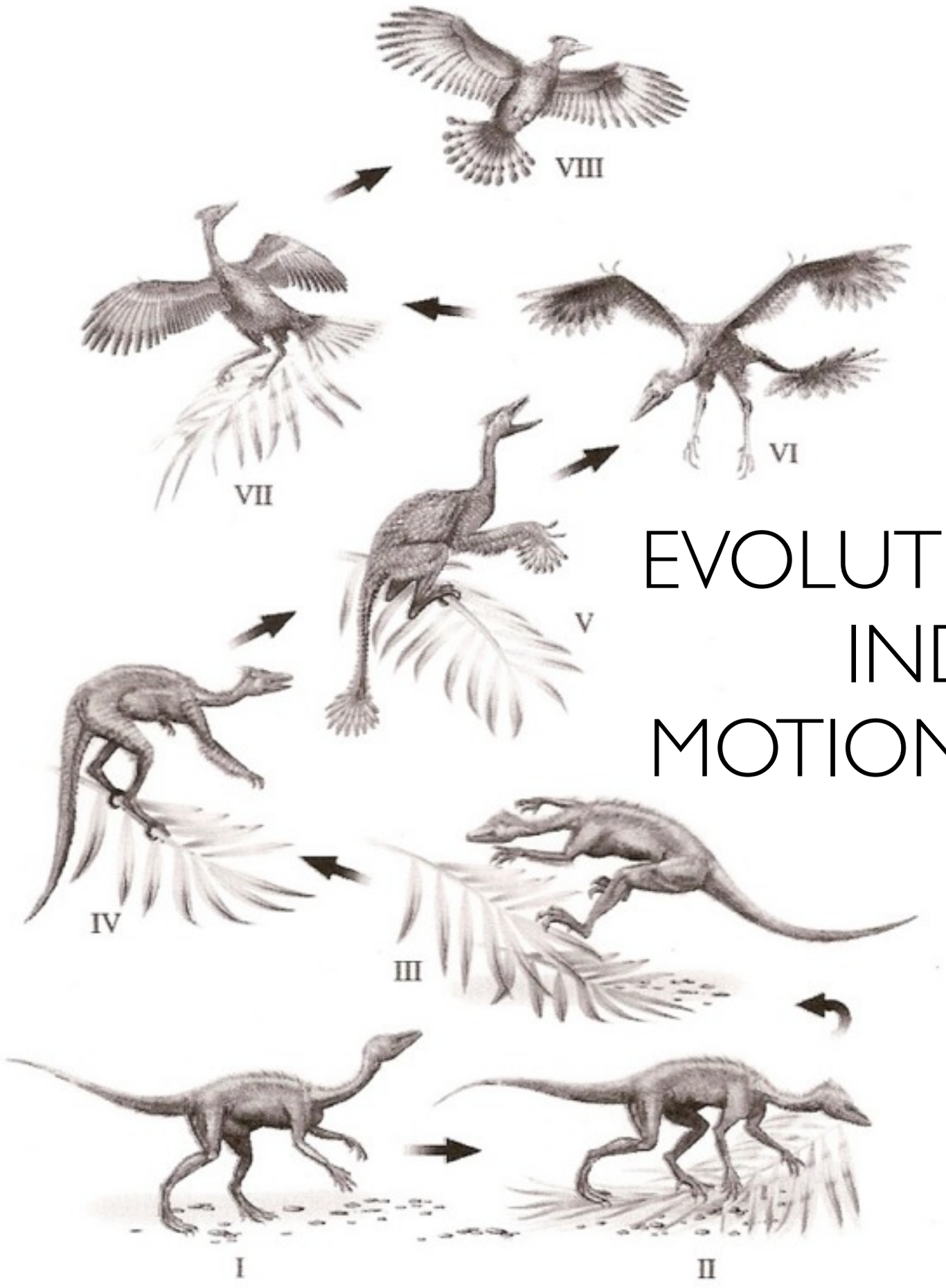

EVOLUTIONARY CHANGE IN INDO-EUROPEAN MOTION EVENT ENCODING

Annemarie Verkerk

SCCR 22/25-02-2011

SYDNEY
CHAMALIERES
HONG KONG
LYON
WARSAW

TALMY'S MOTION TYPOLOGY

Spanish (verb-framed)

La	botella	entró	a	la	cueva	flotando
the	bottle	moved.in	to	the	cave	floating
		PATH				MANNER

Talmy (1985: 69)

Dutch (satellite-framed)

De	fles	dreef	de	grot	in
the	bottle	floated	the	cave	into
		MANNER			PATH

'The bottle floated into the cave'

The Many Ways to Search for a Frog

Linguistic Typology and the Expression of Motion Events

Dan I. Slobin

J. Linguistics **46** (2010), 331–377. © Cambridge University Press 2009
doi:10.1017/S0022226709990272 First published online 30 November 2009

The typology of motion expressions revisited[1]

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(Received 20 March 2008; revised 15 January 2009)

Revising Talmy's typological classification of complex event constructions

William Croft, Jóhanna Barðdal, Willem Hollmann,
Violeta Sotirova, and Chiaki Taoka
University of New Mexico, USA, University of Bergen, Norway,
University of Lancaster, UK, University of Nottingham, UK,
and Kobe College, Japan

PARALLEL CORPUS

Alice's Adventures in Wonderland (Lewis Carroll)

Through the Looking-Glass and what Alice found there

O Alquimista (Paulo Coelho)

308 motion sentences

SWEDISH
LATVIAN
LITHUANIAN
RUSSIAN
ENGLISH
IRISH
DUTCH
POLISH
GERMAN
FRENCH
ROMANIAN
SERBO-CROATIAN
ITALIAN
ALBANIAN
PORTUGUESE
GREEK
ARMENIAN
PERSIAN
NEPALI
HINDI

MOTION ENCODING STRATEGIES

Alice laughed so much at this, that

satellite-framed: **she had to run back into the wood** for fear of their hearing her;

verb-framed: she had to enter the wood running / at a run / quickly

path-only: she had to enter the wood

manner-only: she had to run in the wood

deictic: she had to go into the wood

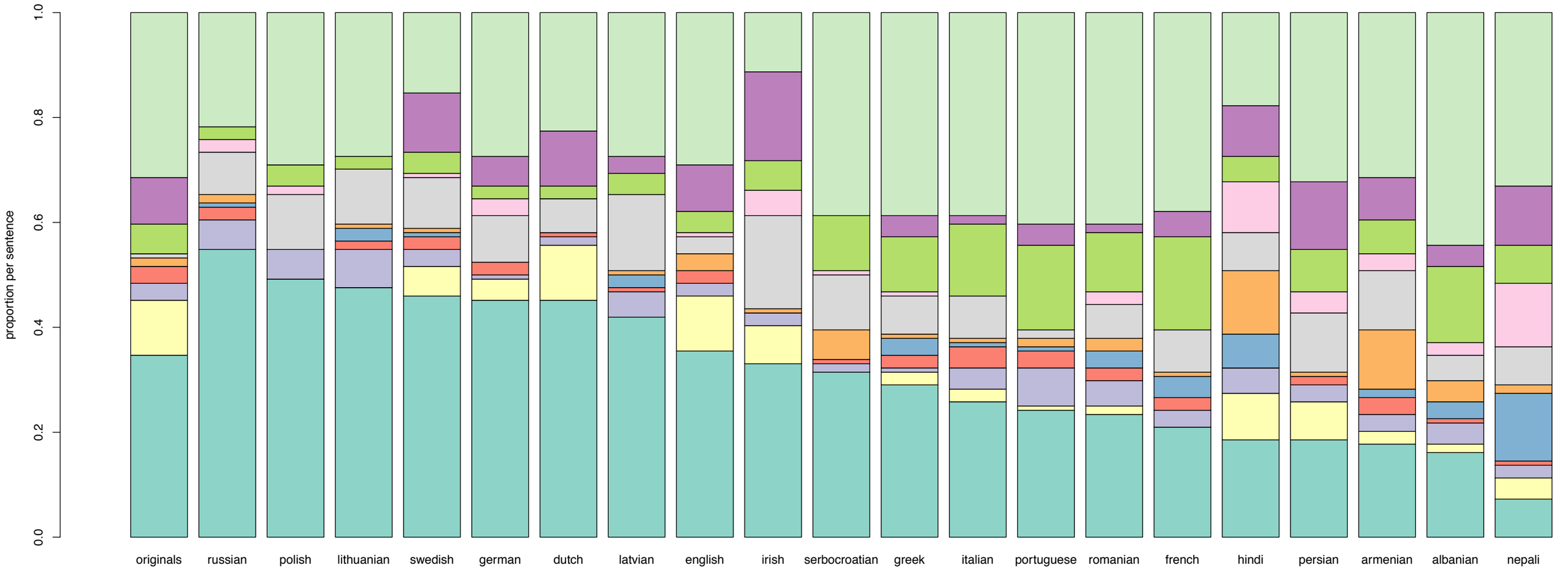
coordination: she had to run and go back into the wood

subordination: she had to run to go back into the wood

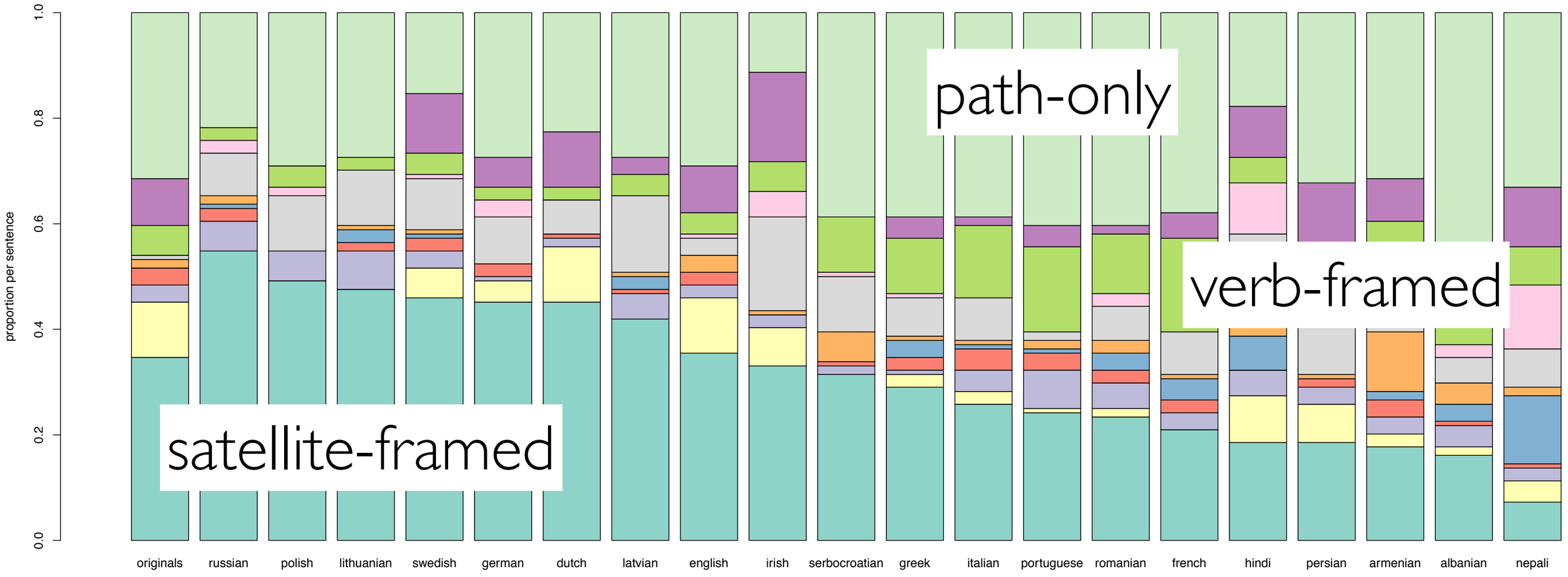
manner+path verb: she had to run+enter the wood

