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# A model-based approach to dependent linguistic change

D. M. Goldstein

19 September 2019

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## The big question

Are there dependent changes in language? And if so, how can we tell?



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– Chain shifts: Grimm's law, Great Vowel Shift

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- Chain shifts: Grimm's law, Great Vowel Shift
- Structure-preserving sound change: compensatory lengthening (de Chene and Anderson 1979, Kavitskaya 2002, Kavitskaya 2017, Gess 1998), metathesis

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- Lexicon: Color terms (Berlin and Kay 1969, Haynie and Bower 2016)

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- Lexicon: Color terms (Berlin and Kay 1969, Haynie and Bower 2016)
- Morphosyntax: "Linguistic cycles" (Gelderen 2011, Gelderen 2013)

# Grimm's Law

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(i)  $*t > \vartheta$

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(i)  $*t > \theta$

(ii)  $*d > t$



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$$(i) \quad *t > \theta$$

$$(ii) \quad *d > t$$

$$(iii) \quad *d^h > d$$



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(i) Dark-cool and light-warm



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(ii) Red



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(i) Dark-cool and light-warm

(ii) Red

(iii) Either green or yellow





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(vi) Brown



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(ii) Red

(iii) Either green or yellow

(iv) Both green and yellow

(v) Blue

(vi) Brown

(vii) Purple, pink, orange, or gray



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(1) i. in macc **the** boy'

ii. macc 'a boy'

(2) Persian

(3) krasivyj novyj derevjannyj **dom**

'a/**the** beautiful new wood **house**' (Bailyn 2012, p. 45)

(4) i. I see **the** farmer on his farm.

ii. I see **a** duck on the other side of the road.



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- When do articles start to appear in Indo-European or are they a property of the root node (Proto-Indo-European)?

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- Does one type of article tend to emerge first? If so, which one?

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- When do articles start to appear in Indo-European or are they a property of the root node (Proto-Indo-European)?
- Does one type of article tend to emerge first? If so, which one?
- Does the presence of one type of article in a language make the development of the other more likely? If so, why?



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## – Independence

“[T]he emergence of a definite article does not entail the simultaneous emergence of an indefinite one.” (Irslinger 2013, p. 46)

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“[T]he emergence of a definite article does not entail the simultaneous emergence of an indefinite one.” (Irslinger 2013, p. 46)

## – Precedence

Definite articles tend to emerge before indefinite ones.  
(de Mulder and Carlier 2011, p. 524)

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## – Dependence?

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- 1 Although dependent morphosyntactic changes have been claimed to exist in the literature, no study that I am aware of specifically tests this hypothesis.

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- 6 Claims of dependency do not test hypotheses of dependency. That is, they do not pose the question: Does a model of dependent change better account for the data than a model of independent change?

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# What's at stake/Implications

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- (5) i. Biological integration/Linguistic integration? Universal Grammar? Parameter hierarchies? Acquisition?  
PHENOTYPIC INTEGRATION (See Wikipedia entry!  
and Olson and Miller 1999, Pigliucci and Preston 2004)  
Complex phenotypes  
Speakers favor certain combinations of traits?  
Has implications for learnability.  
Hale's concentric circles???  
The linguistic system itself can facilitate change
- ii. One of the central pursuits of linguistic theory is the elaboration of Universal Grammar (UG). Dependent properties of language cannot belong to UG.
- iii. Most methods of phylogenetic inference assume independence of characters.

# Claims

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-Grammaticalization of indefinite articles in Indo-European is facilitated by the presence of definiteness as a morphosyntactic category, be it definite articles or definiteness-/specificity-based differential object marking (DOM).  
-The grammaticalization of definiteness marking proceeds along the reference hierarchy.

# Reference hierarchy

Keenan 2009

PREDICTION: INDEFINITE DETERMINERS WILL FIRST BE INDEFINITE SPECIFIC??? OR NOT NEC A PREDICTION OF ANALYSIS?

- (6) REFERENCE HIERARCHY (Dryer 2014, e235)
- Anaphoric definites >
  - nonanaphoric definites >
  - pragmatically specific indefinites >
  - pragmatically nonspecific (but semantically specific) definites >
  - semantically nonspecific indefinites
- (7) Definite > Specific > Non-specific > Non-referential/generic

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- Sample of 94 Indo-European languages (Broad dataset of Chang et al. 2015)

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- Sample of 94 Indo-European languages (Broad dataset of Chang et al. 2015)
- 78 spoken



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- Sample of 94 Indo-European languages (Broad dataset of Chang et al. 2015)
- 78 spoken
- 16 fossilized

# MAP tree (Chang et al. 2015)

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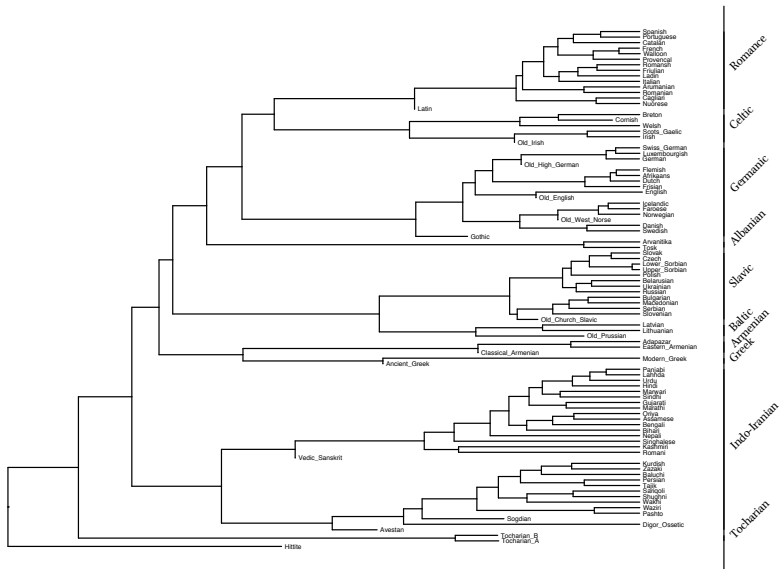
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- Definiteness marking in IE
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- Dependence

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# Articles in Indo-European



# Articles

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## (8) Function

Definite and indefinite articles are markers of referentiality

## (9) Domain

One of their signal features is that they must co-occur with a noun phrase

## (10) Linear properties

I abstract away from differences in linear order and co-occurrence with deictics



# Referential types

A model-based approach to dependent linguistic change  D. M. Goldstein  Introduction  Articles in Indo-European  Precedence  Testing for dependent grammaticalization  Discussion  The rise of the indefinite article  Envoi  Definiteness marking in the history of Indo-European	TYPE	EXAMPLE
	Deictic	Do you see <b>the house</b> over there?
	Recognitional	What happened to <b>that dog</b> (we used to have)?
	Absolutely unique	<b>The Earth</b> is round.
	Anaphoric	Did you like the movie last night? B: <b>The movie</b> was great!
	Bridging	Eva bought a book. <b>The author</b> is French.
	Contextually unique	What's the best way to <b>the center</b> ?
	Establishing	Did you hear the news? They are going to close <b>the museum</b> .
	Specific	I met <b>a strange new neighbour yesterday</b> .
	Non-specific Generic	Do you have <b>a pen</b> ? Any pen will do. I like <b>cats</b> .

