

# The Emergence of Paucality in Dutch

## Syntactic Structure and Dialect Geography

Gertjan Postma

Meertens Instituut Amsterdam & Leiden University

[gertjan.postma@meertens.knaw.nl](mailto:gertjan.postma@meertens.knaw.nl)



REEDS Workshop, Amsterdam, 29–30 June 2023



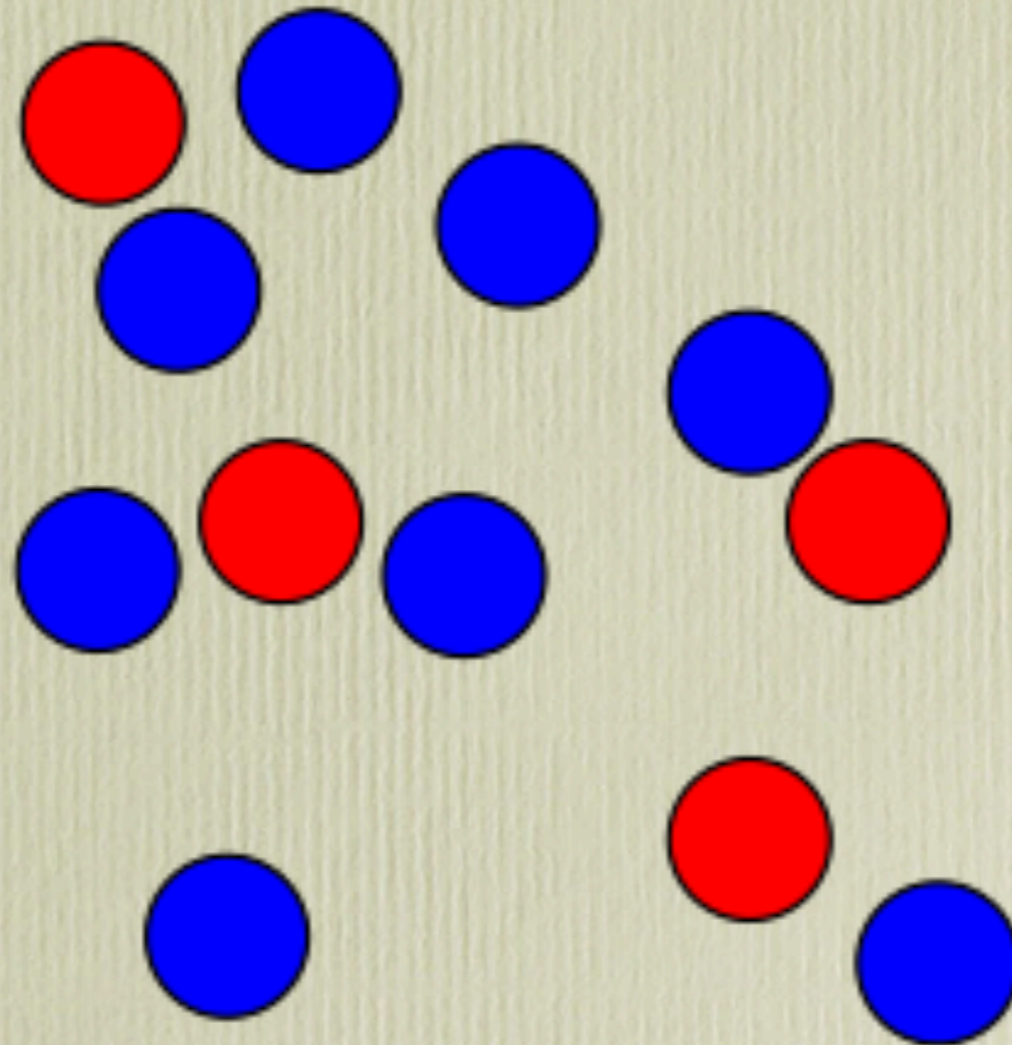
Universiteit  
Leiden

# Subitizing and Counting

(Coolidge & Overmann 2012)

# Subitizing and Counting

(Coolidge & Overmann 2012)



# Subitizing and Counting

(Coolidge & Overmann 2012)

- How many red dots?
- How many blue dots?

# Jevons 1871

## The Power of Numerical Discrimination

Estimated Numbers.	ACTUAL NUMBERS.													
	3	4	5	6	7	8	9	10	11	12	13	14	15	
3	23													
4		65												
5			102	7										
6			4	120	18									
7			1	20	113	30	2							
8					25	76	24	6	1					
9						28	76	37	11	1				
10						1	18	46	19	4				
11							2	16	26	17	7	2		
12								2	12	19	11	3	2	2
13										3	6	3	1	1
14										1	1	4	6	1
15											1	2	2	2
Totals . .	23	65	107	147	156	135	122	107	69	45	26	14	11	

% 100, 100, 94, 82, 72, 56, 62, 43, 38, 42, 46, 28, 18

# Manduruku

(Pica *et al.* 2004)

- Exact Number system: 2, 3, 4

- Approximate Number System: 5 and higher

Manduruku  
*pūg pōgbi X*  
a hand X  
'around 5 X'

Dutch  
*een vijftal X*  
a five-count X  
'around 5 X, roughly 5 X'

# Coolidge & Overmann (2012)

Archaic System (primates, mammals, fish)

