

# Why Polish Numerals Should Not Be Analyzed as Nouns

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## 1. Introduction

Ionin and Matushansky (2005) (henceforth I&M), and Corver and Zwarts (2006) (C&Z) have recently proposed that numerals are nominal rather than functional heads. The aim of the present paper is to show that the above claim cannot be valid cross-linguistically. I will argue that the approach proposed by I&M and C&Z does not find support in the syntax of Polish. It will be shown that most cardinals in Polish should be analyzed as functional heads.

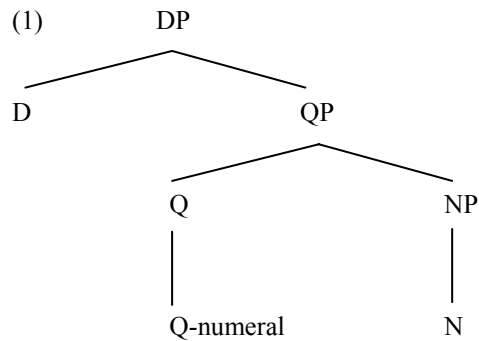
## 2. What Are Q-numerals?

What is usually referred to as “cardinal numerals” (i.e. the class of words expressing cardinalities) is not a homogeneous lexical category in Polish. The four lowest cardinals (*jeden* ‘one’ – *cztery* ‘four’) always agree in case with the head noun; this kind of syntactic behavior is typical of adjectival modifiers in Polish. Very high numerals (such as *tysiąc* ‘one thousand’ or *miliard* ‘one billion’) make the quantified noun assume a genitive case form, therefore they resemble nouns. The rest of Polish cardinals (i.e. numerals such as *pięć* ‘five’ or *dziewięćset* ‘nine hundred’) exhibit a mixed pattern of case assignment/agreement: they assign genitive in structural-case contexts (nominative and accusative) but they agree with the head noun in inherent-case contexts (dative, instrumental, locative). Following Rutkowski (2001, 2002a) and Rutkowski and Szczegot (2001), I will refer to these three classes of cardinals as A-numerals (adjectival

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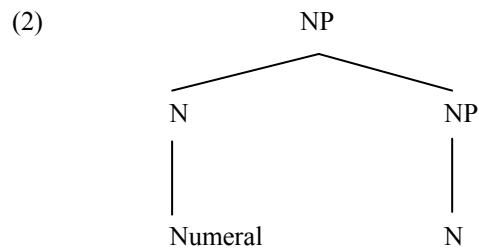
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numerals), N-numerals (nominal numerals) and Q-numerals (numerals proper), respectively, and argue that this tripartite distinction is conditioned syntactically. I take Q-numerals to be functional elements hosted in the head of the Quantifier Phrase (QP), a dedicated functional layer projected above the quantified NP (cf. e.g. Franks 1995). Therefore, Q-numerals are different from A-numerals (spec-based adjectives) and N-numerals (syntactic nouns, base generated in N).<sup>1</sup> The syntactic structure of a Polish Q-numeral expression is shown in (1).<sup>2</sup>



### 3. “Nominal” Properties of Q-numerals

The analysis outlined in the previous section is questioned by I&M’s account of Russian numeral expressions; according to their proposal, a numeral such as *pjat’* ‘five’ is a noun which takes the quantified NP as its complement (this idea stems from Jackendoff 1977):



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1. For accounts of the syntactic distinction between A-, Q- and N-numerals in other Slavic languages see e.g. Giusti and Leko (1996) and Veselovská (2001).
  2. This structure is discussed in detail in Rutkowski (2001, 2002a) and Rutkowski and Szczegot (2001).

Undoubtedly, there are some syntactic properties that are shared by Q-numerals and nouns. One of such characteristics is that Q-numerals may act as genitive assigners. What distinguishes Q-numerals from other pre-nominal elements (such as demonstratives, possessives or adjectives) is also the fact that cardinals may be pre-modified by adjectives. These two characteristics are illustrated in (3):

- (3) *Niecałe dziewięćset wonów zostało pożyczone na pełne pięć lat.*  
 incomplete-ACC nine-hundred-ACC<sup>3</sup> wons-GEN was-3, SING, NEUT  
 borrowed for full-ACC five-ACC years-GEN  
 ‘Almost nine hundred wons were borrowed for five whole years.’