Table 1: Referential types

# Frequency distribution

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- Many languages (e.g., English) have morphologically distinct articles—other languages do not!

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- Many languages (e.g., English) have morphologically distinct articles—other languages do not!
- Definite articles can be homophonous with demonstratives

# Frequency distribution

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- Many languages (e.g., English) have morphologically distinct articles—other languages do not!
- Definite articles can be homophonous with demonstratives
- Indefinite articles can be homophonous with the cardinal numeral ‘one’

# Examples

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Deciding whether or not a language has a definite and indefinite article is not always straightforward (e.g., Old English)

(11) DEMONSTRATIVE

(12) CARDINAL

# Two datasets

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– Narrow dataset

Only morphologically distinct definite and indefinite articles



# Two datasets

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– Narrow dataset

Only morphologically distinct definite and indefinite articles

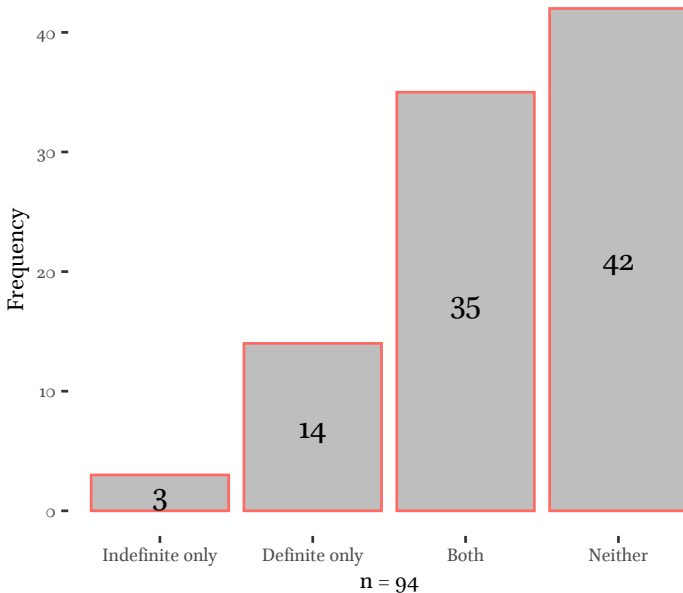
– Broad dataset

Morphologically distinct and non-distinct definite and  
indefinite articles





# Articles across Indo-European (Narrow dataset)



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- Most languages in the sample (77 out of 94, or 0.82 percent) either have both a definite and indefinite determiner or neither.

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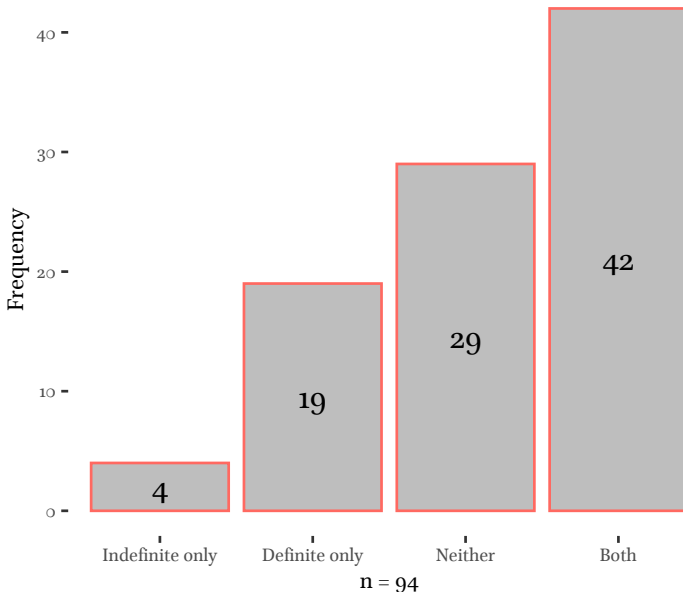
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- Most languages in the sample (77 out of 94, or 0.82 percent) either have both a definite and indefinite determiner or neither.
- Among languages with only one article in the sample, more have a definite (14) than an indefinite (3). The latter class is limited to Upper and Lower Sorbian; Persian; Tajik; Shughni; Sariqoli; and Singhalese.

# Articles across Indo-European (Broad dataset)



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The inclusion of demonstratives that exhibit definite-article behavior has the following effects on the frequency distribution:

- (13)
- i. The number of languages with neither definite nor indefinite article dropped to 29 from 42
  - ii. The number of languages with only an indefinite article dropped to 4 from 3 (Tajik, Persian, and Singhalese)
  - iii. The number of languages with only a definite article increased to 19 from 14
  - iv. The number of languages with both a definite and indefinite article increased slightly to 42 from 35

# Languages with demonstratives used to mark definite referent types

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- (14) i. Gothic (Wright 1910, §265, Sauvageot 1929)
- ii. Old High German (Kraiss 2014)
- iii. Old English
- iv. Latin
- v. Upper and Lower Sorbian (Berger 2007)
- vi. Latvian (Bielenstein 1863, pp. 257, 416)
- vii. Kashmiri (Wali et al. 1997, p. 100)
- viii. Sogdian (Sims-Williams 1994, Skjærvø 2007, p. 19, Wendtland 2011)
- ix. Wakhi (Bashir 2009, p. 841, Lorimer 1958, pp. 60, 208)
- x. Shughni
- xi. Sariqoli (Edelman and Dodykhudoeva 2009, p. 781?)
- xii. Balochi (Gilbertson 1923, p. 12)
- xiii. Ossetic

# Coarse comparison

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- (15) co·n-acca ara chind **in** fer  
'He saw a man in front of him.'  
Lebor na hUidre 4932–4933 *GOI*, §470 (cf. Best and Bergin  
1929, Ronan 2004)

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# Articles typologically

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## WALS?

