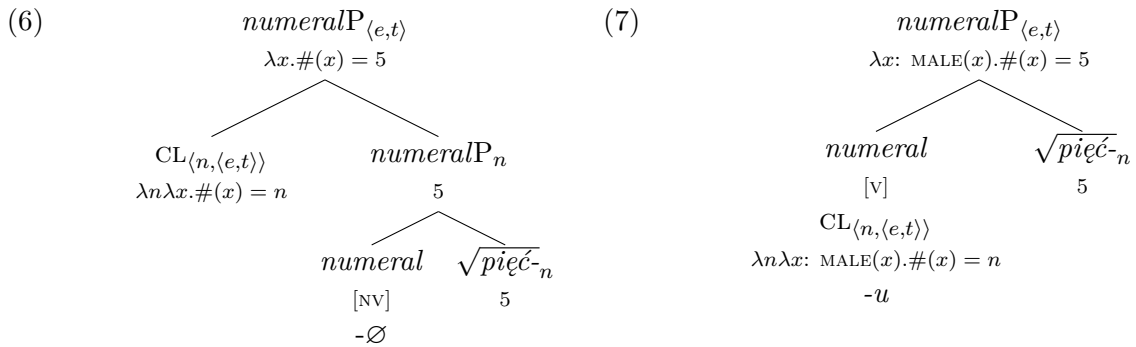
- (4) a. dobre_i pięć_i butelek (5) a. wszystkie pięć butelek
good five bottles all five bottles
b. *liczba dobre_i pięć_i b. *liczba wszystkie pięć
number all five number all five

Finally, notice that virile forms are both morphologically and semantically marked, e.g., *dw-a-j* vs. *dw-a* ('two') or *pięci-u* vs. *pięć-∅* ('five'). Importantly, numeral roots are often homophonous to non-virile forms and never homophonous to virile forms and unlike non-virile numerals, out of the blue virile cardinals involve inference to male individuals.

Cross-linguistic perspective. The observed asymmetry is not a Polish idiosyncrasy. For instance, Arabic distinguishes between morphological forms that can only be used as modifiers and those that can also function as names of number concepts (Fassi Fehri 2017). Distinct forms of

a particular numeral specialized either for nominal modification or for reference to integers are found in such diverse languages as German, Hungarian, Mandarin, Maltese, and Basque (Hurford 2001). Even more interesting, the difference between Polish virile and non-virile cardinals resembles to some extent the behavior of numerals in classifier languages. In Japanese bare numerals cannot be used as nominal modifiers or predicates (Sudo 2016) whereas classifier constructions do not fit unambiguously numeric contexts. Another important fact is that cross-linguistically classifiers are often suffixes on numerals (Aikhenvald 2000).

Analysis. Though it is standardly assumed that in modification contexts classifiers compensate semantic deficits of nouns (e.g., Borer 2005, Chierchia 1998, Scontras 2014), an alternative view posits that it is the semantic properties of numerals that require classifiers in such environments (Krifka 1995, Bale & Coon 2014, Sudo 2016). In the light of the discussed data and cross-linguistic facts I propose that in Polish gender on cardinals should be analyzed as a simple grammaticalized classifier system. In particular, I posit that virile numerals include an incorporated classifier dedicated to counting male individuals whereas non-virile cardinals involve a covert general classifier when used as modifiers and in predicate position. First, I assume that numeral roots are category-free, as often claimed (e.g., Halle & Marantz 1993), and argue that they are always born as names of number concepts, i.e., abstract objects of a primitive type n . In addition, I postulate an element CL (for ‘classifier’) which shifts abstract singular terms into modifiers, i.e., cardinal predicates of the same type as intersective adjectives (Landman 2003). Such an operation also involves a measure function $\#$ which maps a plurality into a natural number; $\#$ is compatible only with quantized predicates (Krifka 1989). The composition of cardinals proceeds as follows, see (6) and (7). The gender value is always associated with a *numeral* head. In the case of non-virile cardinals it contributes no additional meaning and the resulting phrase is still of type n . Such a structure can be used to refer to abstract numbers. However, a bigger structure can be derived by employing the CL element which can be applied to shift the singular term to the type $\langle e, t \rangle$. The classifier semantics enables the numeral to be used predicatively or as a modifier. In the case of virile cardinals the *numeral* head also introduces the CL operation but this time augmented with a special presupposition. As a result, the type of the *numeral*P is $\langle e, t \rangle$, and thus the virile form cannot be used as a name of a number concept. Furthermore, the classifier semantics determines the virile form to count male individuals. The relationship between the two forms is subject to a standard pragmatic competition with the Maximize Presupposition rule playing a central role in blocking non-virile cardinals from counting male individuals (Heim 1991).



In the proposed system, cardinal suffixes such as *-naście* (‘-teen’) and *-dziesiąt* (‘-ty’) are analyzed as operators of type $\langle n, n \rangle$ that take the denotation of the numeral root and yield a number enlarged via addition or multiplication, see (8), which can be then shifted by CL.

- (8) a. $\llbracket \text{-naście} \rrbracket = \lambda n. n + 10$
 b. $\llbracket \text{-dziesiąt} \rrbracket = \lambda n. n \times 10$

Finally, the approach can be extended with additional classifiers to capture a number of phenomena observed with respect to Slavic derivationally complex numeral forms such as group numerals or taxonomic numerals (Dočekal 2013, Khrizman 2015, Wągiel 2015).