

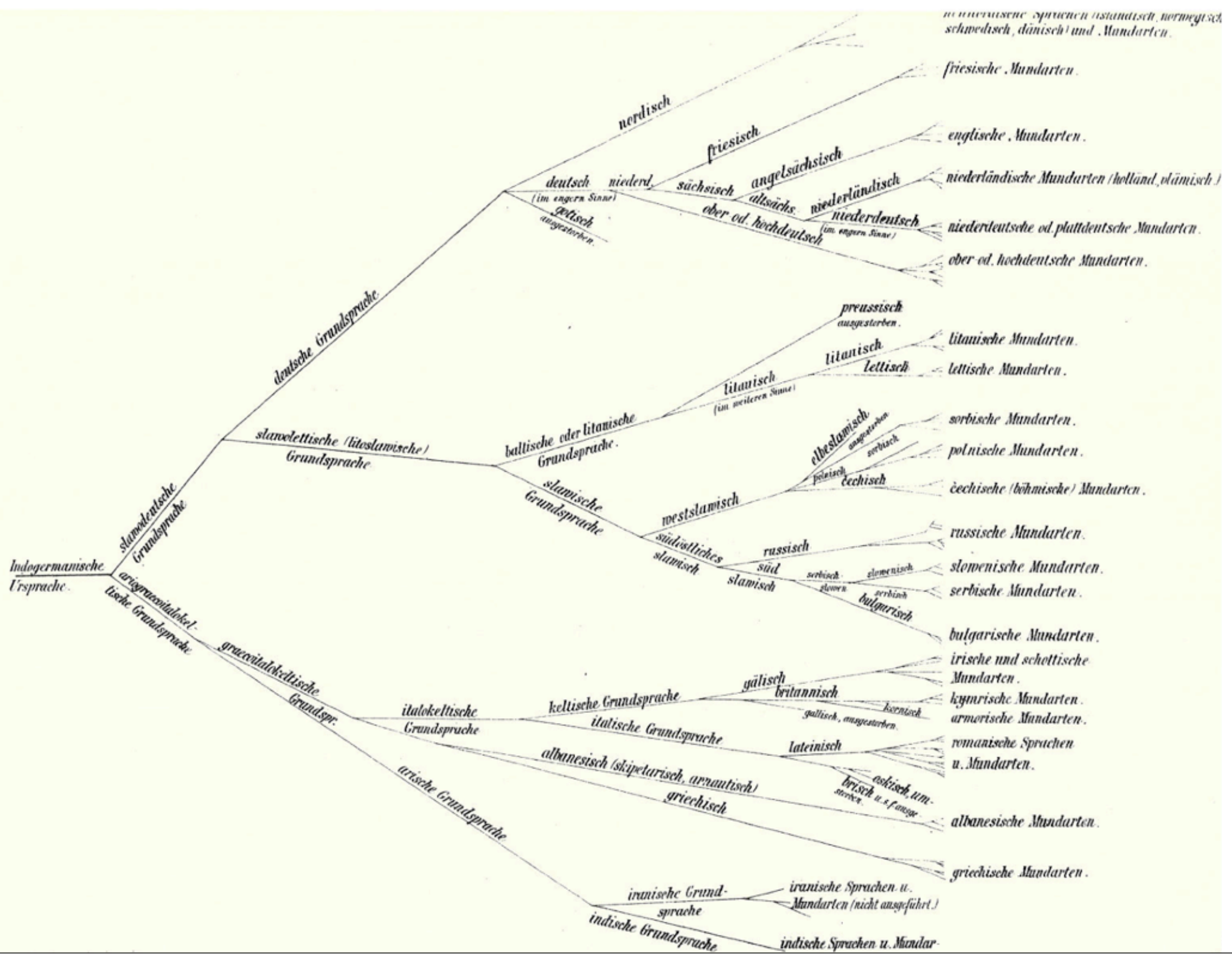
Ungewurzelte Bäume und die Suche nach ihren Wurzeln