- Definite articles attested in approx. 30% of the world's languages

# Cognate articles

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- In most clades, the articles that we find in a given language is cognate with an article in another language of that clade.

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- In most clades, the articles that we find in a given language is cognate with an article in another language of that clade.
- All of the Celtic languages in my sample have a definite article, for instance.

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- In most clades, the articles that we find in a given language is cognate with an article in another language of that clade.
- All of the Celtic languages in my sample have a definite article, for instance.
- These various definite articles all descend from an original demonstrative *\*sindos*.

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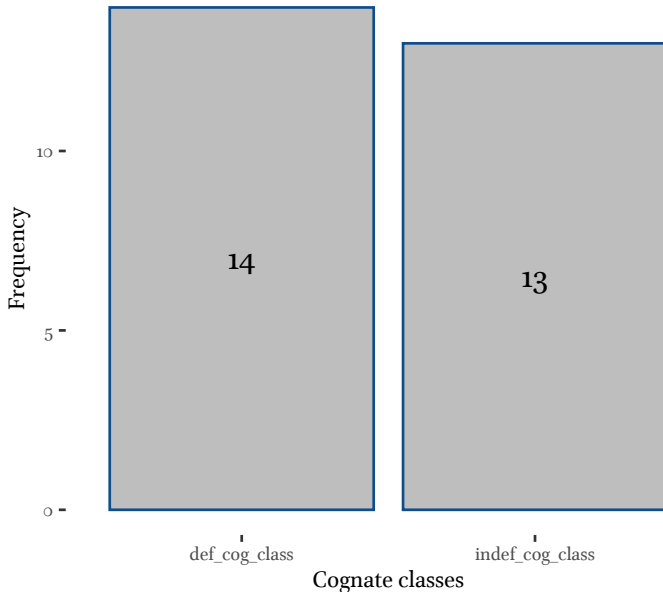
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- In most clades, the articles that we find in a given language is cognate with an article in another language of that clade.
- All of the Celtic languages in my sample have a definite article, for instance.
- These various definite articles all descend from an original demonstrative *\*sindos*.
- The definite article in Celtic thus forms a cognate class.

# Cognate classes (Narrow dataset)



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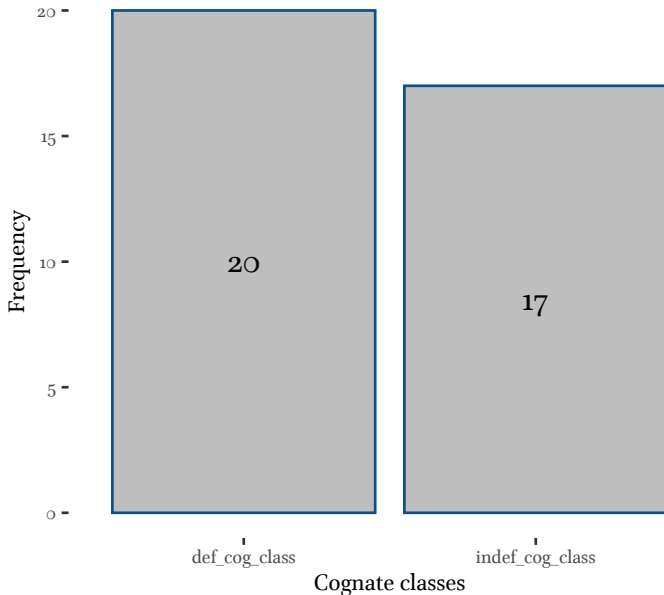
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# Cognate classes (Broad dataset)



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# Definite article cognate classes

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CLADE	COGNATE CLASS	LANGUAGE
Celtic	1	Old Irish, Irish, Scots Gaelic, Welsh, Breton, Cornish
Romance	2	Nuorese, Cagliari
Romance	3	Romanian, Arumenian, Catalan, Portuguese, Spanish, French, Provençal, Walloon, Ladin, Romansh, Friulian, Italian
Northwest Germanic	4	Old Norse, Icelandic, Faroese, Norwegian, Swedish, Danish
Germanic	5	<b>Gothic, Old English</b> , English, Frisian, <b>Old High German</b> , German, Luxembourgish, Swiss German, Dutch, Flemish, Afrikaans
Albanian	6	Tosk, Arvanitika
Greek	7	Ancient Greek, Modern Greek
Armenian	8	Classical Armenian, Eastern Armenian, Adapazar
Baltic	9	Old Prussian
Baltic	10	<b>Latvian</b>
Slavic	11	<b>Upper Sorbian, Lower Sorbian</b>
Slavic	12	Macedonian, Bulgarian
Iranian	13	<b>Sogdian, Wakhi, Baluchi</b>
Iranian	14	Kurdish
Iranian	15	<b>Shugni, Sariqoli</b>
Indic	16	Assamese, Oriya, Bengali
Indic	17	<b>Kashmiri</b>
Indic	18	Romani

Table 2: Cognate classes for the definite article

# Indefinite article cognate classes

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CLADE	COGNATE CLASS	LANGUAGE
Celtic	1	Breton
Romance	2	Nuorese, Cagliari, Romanian, Arumenian, Catalan, Portuguese, Spanish, French, Provençal, Walloon, Ladin, Romansh, Friulian, Italian
Germanic	3	Icelandic, Faroese, Norwegian, Swedish
Germanic	4	English, Frisian
Germanic	5	German, Luxembourgish, Swiss German
Germanic	6	Dutch, Flemish, Afrikaans
Albanian	7	Tosk, Arvanitika
Greek	8	Modern Greek
Armenian	9	Eastern Armenian, Adapazar
Slavic	10	<b>Upper Sorbian, Lower Sorbian</b>
Iranian	11	<b>Tajik</b> , Persian
Iranian	12	Baluchi, Kurdish, Zazaki
Iranian	13	Shughni, Sariqoli
Indic	14	Assamese, Oriya, Bengali
Indic	15	Singhalese
Indic	16	Romani