The adjectives *niecałe* ‘almost’ and *pełne* ‘whole’ in (3) agree in case with the cardinals that they refer to, and not with the quantified elements. Since adjectives normally agree with nouns, the above pattern could be interpreted as indicating that Q-numerals are nouns. However, it should be noted that all that is needed for expressions such as *pełne pięć lat* ‘five whole years’ to be grammatical is that the adjectival specifier be in a checking relation with a head, but not necessarily with a nominal head. Therefore, examples such as (3) do not prove the nominal status of Q-numerals, as long as Q-numerals are analyzed as functional heads (which is the case in this paper – see the structure in (1)).

As for the issue of genitive assignment, Pereltsvaig (2005) rightly points out that “the fact that two (types of) items check the same case on their complements need not mean that they are of the same syntactic category”. In other words, the observation that both Q-numerals and (some) nouns assign genitive to their complements is not enough to analyze the former as nouns. Moreover, as mentioned in Section 2, the genitive of quantification is restricted to structural-case contexts. This limitation is actually one of the main reasons to distinguish Q-numerals from nouns (and N-numerals).<sup>4</sup> If Q-numerals are treated as functional elements, their inability to assign case in inherent-case contexts can be accounted for by

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3. There is convincing evidence that Q-numeral subjects are accusative, rather than nominative – see Krasnowolski (**Błąd! Nie zdefiniowano zakładki.**1897), Szober (1923), Schenker (1971), Franks (1995), Przepiórkowski (1996, 2004), Rutkowski (2000). Note also that such subjects do not trigger agreement on the predicate – instead, the verb assumes a neutral form (third person neuter singular).
4. Babby (1987) makes essentially the same point when he argues that there is a difference between Russian cardinals and nouns such as *korzina* ‘basket’ or *bol’sinstvo* ‘majority’.

postulating that inherent cases are assigned before functional elements are inserted into the derivation (for more details, see Veselovská 2001 and Rutkowski 2001, 2002a). On the other hand, if Q-numerals and regular nouns were subsumed under the same syntactic label, there would no longer be a straightforward means of explaining why they sometimes behave differently with respect to case checking.

#### 4. N-numerals Are Nouns

I argue that, among Polish cardinals, only N-numerals can be considered noun-like heads. It should be noted, though, that even they seem to be undergoing a process of syntactic grammaticalization, which means that they are gradually becoming Q-numerals (see Rutkowski 2006). For instance, when N-numerals are used as subjects, the predicate can either agree with them or assume the third person neuter singular form:

- (4) a. Niecały milion Koreańczyków wyemigrował do Polski.  
incomplete-NOM million-NOM Koreans-GEN  
emigrated-3, SING, MASC to Poland  
'Almost one million Koreans emigrated to Poland.'
- b. Niecałe milion Koreańczyków wyemigrowało do Polski.  
incomplete-ACC million-ACC Koreans-GEN  
emigrated-3, SING, NEUT to Poland  
'Almost one million Koreans emigrated to Poland.'

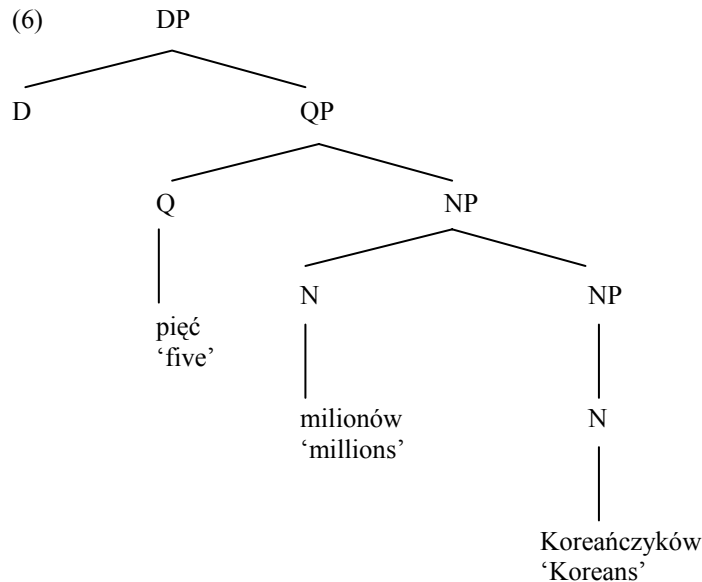
The pattern exemplified in (4a) is typically nominal: the verb agrees with the subject noun in person, number and gender (note that N-numerals such as *milion* 'million' are masculine). On the other hand, the pattern in (4b) is a syntactic innovation, triggered by the syntax of sentences with Q-numerals: the predicate is neuter and the subject is accusative (the latter fact is indicated by the case marking on the adjective *niecałe* 'almost').