- Subitizing system: 2, 3, 4
- Magnitude appreciation: 5 and higher

Additional Human System

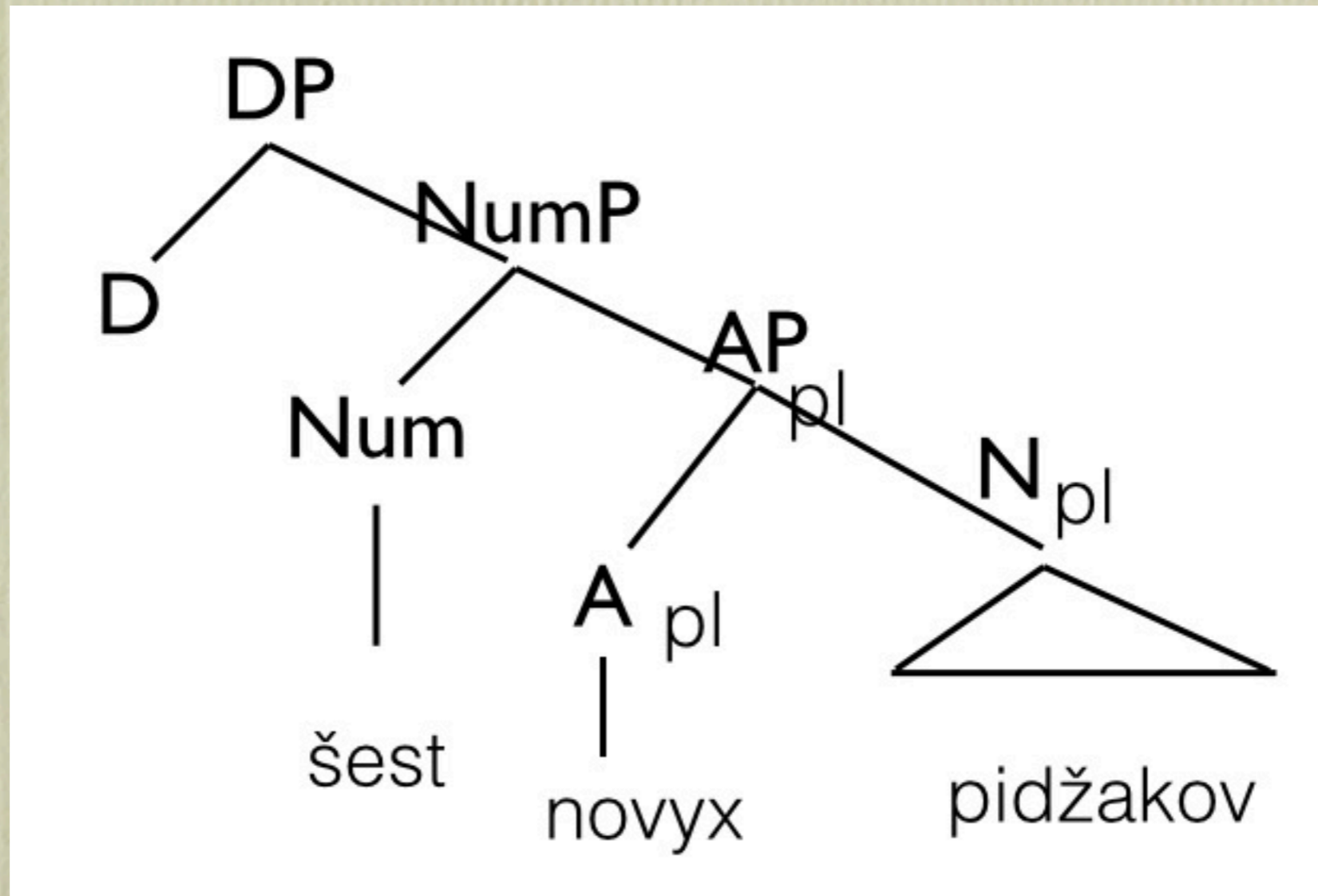
- Ordinality: 5 and higher

# Russian paucal

- |    |  |                   |
|----|--|-------------------|
| a. | dva novyx pidžaka<br>two.NOM new.GEN.PL coat.GEN.SG  | 2+N <sub>sg</sub> |
| b. | tri novyx pidžaka<br>three.NOM new.GEN.PL coat.GEN.SG  | 3+N <sub>sg</sub> |
| c. | četyre novyx pidžaka<br>four.NOM new.GEN.PL coat.GEN.SG  | 4+N <sub>sg</sub> |
| d. | pjat' novyx pidžakov<br>five.NOM new.GEN.PL coat.GEN.PL  | 5+N <sub>pl</sub> |
| e. | šest' novyx pidžakov<br>six.NOM new.GEN.PL coat..GEN.PL<br>'two/three/four/five/six new coats' | 6+N <sub>pl</sub> |

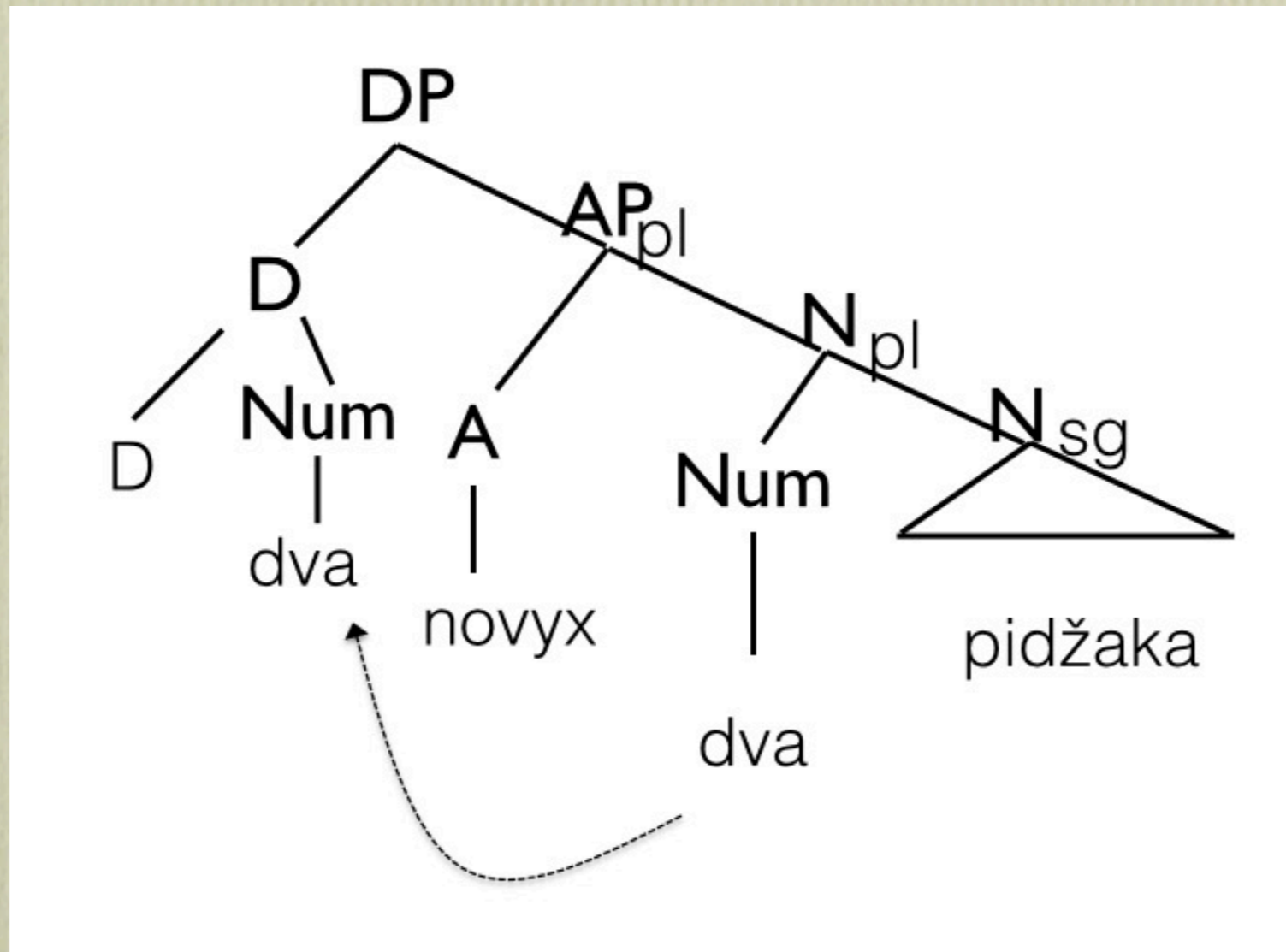


# Pesetsky 2013



high numbers are inserted high

# Pesetsky 2013



low numbers are inserted low + move up to D

# Generalisation

- Inflected numerals are in the lower domain, 2, 3, 4
- NUM that forms a complex with  $AGR_N$  or D gives a paucal effect (“Rule P)

# German

- a. Eine Gesellschaft zweier Personen  
a group two.GEN persons
- b. Eine Gesellschaft dreier Personen  
a group three.GEN persons
- c. ?Eine Gesellschaft vierer Personen  
a group two.GEN persons
- d. \*Eine Gesellschaft fünfer Personen  
a group two.GEN persons
- e. \*Eine Gesellschaft sechser Personen  
a group six.GEN persons
- f. ... etc.

# German

- a. Eine Gesellschaft zweier Personen  
a group two.GEN persons
- b. Eine Gesellschaft dreier Personen  
a group three.GEN persons
- c. ?Eine Gesellschaft vierer Personen  
a group two.GEN persons
- d. \*Eine Gesellschaft fünfer Personen  
a group two.GEN persons
- e. \*Eine Gesellschaft sechser Personen  
a group six.GEN persons
- f. ... etc.

NUM + -er  paucal

# A paucal construction in Dutch

a.	wij tweetjes	2
b.	wij drietjes	3
c.	wij viertjes	4
d.	*wij vijfjes	5
e.	*wij zesjes	6
f.	*wij zeventjes	7
	...	
	we NUM.dim	
	'we four cosily together'	

(Heeroma 1948:247)

# Another paucal construction in Dutch

- a. alle twee de/\* $\emptyset$  boeken  
all two (the) books
- b. alle drie de/\* $\emptyset$  boeken  
all three (the) books
- c. alle vier de/? $\emptyset$  boeken  
all four (the) books
- d. alle vijf de/ $\emptyset$  boeken  
all five (the) books
- e. alle twintig \*de/ $\emptyset$  boeken  
all twenty (the) books  
'all NUM (the) books'

*beide ouders* → *alle beide ouders* → *allebei de ouders*  
both parents      all both parents      alboth the parents

