1. Introduction

**Core phenomenon:** A number of Slavic and Uralic languages share the property of a *case alternation* with numerals – in structural case environments (NOM, ACC), numerals appear to be case-assigners, assigning GENITIVE (Slavic) or PARTITIVE (Uralic), but in oblique case environments, they appear to be case-agreers, showing the same oblique case as the noun.

**Polish:** Genitive(plural)-oblique(plural) – case alternation with numerals

1. Ivan kupił pięć samochodów
   Ivan bought five cars.
2. ... z pięć-oma samochodami
   ... with five-instrumental car-instrumental.

**Finnish:** Partitive(singular)-oblique(singular) – case alternation with numerals

3. Ivan osti viisi autot
   Ivan bought five cars. (Brattico 2011: 1045)
4. Minä asuin kolmessa talossa
   I lived in three houses. (Brattico 2011: 1051)

In this talk, I focus on Polish and return briefly to Finnish in the end. I consider specifically the role of the numeral, treating it as semi-lexical, and discuss how this property in combination with a case-stacking analysis can derive the above facts.

**Sketch of the analysis:**
- Polish 5+ (5-10, 20, 30, …, 100) numerals are semi-lexical: they lack a gender feature, but have a number feature.
- Oblique cases seek a lexical noun, which leads to downwards case percolation when there are semi-lexical elements, such as numerals, present.
- By case stacking, the instrumental case, and not the genitive, is realized on the noun.

\[
\text{INST} \quad \text{GEN} \quad \text{INST}
\]

1 In association with the VIDI project, ‘The Uniformity of Linguistic Variation’.
2 Abbreviations as follows: ACC(USATIVE); AUX(ILIARY); DAT(IVE); F(EMININE); GEN(ITIVE); INE(SIVE); INF(INITIVE); INST(RUMENTAL); LOC(ATIVE); M(ASCULINE); MH(MASCULINE HUMAN); N(EUTER); NOM(INATIVE); NON-MH(NON-MASCULINE HUMAN); PAR(TICLE); PART(ITIVE); PL(URAL); SEM(ANTIC CASE); SG(SINGULAR); VA(VERBAL PARTICIPLE)
2. Conditions for the Polish case alternation

Chomsky (1986) distinguishes between structural and inherent cases, structural cases being nominative and accusative, and inherent cases being all others.

Willim (1990) questions this distinction and argues that non-accusative cases can also be structural. Specifically, datives, instrumentals, and genitives can be either structural or inherent in Polish.

Structural datives, instrumentals, and genitives differ from structural accusatives in that the (transitive) verb carries a lexical specification for the non-accusative case:

\[
\begin{align*}
\text{Accusative:} & \quad [+\text{Case}] \\
\text{Dative:} & \quad [+\text{Case, }/+\text{dat/}] \\
\text{Genitive:} & \quad [+\text{Case, }/+\text{gen/}] \\
\text{Instrumental:} & \quad [+\text{Case, }/+\text{inst/}] \\
\end{align*}
\]

Inherent cases are assigned by proxy, via a preposition or case-marker that is also a case-assigner. Inherent cases occur with intransitive verbs.

This corresponds to the three-way distinction among cases discussed in Woolford (2006):

\[
\begin{align*}
\text{Structural Case:} & \quad \text{Assigned in a particular structural configuration} \\
\text{Lexical Case:} & \quad \text{Idiosyncratic, lexically selected Case} \\
\text{Inherent Case:} & \quad \text{Case inherently associated with certain theta-positions} \\
\end{align*}
\]

Under Willim’s approach, structural and lexical cases are assigned under the same structural configuration. We might therefore expect them to behave similarly with regards to case alternations – however, they do not:

\[
\begin{align*}
\text{(7)} & \quad \text{Ivan kupił pięć samochodów} & \text{Structural Accusative} \\
& \quad \text{Ivan bought five cars.} \\
\text{(8)} & \quad \text{Kierowałam pięcioma studentami} & \text{Lexical Instrumental} \\
& \quad \text{I directed five students.} \\
\end{align*}
\]

Polish also shows a case alternation in the presence of negation. When there is sentential negation, accusative arguments are marked genitive (the Genitive of Negation). However, neither lexical nor inherent cases are affected:

\[
\begin{align*}
\text{(9)} & \quad \text{Widziałam dziewczynę} & \text{Structural Accusative} \\
& \quad \text{I saw a girl.} \\
\text{(10)} & \quad \text{Nie widziałam dziewczyny / *dziewczynę} & \text{Structural Accusative} \\
& \quad \text{I didn’t see a girl.} \\
\end{align*}
\]

\[3\] And ‘an autonomous Th[eta]-role assigner’ (Willim 1990: 215), which thus relates inherent case to theta-roles.
Thus, lexical and inherent cases appear to override structural cases. The status of the genitive, however, remains ambiguous; there certainly are lexical genitives (assigned by verbs), but on a par with the accusative, the genitive in noun-noun constructions would be expected to be the unspecified (structural) variant. Following Babby’s (1987) approach to Russian, I suggest this case hierarchy for Polish; in light of the genitive complications, I put it on both sides.