However, I argue that N-numerals should be analyzed as nouns because of their case assignment properties. Being lexical elements, they assign genitive both in structural and inherent contexts. The difference between Q- and N-numerals is illustrated below:

- (5) a. Ufam pięciu milionom Koreańczyków.  
I-trust five-DAT millions-DAT Koreans-GEN  
'I trust five million Koreans.'
- b. \*Ufam pięciu milionów Koreańczyków.  
I-trust five-DAT millions-GEN Koreans-GEN

- c. \*Ufam pięciu milionom Koreańczykom.  
I-trust five-DAT millions-DAT Koreans-DAT

Note that the verb *ufać* ‘trust’ assigns dative, i.e. an inherent case value. Thus, the Q-numeral *pięć* ‘five’ cannot check genitive on its complement in this context (see (5b)). However, nothing prevents the N-numeral *milion* ‘million’ from acting as a genitive assigner (see (5c)). This difference cannot be captured in the framework suggested by I&M, who treat both cardinals in (5) as nouns. Contrary to I&M, I propose that if a Q-numeral is combined with an N-numeral in a complex numerical expression (such as *pięć milionów* ‘five million’) their syntactic status is not the same:



According to I&M, the assumption that cardinals are functional heads implies that complex numeral expressions must be treated as morphological compounds (occupying a single syntactic slot). As shown in (6), there is no such implication.

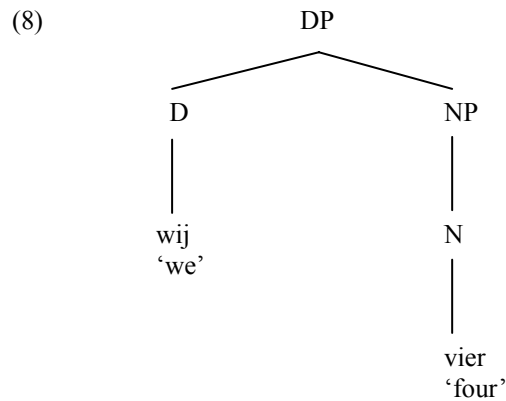
## 5. Structures with Personal Pronouns

C&Z propose that Dutch cardinals should be analyzed as nouns because

they may appear in structures such as (7).

- (7) Wij vier(en) begrepen er niks van.  
 we four(-PL) understood there nothing of  
 ‘The four of us didn’t understand anything of it.’

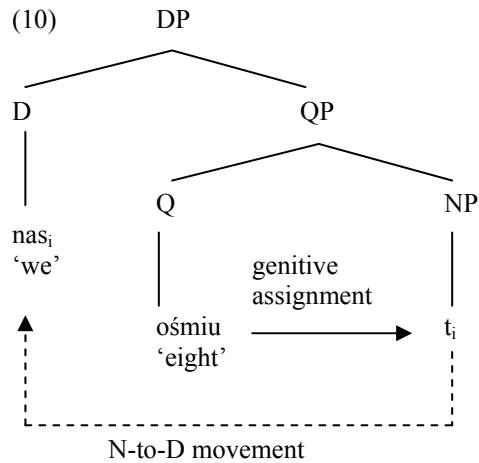
C&Z argue that personal pronouns are determiners, which can only be complemented by nouns. According to this account, expressions such as *wij vier* ‘the four of us’ should have the following structure:



The above construction has an equivalent in Polish:

- (9) Nas ośmiu nic z tego nie zrozumiało.  
 we-GEN eight-ACC nothing of it not understood-3, SING, NEUT  
 ‘The eight of us didn’t understand anything of it.’

Nevertheless, unlike C&Z and Postal (1969), I do not treat personal pronouns as base generated in D. Instead, I follow Cardinaletti (1994) and Progovac (1998) in assuming that pronouns originate in N; however, due to their referential properties, they are subject to N-to-D raising. Regular nouns do not move to D; therefore, Q-numerals (which are located in a functional projection in the region between D and N) precede nouns but follow pronouns in surface syntax. This analysis is corroborated by the fact that the personal pronoun in (9) is marked genitive. This case value is undoubtedly assigned by the Q-numeral *ośmiu* ‘eight’. Thus, the personal pronoun cannot be treated as base generated in D. The derivation of examples such as (9) is illustrated in (10) – see Rutkowski (2002c) for more details.



Therefore, I do not find C&Z's analysis of examples such as (7) applicable to Polish.