other: she was in the wood

MOTION ENCODING IN IE

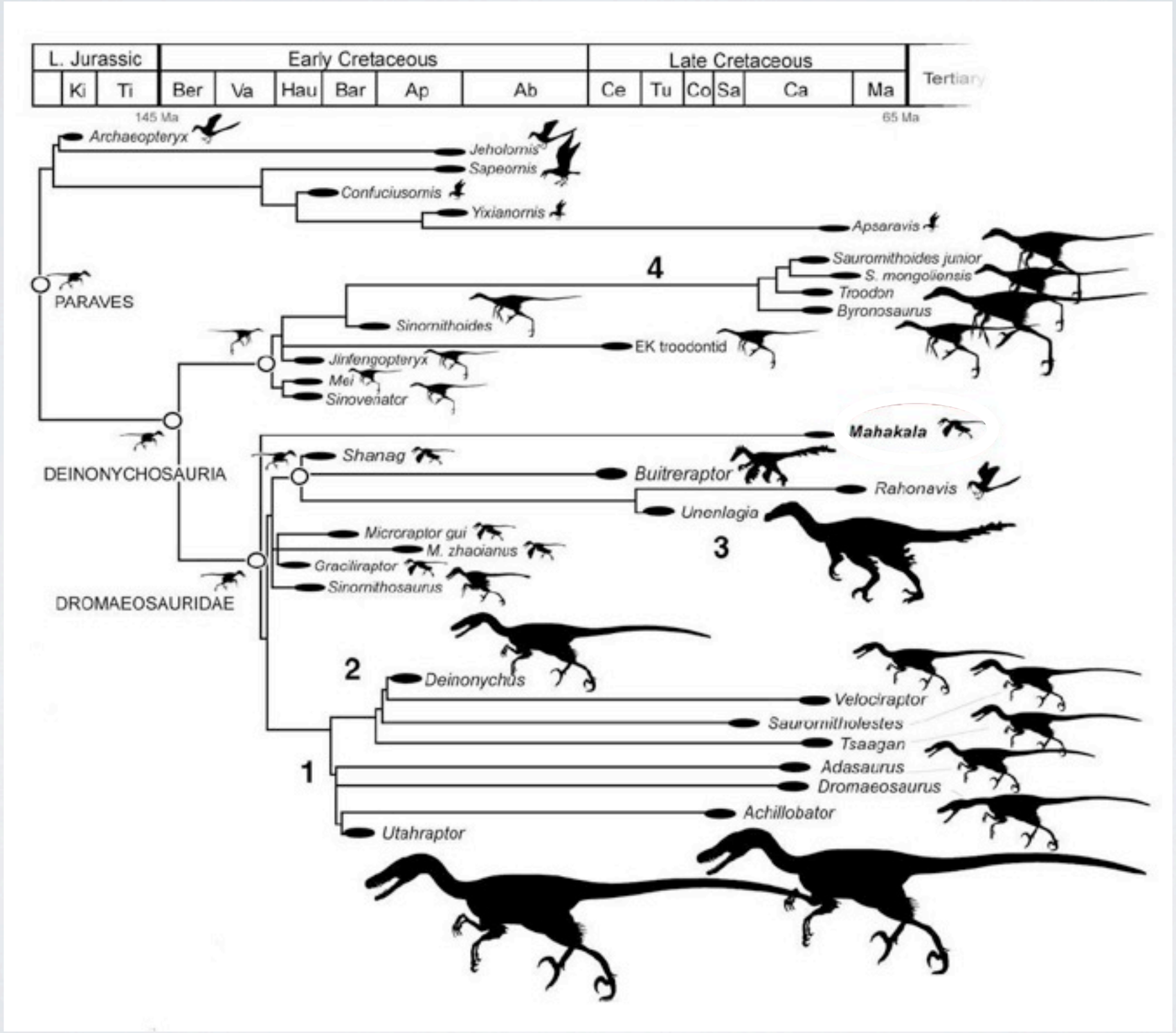


MOTION ENCODING IN IE



PHYLOGENETIC COMPARATIVE METHODS

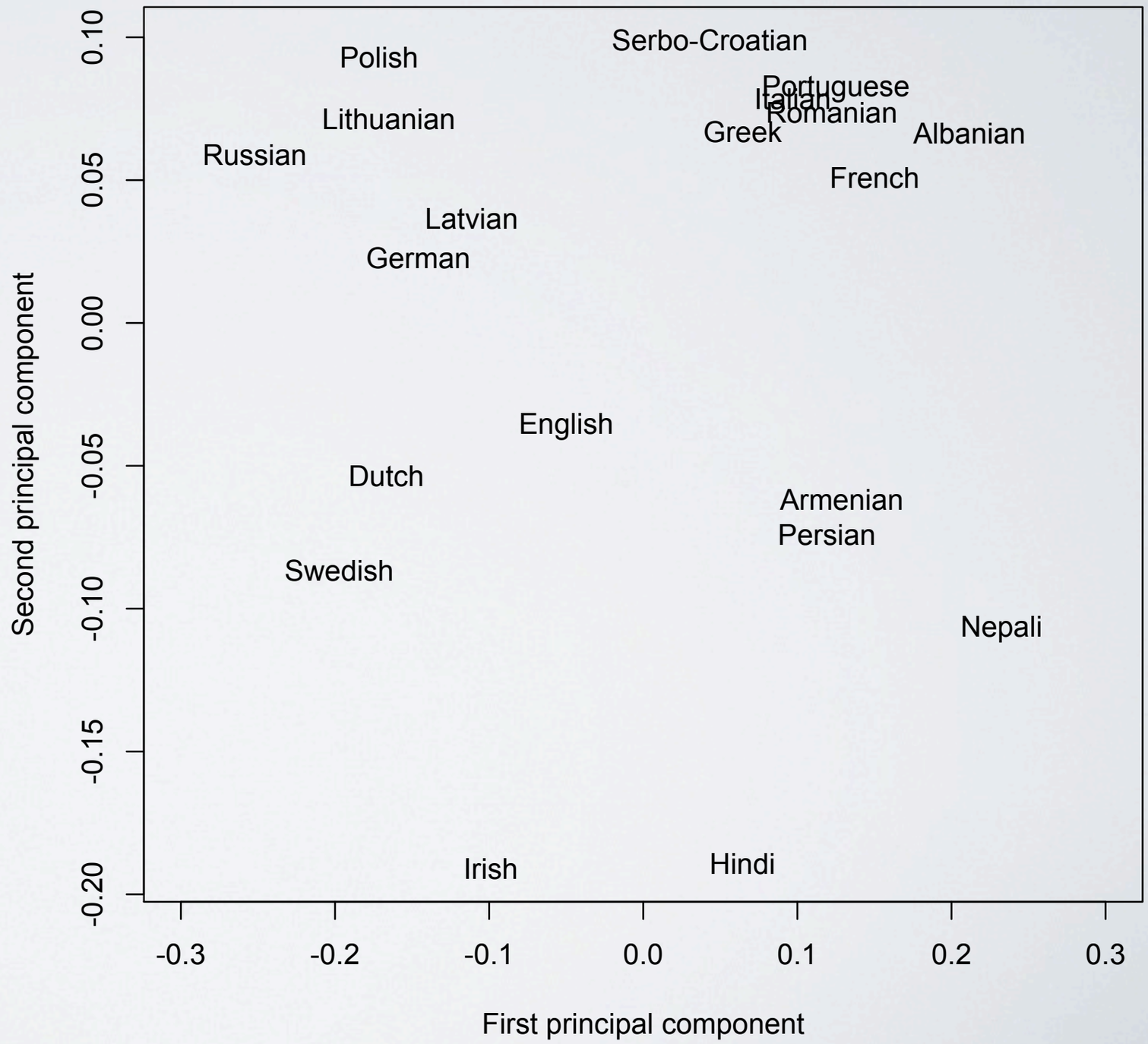
PHYLOGENETIC COMPARATIVE METHODS



PRINCIPAL COMPONENT ANALYSIS

65% of the variance is explained by the first principal component

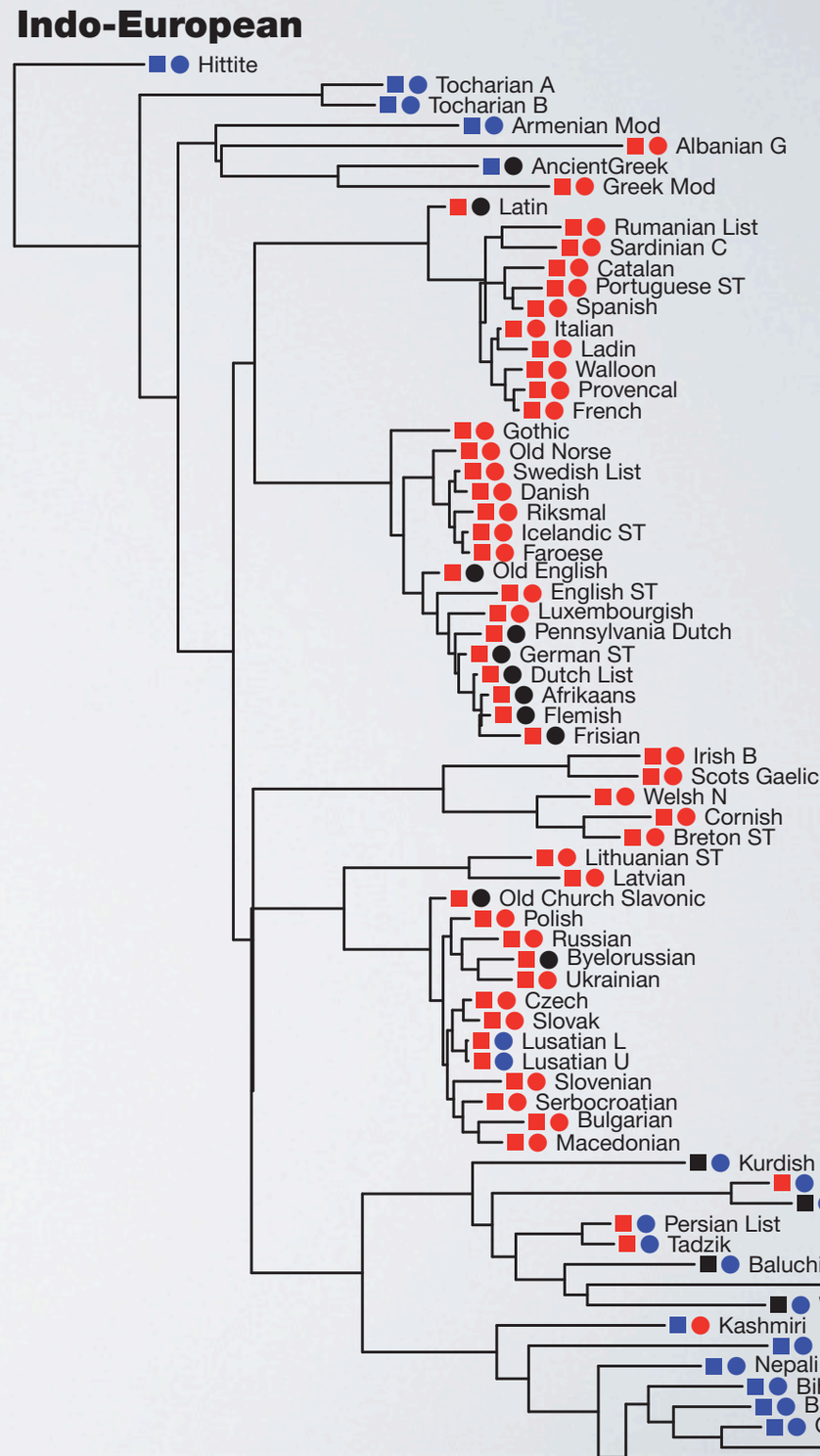
Take the score of each language on the first principal component