I turn now to properties of the numeral.

### 3. Polish 5+ numerals are semi-lexical

#### 3.1 Defining semi-lexicality

Baker’s (2003) theory of lexical categories:

<table>
<thead>
<tr>
<th>Case</th>
<th>Nouns:</th>
<th>Adjectives:</th>
<th>Verbs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifier</td>
<td>No specifier,</td>
<td>No specifier,</td>
<td>Specifier,</td>
</tr>
<tr>
<td>Referential index</td>
<td>Referential index</td>
<td>No referential index</td>
<td>No referential index</td>
</tr>
</tbody>
</table>

Nouns are typically agreement ‘controllers’, whereas adjectives and verbs are agreement ‘targets’ (Corbett, 2006). This correlates with the valued/unvalued phi-feature distinction, and furthermore with the presence/absence of a referential index.

<table>
<thead>
<tr>
<th>Controller</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valued phi-features</td>
<td>Unvalued phi-features</td>
</tr>
<tr>
<td>Referential index</td>
<td>No referential index</td>
</tr>
</tbody>
</table>

If we equate referential indices with valued phi-features, the following system arises:

<table>
<thead>
<tr>
<th>Case</th>
<th>Nouns:</th>
<th>Adjectives:</th>
<th>Verbs:</th>
</tr>
</thead>
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<tr>
<td>Specifier</td>
<td>No specifier,</td>
<td>No specifier,</td>
<td>Specifier,</td>
</tr>
<tr>
<td>Valued phi-features</td>
<td>Valued phi-features</td>
<td>Unvalued phi-features</td>
<td>Unvalued phi-features</td>
</tr>
</tbody>
</table>

Under this definition of adjectives and nouns, we can define a class of semi-lexical (Corver & van Riemsdijk 2001) or grammatical (Emonds 1985) adjectives and nouns which differ from
their lexical counterparts by virtue of carrying mixed (valued and unvalued) or incomplete phi-feature sets (or a combination of the two provided there are enough phi-features to make this possible).

3.2 *Polish 5+ numerals (5-10, 20, 30, ..., 100)*:

**Gender:** In subjects, these numerals trigger neuter singular verbal agreement:

(19) Dziewczyny spały No numeral
Girl.F.PL.NOM slept.NON-MH.PL ‘The girls slept.’

(20) Pięć dziewczyn spało 5+ numeral
Five girl.F.PL.GEN slept.N.SG ‘Five girls slept.’

The presence of neuter singular does not seem to reflect features of the numeral itself. Firstly, the coordination of two numeral phrases does not produce a plural as the coordination of two neuter singulars does:

(21) Krzesło i biurko rozbila się
Chair.N.SG and desk.N.SG broke.NON-MH.PL PAR
‘A chair and desk broke.’

(22) Pięć krzeseł i sześć biurek rozbilo się
Five chair.GEN and six desk.GEN broke.N.SG PAR
‘Five chairs and six desks broke.’

Secondly, demonstrative agreement clearly shows that the neuter singular form is impossible.

(23) *To pięć dziewczyn
This.N.SG.NOM five girl.F.PL.GEN

Instead, this seems to be a case of default agreement, which also triggers neuter singular in Polish (Dziwirek 1990):

(24) Padało Weather verb: no subject
Rained.N.SG ‘It rained.’

(25) Nudziło mi się Impersonal Construction: dative DP
only Bored.N.SG me.DAT PAR ‘I was bored.’

This default agreement can be explained if we say that the numeral is lacking in some phi-feature, making it a defective goal – as a defective goal, the verb cannot value all of its own features and leads to default agreement (Preminger 2011).

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4 This behavior is also replicated by compound numbers ending in 5-9.