## 6. Denumeral Nouns

I&M and C&Z's hypothesis that cardinal numerals are regular nouns is questioned by the fact that Polish has a separate class of regularly derived denumeral nouns, such as *piątka* 'a five', *szóstka* 'a six', *siódemka* 'a seven', *dziesiątka* 'a ten', *setka* 'a hundred'.<sup>5</sup> They are all feminine and denote objects such as coins, grades etc. or groups of people/elements:

- (11) Dostałem wczoraj piątkę w szkole.  
I-got yesterday five-N, ACC at school  
'Yesterday I got an A [literally: a five] at school.'
- (12) Widziałem piątkę Koreańczyków.  
I-saw five-N, ACC Koreans-GEN  
'I saw (a) five (of) Koreans.'

As shown below ((13) vs. (14)), denumeral nouns assign genitive in inherent-case contexts, which makes them clearly different from Q-numerals (note that the verb *ufać* 'trust' requires dative case on its complement).

5. Pereltsvaig (2005) argues that also in Russian cardinal numerals, such as *pjat'* 'five', *desjat'* 'ten', *sto* 'hundred', behave differently from denumeral nouns, such as *pjatok* 'five', *desjatok* 'ten', *sońja* 'hundred'.

- (13) Ufam piątce Koreańczyków.  
 I-trust five-N, DAT Koreans-GEN  
 ‘I trust (a) five (of) Koreans.’
- (14) Ufam pięciu Koreańczykom.  
 I-trust five-DAT Koreans-DAT  
 ‘I trust five Koreans.’

I&M and C&Z’s claim that numerals are nouns makes it impossible to distinguish between the two case patterns shown in (13) and (14). On the other hand, this dichotomy can be given a principled explanation if *piątka* ‘a five’ is assumed to be a noun, whereas *pięć* ‘five’ is treated as a functional element.

Interestingly, C&Z point out that Dutch numerals may take diminutive inflection, which indicates that they are nouns:

- (15) Ik heb jullie drietjes niet gezien.  
 I have you three-DIM, PL not seen  
 ‘I didn’t see the (little) three of you.’

If this morphological test is applied to Polish cardinal expressions, it becomes clear that Q-numerals are not nouns: they cannot be used diminutively. On the other hand, denumeral nouns and N-numerals do have diminutive forms:

- (16) Dostałem wczoraj piąteczkę w szkole.  
 I-got yesterday five-N, DIM, ACC at school  
 ‘Yesterday I got a nice little A [literally: a little five] at school.’
- (17) Dostałem wczoraj miliardzik wonów.  
 I-got yesterday billion-DIM, ACC wons-GEN  
 ‘Yesterday I got a nice little billion wons.’

Note that denumeral nouns and N-numerals, as opposed to Q-numerals, may be pluralized, which is also a nominal characteristic:

- (18) Dostałem wczoraj pięć piątek w szkole.  
 I-got yesterday five-ACC fives-N, ACC at school  
 ‘Yesterday I got five As [literally: five fives] at school.’
- (19) Dostałem wczoraj pięć miliardów wonów.  
 I-got yesterday five-ACC billions-GEN wons-GEN  
 ‘Yesterday I got five billion wons.’



As shown in (20), Q-numerals cannot take other Q-numerals as their complements, which is problematic if we follow I&M and C&Z in assuming that numerals are regular nouns. Note that this problem does not arise if a Q-numeral is complemented by a denumeral noun – see (18).

- (20) \*Dostałem wczoraj pięć pięciu wonów.  
I-got yesterday five-ACC five-GEN wons-GEN

Another difference between denumeral nouns and Q-numerals is that, when used as subjects, denumeral nouns do not trigger the default neuter agreement on the predicate. Instead, the verb agrees with the noun in gender: namely, it must be feminine (all denumeral nouns are feminine in Polish). This is illustrated in (21).

- (21) a. Piątka Koreańczyków spała tutaj wczoraj.  
five-N, NOM Koreans-GEN slept-3, SING, FEM here yesterday  
'(A) five (of) Koreans slept here yesterday.'  
b. \*Piątka Koreańczyków spało tutaj wczoraj.  
five-N, NOM Koreans-GEN slept-3, SING, NEUT here yesterday

If denumeral nouns are pre-modified by adjectives or demonstratives, the modifier must also be feminine:

- (22) Widziałem tę całą piątkę Koreańczyków.  
I-saw this-ACC, FEM whole-ACC, FEM five-N, ACC Koreans-GEN  
'I saw all these five Koreans.'