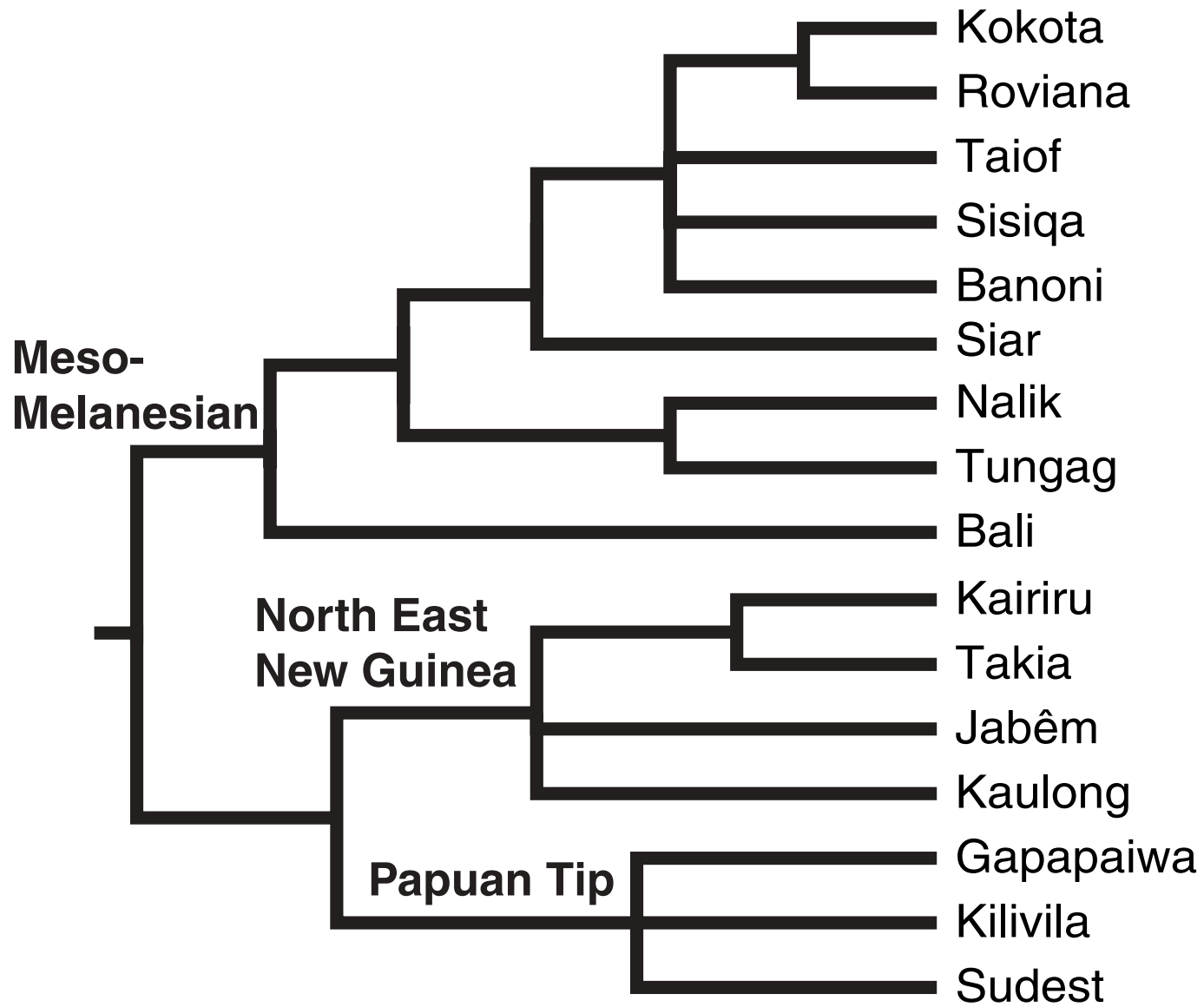
Michael Cysouw

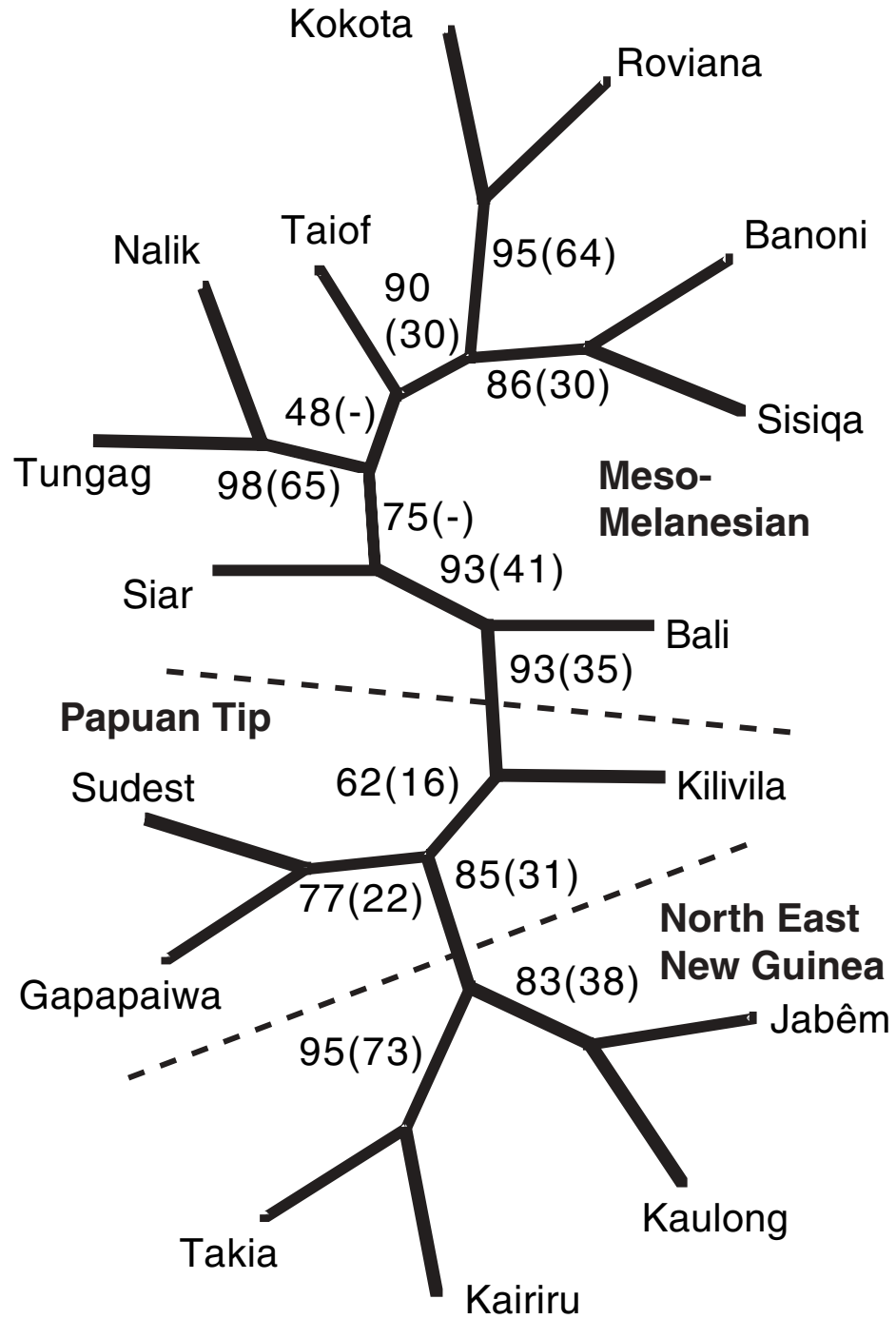