Table 3: Cognate classes for the indefinite article

# Cognate classes per language type (Narrow dataset)

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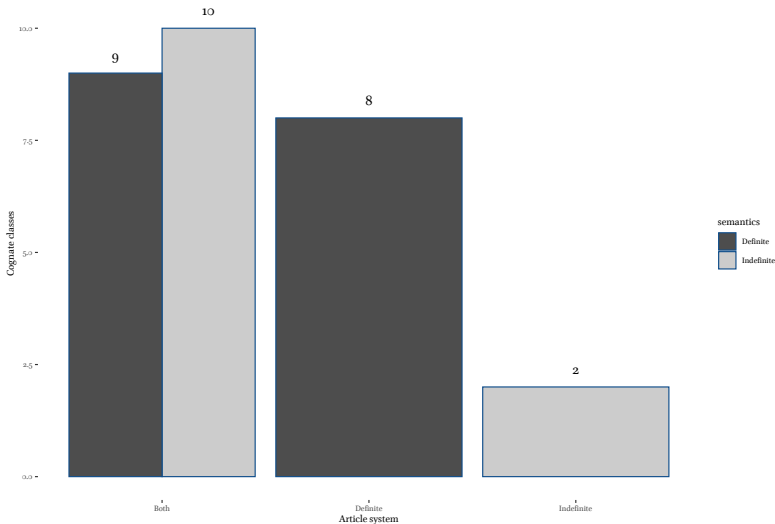
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# Cognate classes per language type (Broad dataset)

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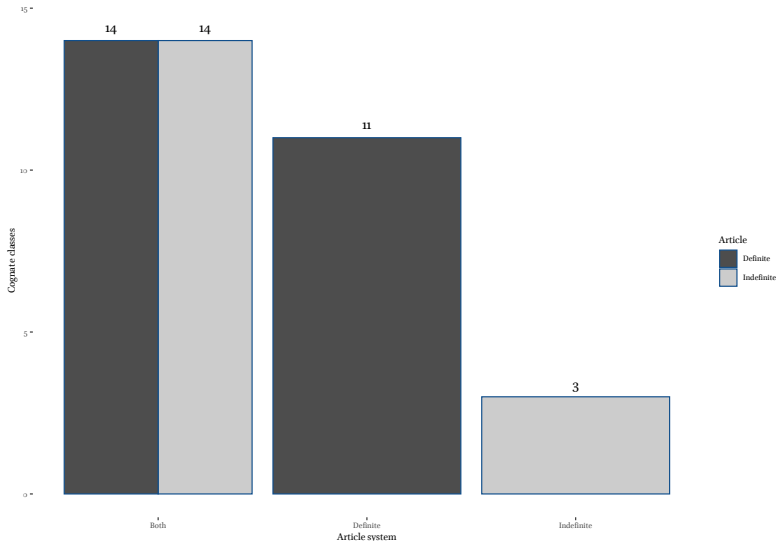
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<http://blog.phytools.org/2014/12/simulating-correlated-evolution-of.html>



# ASE Definite broad dataset

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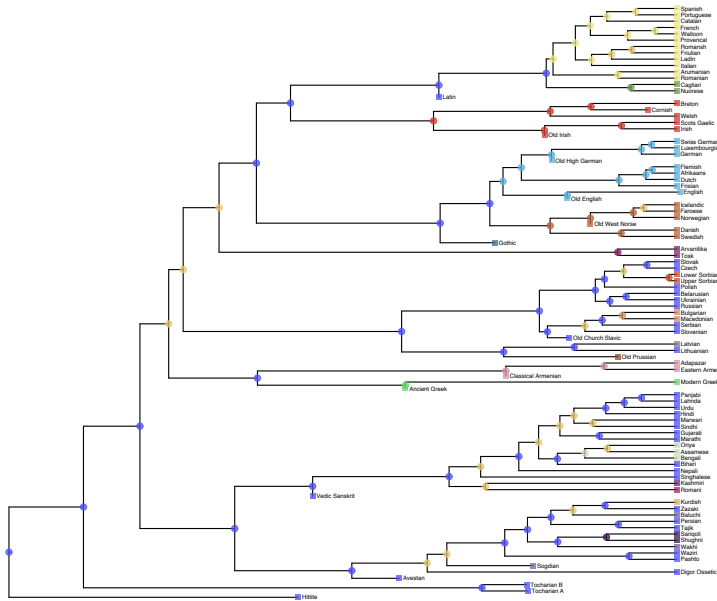
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# ASE Indefinite narrow dataset

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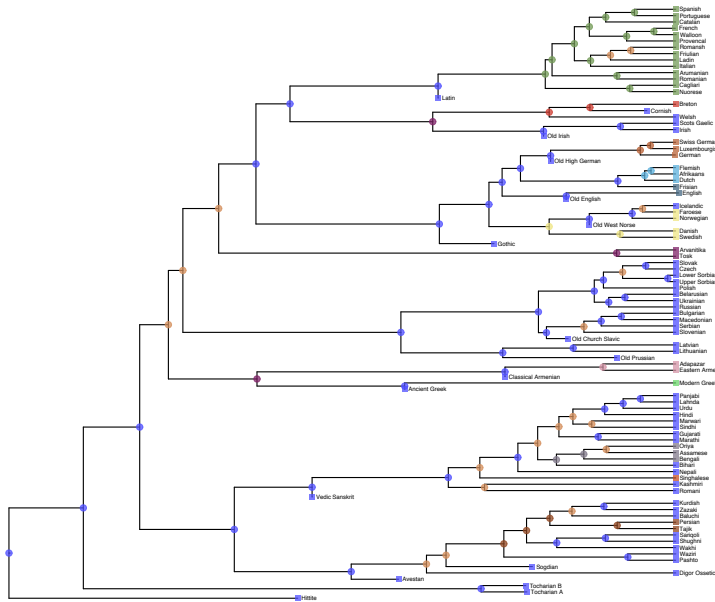
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# ASE Indefinite broad dataset

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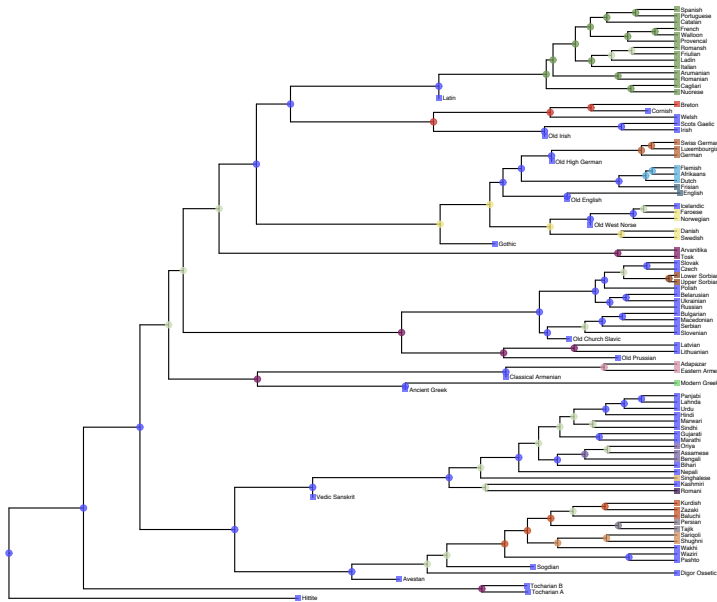
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- (16) Distal demonstrative  
True for ON?  
What to say about Armenian?
- (17) Reflexive intensifier (ipse)
- (18) Relative pronoun ???