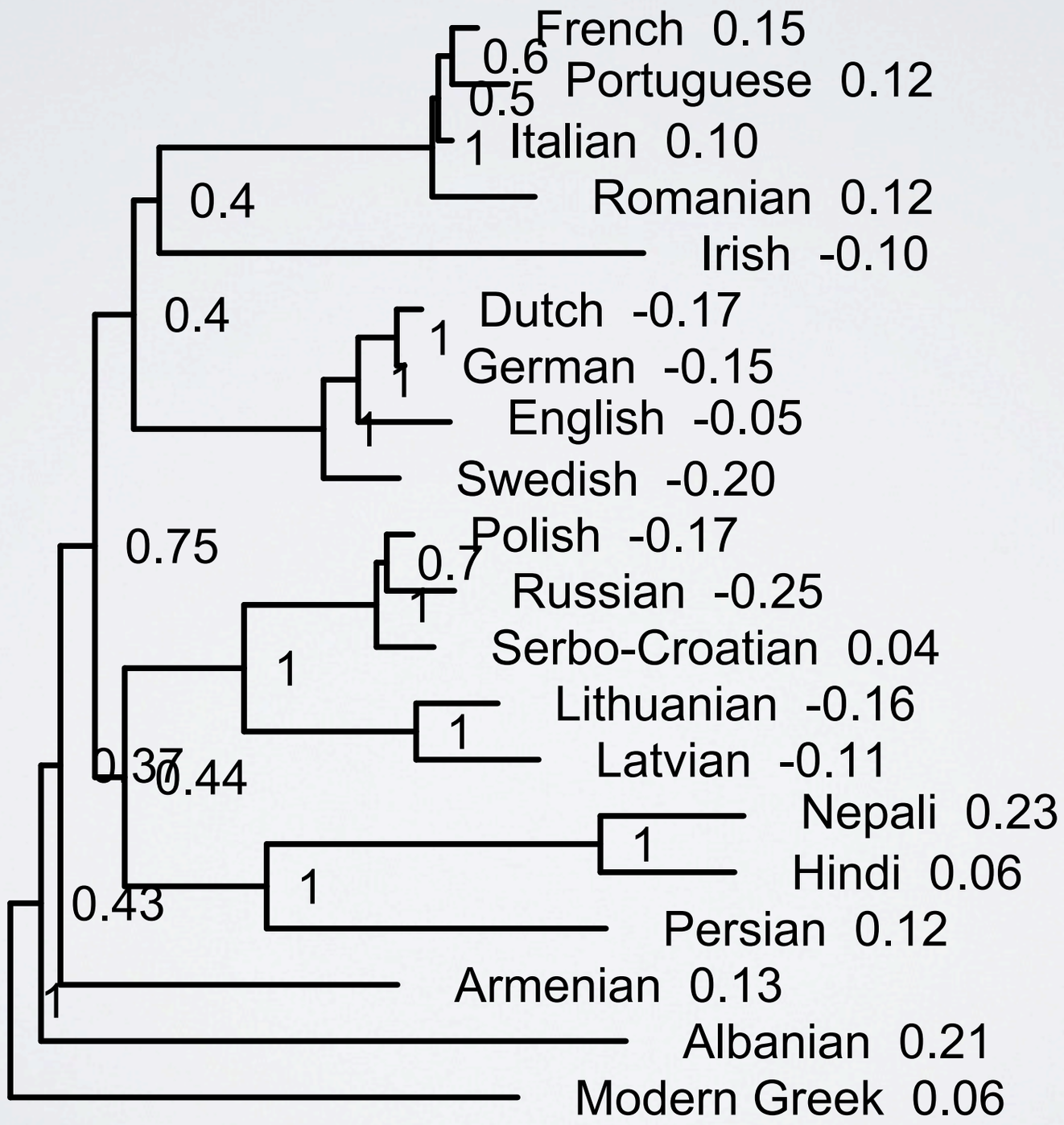
TESTING HISTORICAL SIGNAL

Phylogenetic trees:

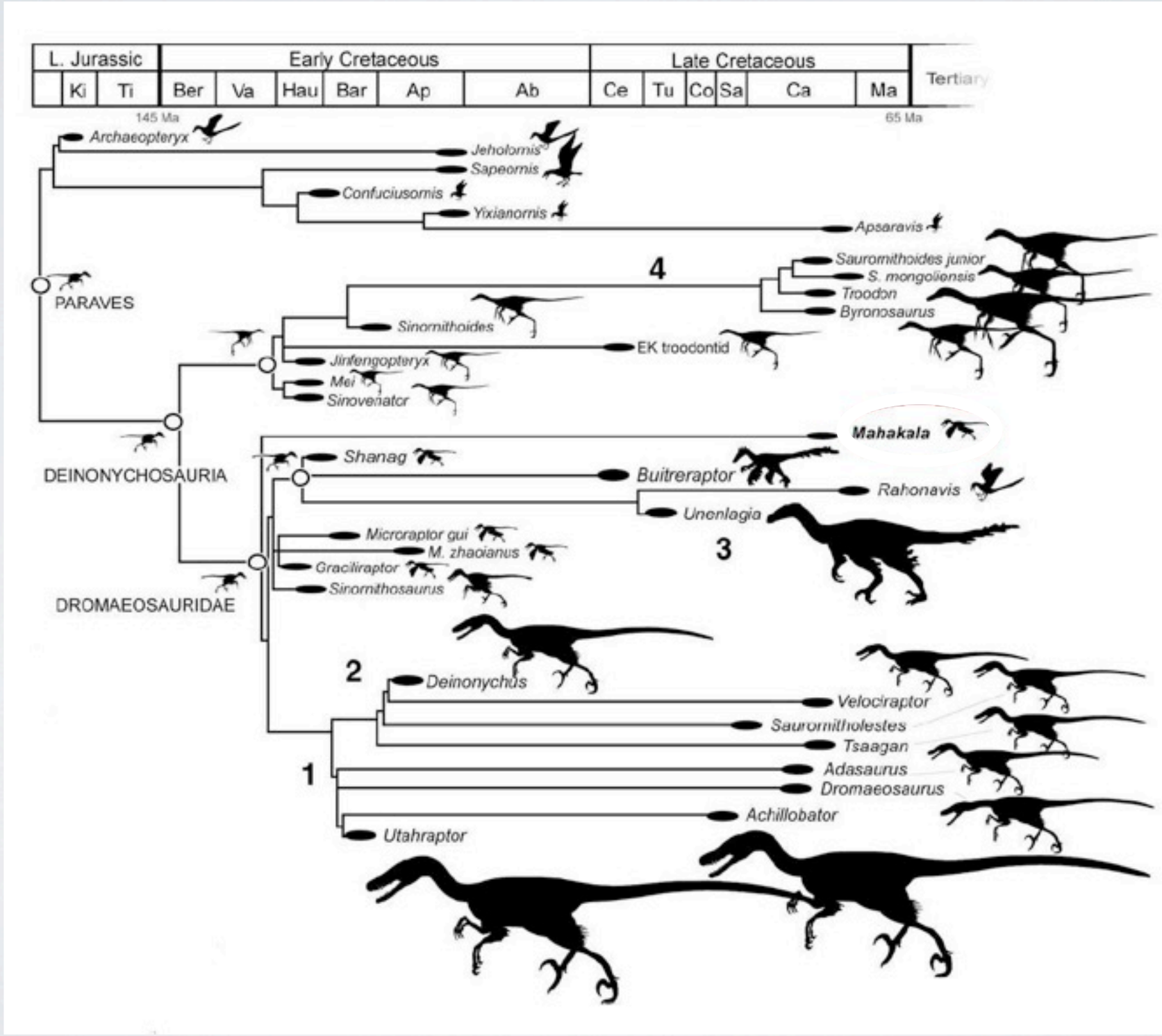
- from Dunn et al. (2011)
- build on lexical data (Swadesh lists)
- estimated using a Bayesian Markov Chain Monte Carlo approach



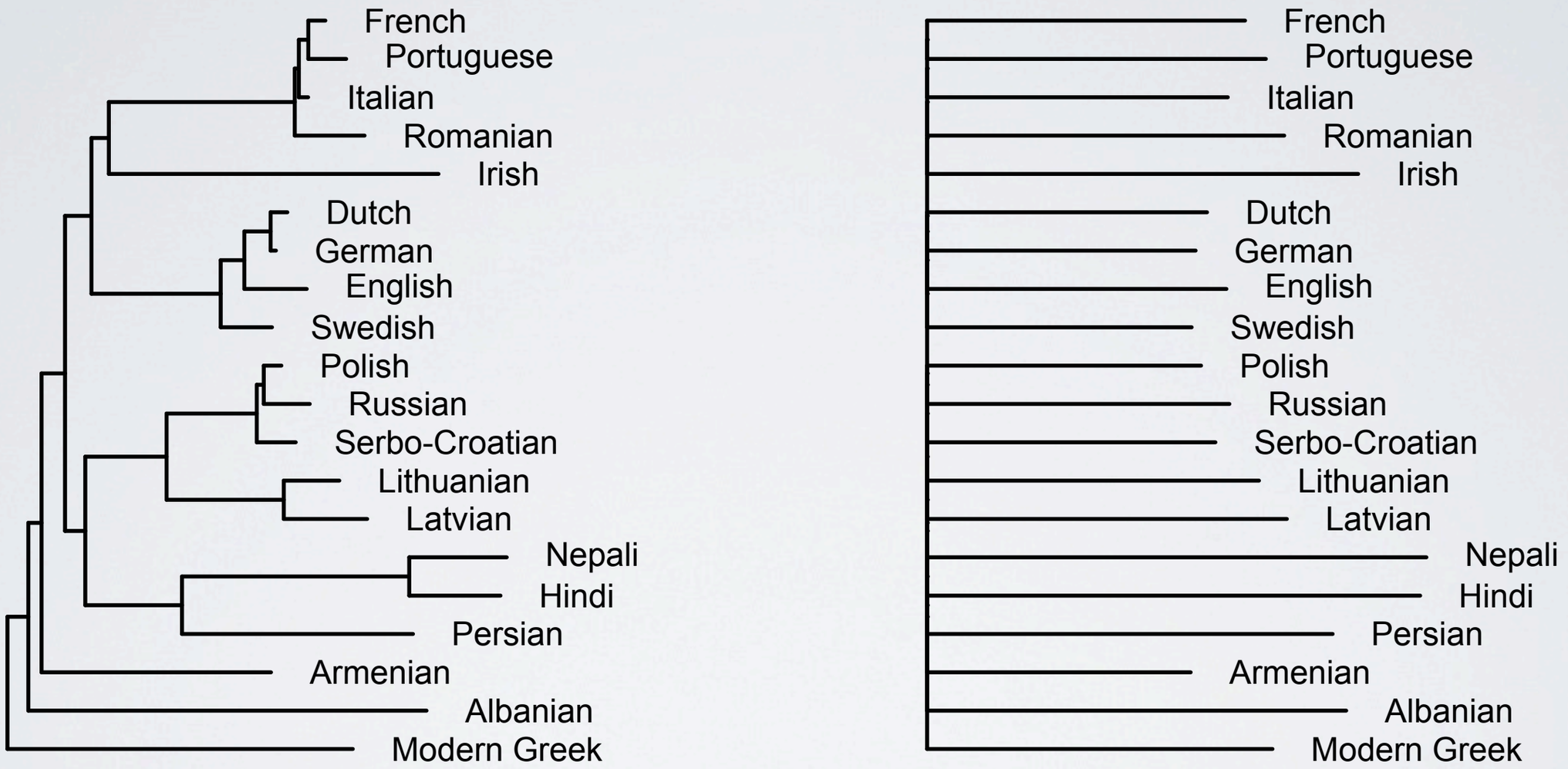
DATA + TREES


French 0.15
0.6
Portuguese 0.12
0.5
1
Italian 0.10
0.4
Romanian 0.12
Irish -0.10
0.4
Dutch -0.17
1
1
German -0.15
English -0.05
Swedish -0.20
0.75
Polish -0.17
0.7
1
Russian -0.25
Serbo-Croatian 0.04
1
Lithuanian -0.16
1
Latvian -0.11
0.37
0.44
Nepali 0.23
1
Hindi 0.06
1
0.43
Persian 0.12
Armenian 0.13
1
Albanian 0.21
Modern Greek 0.06