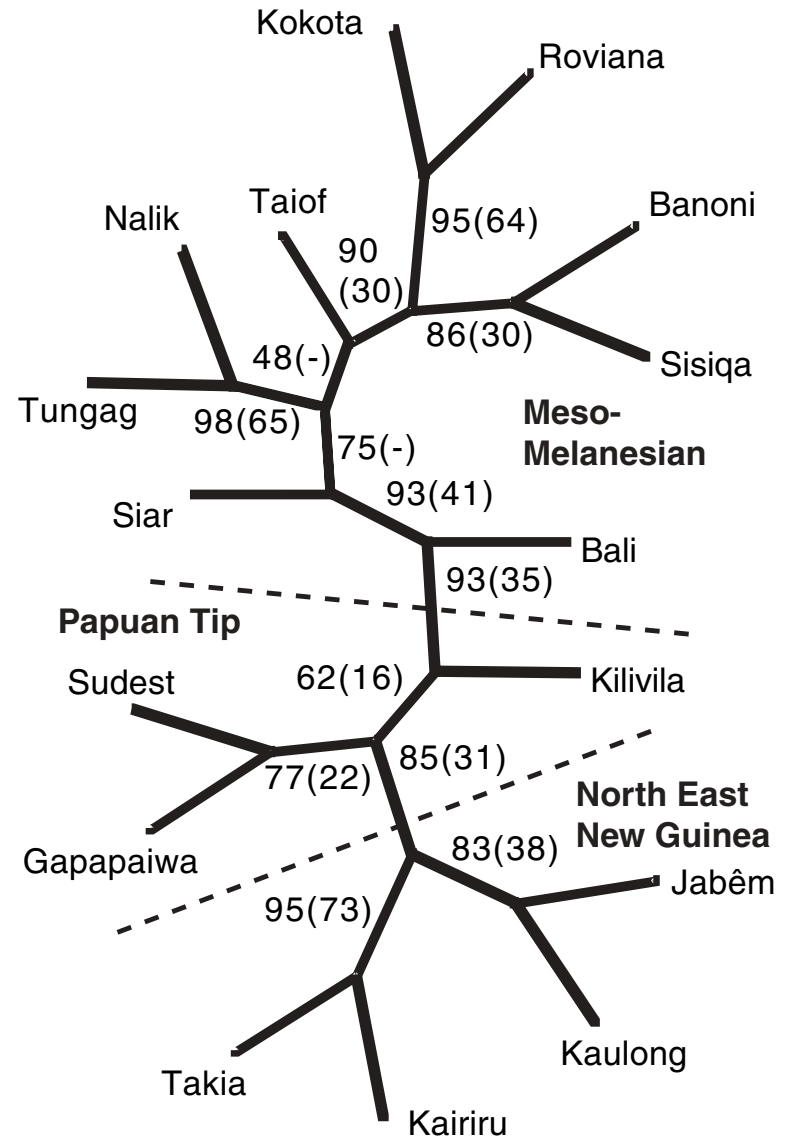
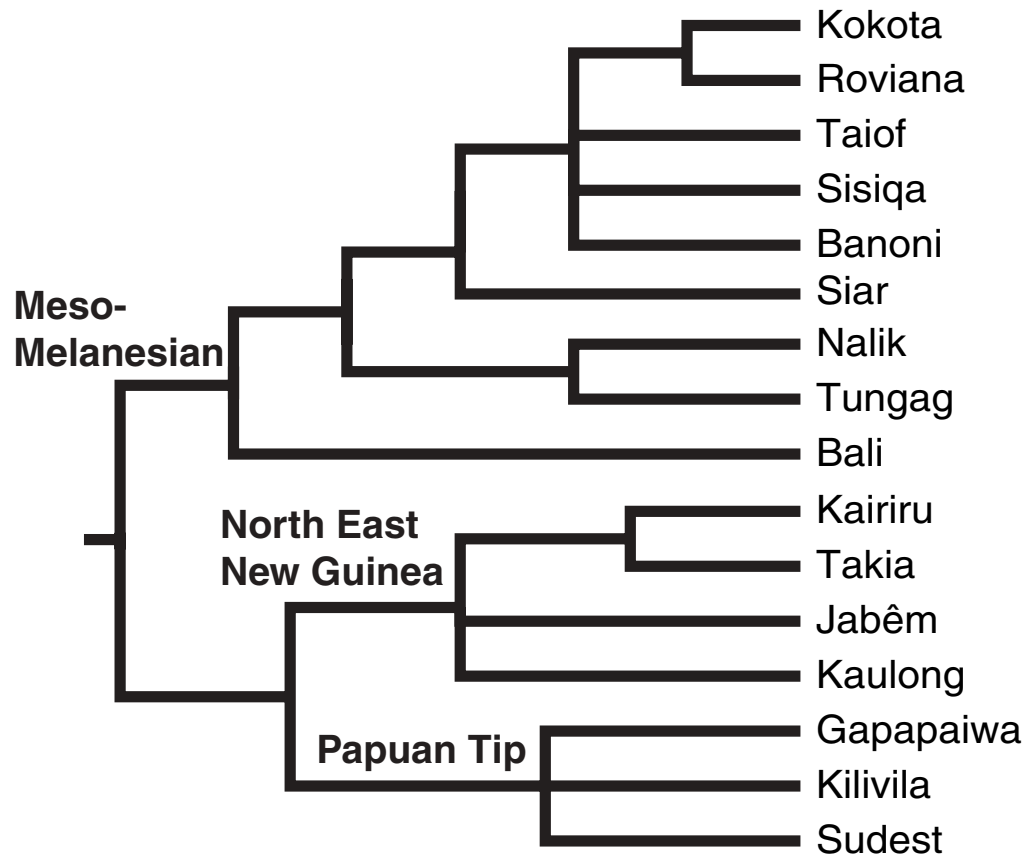
MAX-PLANCK-GESellschaft