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# Precedence

# Establishing precedence

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– Textual evidence



# Establishing precedence

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- Textual evidence
- Comparative parsimony analysis



# Textual evidence

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Definite Article	Indefinite article
Archaic Greek	Medieval Greek
Old English	Middle English
Classical Armenian	Modern Armenian

# Comparative evidence

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# Comparative evidence

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- The Celtic languages in my sample all have a definite article than continues *\*sindos*, but only Breton has an indefinite article.
- Parsimony analysis would again assign the definite article to an earlier state of the Celtic languages than the indefinite article.



# Inferring past states

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- With the exception of Celtic, the earliest attested languages of each clade uniformly lack definite and indefinite articles.

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- With the exception of Celtic, the earliest attested languages of each clade uniformly lack definite and indefinite articles.
- There is no definite article found early enough and with cognates in other clades for there to be a viable candidate for a definite or indefinite article in Proto-Indo-European.

# A history of gain

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- If we assume that PIE lacked both definite and indefinite articles, then such forms in the attested languages all constitute innovations.

# A history of gain

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- If we assume that PIE lacked both definite and indefinite articles, then such forms in the attested languages all constitute innovations.
- The history of definiteness marking across IE is then only exclusively of gain: there are no known cases of a definite or indefinite article being lost in the history of IE.

# Slavic

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■ PIE then resembles languages such as Russian and Lithuanian

Gundel et al. 1993, p. 284 has a table

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# Testing for dependent grammaticalization

# What we want to know

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- Is the presence of an indefinite article in a language dependent on that of a definite article?

# What we want to know

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- Is the presence of an indefinite article in a language dependent on that of a definite article?
- Does the rate at which an indefinite article develops differ if the presence of a definite article is taken into account?



# Uncertainty

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– We don't know the true phylogenetic tree

# Uncertainty

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- We don't know the true phylogenetic tree
- We don't know the ancestral states

# Bayesian phylogenetics

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## ■ use environment?

### – Main idea

What is the probability of a tree and its associate parameters given the observed data?



# Bayesian phylogenetics

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## ■ use environment?

### – Main idea

What is the probability of a tree and its associate parameters given the observed data?

### – More specifically for our purposes

Given a set of trees and the observed data, what is the probability of the rate of change of the linguistic characters?



# Bayesian phylogenetics

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$$f(\tau, \nu, \Phi | \mathbf{X}) = \frac{f(\mathbf{X} | \tau, \nu, \Phi) \times f(\tau, \nu, \Phi)}{f(\mathbf{X})}$$

## Parameters

$\tau$  Tree topology

$\nu$  Branch lengths

$\Phi$  Model of trait change

$\mathbf{X}$  “Observed” data

# Informative priors

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- Model is heavily biased toward no articles at the root node

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- Model is heavily biased toward no articles at the root node
- The number of cognate classes were used as priors for the transition rates

# Accounting for uncertainty

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Bayesian-MCMC analyses yield not one tree, but a distribution of phylogenetic trees.

- Ancestral states and transition rates estimated across 50 phylogenetic trees to account for phylogenetic uncertainty



# Markov Chain Monte Carlo

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For the sort of situations we're working with, there's no analytic situation to Bayes' formula.

So we approximate an answer via Markov Chain Monte Carlo.

# Transition models

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# Testing for correlated evolution

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## Hypothesis

The rate of developing a indefinite article given the presence of a definite article  $\neq$  rate of developing an indefinite article given the absence of a definite article.

# Two models

- In the simple model there is one rate parameter for the development of definite articles and one rate parameter for the development of indefinite articles.

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# Two models

- In the simple model there is one rate parameter for the development of definite articles and one rate parameter for the development of indefinite articles.
- In the more complex model there are four rate parameters:

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- In the simple model there is one rate parameter for the development of definite articles and one rate parameter for the development of indefinite articles.
- In the more complex model there are four rate parameters:
  - 1**  $(0,0) > (1,0)$  [Gain definite article without an indefinite article]

# Two models

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- In the more complex model there are four rate parameters:
  - 1  $(0,0) > (1,0)$  [Gain definite article without an indefinite article]
  - 2  $(0,0) > (0,1)$  [Gain indefinite article without a definite article]

# Two models

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  - 2  $(0,0) > (0,1)$  [Gain indefinite article without a definite article]
  - 3  $(0,1) > (1,1)$  [Gain definite article with an indefinite article already present]



# Two models

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  - 3  $(0,1) > (1,1)$  [Gain definite article with an indefinite article already present]
  - 4  $(1,0) > (1,1)$  [Gain indefinite article with a definite article already present]

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- In the more complex model there are four rate parameters:
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  - 2  $(0,0) > (0,1)$  [Gain indefinite article without a definite article]
  - 3  $(0,1) > (1,1)$  [Gain definite article with an indefinite article already present]
  - 4  $(1,0) > (1,1)$  [Gain indefinite article with a definite article already present]
- Is the increase in model complexity justified by the observable evidence?

# Dealing with phylogenetic uncertainty

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- To accomodate phylogenetic uncertainty, the transition rates of the definite and indefinite articles are being estimated across a sample of 50 trees.

# Reversible Jump

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Pagel 1994; Pagel and Meade 2006

# Results (Narrow dataset)

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■ Graph here!

# Results (Broad dataset)

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■ Graph here!

# Model comparison

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# Definiteness hierarchy

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- (19) REFERENCE HIERARCHY (Dryer 2014, e235)
- Anaphoric definites > nonanaphoric definites >  
pragmatically specific indefinites > pragmatically  
nonspecific (but semantically specific) definites >  
semantically nonspecific indefinites

Dryer 2014

Greenberg 1978

Keenan 2009

# The givenness hierarchy

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- Determiners and pronominal forms conventionally signal different cognitive statuses.

(20) Gundel et al. 1993  
in focus: *it* »  
activated: *this, that, this N* »  
familiar: *that N* »  
uniquely identifiable (definite specific) *the N* »  
referential (indefinite specific) *this N* »  
type identifiable (generic) *a N*

# Indefinite trajectory

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(21) Heine 1997, pp. 71–76

Numeral ‘one’ > presentative marker > specific marker >  
nonspecific marker > generalized marker

Givón 1981

# Heine's trajectory

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## Numeral 'one' Individuation and quantification

# Heine's trajectory

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Numeral 'one' Individuation and quantification

Presentative marker Signals prominent, topical discourse referents not yet identifiable to the hearer. Most uses correspond to the introduction of new referents into the discourse.