Note that the fact that denumeral nouns are categorically different from regular numerals finds additional support in the fact that, as illustrated in (23c), elements belonging to these two classes cannot be combined in a complex numerical expression:

- (23) a. tysiąc dwieście dziesięć  
thousand two-hundred ten  
'one thousand two hundred and ten'  
b. \*tysiąc dwieście dziesiątka  
thousand two-hundred ten-N

Pereltsvaig (2006) shows that, in Russian, numeral expressions may undergo a semantically conditioned inversion: N-movement across the

numeral is used to express approximation. According to her, this N-raising targets a higher functional phrase (labeled EvidP, Evidential Phrase).

- (24) a. *desjat'* *knig*  
 ten books-GEN  
 'ten books'  
 b. *knig desjat'*  
 books-GEN ten  
 'approximately ten books'

As shown in Pereltsvaig (2005), the approximative N-movement is not possible in the case of denumeral nouns:

- (25) a. *desjatok knig*  
 ten-N books-GEN  
 '(a) ten (of) books'  
 b. \**knig desjatok*  
 books-GEN ten-N

Elements such as *desjatok* in (25a) are regular nouns, which means that they cannot be located in the functional complex above the head noun. Hence, even if the quantified noun moved to EvidP in (25), it would not cross the denumeral noun. The phenomenon of approximative inversion does not exist in Polish. However, Polish also offers word-order evidence for analyzing denumeral nouns as different from Q-numerals. Recall from Section 5 that Polish personal pronouns surface as Ds, as a result of N-to-D movement. Therefore, they precede Q-numerals in structures such as (26b):

- (26) a. *Poszedłem tam z osiemnastoma Koreańczykami.*  
 I-went there with eighteen-INSTR<sup>6</sup> Koreans-INSTR  
 'I went there with eighteen Koreans.'  
 b. *Poszedłem tam z nimi osiemnastoma.*  
 I-went there with they-INSTR eighteen-INSTR.  
 'I went there with the eighteen of them.'

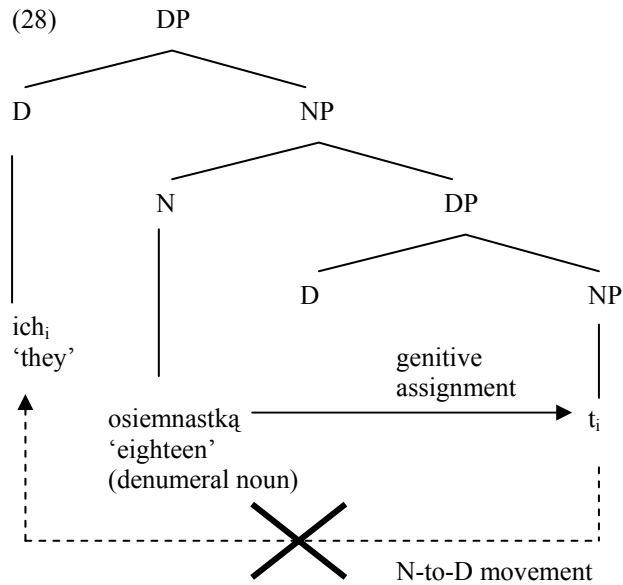
However, as illustrated in (27b), this raising of pronouns is not possible in the case of expressions with denumeral nouns:

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6. Note that the preposition *z* 'with' assigns instrumental case.

- (27) a. Poszedłem tam z osiemnastką Koreańczyków.  
 I-went there with eighteen-N, INSTR Koreans-GEN  
 ‘I went there with (an) eighteen (of) Koreans.’  
 b. ?\*Poszedłem tam z ich osiemnastką.  
 I-went there with they-GEN eighteen-N, INSTR.

The above data indicates that structures with denumeral nouns consist of two extended nominal projections (note that Q-numeral expressions are “monophrasal”, i.e. constitute a single DP). Thus, the personal pronoun in (27b) cannot be raised to the D position in the upper DP: N-to-D movement must not cross DP boundaries. This is illustrated in (28).



In summary, there seems to be substantial evidence that the syntactic status of Q-numerals is different from that of denumeral nouns in Polish. This fact cannot be accounted for in the model proposed by I&M and C&Z.