Max Planck Institute
for Evolutionary Anthropology

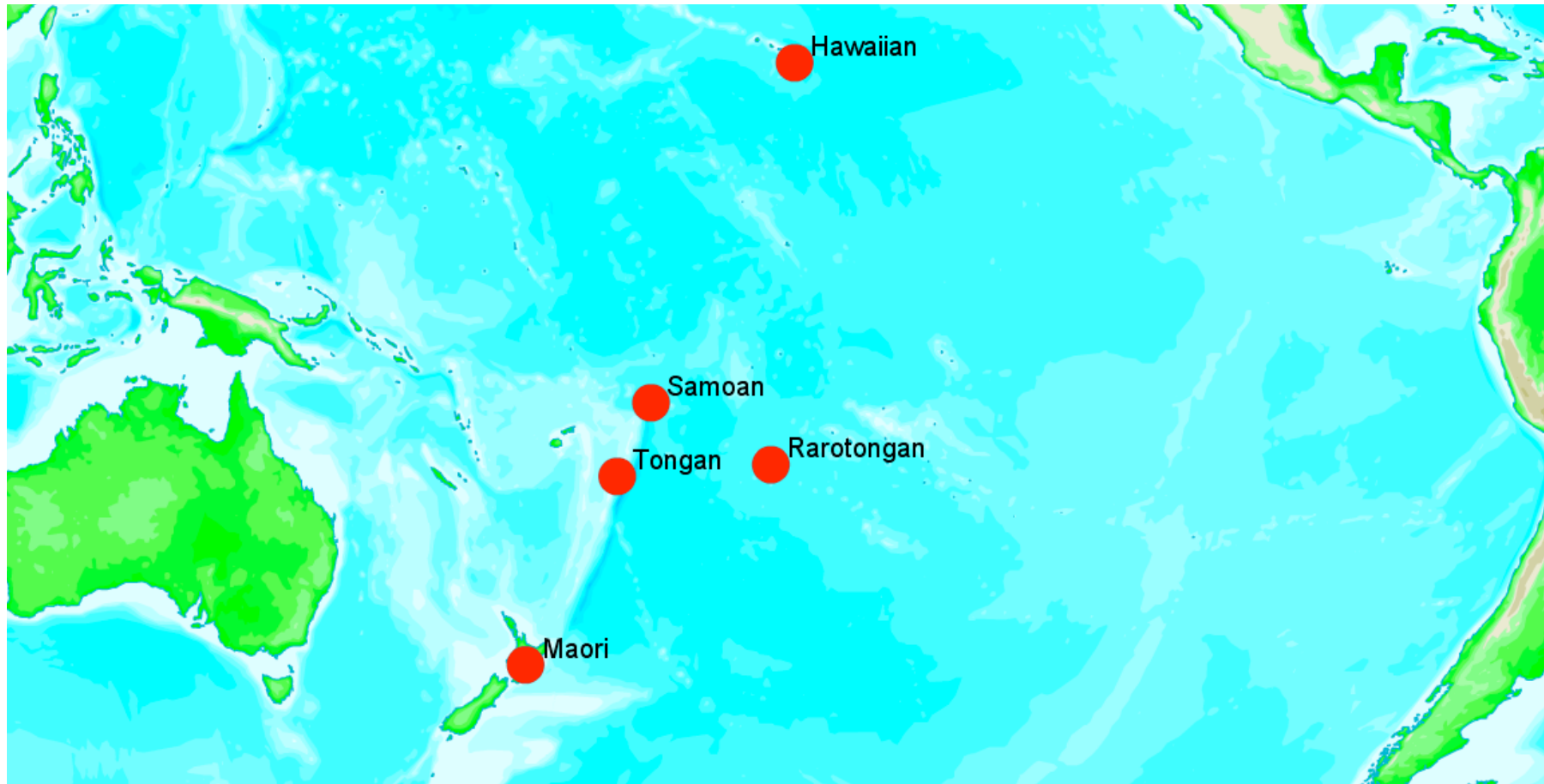








Polynesian Languages



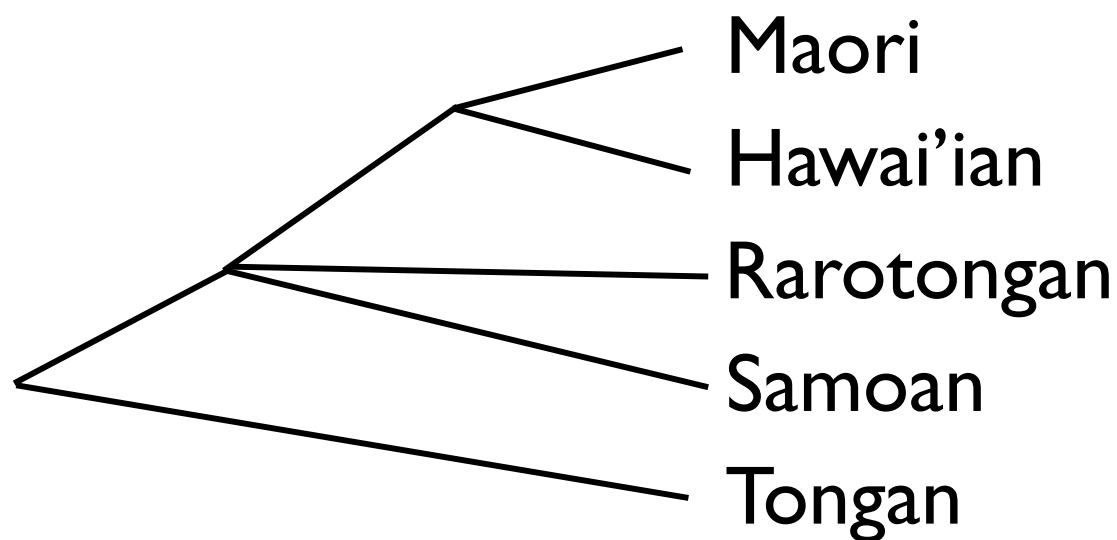
	Maori	Tongan	Samoa	Raroto	Hawai'i	Proto
C1	t	t	t	t	k	*t
C2	p	p	p	p	p	*p
C3	h	h	s	ʔ	h	*s
C4	h	f	f	ʔ	h	*f
C5	∅	ʔ	∅	∅	∅	*ʔ
C6	ŋ	ŋ	ŋ	ŋ	n	*ŋ
C7	∅	h	∅	∅	∅	*h
C8	k	k	ʔ	k	ʔ	*k
C9	m	m	m	m	m	*m
C10	r	l	l	r	l	*L
C11	ϕ	f	f	ʔ	h	*f
C12	n	n	n	n	n	*n
C13	w	v	v	v	w	*V