# Dutch

	all NUM the/ø books 'all three (the) books'	GJP	trochee
2.	alle bei de/*ø boeken	+/-	+
2.	alle twee de/*ø boeken	+/-	+
3.	alle drie de/*ø boeken	+/-	+
4.	alle vier de/?ø boeken	+/?	+
5.	alle vijf de/ø boeken	+/+	+
6.	alle zes de/ø boeken	+/+	+
7.	alle zeven *de/ø boeken	-/+	-
8	alle acht *de/ø boeken	-/+	+
9.	alle negen *de/ø boeken	-/+	-
10.	alle tien de/ø boeken	+/+	+
11.	alle elf de/ø boeken	+/+	+
12.	alle twaalf de/ø boeken	+/+	+
13.	alle dertien ??de/ø boeken	??/+	-
20.	alle twintig ??de/ø boeken	??/+	-
21.	alle eenentwintig *de/ø boeken	-/+	-
30.	alle dertig *de/ø boeken	-/+	-
100.	alle honderd *de/ø boeken	-/+	-
1000.	alle duizend *de/ø boeken	-/+	-
10 <sup>6</sup> .	alle miljoen *de/ø boeken	-/+	+
1000.	alle [duizend en een] *de/ø nachten	-/+	+



# Dutch

	all NUM the/∅ books 'all three (the) books'	GJP	trochee
2.	alle bei de/*∅ boeken	+/-	+
2.	alle twee de/*∅ boeken	+/-	+
3.	alle drie de/*∅ boeken	+/-	+
4.	alle vier de/?∅ boeken	+/?	+
5.	alle vijf de/∅ boeken	+/+	+
6.	alle zes de/∅ boeken	+/+	+
7.	alle zeven *de/∅ boeken	-/+	-
8	alle acht *de/∅ boeken	-/+	+
9.	alle negen *de/∅ boeken	-/+	-
10.	alle tien de/∅ boeken	+/+	+
11.	alle elf de/∅ boeken	+/+	+
12.	alle twaalf de/∅ boeken	+/+	+
13.	alle dertien ??de/∅ boeken	??/+	-
20.	alle twintig ??de/∅ boeken	??/+	-
21.	alle eenentwintig *de/∅ boeken	-/+	-
30.	alle dertig *de/∅ boeken	-/+	-
100.	alle honderd *de/∅ boeken	-/+	-
1000.	alle duizend *de/∅ boeken	-/+	-
10 <sup>6</sup> .	alle miljoen *de/∅ boeken	-/+	+
1000.	alle [duizend en een] *de/∅ nachten	-/+	+

- from 2-4 : *-de* is obligatory present - strong judgments - semantic reason
- from 5-20 : (optionality), but phonological structure seems to play a role
- from 21- ∞ : *-de* is obligatorily absent - strong judgments - semantic reason

# Dutch

GJP: alle [tin] de/ø boeken  
alle [ɛ<sup>u</sup>f] de/ø boeken  
alle [twa:<sup>u</sup>f] de/ø boeken  
IM: alle [tin] de/ø boeken  
alle [ɛləf] \*de/ø boeken  
alle [twaləf] \*de/ø boeken

- *-de* is **obligatory** with the lower numbers 2-4 (paucal effect)
- *-de* is **possible** iff *-de* can cliticize onto the preceding numeral and form a syllabic trochee with it.

# The (UG) mechanism of paucal

- inflected numerals in the lower domain

- NUM + AGR<sub>N</sub> → paucal effect

- NUM + D → paucal effect

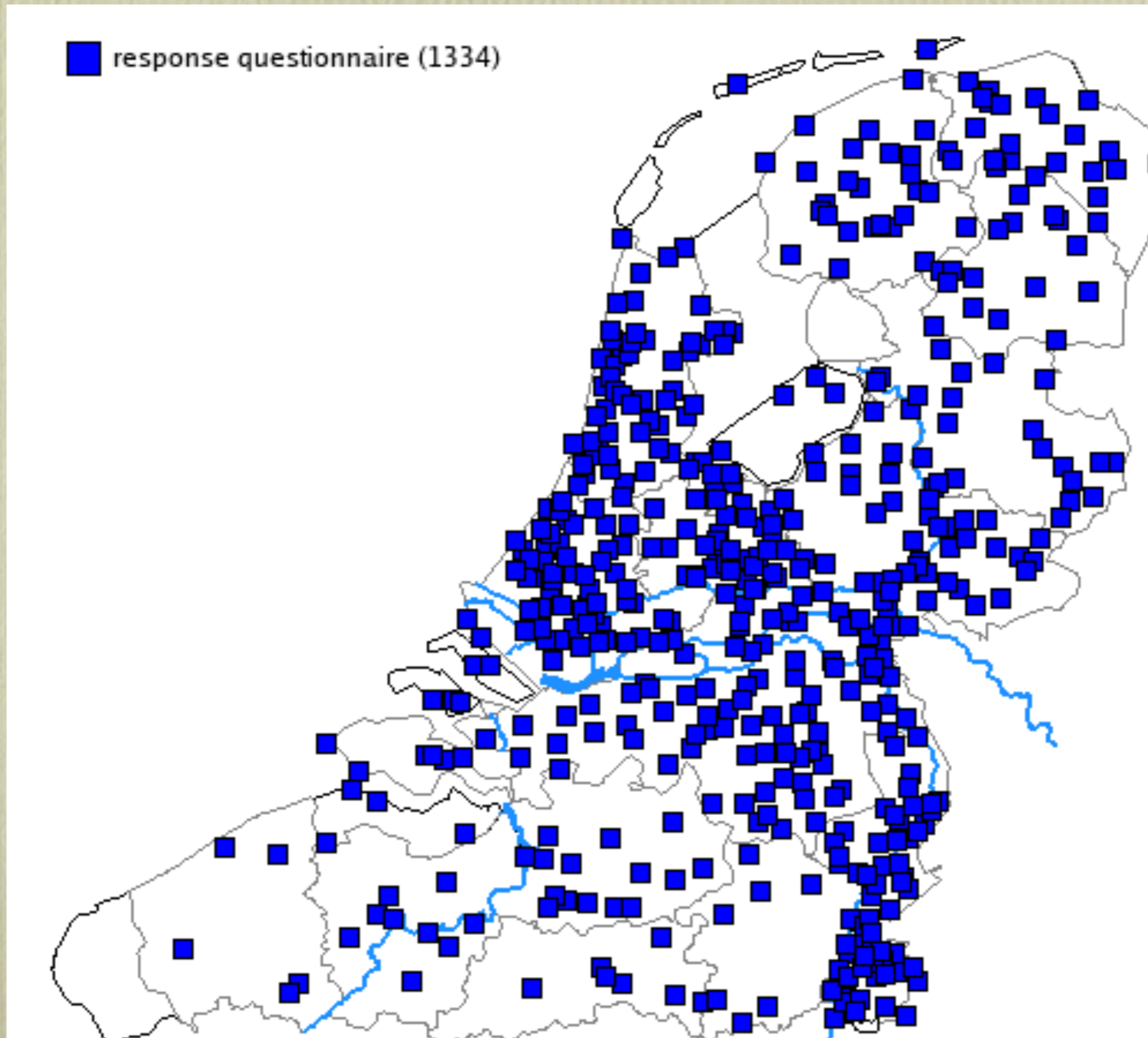
- NUM + tje → paucal effect

- NUM + X<sub>i</sub> → paucal effect (Rule P)