# Heine's trajectory

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Numeral 'one' Individuation and quantification

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Specific marker Exclusive-specific articles/indefinite specific

# Heine's trajectory

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Numeral 'one' Individuation and quantification

Presentative marker Signals prominent, topical discourse referents not yet identifiable to the hearer. Most uses correspond to the introduction of new referents into the discourse.

Specific marker Exclusive-specific articles/indefinite specific

Nonspecific marker Indefinite article that encodes both specific and nonspecific referents

# Heine's trajectory

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Numeral 'one' Individuation and quantification

Presentative marker Signals prominent, topical discourse referents not yet identifiable to the hearer. Most uses correspond to the introduction of new referents into the discourse.

Specific marker Exclusive-specific articles/indefinite specific

Nonspecific marker Indefinite article that encodes both specific and nonspecific referents

Generalized marker ??????



# Latin

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- Use as a numeral and presentative marker?
- We only find specific readings in Romance

# The rise of exclusive-specific readings????

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# Old French

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(OF) texts is the Cantilène de Ste Eulalie ca. 880 CE

# Bede's account of the poet Caedmon

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# The Voyages of Ohthere and Wulfstan—first ex. of indefinite?

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(22) Þonne is ān port on sūðewearðum þāem lande, þone man  
hæt Scīringes hēal.

In this passage, Ohthere is describing Helgeland, his home country:

# Motivating the change

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## ■ The structure has already developed?

When a definite article develops, it introduces the category of definiteness into the language/creates a contrast (Bauer 2007 disagrees with this).

This step facilitates the development of indefinite articles, because a definite-indefinite contrast already exists. It simply that indefinites are not marked.

So the development of an indefinite article is just replacement of the null realization of indefiniteness with something pronounceable.

# Not a linguistic universal

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## ■ Run the analysis without Romance and Germanic?

This is a lineage-specific pattern with a strong areal bent

“But the trend is to a system containing both a definite and an indefinite article.” (Lakoff 1972, p. 174)

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# The rise of the indefinite article



# What semantic mechanisms are at play?

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Mosegaard Hansen and Waltereit 2006

# The indefinite specific

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In line with the trajectory view is the fact that in some languages the first reference type of the indefinite article is the indefinite specific article.

Keenan's work

# A stronger effect?

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- It is likely that the dependency between indefinite and definite article is stronger than my results indicate.

1 Romance

2 Tajik and Persian

# Romance

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- The dependency between definite and indefinite article is stronger than my experiment indicates because of the Romance languages.
- In my view it is likely that the development of the indefinite article was homoplastic in Romance, but it's difficult to know how homoplastic.
- Uniformly coded

# Parsimony upset: The case of Romance

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- (23)
- i. Romance indefinite articles uniformly continue Latin *unus* ‘one’.
  - ii. The definite articles, however, do not develop from a singular source.
  - iii. A parsimony analysis of the comparative data would reconstruct an indefinite article \**unus* to Proto-Romance and a definite article to a later stage.

# Homoplasy

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(24) Old French reveals that such a reconstruction is demonstrably false. In the earliest Old French texts, the definite article is present, but the indefinite is nascent???

Meyer-Lübke (1923 [1890-1906]: III, 231) point outs the evolution from *ū nus* to indefinite article is later than the formation of the definite article.

Definite article present but indefinite only used in...?

See biblio!

This also happened in Germanic!

# The grammaticalization of definiteness marking

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■ structure before exponent???

Börjars et al. 2016

# Hawkins

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Hawkins 2004, pp. 84–86 identifies four stages of semantic/pragmatic evolution of articles derived from demonstrative pronouns. I include the deictic pronoun as stage 0. Hawkins' stage 2 picks up where Leiss (1994) left off.

- Use as deictic only
- Abandonment of deictic restriction and adoption of anaphoric function for visible or recently mentioned nouns
- Expansion of the range of use from visible to nonvisible nouns
- Universal or generic use with little or no pragmatic delineation
- Extension to specific indefinite reference and purely syntactic purposes, for example, as a noun class marker



# Implications for the DP-Hypothesis

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I have argued that the grammaticalization of an indefinite article depends on the previous existence of definiteness as a morphosyntactic category in the language (whether realized by a definite article, DOM, OR DEFINITE ADJECTIVES????).

If we adopt DP analyses of languages without definite articles we introduce definiteness as a category.

Under this view, languages without an overt definite article should have more indefinite articles.

Pereltsvaig 2007, Pereltsvaig 2013

# Anagenetic or cladogenetic change?

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What does it add to the analysis to know whether the change is anagenetic or cladogenetic?

Following givenness hierarchy and also undergoing a burst of change?

It's a historical accident that

- Build bigger character suites for Boskovic' NP and DP languages?

# The development of definite articles

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Becker 2019a: slide 41

(25) (distal) deictic > anaphoric > (contextually) unique

Himmelmann 1997, pp. 93–97

- My study did not investigate the diachronic trajectory among definite referential types.

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# Future work

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# A better method

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- Rather than focus on the presence/absence of definite and indefinite articles, I look at which type of referential phrases get marked.
- No distinction between marker. All that is being scored is whether or not the NPs get marked
- Some definite article function are covered by the demonstrative!

# Carving up the referential space

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- My study does not account for the differences in marking along the definiteness hierarchy and why some languages draw the dividing line between definite and indefinite marker at different points in the referential space



# Rapa Nui

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One marker for definite, specific, and non-specific referent types

# Becker's areal data?

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Use it to make a claim about development of articles outside of IE?  
You need trees...

- (26) Lineage-specific trajectory/generalizations
- i. If a language has one article, it marks definiteness/specificity
  - ii. If a language has two articles, one marks definiteness/specificity and one non-specifics
  - iii. If a language has three articles, one marks definiteness/specificity, one non-specifics, and one generics

# Typological gaps

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slide 20, Becker 2019a

The existence of nonspecific articles depends on the existence of specific articles in the system.

As expected, a single article cannot encode definite and nonspecific referents without encoding specific referents.

# The numeral one as exclusive specific

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(27) Kashmiri (Wali et al. 1997, p. 100)

(28) Persian

(29) Tajik

(30) NO: Balochi? -e? Balochi has cardinal *yakk*: they can co-occur! Axenov 2006, p. 63

# A first generalization

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- (31) In all languages with both a definite and an indefinite article where we can infer a precedence relationship, the definite article developed before the indefinite—with two exceptions, Persian and Tajik.