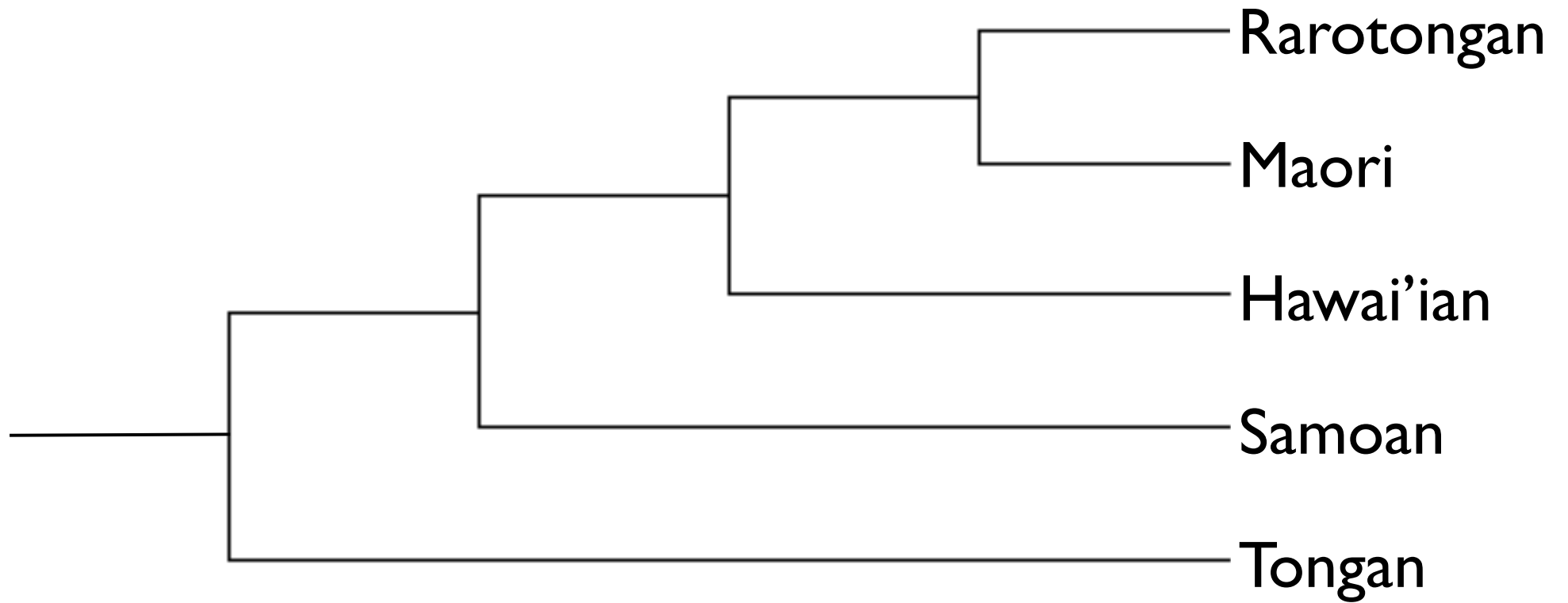
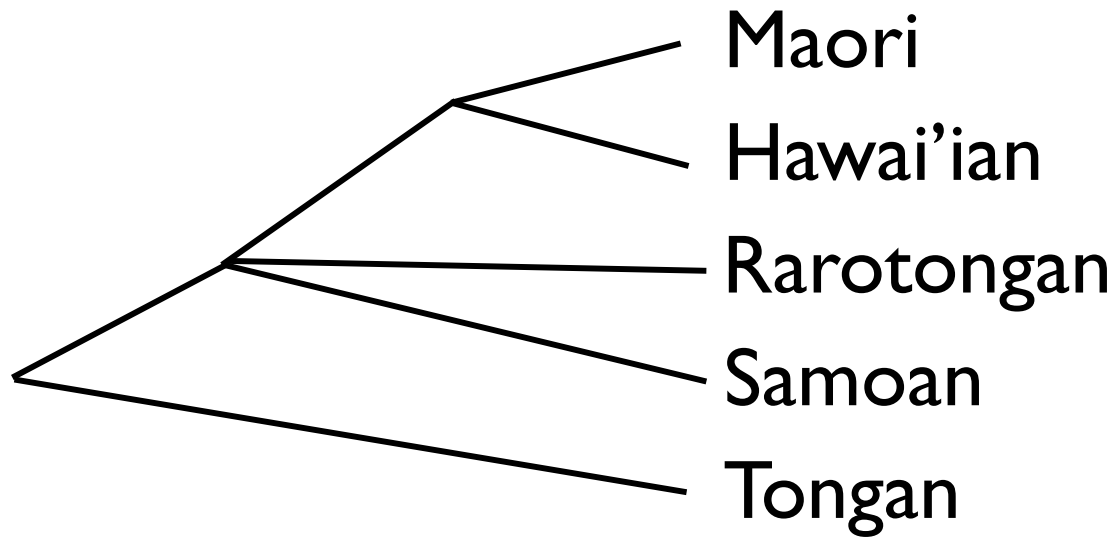
	Maori	Tongan	Samoa	Raroto	Hawai'i	Proto
C1	t	t	t	t	k	*t
C2	p	p	p	p	p	*p
C3	h	h	s	?	h	*s
C4	h	f	f	?	h	*f
C5	∅	?	∅	∅	∅	*?
C6	ŋ	ŋ	ŋ	ŋ	n	*ŋ
C7	∅	h	∅	∅	∅	*h
C8	k	k	?	k	?	*k
C9	m	m	m	m	m	*m
C10	r	l	l	r	l	*L
C11	ϕ	f	f	?	h	*f
C12	n	n	n	n	n	*n
C13	w	v	v	v	w	*V

Shared Innovation !

	Maori	Tongan	Samoa	Raroto	Hawai'i	Proto
C1	t	t	t	t	k	*t
C2	p	p	p	p	p	*p
C3	h	h	s	ʔ	h	*s
C4	h	f	f	ʔ	h	*f
C5	∅	ʔ	∅	∅	∅	*ʔ
C6	ŋ	ŋ	ŋ	ŋ	n	*ŋ
C7	∅	h	∅	∅	∅	*h
C8	k	k	ʔ	k	ʔ	*k
C9	m	m	m	m	m	*m
C10	r	l	l	r	l	*L
C11	ϕ	f	f	ʔ	h	*f
C12	n	n	n	n	n	*n
C13	w	v	v	v	w	*V

	Maori	Tongan	Samoa	Raroto	Hawai'i	Proto
C1	t	t	t	t	k	*t
C2	p	p	p	p	p	*p
C3	h	h	s	ʔ	h	*s
C4	h	f	f	ʔ	h	*f
C5	∅	ʔ	∅	∅	∅	*ʔ
C6	ŋ	ŋ	ŋ	ŋ	n	*ŋ
C7	∅	h	∅	∅	∅	*h
C8	k	k	ʔ	k	ʔ	*k
C9	m	m	m	m	m	*m
C10	r	l	l	r	l	*L
C11	ϕ	f	f	ʔ	h	*f
C12	n	n	n	n	n	*n
C13	w	v	v	v	w	*V