5 Adjectives use the same form for N.SG as for NON-MH.PL, making them an uninformative test.
Historically, these numerals used to trigger feminine singular verbal agreement (Miechowicz-Mathiason & Dziubała-Szrejbrońska 2002):

(26) Ona siedm panien szła
That.F.NOM seven.NOM maidens GEN walked.F.SG
‘Those seven maidens were walking.’ (Old Polish: Rutkowski 2006: 93)

We can make sense of this by saying that these Polish numerals have lost their gender.

Thus, they are missing a gender feature.6

Number: These numerals are restricted to appearing with plural nouns:

(27) Pięć *dziewzyna / dziewczyny
Five girl.F.SG / girl.F.PL
‘Five girl(s)’

Their case morphology remotely resembles that of the plural in the instrumental:

(28) INST(5): pięci-oma Compare: (small stores) mał-ymy sklep-ami
(small store) mał-ym sklep-em

Outside agreement by demonstratives/adjectives can occur with either the numeral or the noun; with the numeral, it is plural:

(29) Te_i / tych_j pięć_i dziewczyn_j
these.NON-MH.PL.NOM / these.NON-MH.PL.GEN five girl.F.PL.GEN
‘these five girls’

I take this to indicate that these numerals carry an inherently valued plural feature.

Thus, Polish 5+ numerals are semi-lexical, due to having an incomplete phi-feature set.

4. An Analysis of Case Alternations

Case Alternation:

(30) Ivan kupił pięć samochodów Accusative environment
Ivan bought five car-GEN.PL
‘Ivan bought five cars.’

(31) ... z pięci-oma samochodami Instrumental environment
... with five-INST car-INST.PL
‘... with five cars.’

6 Polish 5+ numerals also show special behavior with masculine human nouns, taking the form pięciu in subject and object positions, as opposed to pięć. Many take this to be gender agreement, following what is known as the Accusative Hypothesis (Franks 1994, 2002). I take an alternative approach and treat this as a case alternation, in which numerals are a (default) nominative with non-masculine-human nouns and genitive with masculine human nouns, termed the Nominative-Genitive Hypothesis (Doroszewski 1952). See Klockmann (2012) for more discussion and an analysis of the numerals using this hypothesis.
We have two questions to answer in particular:

i. What happened to the genitive case of the numeral?

ii. How did the oblique case arrive on the noun?

4.1 Where did the genitive go?

Babby (1987): There is a Case Hierarchy which follows from independent principles of the grammar (subcategorization case requirements). When there are case conflicts, the Case Hierarchy determines which case appears overtly.

\[(32)\] Syntactic Case Hierarchy in Russian: Oblique Case > Gen > Nom/Acc

When locality is taken to resolve conflicts of structural cases (nominative, accusative, genitive), the Case Hierarchy can be simplified as follows:

\[(33)\] Oblique Case > Structural Case

As determined in the previous section, we restate the case hierarchy as follows:

\[(34)\] Polish Case Hierarchy: Inherent, Lexical Cases > Structural Cases, Genitive

Under a Minimalist approach, we have two alternatives:

i. Numerals (and negation) lose their ability to assign case in oblique environments.

For numerals, analyses of this type would need to relate the difference to the category of the numeral or the structure it appears in (e.g. Franks 2002).

For negation, any analysis is dually complicated: accusative environments would entail a loss of the verb’s ability to assign accusative while other case environments would entail a loss of the negation’s ability to assign genitive.

I disregard such approaches, as they add many complications to the grammar.

ii. Numerals (and negation) retain their ability to assign case in oblique environments.

Involves analyses of two types:

a. Those that rely on some form of a case hierarchy to resolve case conflicts (e.g. Babby 1987; Brattico 2010).

b. Those that assume case stacking (e.g. Pesetsky 2012; Matushansky 2008, 2010; Brattico 2011; Richards 2007).

Analyses of type (a) are an attempt to maintain the Case Criterion.

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\(^7\) Pesetsky (2012) and Matushansky (2008, 2010) aim to treat case as a morphological realization of categories. At this point, I remain agnostic as to what the exact contribution of case is.
(35) **Case Criterion:** Every NP receives one and only one Case; each Case is assigned to one and only one NP (as given in Matushansky 2010: 117).

However, as Brattico (2011) points out, for a case hierarchy to resolve case conflicts, cases must first be in competition on some element. This means that however we do it, we must at some point in the derivation have multiple cases on an element. However, we could just as easily call that case stacking.

Consequently, I abandon the Case Criterion and adopt a type (b) case stacking analysis.