**Dialect geography  
of  
the emerging paucal**

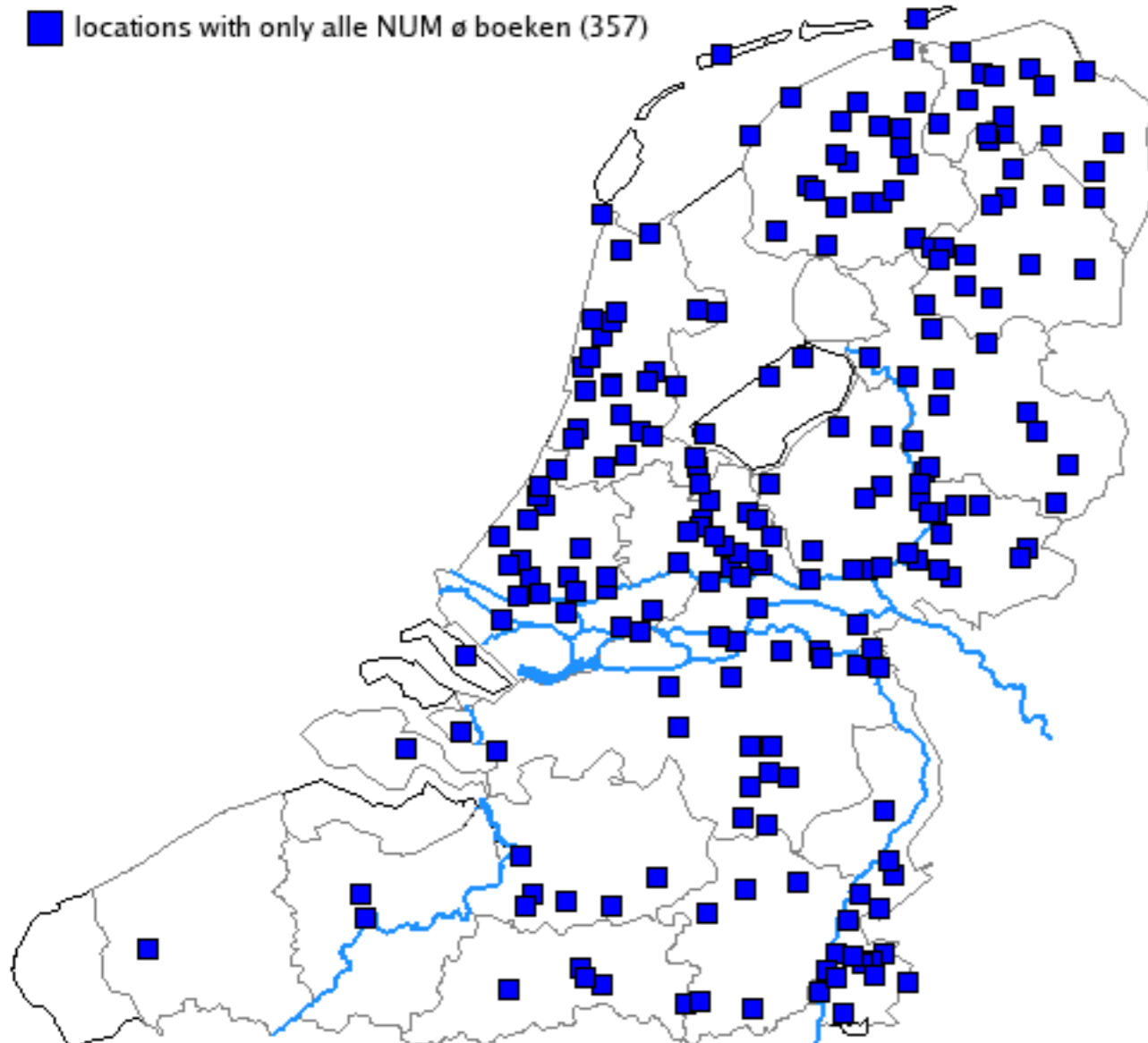
# Meertens Vragenlijst 2021

# Meertens Vragenlijst 2021- reponse

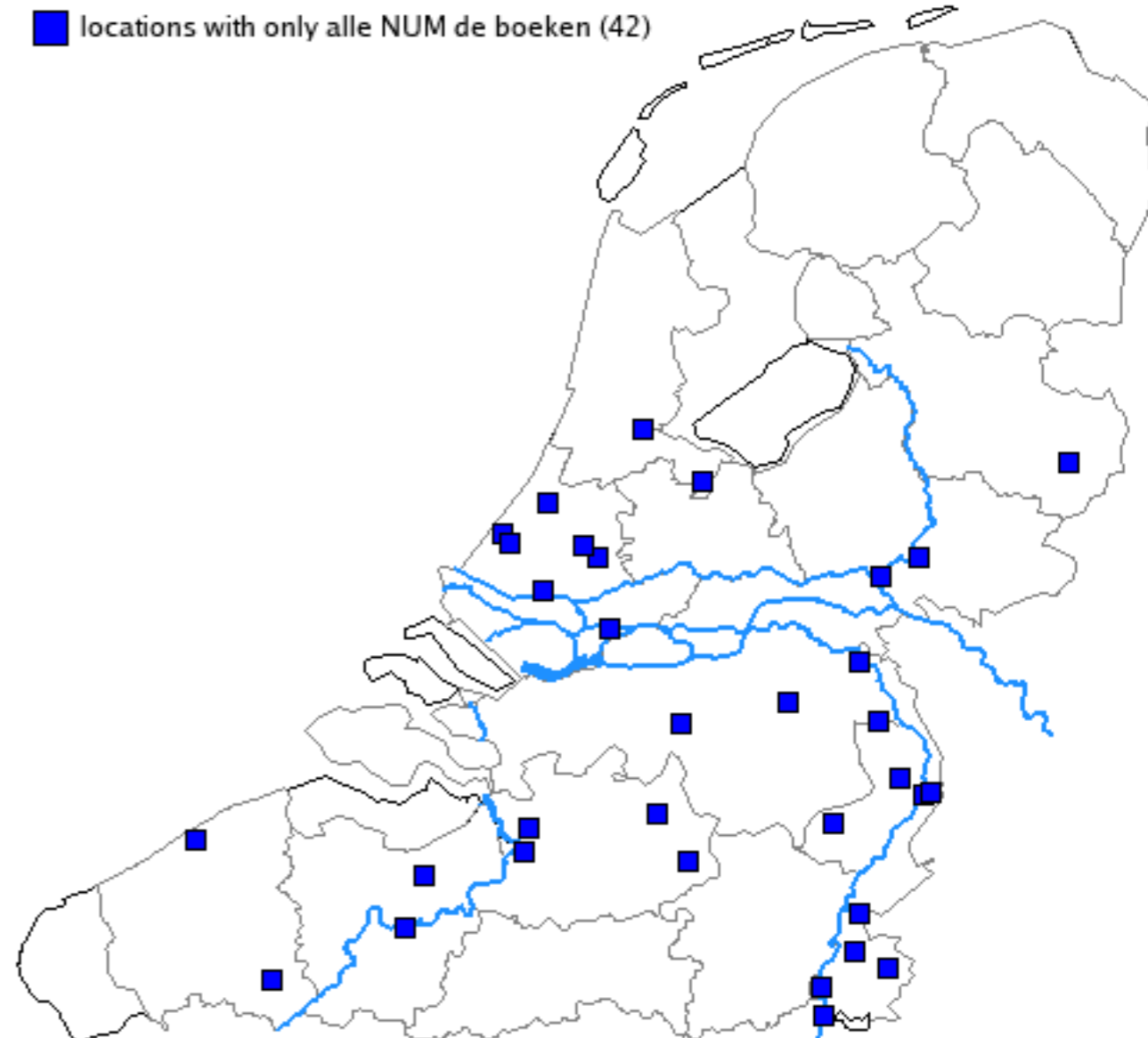


# pure $\emptyset$ and pure *de*-speakers

■ locations with only alle NUM  $\emptyset$  boeken (357)