## 7. Old Polish Numerals Were Nouns

My final argument against the approach advocated in I&M and C&Z is as follows: Q-numerals cannot be analyzed as nouns because they have

actually evolved from nouns in the diachronic sense (cf. Rutkowski 2002b, 2006). As shown in Klemensiewicz, Lehr-Splawiński and Urbańczyk (1964) and Klemensiewicz (1974), among many others, Old Polish cardinals were regular feminine nouns.<sup>7</sup> They assigned genitive case to the quantified noun in all syntactic contexts. The difference between Old Polish and today's numerical expressions is shown in Table 1.

Case	Old Polish	Modern Polish
Nominative	pięć lat five-NOM years-GEN	pięć lat five-ACC years-GEN
Genitive	pięci lat five-GEN years-GEN	pięciu lat five-GEN years-GEN
Dative	pięci lat five-DAT years-GEN	pięciu latom five-DAT years-DAT
Accusative	pięć lat five-ACC years-GEN	pięć lat five-ACC years-GEN
Instrumental	pięcią lat five-INSTR years-GEN	pięcioma latami five-INSTR years-INSTR
Locative	pięci lat five-LOC years-GEN	pięciu latach five-LOC years-LOC

Table 1. Diachronic development of the syntax of Polish cardinals

When used as sentential subjects, Old Polish cardinals were nominative (which is indicated by the case marking on the demonstrative in (29)) and triggered regular gender agreement on the predicate (recall that in present-day Q-numeral structures the verb assumes the third person neuter singular form):

- (29) Ona pięć ludzi szła.  
 that-NOM, FEM five-NOM people-GEN walked-3, SING, FEM  
 'Those five people were walking.'

The syntax of Old Polish numerals was, thus, identical to that of feminine group nouns, such as *masa* 'mass':

- (30) Ta masa ludzi szła.  
 this-NOM, FEM mass-NOM people-GEN walked-3, SING, FEM  
 'This mass of people was walking.'

7. See also Babby 1987 for similar observations concerning Old Russian numerals.

As shown in Rutkowski (2002b, 2006), the historical development of Q-numerals is an example of the reanalysis of a lexical head as a functional head. This kind of diachronic change could be interpreted as structural simplification (in the spirit of Roberts and Roussou's 1999 generative account of grammaticalization): a complex expression consisting of two separate extended projections (namely, the DP hosting the numeral and the quantified DP) gets reanalyzed as a single nominal construction (with the numeral located in a functional projection) – see Rutkowski (2002b, 2006) for a detailed account. If C&Z and I&M's approach to the syntactic status of numerals were adopted in the analysis of Polish, there would be no way to explain why the syntax of Polish cardinals has changed between the Old Polish period and today. Interestingly, Modern Polish Q-numerals developed not only from nouns but also from syntactic structures. The pairs of examples in (31-33) illustrate how complex expressions gave rise to present-day simplex cardinal forms (cf. Klemensiewicz, Lehr-Splawiński and Urbańczyk 1964: 344-352).

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|---------|--|-----------------|
| (31) a. | siedm na dzieście wsi<br>seven-NOM on ten-LOC villages-GEN<br>'seventeen villages' | [Old Polish]    |
| b.      | siedemnaście wsi<br>seventeen-ACC villages-GEN<br>'seventeen villages'             | [Modern Polish] |
| (32) a. | siedm dziesiąt wsi<br>seven-NOM ten-GEN villages-GEN<br>'seventy villages'         | [Old Polish]    |
| b.      | siedemdziesiąt wsi<br>seventy-ACC villages-GEN<br>'seventy villages'               | [Modern Polish] |
| (33) a. | siedm set wsi<br>seven-NOM hundred-GEN villages-GEN<br>'seven hundred villages'    | [Old Polish]    |
| b.      | siedemset wsi<br>seven-hundred-ACC villages-GEN<br>'seven hundred villages'        | [Modern Polish] |

All of these cases of diachronic reanalysis involve syntactic, morphological and phonological reduction. Such processes typically result from grammaticalization, which supports the idea that Q-numerals are grammaticalized (i.e. functional) elements – see Rutkowski (2006).

## 8. Conclusion

I argue that the functional (non-nominal) status of Q-numerals (which constitute a vast majority of cardinals in Polish) lets us explain many of their unusual syntactic properties. On the other hand, I do not find any substantial evidence for analyzing Q-numerals as nouns. It should be emphasized that I do not propose that numerals are functional heads universally. My aim is to show that, even if there are good reasons to analyze numerals as nouns in Dutch, such an account cannot be applied to Polish. Therefore, I conclude that I&M and C&Z's proposals cannot be claimed to hold cross-linguistically.

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