HISTORICAL SIGNAL



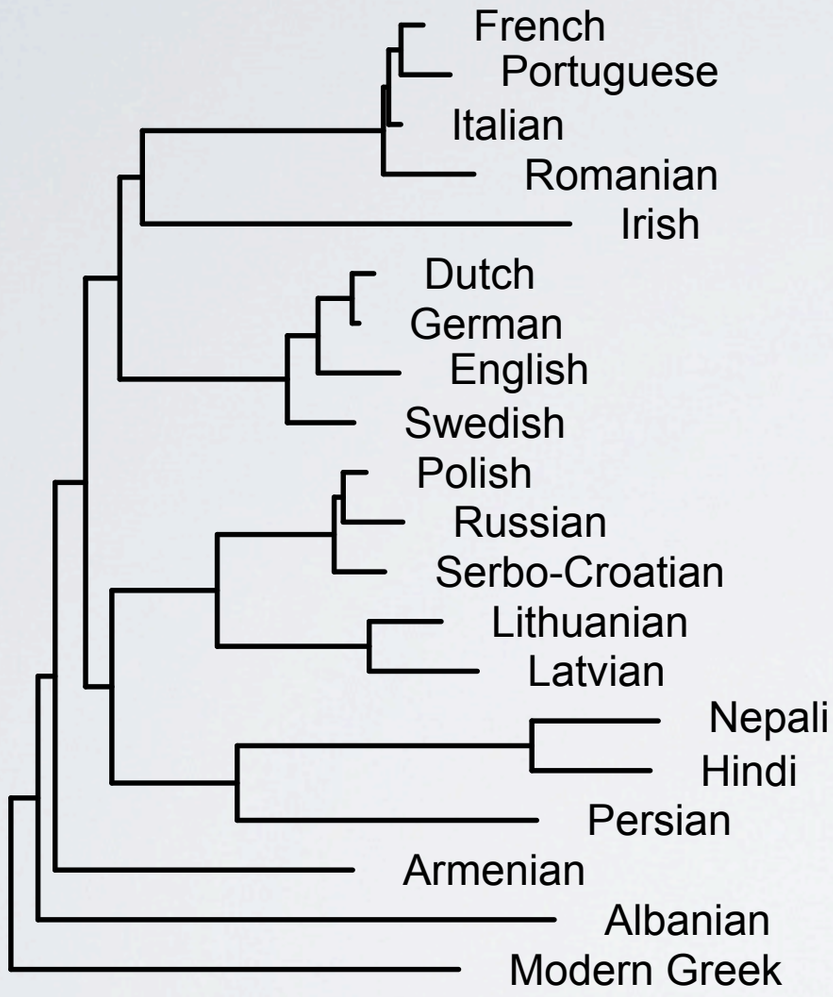
TESTING HISTORICAL SIGNAL

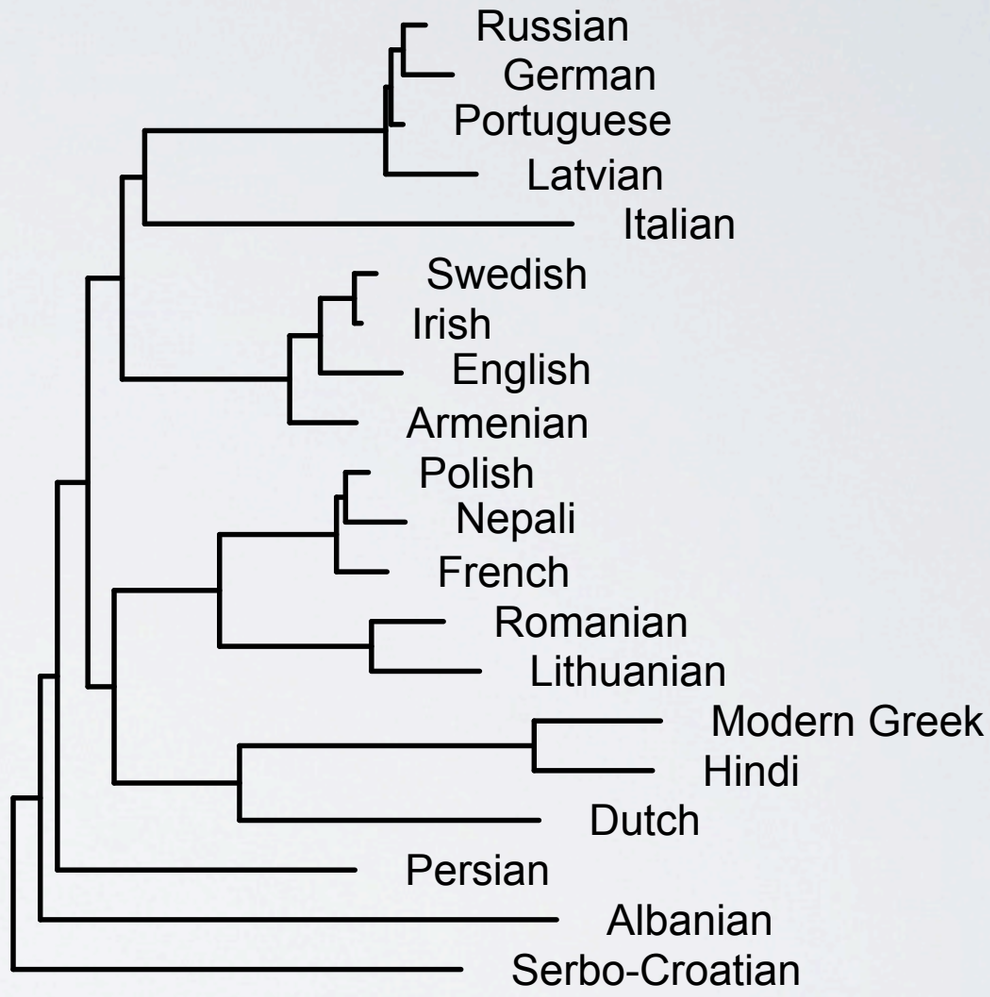


the likelihood of real trees is significantly different from likelihood of trees with zero lambda ($p < 0.01$)

(Pagel 1999)

TESTING HISTORICAL SIGNAL

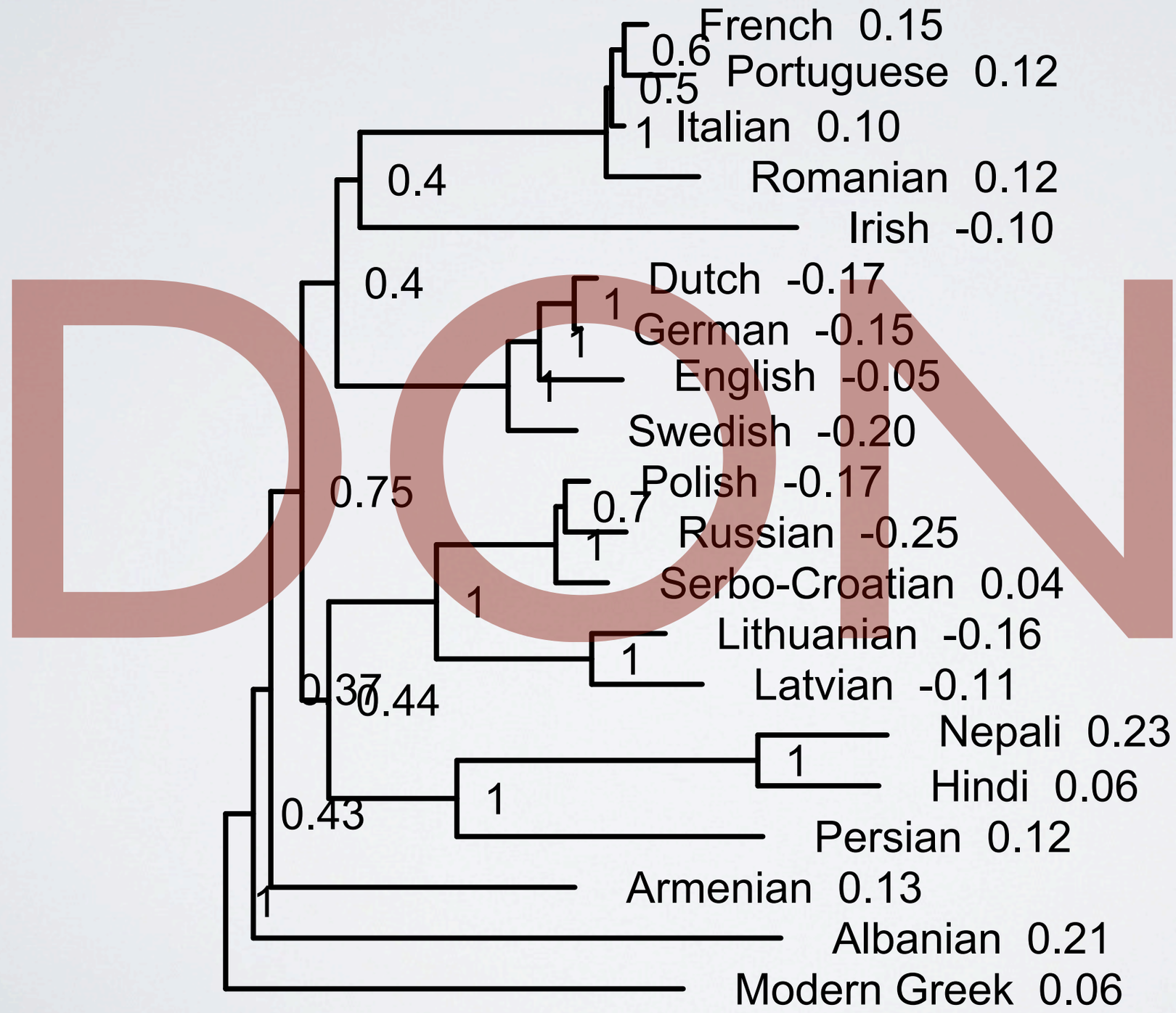




the kappa score provided by this analysis shows that historical signal is present

Blomberg et al. (2003)