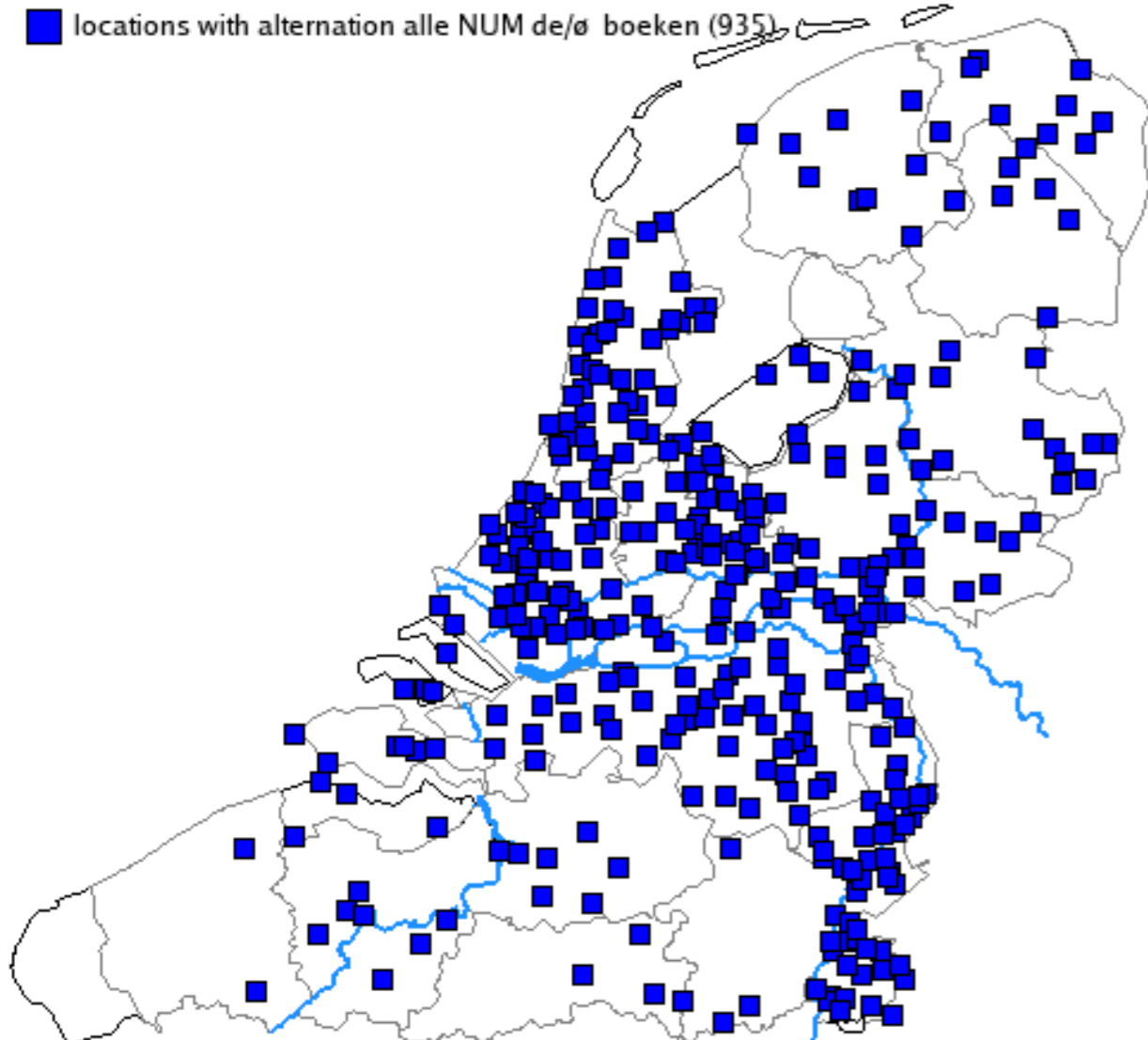


■ locations with only alle NUM *de* boeken (42)

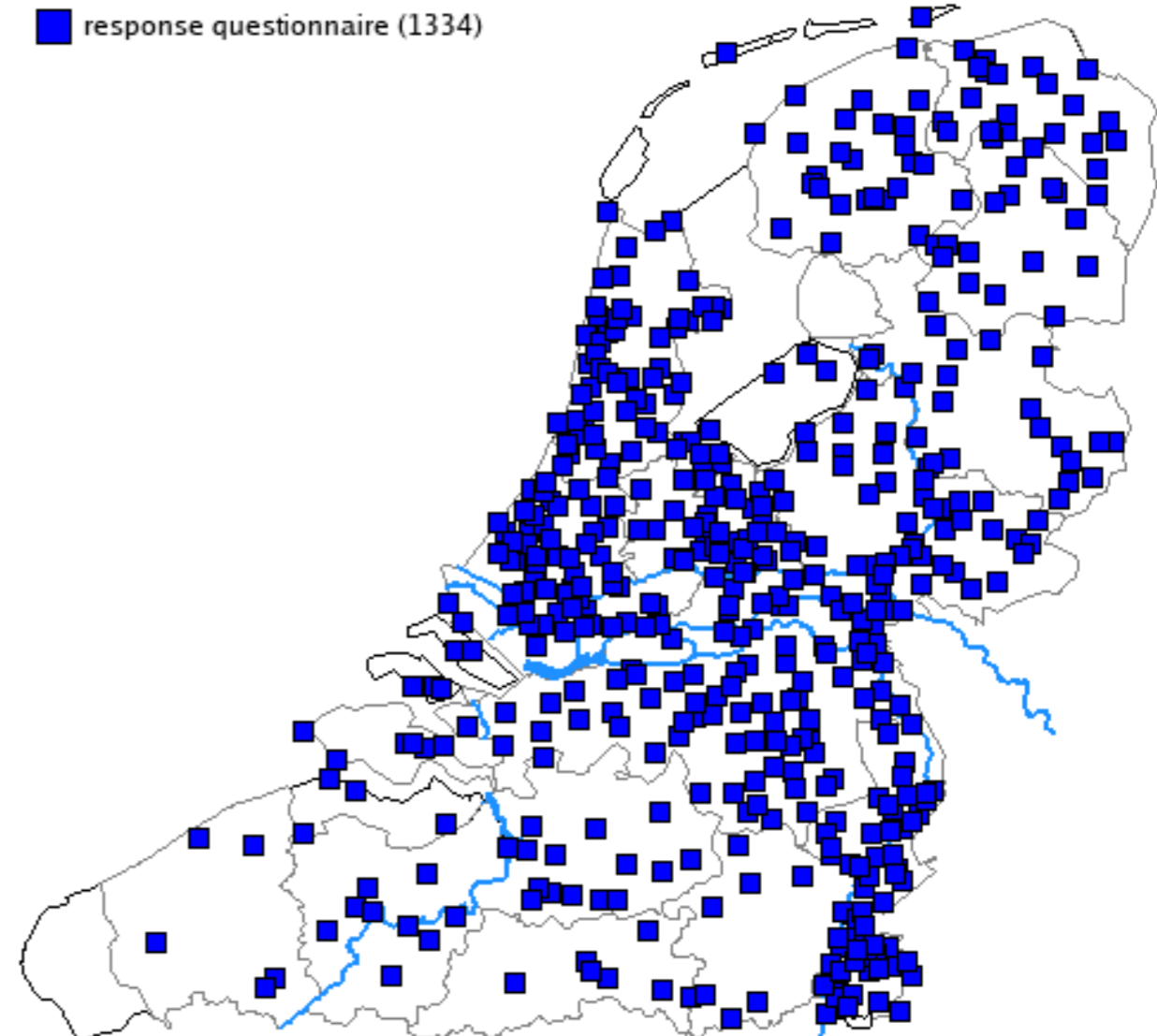


# complement set: paucal speakers

■ locations with alternation alle NUM de/ø boeken (935)



■ response questionnaire (1334)





# Some data within speaker set with variation

alle 2 – boeken	de	ø	
alle 100 – boeken			
de	19	1	20
ø	901	15	916
	920	16	936

speakers with 2-100 paucal contrast: 96%.