# Tajik and Persian

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- (32)
- i. Persian has no definite article (Mace 2003, p. 37)
  - ii. Two markers of indefiniteness in Persian (Jasbi 2014)
    - ye*: which behaves very much the English a(n).
    - i*: which behaves a bit like the English any.

# Persian indefinite marking

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- (33) i. ye keik xord-am  
a cake eat-1SG  
I ate a cake.
- ii. \*keik i xord-am  
cake INDEF eat-1SG
- iii. ye keik i xord-am  
a cake INDEF eat-1SG  
I ate a cake.



# Indefiniteness in Tajik

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Perry 2005

Tajik Persian: demonstrative covers the definite referent types and the indefinite is a specific indefinite?

These are both specificity/definiteness DOM languages! Jasbi 2014 on Persian

Becker 2019b, pp. 231–232

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Lycian: DOM but not the right demonstrative system? Or Hittite?  
Becker 2019b discusses this in relation to australian

One would not want to say that Tajik and Persian have a definite  
and indefinite articles.

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First demonstrative used to mark definites and then indefinites develop thereafter.

**YOU THEREFORE ABSOLUTELY MUST RECOGNIZE  
DEMONSTRATIVES/DEICTICS USED TO MARK DEFINITES!**

Slide 31, Becker 2019a: case marking can handle referential marking of objects!

in direct object position, case markers indicate referential type

# Differential object marking (DOM)

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Although Tajik and Persian lack definite articles, they do mark definites.

It is, however, true that Tajik and Persian mark both definite and indefinite referent types and the development of these articles is consistent with the definiteness hierarchy above.

Sinnemäki 2014

What about definite adjectives? Does that count too?

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# Definiteness marking in the history of Indo-European

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- Definite article
- Differential object marking (DOM)
- Adjective declension

# MCMC chains

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# Diversification rates

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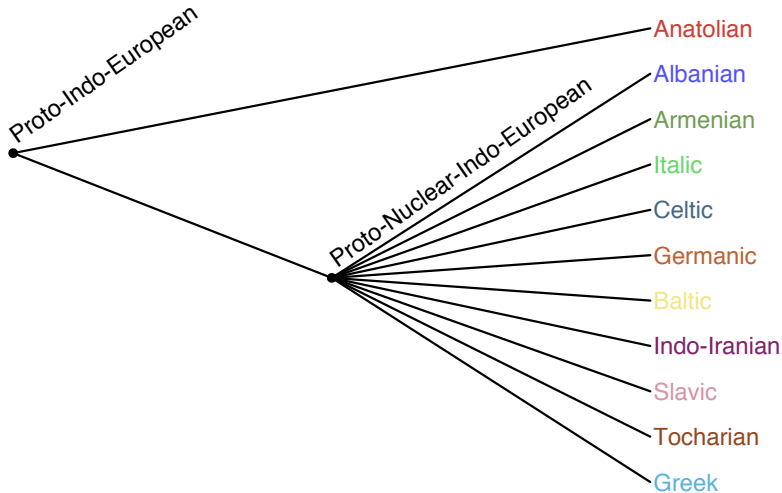
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# A common view of the history of IE



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# Testing ground

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## Definition

A **prime number** is a number that has exactly two divisors.

Structure Structure Structure Structure Structure

What's this

Axenov, Serge (2006). *The Balochi language of Turkmenistan. A corpus-based grammatical description*. Studia Iranica Upsaliensia 10. Uppsala: Acta Universitatis Upsaliensis.

Bailyn, John F. (2012). *The syntax of Russian*. Cambridge University Press. DOI: 10.1017/CBO9780511984686.

Bashir, Elena (2009). “Wakhi”. In: *The Iranian languages*. Ed. by Gernot Windfuhr. London: Routledge, pp. 825–858.

Bauer, Brigitte L. M. (2007). “The definite article in Indo-European. Emergence of a new grammatical category?” In: *Nominal determination. Typology, context constraints and historical emergence*. Ed. by Elisabeth Stark, Elisabeth Leiss, and Werner Abraham. Amsterdam: John Benjamins, pp. 103–139. DOI: 10.1075/slcs.89.06lei.

Becker, Laura (2019a). “Articles in the world’s languages”. Universität Bamberg. June 2019.

– (2019b). *Articles in the world's languages*. Berlin: Language Science Press.

Berger, Tilman (2007). “Tendencies of the evolution of a definite article in the Sorbian languages”. Slavic Linguistic Society. Aug. 2007.

Berlin, Brent and Paul Kay (1969). *Basic color terms. Their universality and evolution*. Berkeley: University of California Press.

Best, Richard I. and Osborn Bergin, eds. (1929). *Lebor na Huidre. Book of the dun cow*. Dublin: Hodges, Figgis, & Co.

Bielenstein, August Johann Gottfried (1863). *Lettische Grammatik*. German. Mitau: Fr. Lucas.

Börjars, Kersti, Pauline Harries, and Nigel Vincent (2016). “Growing syntax. The development of a DP in North Germanic”. In: *Language* 92.1 (Mar. 2016), e1–e37. DOI: 10.1353/lan.2016.0002.

Chang, Will, Chundra Cathcart, David P. Hall, and Andrew J. Garrett (2015). "Ancestry-constrained phylogenetic analysis supports the Indo-European steppe hypothesis". In: *Language* 91.1 (Mar. 2015), pp. 194–244. DOI: 10.1353/lan.2015.0005.

De Chene, E. Brent and Stephen R. Anderson (1979). "Compensatory lengthening". In: *Language* 55.3 (Sept. 1979), pp. 505–535.

De Mulder, Walter and Anne Carlier (2011). "The grammaticalization of definite articles". In: *The Oxford handbook of grammaticalization*. Ed. by Bernd Heine and Heiko Narrog. Oxford: Oxford University Press, pp. 522–534. DOI: 10.1093/oxfordhb/9780199586783.013.0042.

Dryer, Matthew S. (2014). "Competing methods for uncovering linguistic diversity. The case of definite and indefinite articles (Commentary on Davis, Gillon, and Matthewson)". In: *Language* 90.4 (Dec. 2014), pp. 232–249. DOI: 10.1353/lan.2014.0070.

Edelman, Džoy I. and Leila R. Dodykhudoeva (2009). “Shughni”. In: *The Iranian languages*. Ed. by Gernot Windfuhr. London: Routledge, pp. 787–824.

Gelderen, Elly van (2011). *The linguistic cycle. Language change and the language faculty*. Oxford: Oxford University Press.