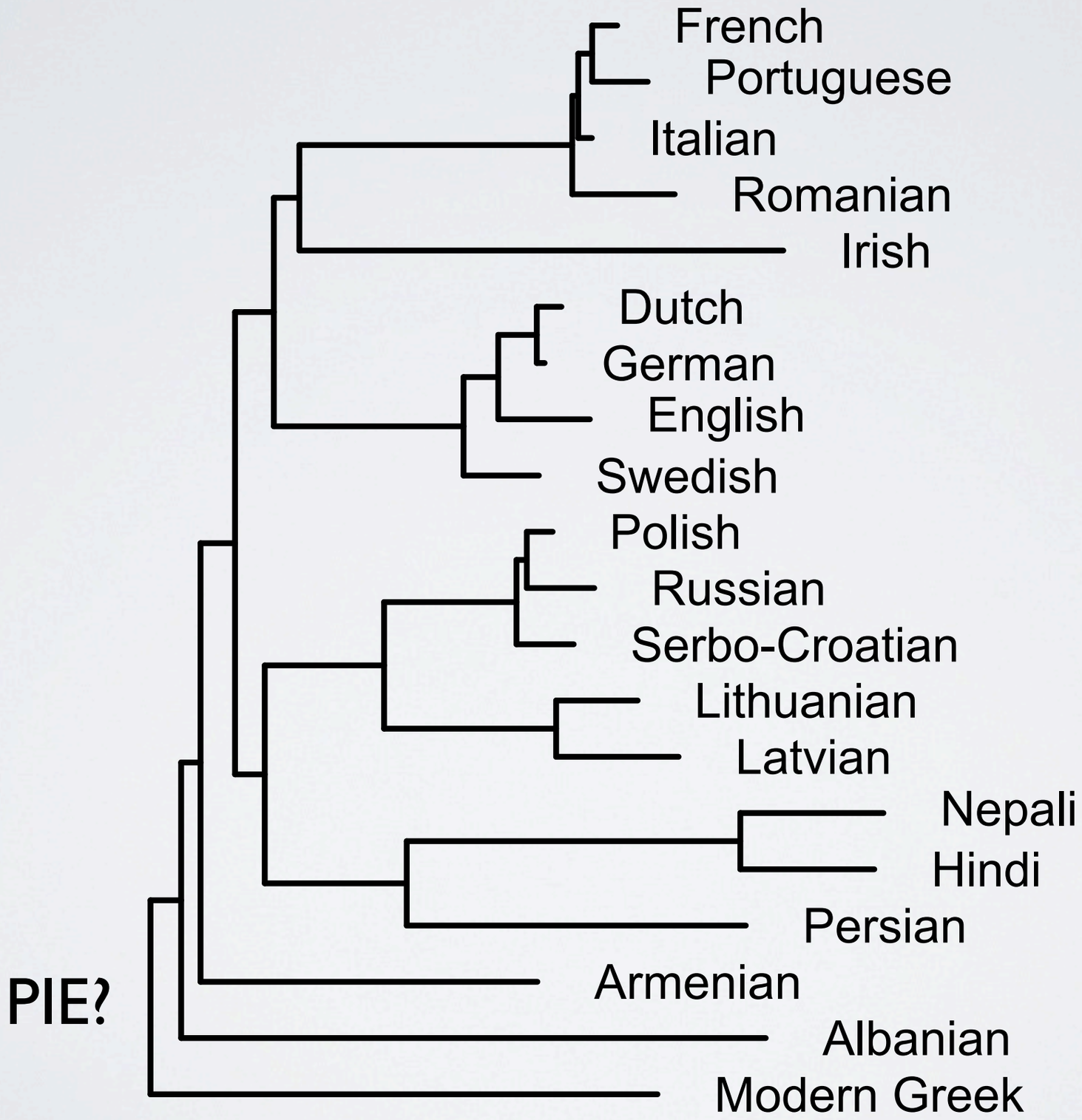
TESTING FOR HISTORICAL SIGNAL



DONE

ANCESTRAL STATE ESTIMATION

ANCESTRAL STATE ESTIMATION



ANCESTRAL STATE ESTIMATION

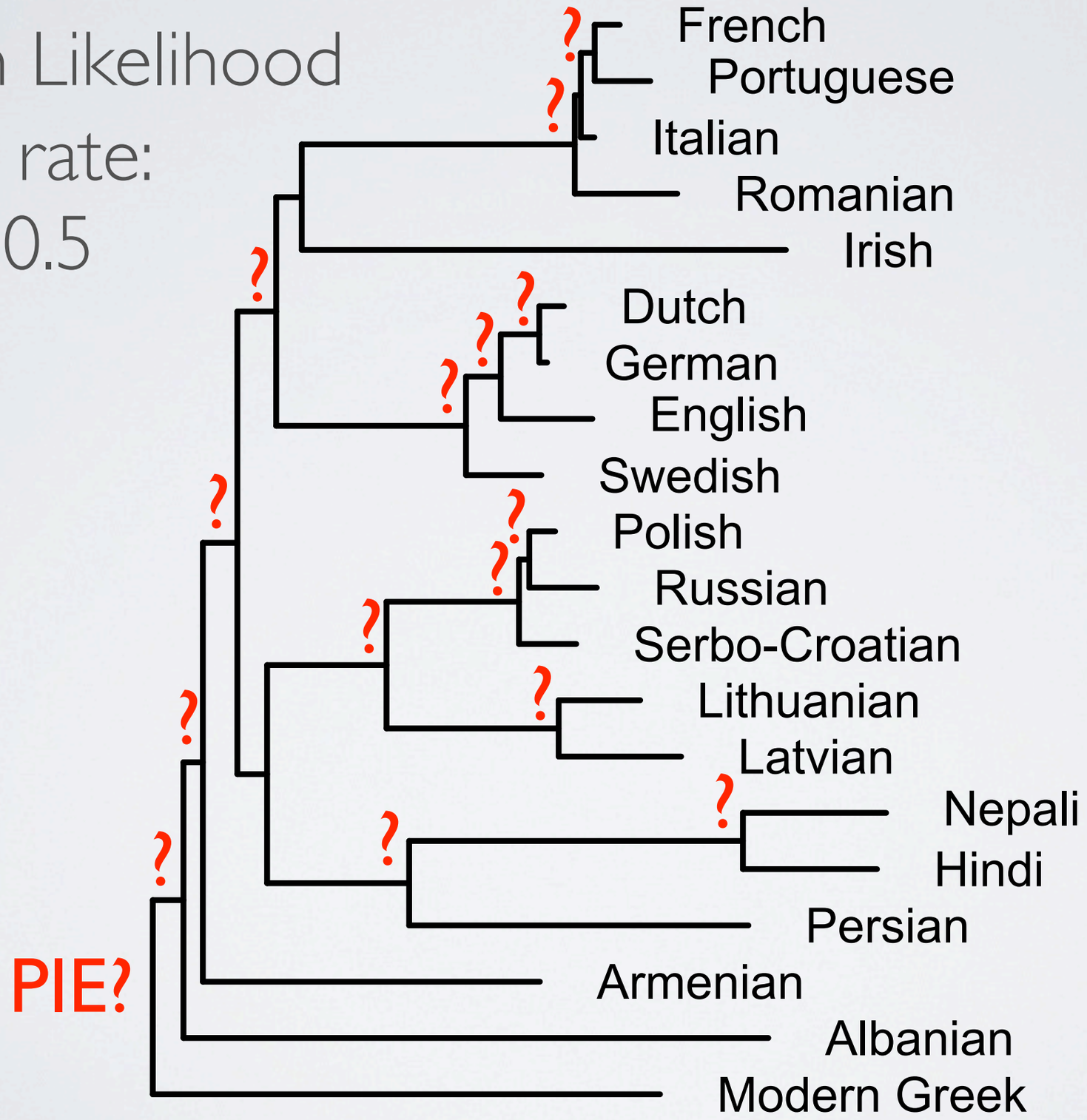
PIE = satellite framed?
(Talmy 2007, Acedo Matellán and Mateu 2008)

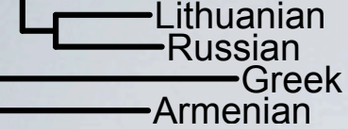
ANCESTRAL STATE ESTIMATION

Maximum Likelihood

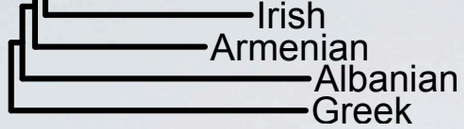
transition rate:

$-0.5 \rightleftarrows 0.5$



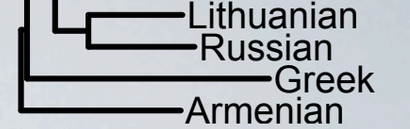


n. 345



n. 346

n. 347



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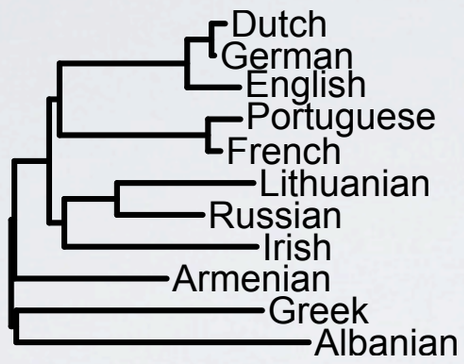
n. 619



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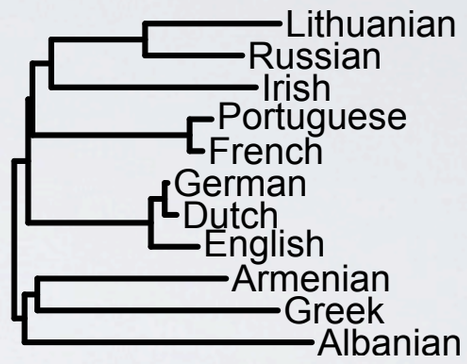

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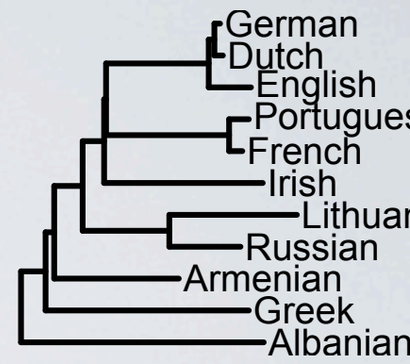

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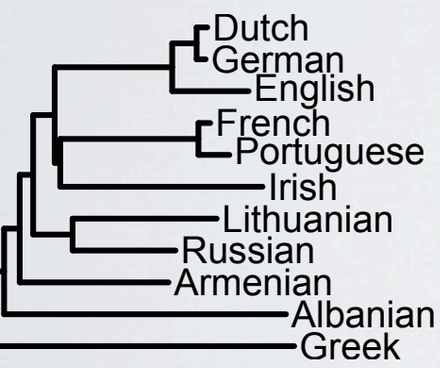