# Some data within speaker set with variation

	alle 2	de	ø	
alle 20				
de		59	0	59
ø		861	16	877
		920	16	936

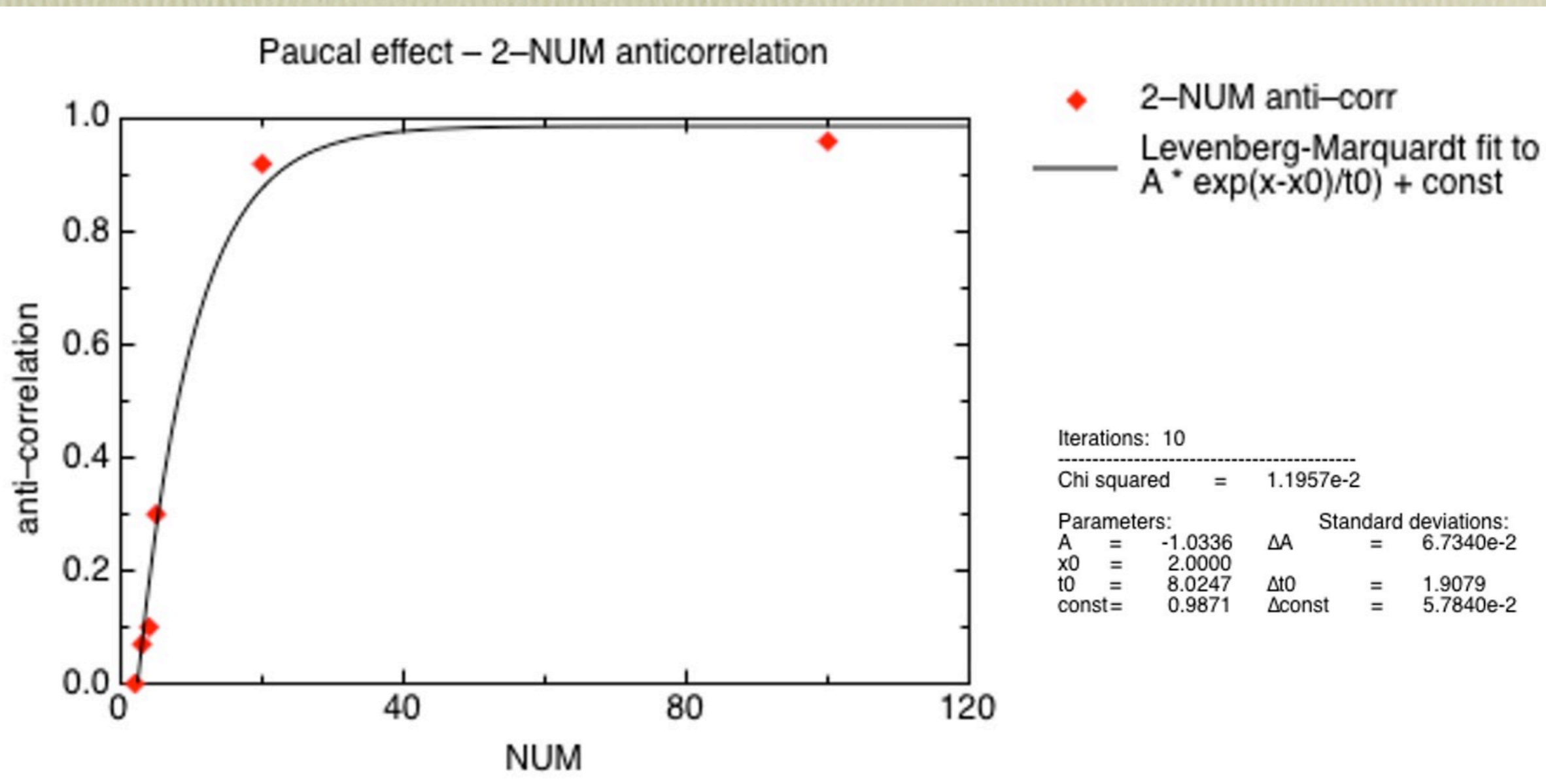
speakers with 2-20 paucal contrast: 92% of speakers.

## $2 \leftrightarrow \text{NUM}$ anti-correlation data

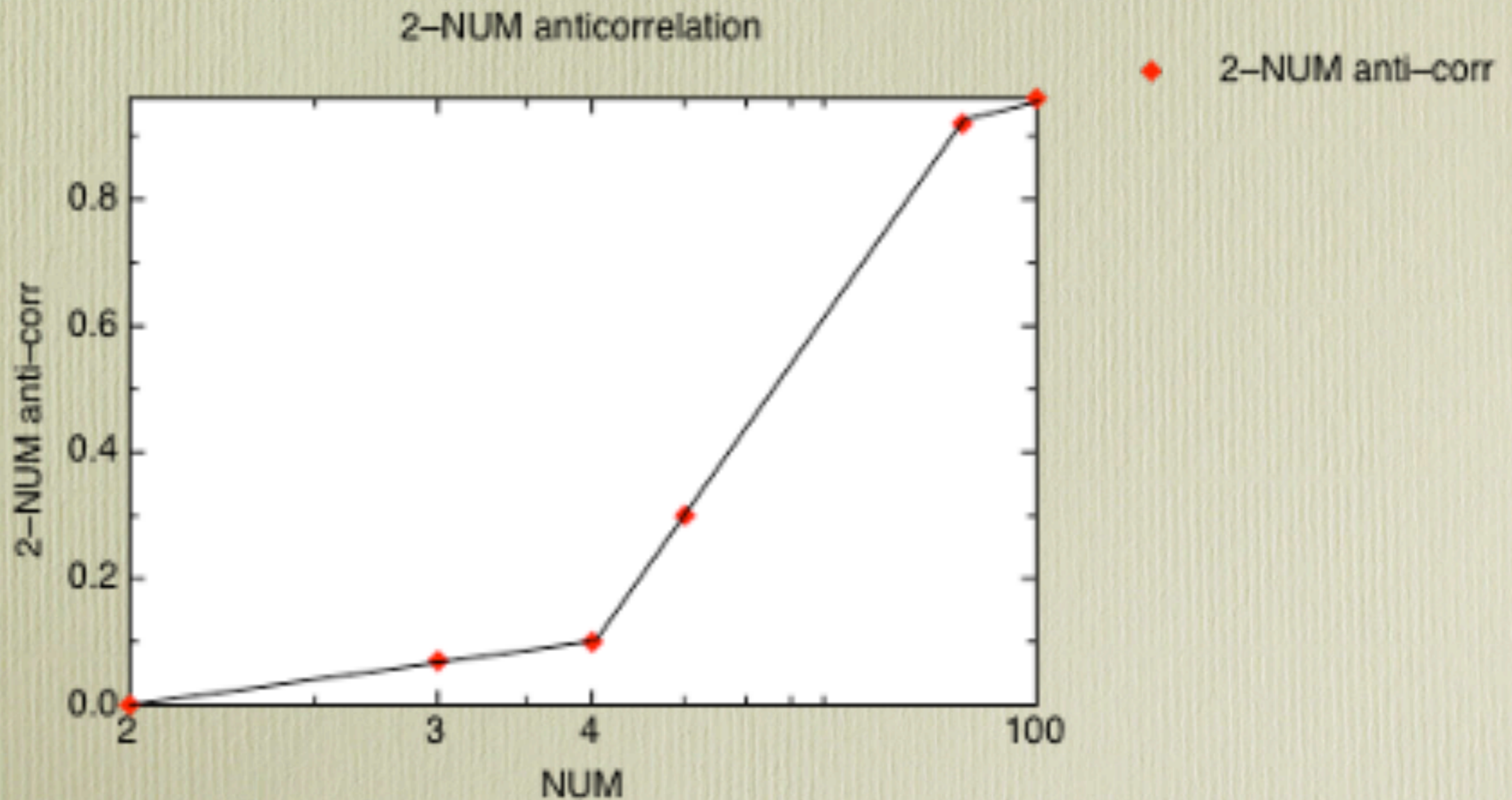
$2 \leftrightarrow x$  paucal contrast

$x$	%
100	96
20	92
5	30
4	10
3	7
2	0

# 2 $\leftrightarrow$ NUM anti-correlation data



# $2 \leftrightarrow \text{NUM}$ anti-correlation data



Logarithmic scale

# Hunch

There is reason to believe that there is a paucality effect in the Dutch *alle* NUM *de/ø* NOUN construction, but a better understanding of when, where, how, and why it emerges is welcome.

## Method: 2 $\leftrightarrow$ NUM paucal effect

In order to exclude a possible categorial effect (*honderd* ‘100’ is a noun), we study the paucal effect geographically, using the contrast between the two numerals *twee* ‘2’ and *twintig* ‘20’, and not use *honderd*, which is (also) a noun.

# Four Types of speakers in our survey

- Systematic *de*-speakers: always *de* with 2,3,4,5,20,100
- Systematic  $\emptyset$ -speakers: always  $\emptyset$  with 2,3,4,5,20,100
- Paucal speakers (2 $\leftrightarrow$ 20 anti-correlation)
- Random speakers



# Directionality

Total set, entire area, N=1333

	alle 2	de	ø	
alle 20				
de		99	5	104
ø		861	368	1229
		960	373	1333

65% paucal speakers

# Directionality

Total set, entire area (women)

	alle 2	de	ø	
alle 20				
de		50	2	52
ø		<b>531</b>	165	696
		581	167	748

71% paucals

Total set, entire area (men)

	alle 2	de	ø	
alle 20				
de		49	3	52
ø		<b>326</b>	201	527
		375	204	579

56% paucals

If we assume that women are ahead (be it by prestige Labov 2001 or by constructing social identity (Eckert 1989), the percentages point to an *emergence of a paucal system*, not a decline.