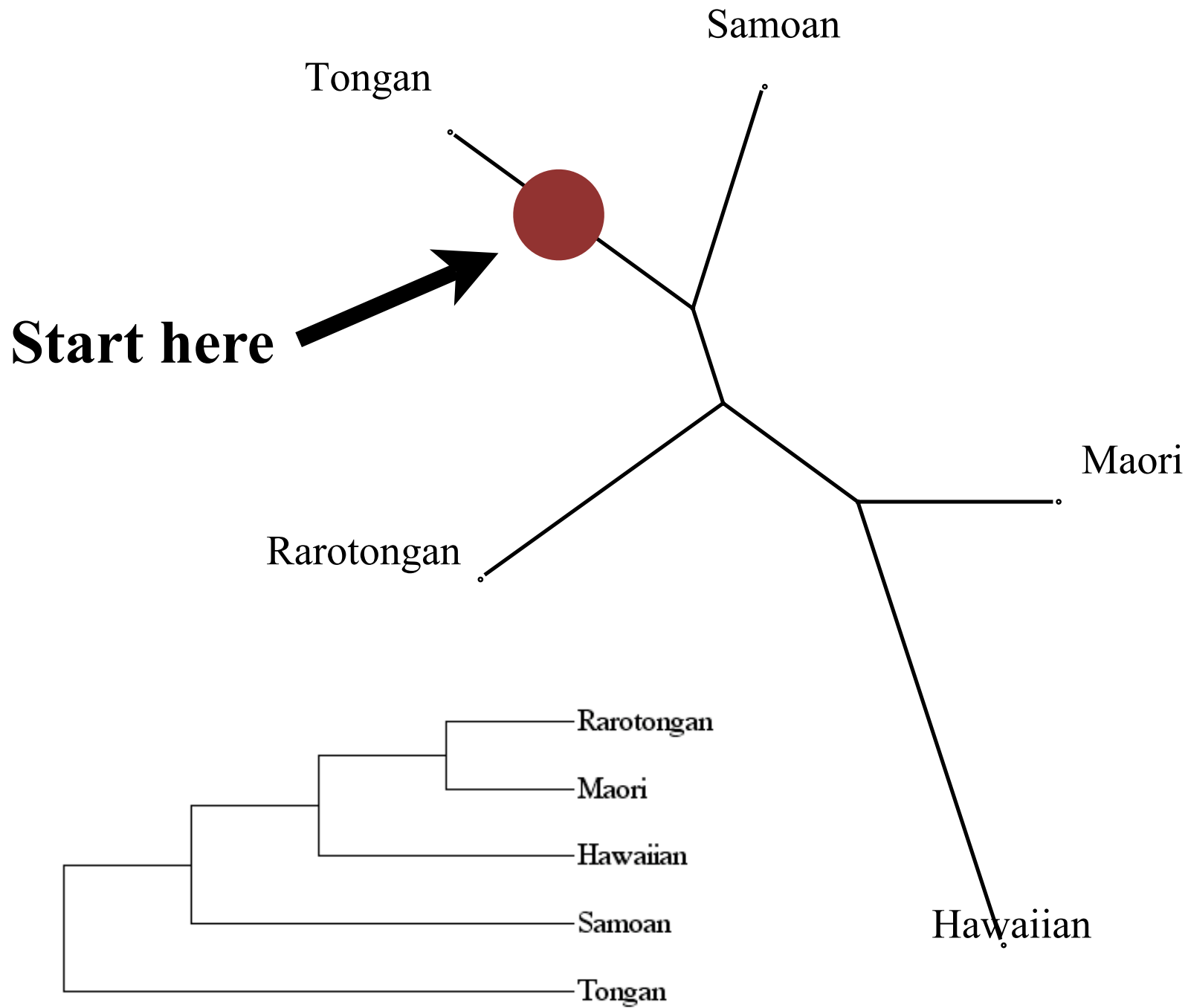




Different approaches

- Historical-comparative approach
 - ▶ First reconstruct proto-language
 - ▶ Then establish subgrouping of languages
- ‘Bioinformatics’ approach
 - ▶ First establish subgrouping (unrooted tree)
 - ▶ Then locate proto-language (by outgroup)

	Maori	Tongan	Samoa	Raroto	Hawai'i	Proto
C1	t	t	t	t	k	*t
C2	p	p	p	p	p	*p
C3	h	h	s	ʔ	h	*s
C4	h	f	f	ʔ	h	*f
C5	∅	ʔ	∅	∅	∅	*ʔ
C6	ŋ	ŋ	ŋ	ŋ	n	*ŋ
C7	∅	h	∅	∅	∅	*h
C8	k	k	ʔ	k	ʔ	*k
C9	m	m	m	m	m	*m
C10	r	l	l	r	l	*L
C11	ϕ	f	f	ʔ	h	*f
C12	n	n	n	n	n	*n
C13	w	v	v	v	w	*V