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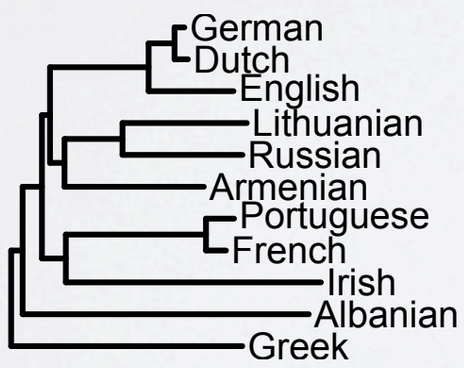
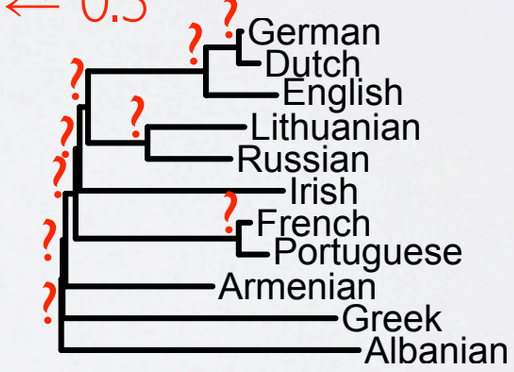
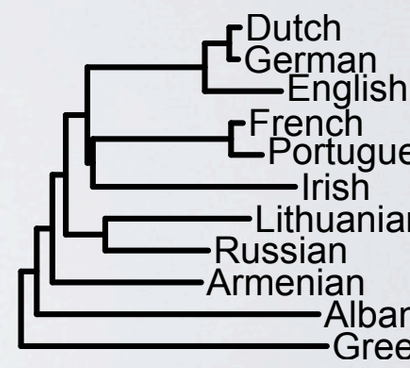


n. 887

-0.5 ⇄ 0.5



n. 888



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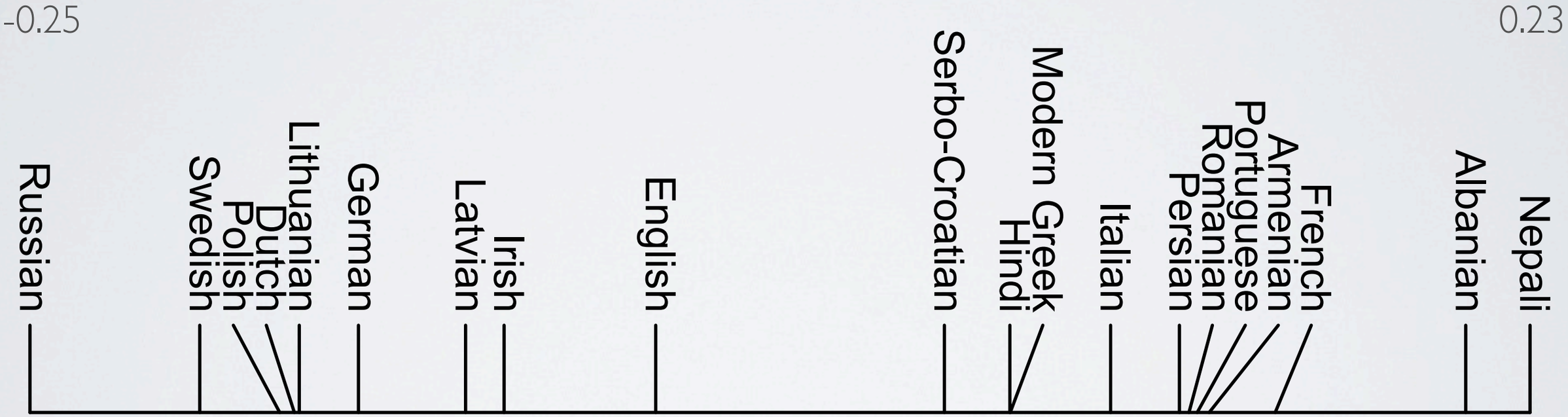
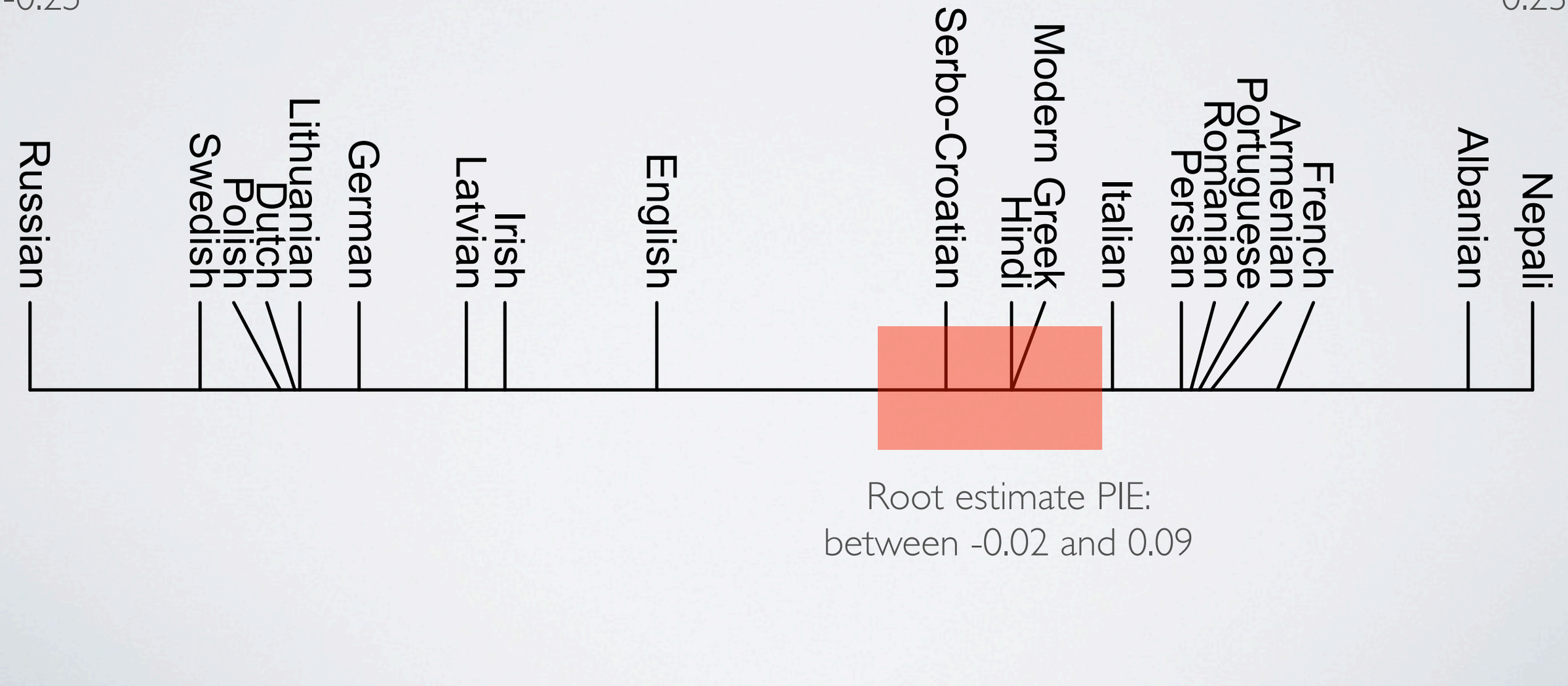
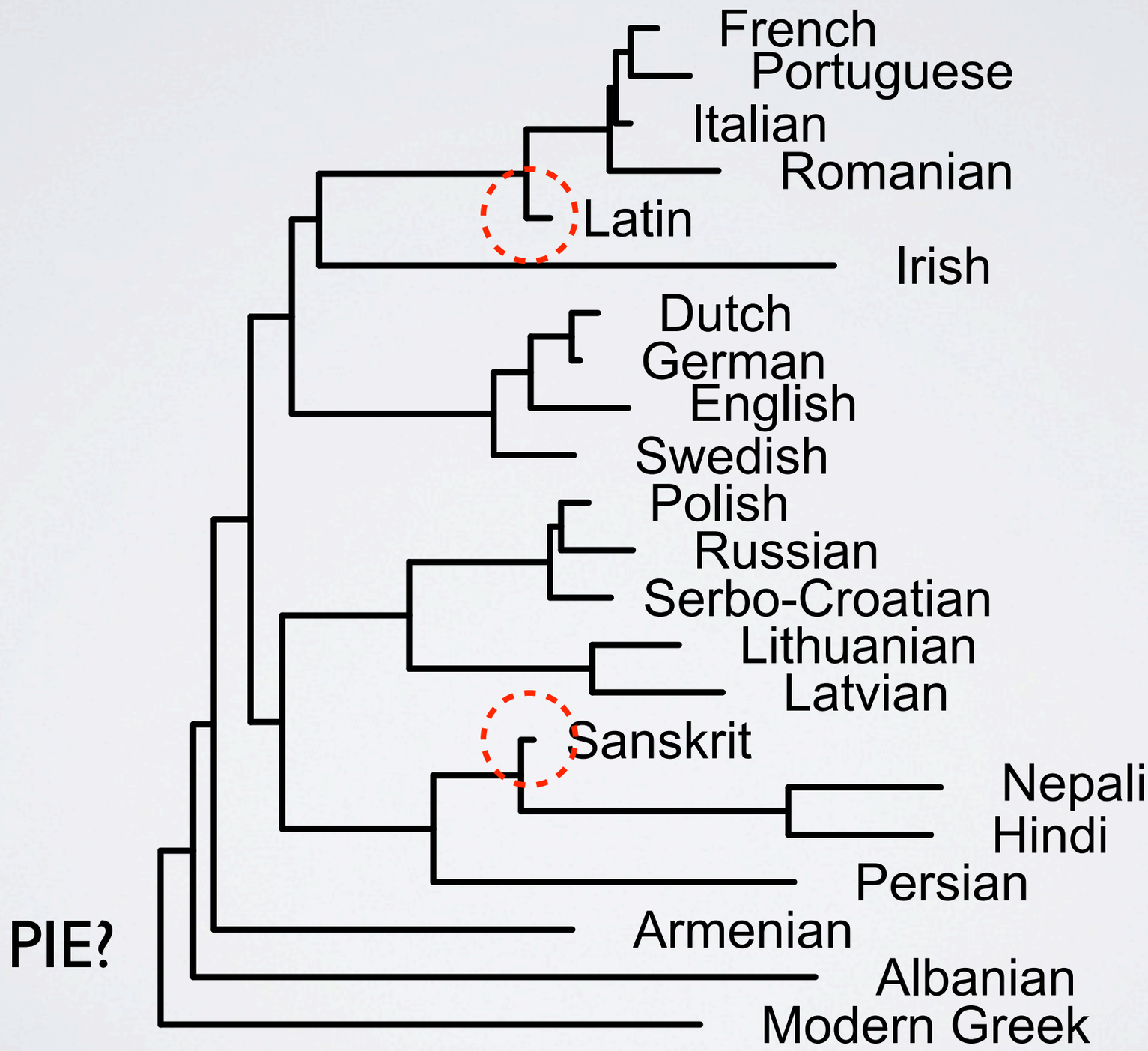
ANCESTRAL STATE ESTIMATION



ANCESTRAL STATE ESTIMATION



INCORPORATING INFORMATION FROM ANCIENT LANGUAGES



THE EVOLUTION OF THE PIE PREVERB SYSTEM

PIE → Latin → Romance

{"Preverb ... Verb" / "... Preverb Verb"} → "Prep.+Noun ... Verb"

{"Preverb ... Verb" / "... Preverb Verb"} → "... prefix-Verb" → "... Verb"

Watkins (1964), Vincent (1999), Iacobini & Masini (2006)

THE EVOLUTION OF THE PIE PREVERB SYSTEM

Latin

se-que	rursus	in	osti-um	dom-us	**in**-ced-ere
3SG.F.REFL.ACC-and	back	in	entrance-N.ACC.SG	house-F.GEN.SG	in-go-PRS.INF

'and found herself walking in at the front-door again.'

in	tenebr-as	se	ab-rip-uit	quam	cel-emme	pot-uit
into	darkness-F.ACC.PL	3SG.REFL.ACC	away-tear-PFV.3SG	how	fast-ADV	be.able-PFV.3SG

'and skurried away into the darkness as hard as he could go.'

THE EVOLUTION OF THE PIE PREVERB SYSTEM

PIE/Sanskrit | later Sanskrit | modern lang.