# Dialect Geography

(In the complete set)

Friesland: total 49

	alle 2	de	ø	
alle 20				
de		0	1	1
ø		13	35	48
		13	36	49

27% paucals speakers

Zeeland: 18

	alle 2	de	ø	
alle 20				
de		1	0	1
ø		14	3	17
		15	3	18

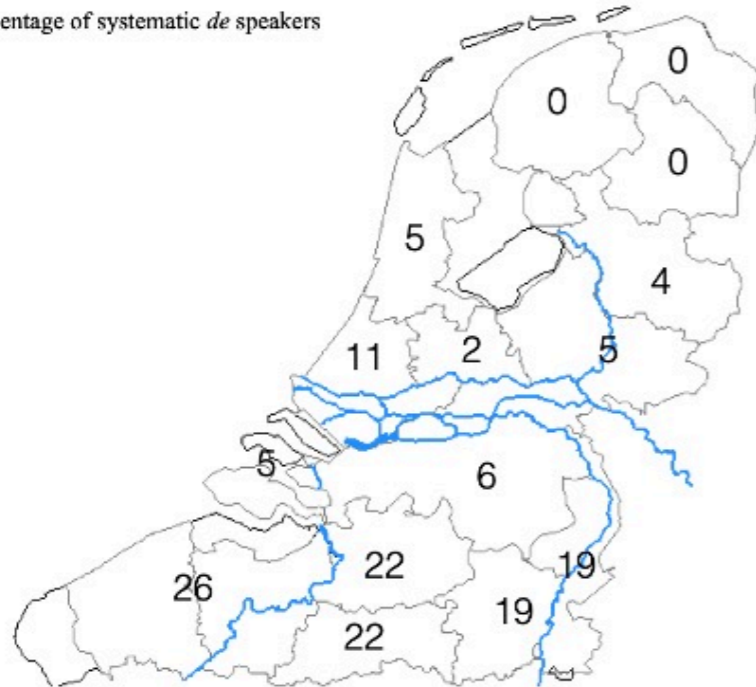
78% paucal speakers

# Dialect Geography

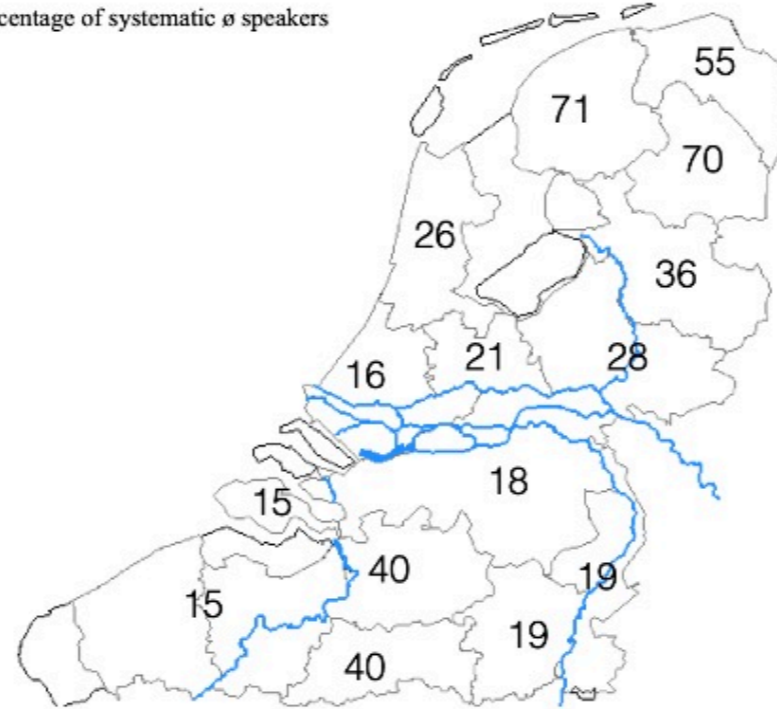
province	paucals in %	ø-speakers in %	<i>de</i> -speakers in %	inverted speakers in #
Zeeland	78	15	5	0
Utrecht	76	21	2	1
NBrabant	75	18	6	2
SHolland	72	16	11	0
NHolland	69	26	5	0
Gelderland	65	28	5	1
Limburg (NL+BE)	62	19	19	0
Overijssel	61	36	4	0
Flanders	58	15	26	0
Groningen	45	55	0	0
Antwerp + Brabant	37	40	22	0
Drenthe	30	70	0	0
Friesland	27	71	0	1

# Dialect Geography

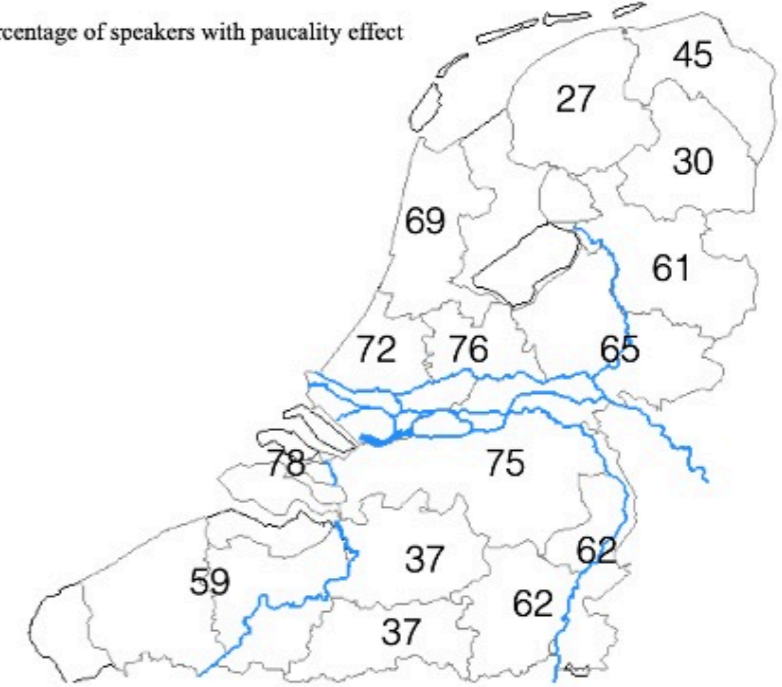
Percentage of systematic *de* speakers



Percentage of systematic  $\emptyset$  speakers



Percentage of speakers with paucality effect



There are three regions:

1. Fr+G+D : predominantly  $\emptyset$
2. GL+ Zee+ Utr+ NB + ZH + NH + (Ov?): paucal effect
3. Flanders+(Antw+Brabant)+Limburg (BE+NL) have highest relict of pure *de*-speakers
4. absent: predominantly *de*

# North-East (Fr+Gr+Dr)

Fr+Gr+D:126

	alle 2	de	ø	
alle 20				
de		0	1	1
ø		44	81	125
				126

Paucal effect in 35% of the speakers.

# North-East

(Fr+Gr+Dr – ø speakers)

Fr+Gr+D:126 minus people without effect (80) =46

	alle 2	de	ø	
alle 20				
de		0	1	1
ø		44	1	45
				46

This is a paucal effect in 95% of the speakers.

# North-East

## (Fr+Gr+Dr – pure ø speakers)

Fr+Gr+D:126 minus people without effect (80) =46

alle 2	de	ø	
alle 20			
de	0	1	1
ø	44	1	45
			46

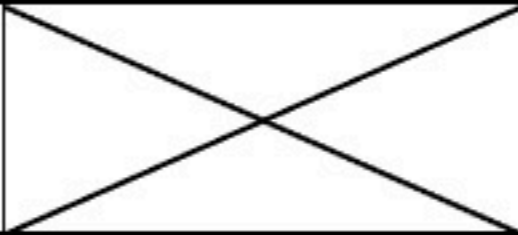
This is a paucal effect in 95% of the speakers.

- This is one of the purest paucal dialects (p-value = 0.04).
- The 81 people without *de* at all show a substrate effect of Friso-Saxon in their Dutch. They are the native speakers of Frisian + Low Saxon + people from the Frisian city dialects.