Advantages

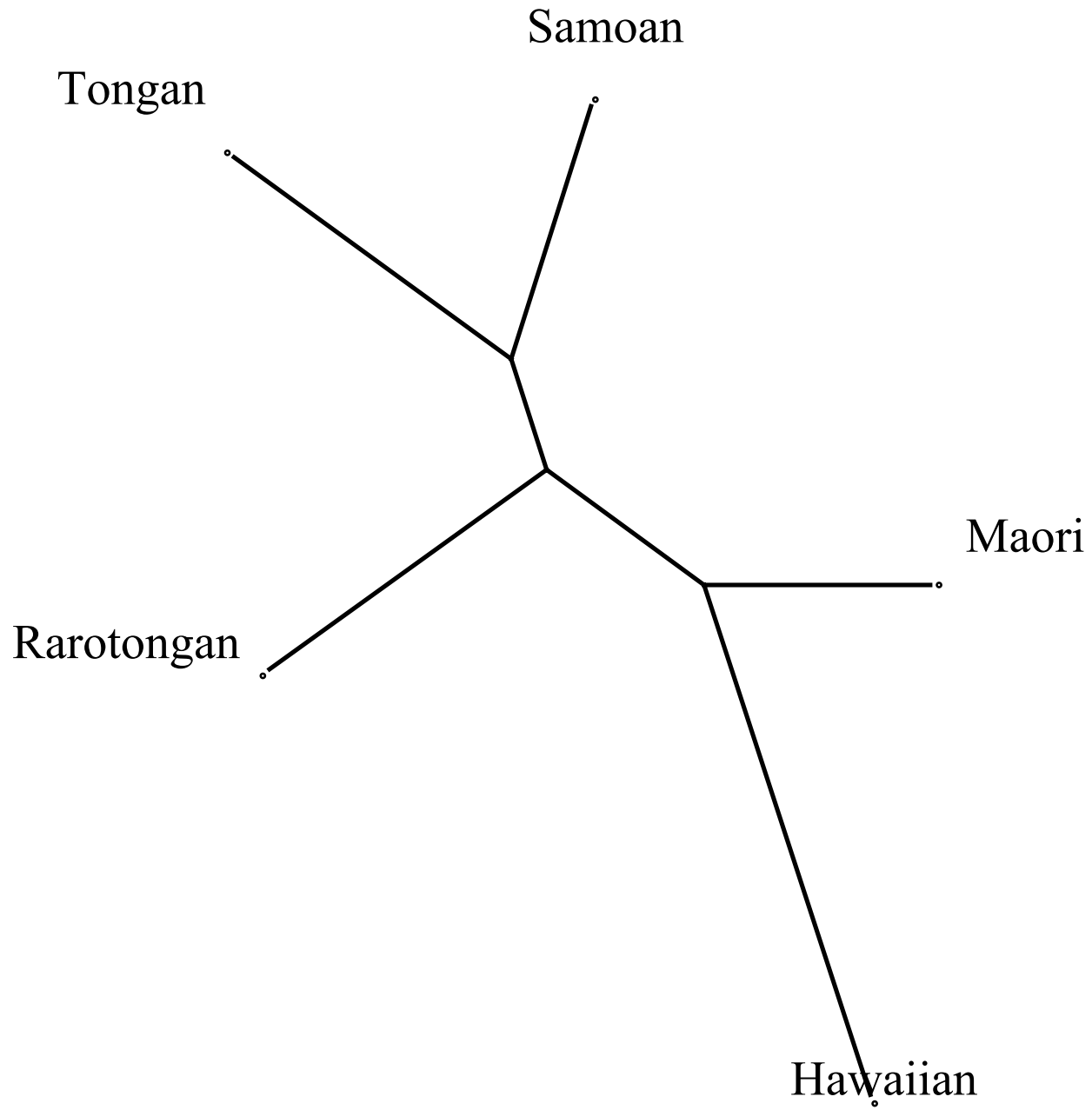
- Powerful computational approaches available for subgrouping
- No need for correspondence sets ('types'): it also works directly with all individual correspondences ('tokens')
- No need to build reconstructions on reconstructions: each reconstruction can be based directly on the correspondences

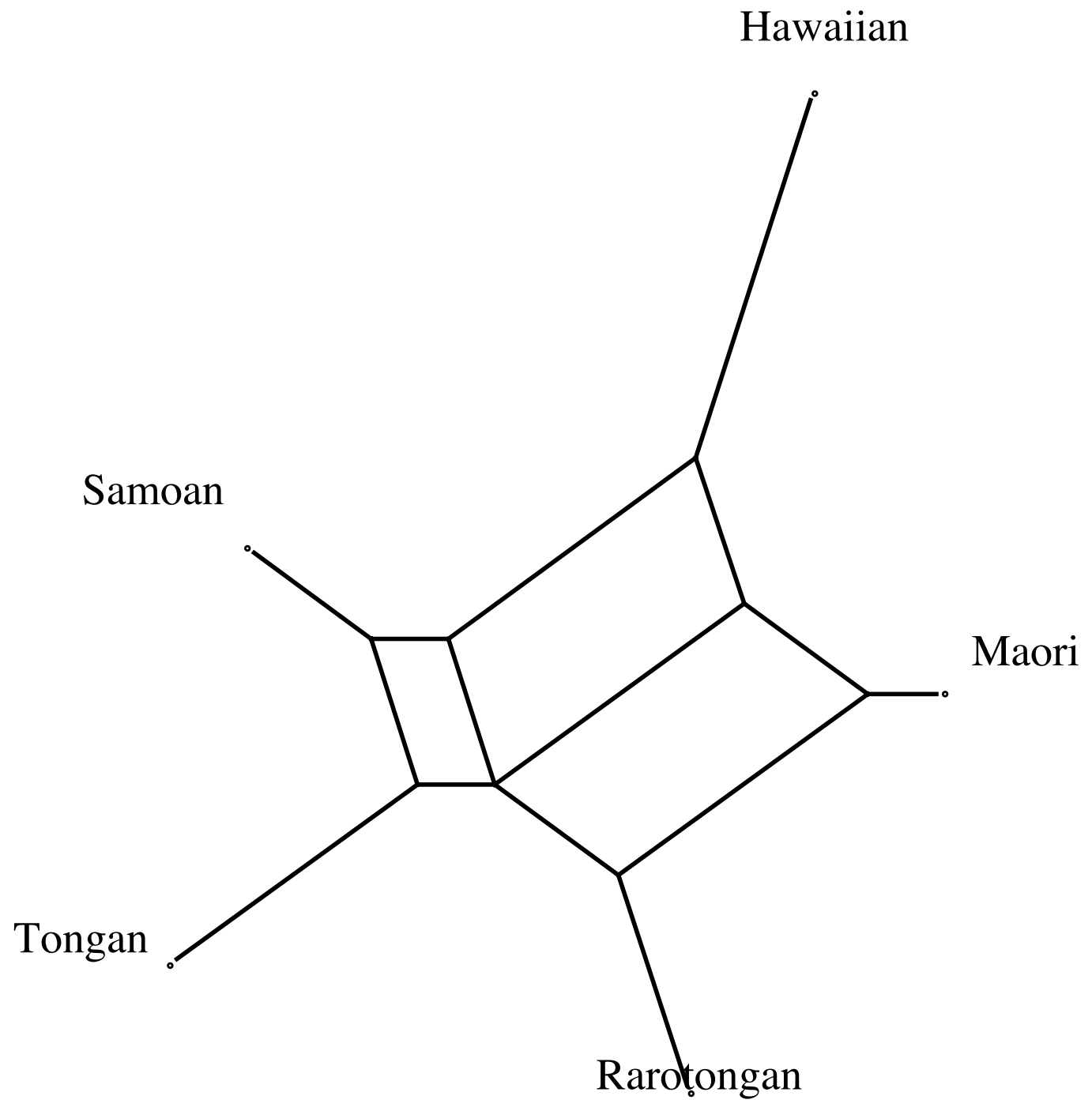
Possible analyses

- Subgrouping
 - ▶ Similarity-based approaches
 - ▶ Parsimony-based approaches
- Rooting
 - ▶ Outgroup comparison
 - ▶ Transition probabilities