{"Preverb ... Verb" / "... Preverb Verb"} → "Prep.+Noun ... Verb" → lost

{"Preverb ... Verb" / "... Preverb Verb"} → "Noun+Post. ... Verb"

{"Preverb ... Verb" / "... Preverb Verb"} → "... prefix-Verb" → "... Verb"

Watkins (1964), Bloch (1965)

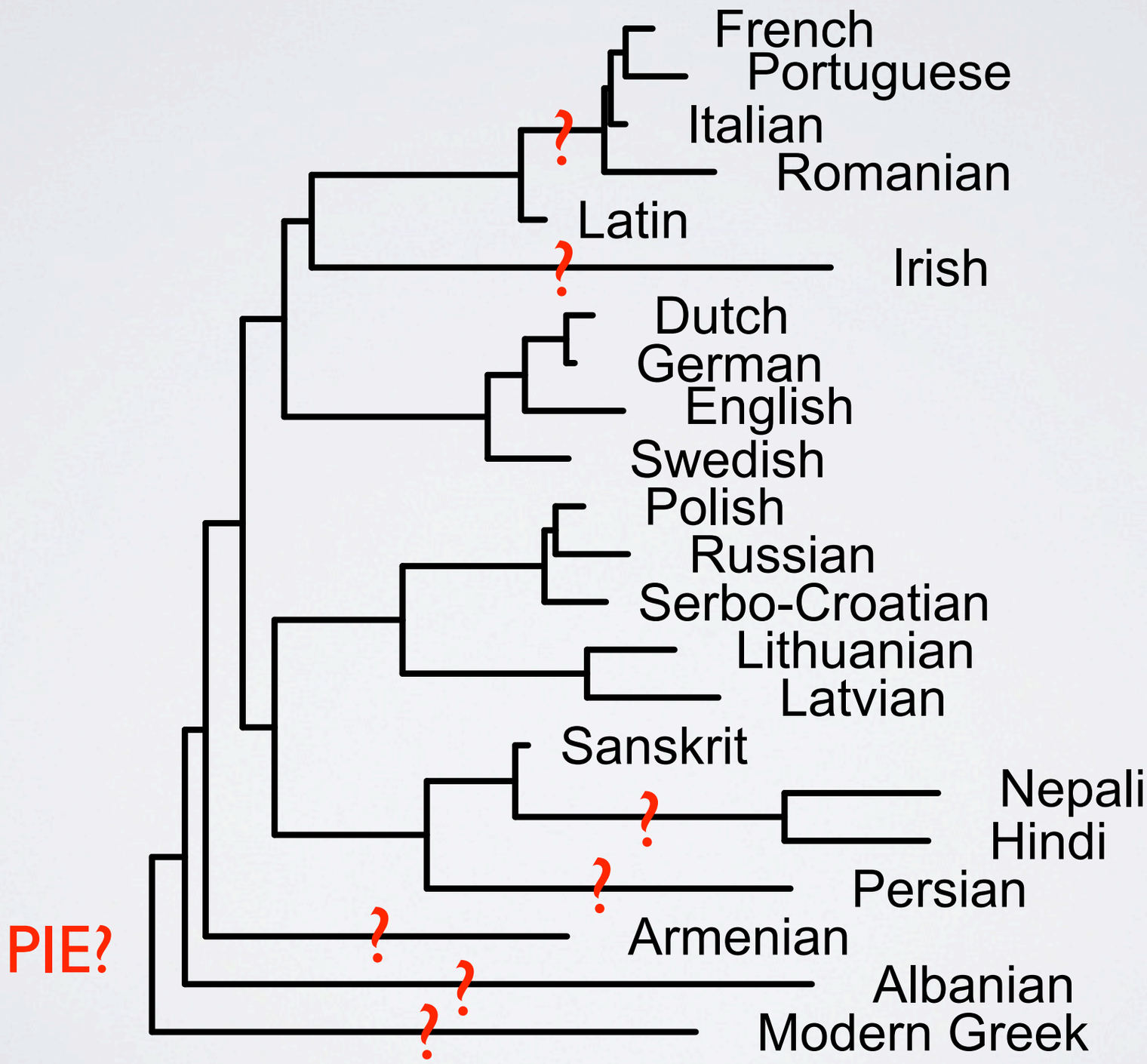
THE EVOLUTION OF THE PIE PREVERB SYSTEM

Sanskrit

út	pā**t**-ay-ati	pakṣíṇaḥ
away/out	fly-CAUS-3PL	bird.PL

'she makes the birds fly away' Delbrück (1893: 648)

INCORPORATING INFORMATION FROM ANCIENT LANGUAGES



CORRELATED EVOLUTION

skim
glide
skurry
crawl
rush
swim
roll
hurry
tumble
soar
float
jog
march
run
saunter
creep
walk
fly
drift
slip

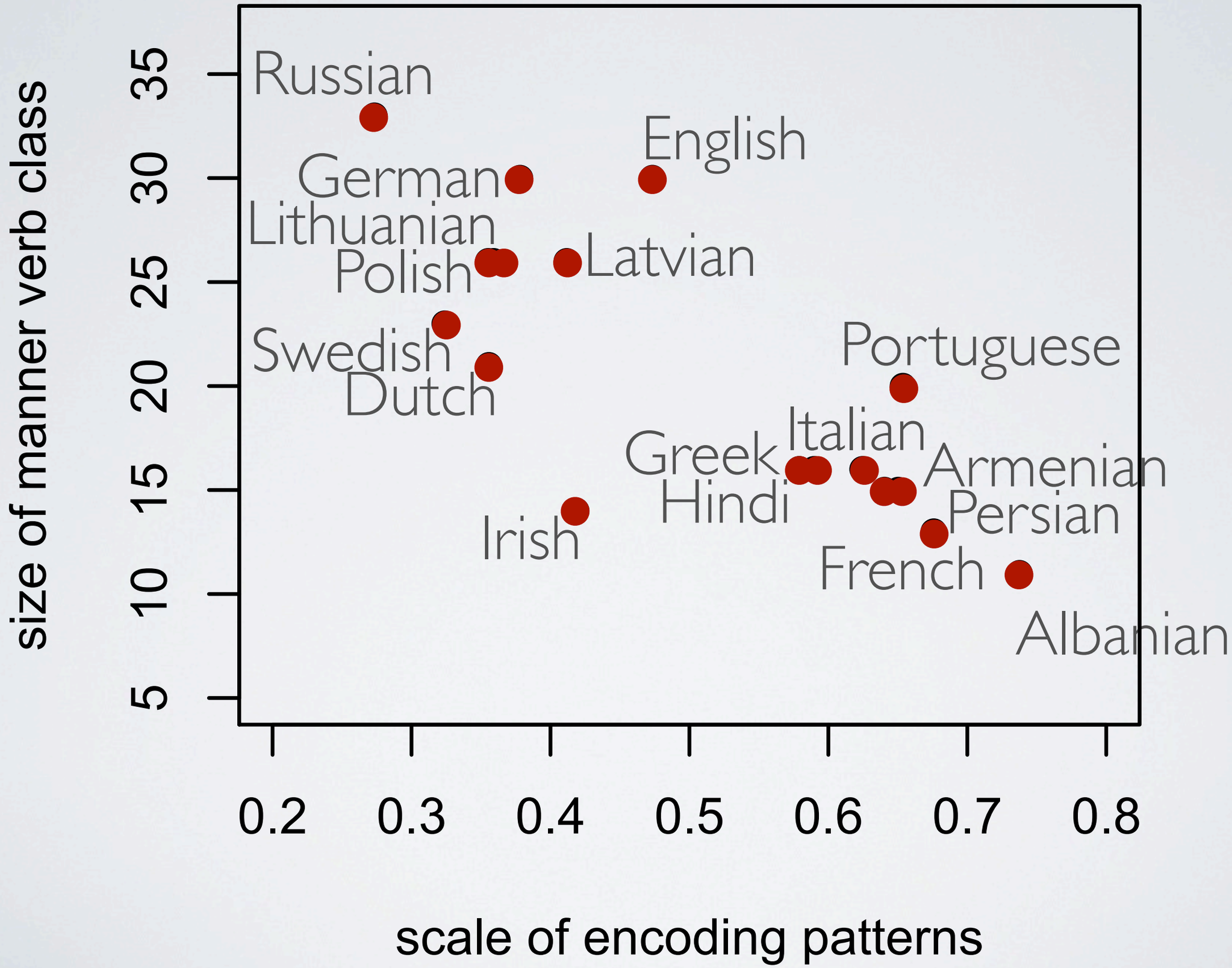
passear
caminhar
nadar
precipitar se
trotar
correr
esgueirar se
rastejar
pular
voar

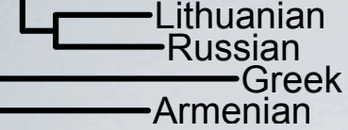
(Slobin 2004)

CORRELATED EVOLUTION

	language	encoding	manner verb class
1.	Russian	-0.23	33
2.	Swedish	-0.18	23
3.	Polish	-0.15	26
4.	Lithuanian	-0.14	26
5.	Dutch	-0.14	21
6.	German	-0.12	30
7.	Latvian	-0.09	26
8.	Irish	-0.08	14
9.	English	-0.03	30
10.	Greek	0.09	16
11.	Hindi	0.08	16
12.	Italian	0.13	16
13.	Persian	0.14	15
14.	Portuguese	0.15	20
15.	Armenian	0.15	15
16.	French	0.18	13
17.	Albanian	0.24	11

CORRELATED EVOLUTION





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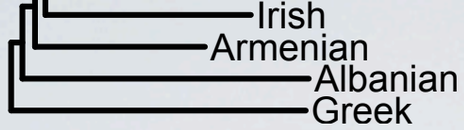

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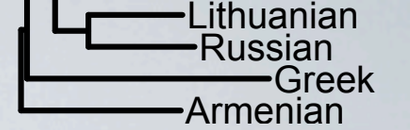

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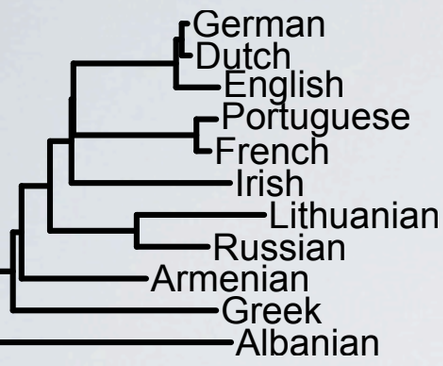

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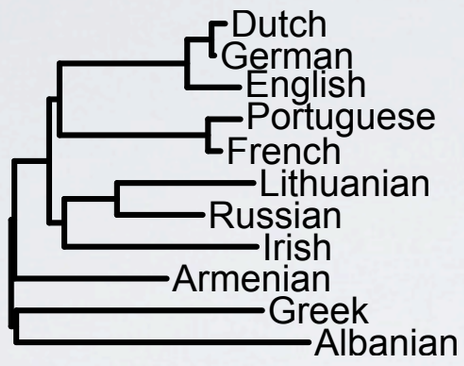

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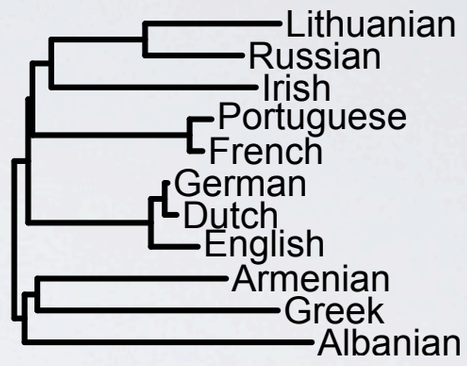