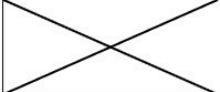
# Overall situation in the Netherlands

Bricolage of two grammars of Dutch into a paucal system

alle 2 alle 100	de	∅
de	“Southern” <i>de</i> -speakers	
∅	paucal de/∅-speakers	“Northern” ∅-speakers

# By what mechanism?

Bricolage of two grammars of Dutch into a paucal system

alle 2 alle 100	de	∅
de	“Southern” <i>de</i> -speakers	
∅	paucal de/∅-speakers	“Northern” ∅-speakers

Questions:

Why is there no random distribution?:

Why do they fill one of the two off-diagonal cell and not the other?

What is the mechanism? The grammar must be active.

# Cross-linguistic Pattern

NUM + AGR<sub>N</sub> /D → paucal reading (Rule P)

# Cross-linguistic Pattern

NUM + AGR<sub>N</sub> /D → paucal reading (Rule P)

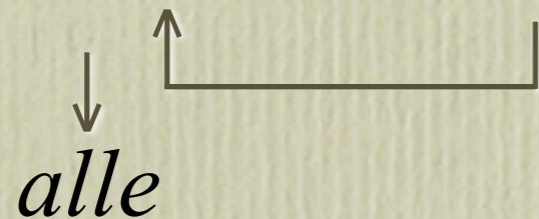
*al* + *de* NUM *de* N is original in both North + South

↓ ↑  
*alle*

# Cross-linguistic Pattern

NUM + AGR<sub>N</sub> /D → paucal reading (Rule P)

*al* + *de* NUM *de* N is original in North+South

  
*alle*

- In the *de*-chain, the lower *de* undergoes chain reduction unless it phonologically cliticizes to NUM. This happens in Flemish, which is rich in clitics. It does not have semantic consequences, only phonological.

# Cross-linguistic Pattern

NUM + AGR<sub>N</sub> /D → paucal reading (Rule P)

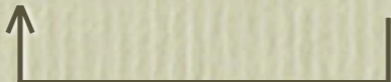
*al* + *de* NUM *de* N is original in North+South

↓     ↑  
*alle*

- In the North, without an extended system of clitics, chain reduction proceeds straightforwardly: **alle drie ø boeken**

# Cross-linguistic Pattern

NUM + AGR<sub>N</sub> /D → paucal reading (Rule P)

*al* + *de* NUM *de* N is original in North+South  


- Northern speakers without a clitic system, who are confronted with this Southern speech, reanalyze NUM-*de* units as a morpho-syntactic merger. This triggers Rule P with the semantic paucal effect.

# Conclusions

- Dutch displays paucal effect in *alle* NUM *de/ø* *boeken*
- This system is emerging
- It emerges because of language contact between Northern and Southern speakers
- The North had originally *alle* NUM *boeken*
- The South had originally *alle* NUM *de* *boeken*
- Phonological properties distinguish the two systems



# References

- CGN** - Corpus Gesproken Nederland (Corpus Spoken Dutch) - <http://tst-centrale.org/producten/corpora/corpus-gesproken-nederlands/6-17>
- Cirillo, Robert (2015)**. Why All John's Friends Are Dutch, Not German: On Differences in West Germanic in the Interaction Between Universal Quantifiers and Genitives. *Bucharest Working Papers in Linguistics* (2/2014).
- Coolidge, Frederick L. & Karenleigh A. Overmann (2012)**. Numerosity, Abstraction, and the Emergence of Symbolic Thinking. *Current Anthropology* 53, 204-212.
- Corbett, Greville (2000)**. *Number*. Textbooks in Linguistics, Cambridge University Press.
- Corbett, Greville (2001)**. Number. In: Haspelmath, Martin (2001). *Language Typology and Language Universals: An International Handbook*, Volume 1. Walter de Gruyter, - Language Arts & Disciplines.
- Eckert, Penelope (1989)**. The whole woman: Sex and gender differences in variation. *Language Variation and Change* 1(3). 245-267.
- Harbour, Daniel (2014)**. Paucity, Abundance, and the Theory of Number. *Language* 90, 185-229.
- Heeroma, K. (1948)**. De Telwoorden. *De Nieuwe Taalgids*. 41, 241-250.
- Julien, Marit. (2005)**. Nominal Phrases from a Scandinavian Perspective. John Benjamins, Amsterdam.
- Labov, William. (2001)**. Principles of linguistic change, vol. 2: Social factors. Oxford: Blackwell
- Lunt, Horace G (1968)**. *Fundamentals of Russian* (rev. ed.), Columbus, OH: Slavica.
- Nunes, Jairo (2004)**. Linearization of Chains and Sideward Movement. MIT Monograph 23.
- Postma, Gertjan (2015)**. Over de relatie tussen het kwantitatieve *er* en de genitief. Ms .Meertens Institute.
- Pesetsky, David. (2013)**. *Russian Case Morphology and the Syntactic Categories*. MIT Press, Cambridge (MA).
- Pica, Pierre, Cathy Lemer, V.ronique Izard & Stanislas Dehaene (2004)**. Exact and Approximate Arithmetic in an Amazonian Indigene Group. *Science* 306, 499-503.
- Schoorlemmer, Erik (2009)**. Agreement, Dominance and Doubling. The morphosyntax of DP. PhD dissertation Leiden University.
- Taalunie (without date)**. Taaladviesdienst van de Taalunie. <https://onzetaal.nl/taaladvies/advies/alle-drie-winnaars-alle-drie-de-winnaars>.

# The Emergence of Paucality in Dutch

## Syntactic Structure and Dialect Geography

Gertjan Postma

Meertens Instituut Amsterdam & Leiden University

[gertjan.postma@meertens.knaw.nl](mailto:gertjan.postma@meertens.knaw.nl)



REEDS Workshop, Amsterdam, 29–30 June 2023



Universiteit  
Leiden

# Ordering to paucal speakers

(Total set)

area	percentage 2–20 paucal speakers of total	system. $\emptyset$ speakers	system. <i>de</i> speakers	random speakers	N
Ze	78%	0%	11%	11%	18
U	77%	20%	0%	3%	129
NB	76%	18%	4%	2%	133
NH+ZH	69%	22%	2%	7%	480
GLD	66%	28%	1%	5%	163
LB	64%	17%	10%	9%	132
Ov	61%	36%	2%	2%	56
Belgie	47%	33%	18%	2%	55
Fr+Gr+Dr	35%	63%	0	2%	126

# Ordering to systematic ø speakers

(Total set)

area	percentage 2–20 paucal speakers of total	system. ø speakers	system. <i>de</i> speakers	random speakers	N
Fr+Gr+Dr	35%	63%	0	2%	126
Ov	61%	36%	2%	2%	56
Belgie	47%	33%	18%	2%	55
GLD	66%	28%	1%	5%	163
NH+ZH	69%	22%	2%	7%	480
U	77%	20%	0%	3%	129
NB	76%	18%	4%	2%	133
LB	64%	17%	10%	9%	132
Ze	78%	0%	11%	11%	18

# Ordering to systematic *de* speakers

(Total set)

area	percentage 2–20 paucal speakers of total	system. $\emptyset$ speakers	system. <i>de</i> speakers	random speakers	N
Belgie	47%	33%	18%	2%	55
Ze	78%	0%	11%	11%	18
LB	64%	17%	10%	9%	132
NB	76%	18%	4%	2%	133
NH+ZH	69%	22%	2%	7%	480
Ov	61%	36%	2%	2%	56
GLD	66%	28%	1%	5%	163
U	77%	20%	0%	3%	129
Fr+Gr+Dr	35%	63%	0	2%	126

# Random speakers

area	percentage 2–20 paucal speakers of total	system. $\emptyset$ speakers	system. <i>de</i> speakers	random speakers	N
Ze	78%	0%	11%	11%	18
LB	64%	17%	10%	9%	132
NH+ZH	69%	22%	2%	7%	480
GLD	66%	28%	1%	5%	163
U	77%	20%	0%	3%	129
NB	76%	18%	4%	2%	133
Ov	61%	36%	2%	2%	56
Belgie	47%	33%	18%	2%	55
Fr+Gr+Dr	35%	63%	0	2%	126