– (2013). “The linguistic cycle and the language faculty”. In: *Language and Linguistics Compass* 7.4, pp. 233–250. DOI: 10.1111/lnc3.12017.

Gess, Randall (1998). “Compensatory lengthening and structure preservation revisited”. In: *Phonology* 15.3 (Dec. 1998), pp. 353–366. DOI: 10.1017/S0952675799003656.

Gilbertson, George Waters (1923). *The Balochi language. A grammar and manual*. Hertford: Stephen Austin & Sons.

Givón, Talmy (1981). “On the development of the numeral ‘one’ as an indefinite marker”. In: *Folia Linguistica Historica* 15.2, pp. 35–54. DOI: 10.1515/flih.1981.2.1.35.

Greenberg, Joseph H. (1978). “How does a language acquire gender markers?” In: *Universals of Human Language*. Ed. by Joseph H. Greenberg, Charles A. Ferguson, and Edith A. Moravcsik. Vol. 3. Palo Alto: Stanford University Press, pp. 47–82.

Gundel, Jeanette K., Nancy Hedberg, and Ron Zacharski (1993). “Cognitive status and the form of referring expressions in discourse”. In: *Language* 69.2 (June 1993), pp. 274–307.

Hawkins, John A. (2004). *Efficiency and complexity in grammars*. Oxford: Oxford University Press.

Haynie, Hannah J. and Claire Bower (2016). “Phylogenetic approach to the evolution of color term systems”. In: *Proceedings of the National Academy of Sciences of the United States of America* 113.48, pp. 13666–13671. DOI: 10.1073/pnas.1613666113.

Heine, Bernd (1997). *Cognitive foundations of grammar*. Oxford: Oxford University Press.

Himmelmann, Nikolaus (1997). *Deiktikon, Artikel, Nominalphrase.*

*Zur Emergenz syntaktischer Struktur.* German. Tübingen:

Niemeyer. DOI: 10.1515/9783110929621.

Irslinger, Britta S. (2013). “Standard Average European and the western fringe. A reconsideration”. In: *Historische Sprachforschung* 126.1, pp. 33–88. DOI: 10.13109/hisp.2013.126.1.33.

Jasbi, Masoud (2014). “Definiteness, specificity or topicality? The semantics of differential object marking in Persian”. Oct. 2014.

Kavitskaya, Darya (2002). *Compensatory lengthening. Phonetics, phonology, diachrony.* London: Routledge.

- (2017). “Compensatory lengthening and structure preservation revisited yet again”. In: *On looking into words (and beyond)*. Ed. by Claire Bowern, Laurence R. Horn, and Raffaella Zanuttini. Berlin: Language Science Press, pp. 41–58. DOI: 10.5281/zenodo.495438.



Keenan, Caitlin (2009). "In search of the genuine article. A reanalysis of the nature of "indefinite" articles in a diachronic perspective". B.A. thesis. June 2009.

Kraiss, Andrew (2014). "The evolution of the definite article in Old High German". In: *Journal of Germanic Linguistics* 26.2 (June 2014), pp. 127–155. DOI: 10.1017/S1470542714000038.

Lakoff, Robin T. (1972). "Another look at drift". In: *Linguistic change and generative theory*. Ed. by Robert P. Stockwell and Ronald K. S. Macauley. Bloomington: Indiana University Press, pp. 172–198.

Lorimer, David Lockhart Robertson (1958). *The Wakhi language. Introduction, phonetics, grammar and texts*. Vol. 1. London: School of Oriental and African Studies, University of London.

Mace, John (2003). *Persian grammar. For reference and revision*. London: Routledge.

Mosegaard Hansen, Maj-Britt and Richard Waltereit (2006). "On the role of generalized conversational implicature in semantic change". In: *Proceedings from the Forty-Second Annual Meeting of the Chicago Linguistic Society*. Ed. by Jacqueline Bunting, Sapna Desai, Robert Peachey, Christopher Straughn, and Zuzana Tomková. Vol. 42. 1. Chicago: Chicago Linguistic Society, Jan. 2006, pp. 33–45.

Olson, Everett C. and Robert L. Miller (1999). *Morphological integration*. Chicago: University of Chicago Press.

Pagel, Mark (1994). "Detecting correlated evolution on phylogenies. A general method for the comparative analysis of discrete characters". In: *Proceedings of the Royal Society B* 255.1342, pp. 37–45. DOI: 10.1098/rspb.1994.0006.

Pagel, Mark and Andrew Meade (2006). "Bayesian analysis of correlated evolution of discrete characters by reversible-jump Markov Chain Monte Carlo". In: *The American Naturalist* 167.6, pp. 808–825. DOI: 10.1086/503444.

Pereltsvaig, Asya (2007). "The universality of DP. A view from Russian". In: *Studia Linguistica* 61.1, pp. 59–94. DOI: 10.1111/j.1467-9582.2007.00129.x.

– (2013). "Noun phrase structure in article-less Slavic languages. DP or not DP?" In: *Language and Linguistics Compass* 7.3 (Mar. 2013), pp. 201–219. DOI: 10.1111/lnc3.12014.

Perry, John R. (2005). *A Tajik Persian reference grammar*. Leiden: Brill.

Pigliucci, Massimo and Katherine A. Preston (2004). *Phenotypic integration*. Oxford: Oxford University Press.

Ronan, Patricia (2004). "Co *n-accae in fer* and *Functional Grammar*". In: *Journal of Celtic* 8, pp. 133–147.

Sauvageot, Aurelien (1929). *L'emploi de l'article en gotique*. French. Paris: Champion.

Sims-Williams, Nicholas (1994). "The triple system of deixis in Sogdian". In: *Transactions of the Philological Society* 92.1 (May 1994), pp. 41–53. DOI: 10.1111/j.1467-968X.1994.tb00427.x.

Sinnemäki, Kaius (2014). "A typological perspective on differential object marking". In: *Linguistics* 52.2, pp. 281–313. DOI: 10.1515/ling-2013-0063.

Skjærvø, Prods O. (2007). "An introduction to Manichean Sogdian". MS., Harvard University.

Thurneysen, Rudolf (1946). *A grammar of Old Irish*. Trans. by David A. Binchy and Osborn Bergin. Dublin: Dublin Institute for Advanced Studies.

Wali, Kashi, Omkar Nath Koul, and Omakāra Aina Kaula (1997). *Kashmiri. A cognitive-descriptive grammar*. London: Routledge.

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Wright, Joseph (1910). *Grammar of the Gothic language*. Oxford: Clarendon Press.