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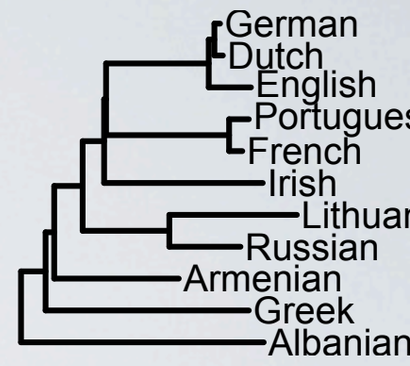
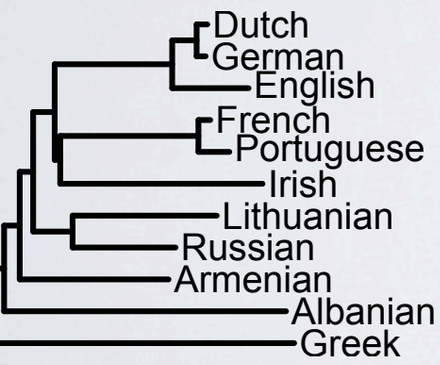


n. 622

Phylogenetic Generalized Least Squares



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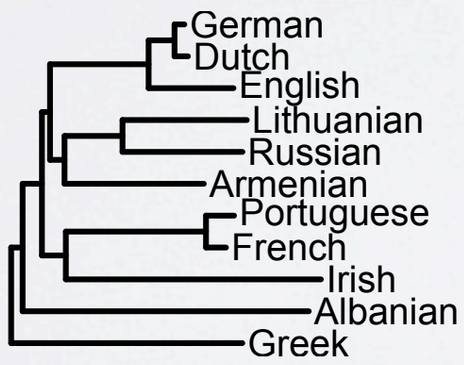

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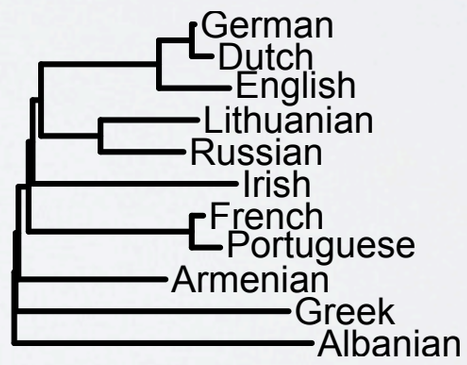
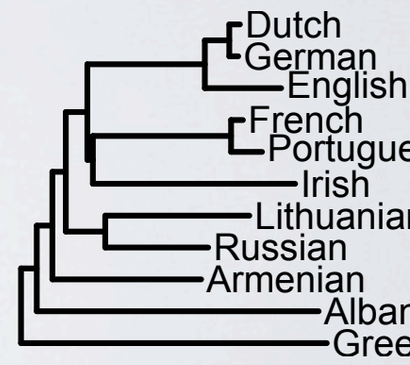
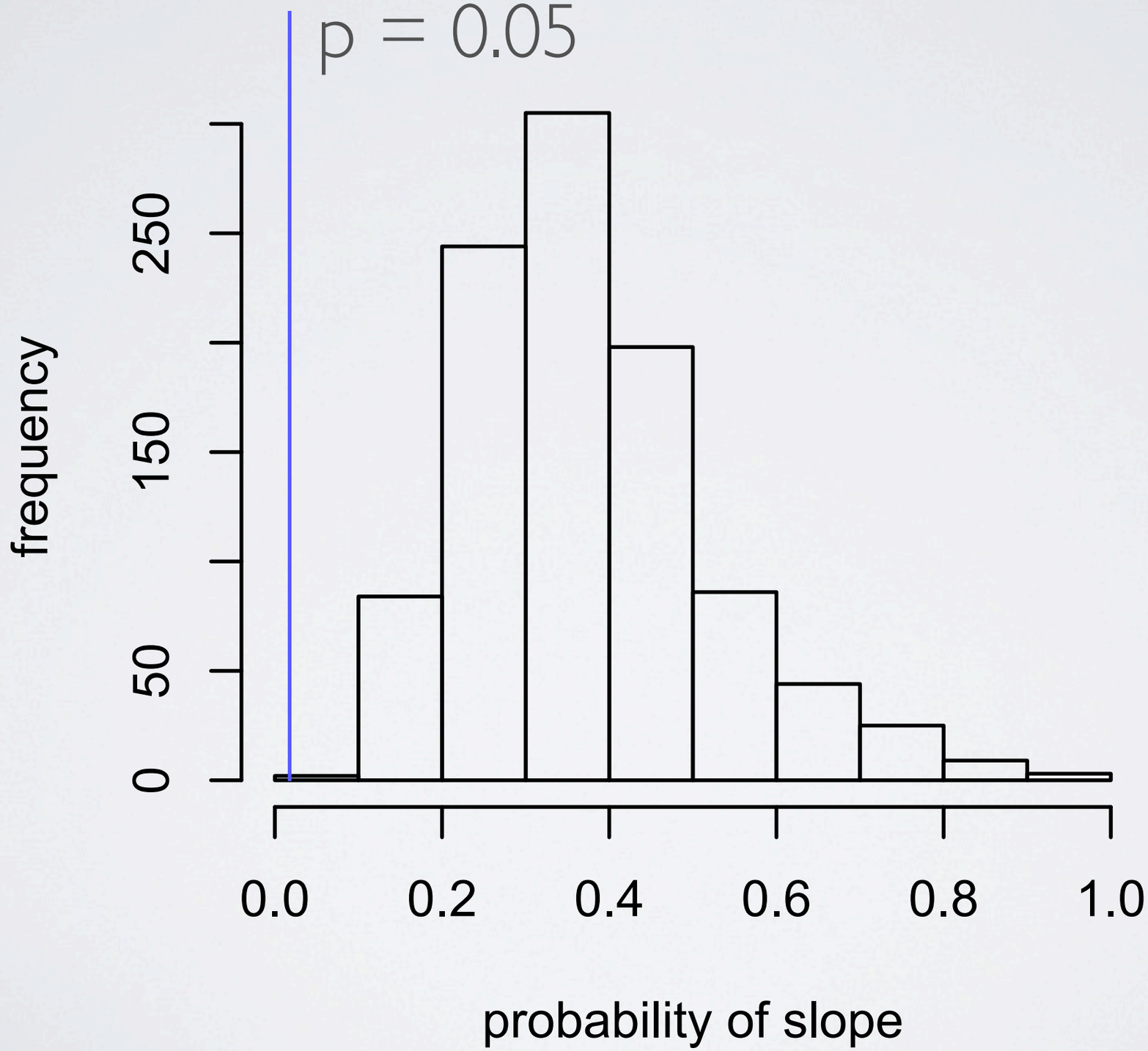


n. 888



n. 889

CORRELATED EVOLUTION



CONCLUSION

An approach to motion events that takes into account patterns of usage gives us a more fine-grained and productive perspective

Patterns of motion encoding diversity are not random but historically patterned, and comparative analysis needs to take this into account

In order to take into account this history we need ways to combine traditional historical linguistic methods with phylogenetic comparative methods

Thank you!

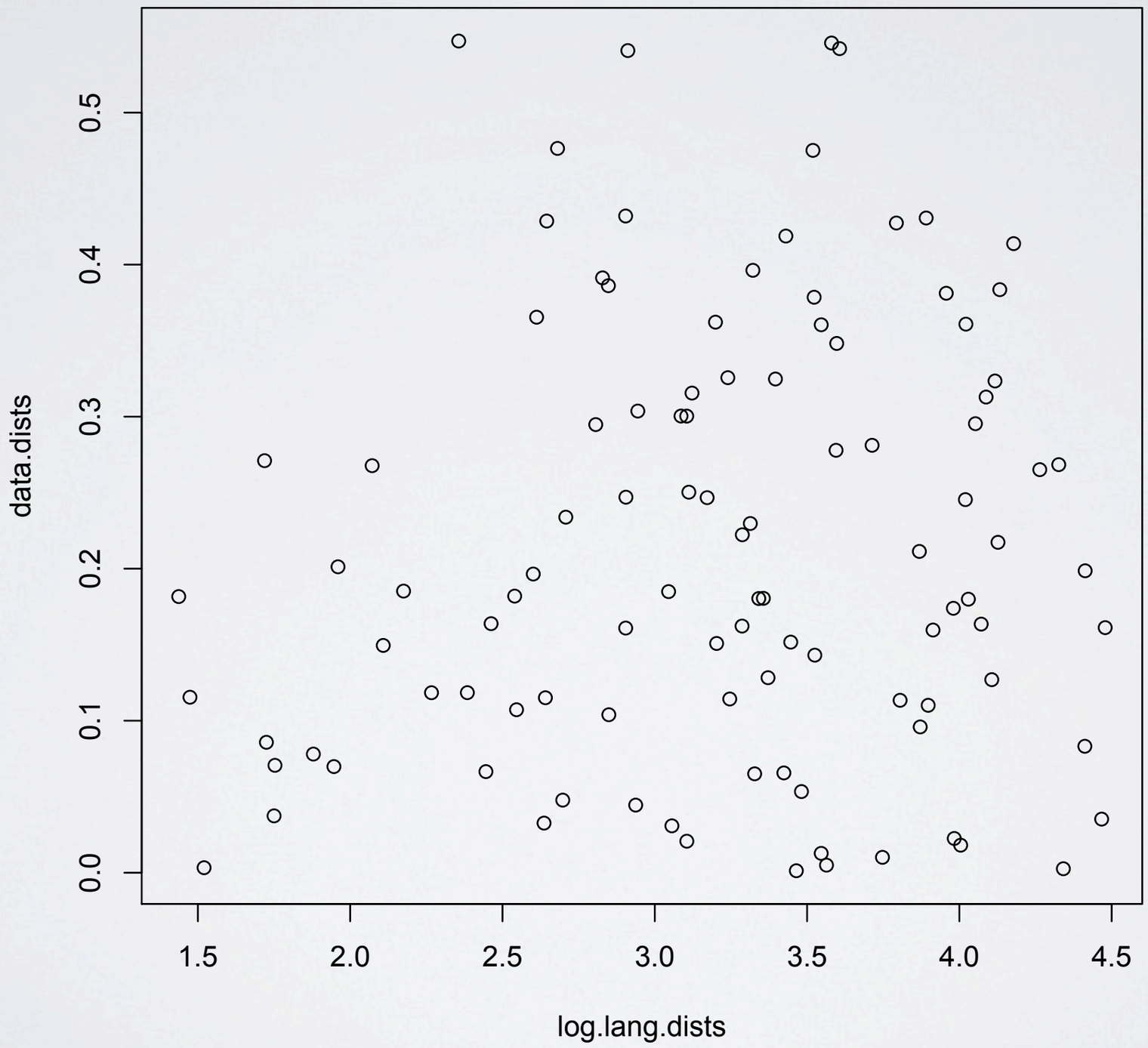
GEOGRAPHICAL DISTANCE

Mantel test (Spearman correlation):

Mantel coefficient 0.095

Two-tailed p-value: 0.369

GEOGRAPHICAL DISTANCE



CORRELATED EVOLUTION

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	2.73756	0.31165	8.7841	1.041e-05	***
log(encoding)	-1.01505	0.36695	-2.7662	0.02189	*

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.01612 on 9 degrees of freedom
Multiple R-squared: 0.4595, Adjusted R-squared: 0.3995
F-statistic: 7.652 on 2 and 9 DF, p-value: 0.01144