In order to determine which case appears overtly, we require our case hierarchy in combination with a locality constraint:

(36) **Polish Case Hierarchy:** Inherent, Lexical Cases > Structural Cases, Genitive

(37) **One-Suffix Rule (adapted from Pesetsky 2012):**
The last suffix assigned is the one realized.

(38) **Case Stacking:** Resolve case conflicts via the Case Hierarchy. If there is still a conflict (more than one case), apply the One-Suffix Rule.

**Examples: Negation**

(39) **Resolution via Case Hierarchy (Instrumental > Genitive):**

\[
\begin{array}{c}
\text{Neg} \quad \text{V} \quad \text{Noun}
\end{array}
\]

\[
\begin{array}{c}
\text{INST} \quad \text{GEN}
\end{array}
\]

(40) **Resolution via One Suffix Rule (Genitive > Accusative):**

\[
\begin{array}{c}
\text{Neg} \quad \text{V} \quad \text{Noun}
\end{array}
\]

\[
\begin{array}{c}
\text{ACC} \quad \text{GEN}
\end{array}
\]

However, this cannot fully explain the numeral data. If lexical cases can reach the noun, we’d expect structural cases to be able to do so too. By the One-Suffix Rule, then, we incorrectly predict nominative/accusatively marked nouns:

(41) **Resolution via Case Hierarchy (Instrumental > Genitive):**

\[
\begin{array}{c}
\text{z} \quad \text{5} \quad \text{Noun}
\end{array}
\]

\[
\begin{array}{c}
\text{INST} \quad \text{GEN} \quad \text{INST}
\end{array}
\]

---

---

8 Why should such a case hierarchy exist? Caha (2009) proposes that cases contain each other, as in (i):

i. \[
\begin{array}{c}
\text{instrumental} \quad \text{dative} \quad \text{genitive} \quad \text{accusative} \quad \text{nominative}
\end{array}
\]

If so, then the case hierarchy is simply a consequence of this. Nominatives and accusatives would be ‘smaller’ than genitives or partitives, while all other cases would be ‘larger.’ Case stacking could then be conceptualized as adding on more case layers – nominatives and accusatives are already contained in the genitive/partitive, making it appears as if the nominative/accusative has been surpressed; with the other cases, they contain the genitive/partitive, thus making it appear as if the genitive/partitive has been surpressed. Note, it would still be necessary to restrict when case stacking can occur (case alternations) and when not. See also Caha (2013).
Prediction: Resolution via One-Suffix Rule (*Accusative > Genitive):

\[
V_{\text{ACC}} \quad \begin{array}{c}
5 \\
\text{Noun}
\end{array}
\]\n
Thus, we must still answer the question of how the oblique case gets to the noun (and why the structural accusative/nominative does not).

4.2 Why is the oblique case on the noun? The role of semi-lexicality

Consider the difference between Polish numeral 5 and numeral 1000. Numeral 5 engages in case alternations, whereas numeral 1000 does not:

(43) …z pięćma ptakami
with five.INSBALL birds.INSBALL
‘…with five birds.’

(44) …z tysiącem ptaków
with thousand.INSBALL birds.GEN
‘…with a thousand birds.’

A further difference is that numeral 1000 can trigger verbal agreement while numeral 5 can only trigger default agreement. Note also the form of adjectival agreement.

(45) Pięć ptaków spało
Five birds.GEN slept.NSG
‘Five birds slept.’

(46) Cały tysiąc ptaków spał
Whole.M.SG.NOM thousand.M.SG.NOM birds.GEN slept.M.SG
‘A whole thousand birds slept.’

This suggests that numeral 1000 carries gender and number features, making it a noun by our definitions above.

The defining difference between 5 and 1000 then is semi-lexicality. Numeral 5 is semi-lexical, whereas numeral 1000 is not.

Conclusion: The semi-lexical nature of the numeral is responsible for case alternations.

Hypothesis: Semi-lexical elements cannot serve as the sole host of oblique morphology.

This is confirmed by other hypothesized semi-lexical elements, like the indefinite pronoun coś, which also shows a case alternation (Rutkowski & Szczegot 2001):

(47) Widziałam cość miłego
I.saw something nice.GEN
‘I saw something nice.’

The behavior of numeral 1000 in subject position is variable from speaker to speaker. Furthermore, it seems that a preceding modifier is required for verbal agreement to be possible. This puts into question the full nominal status of numeral 1000, but I put this issue aside for now.
Question: Why can semi-lexical elements not be the sole host of oblique case morphology?

Hypothesis A (weak version): Oblique case needs to be expressed on a lexical noun (or adjective?), i.e. something with a full set of homogeneous phi-features. This leads to oblique case percolation downwards in the presence of semi-lexical elements.

Percolation (with case stacking = Instrumental > Genitive):

\[
\begin{array}{c}
\text{z}_{\text{INST}} \quad [ 
\text{5}_{\text{PL}} \quad [ 
\text{Noun}_{\text{PL}, \text{GEN}} ] ] \\
\text{INST} \quad \text{GEN} \quad \text{INST}
\end{array}
\]

Why should oblique case care whether something is lexical or not?

Hypothesis B (strong version): Oblique case is related to theta role assignment. Theta roles can only be associated with lexical elements, and oblique cases look for such elements. This leads to case percolation downwards.

Percolation (with case stacking = Instrumental > Genitive):

\[
\begin{array}{c}
\text{z}_{\text{INST}} \quad [ 
\text{5}_{\text{SEMI}} \quad [ 
\text{Noun}_{\text{LEXICAL}} ] ] \\
\text{INST} \quad \text{GEN} \quad \text{INST}
\end{array}
\]

This appears to turn the Visibility Hypothesis of Chomsky (1981) on its head.

Visibility Hypothesis: Only cased elements are visible to theta role assignment.

Hypothesis B: theta roles \(\rightarrow\) oblique case

Visibility Hypothesis: oblique case \(\rightarrow\) theta roles

But perhaps we can get by with assuming that an element must be cased for its theta-role to be visible. Then, order is not important.

4.3 Returning to Finnish

Case alternations in Finnish, which are found with numerals and with negation, respect the following hierarchy (Brattico 2010, 2011):

Semantic cases, Partitive, Genitive > Nominative, Accusative

According to Brattico (2011 and references therein), partitive and genitive are also structural cases in Finnish, motivating the need for a case hierarchy different from Babby’s (1987).

Case alternations are derived in the same way as for Polish: assuming Finnish numerals are also semi-lexical and Finnish allows case stacking (subject to the case hierarchy and One-Suffix Rule), the case alternation follows.
5. **An excursion in Serbo-Croatian**

Serbo-Croatian does not have a case alternation with numerals.\(^{10}\)

(54) Kupili smo pet knjiga \(\text{Accusative environment}\)

Bought.M.PL AUX.1.PL five books-GEN.PL

‘We bought five books.’ (Franks 1994: 605)

(55) ... sa pet devojaka \(\text{Instrumental environment}\)

...with five girls-GEN.PL

‘...with five girls.’ (Franks 1994: 606)

In addition, it also lacks a productive Genitive of Negation construction – accusative objects remain accusative even in the presence of negation (Tvica, p.c.)

(56) Ja vidim devojk-u \(\text{Accusative Environment}\)

I see girl-ACC

‘I see a girl.’

(57) Ja née vidim devojk-u

I not see girl-ACC

‘I don’t see a girl.’

However, Serbo-Croatian numerals seem to be semi-lexical. Serbo-Croatian numeral 5 produces neuter singular verbal marking:

(58) Pet žena je stigl-o

Five women.GEN is.SG come-N.SG

‘Five women came.’

But, like Polish, it does not seem to be the case that this is due to the numeral carrying neuter singular features – coordination still produces a neuter singular:

(59) Pet muškaraca i šest žena je stigl-o

Five men.GEN and six women.GEN is.SG come-N.SG

‘Five men and six women came.’

This could be explained if these numerals are also semi-lexical, perhaps lacking gender.

**Question:** Polish and Serbo-Croatian both have semi-lexical numerals. Why does only Polish have a case alternation?

**Potential Answer:** Serbo-Croatian does not allow for case stacking. The first case assigned is the one realized. This is why numerals do not show case alternations, nor does negation produce a Genitive of Negation. This answer predicts that there are no case alternations in Serbo-Croatian.

\(^{10}\) Although it does have specific restrictions on where case-assigning numeral-noun constructions are allowed, related to the inability of the numerals to decline for case. Specifically, they seem to be restricted to positions where the case morphology can be expressed overtly, such as following prepositions. For more details on this issue, see Zlatić (1997) and Wechsler and Zlatić (2001).
6. Conclusion

Case alternations appear to challenge linguistic theory, suggesting that numerals can lose their case assigning ability, or their category can differ as a function of their case position.

However, if we treat numerals as semi-lexical, unable to be the sole holder of oblique case, and introduce a theory of case stacking (almost unavoidable for the given data), which draws on markedness and locality constraints, we can give a principled explanation of case alternations.

7. References