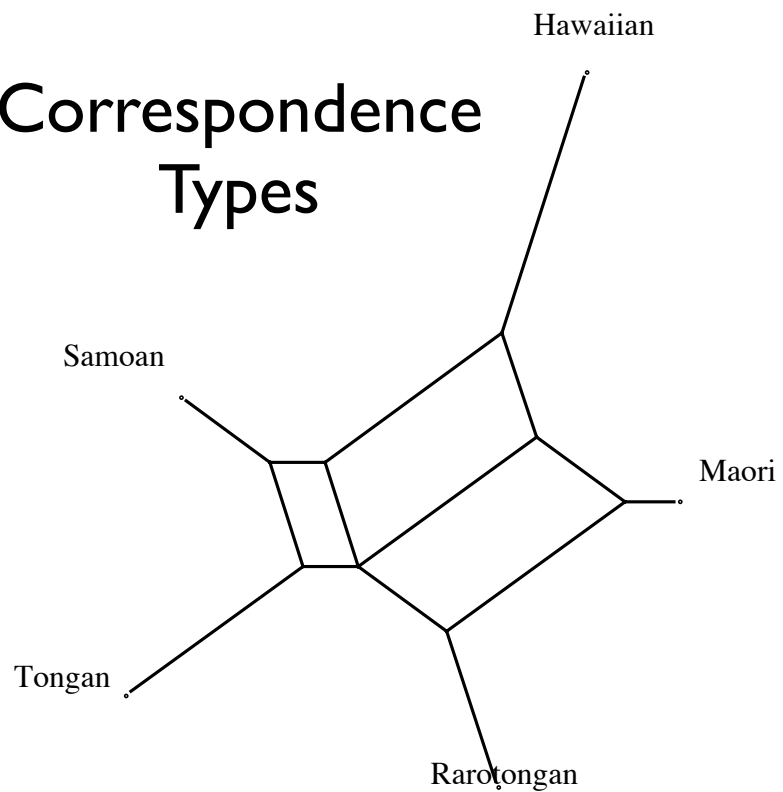
Possible analyses

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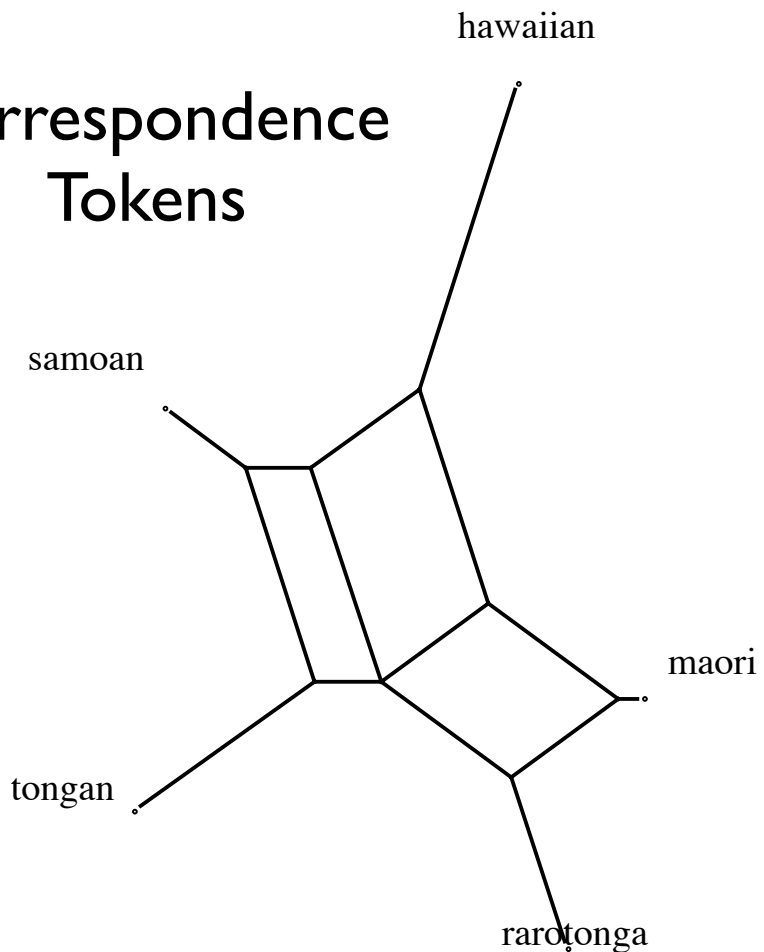




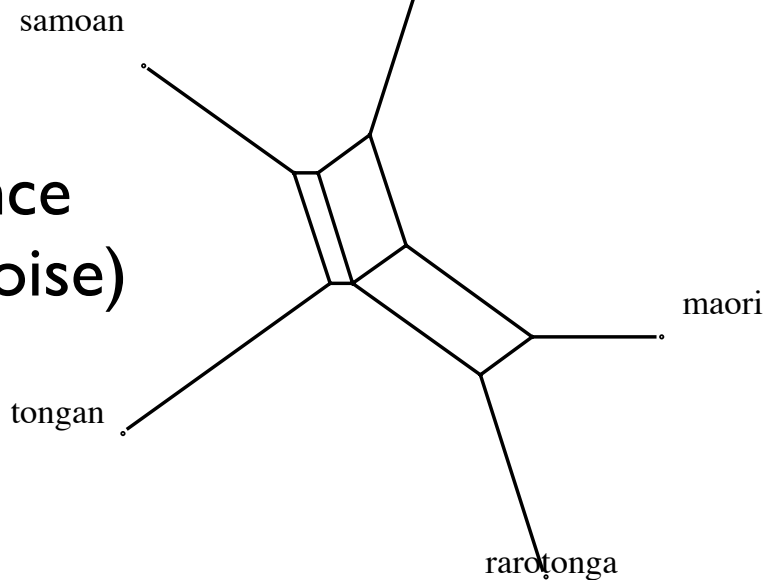
Correspondence Types



Correspondence Tokens



Correspondence Tokens (+25% noise)



Possible analyses

- Subgrouping
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 - ▶ **Parsimony-based approaches**
- Rooting
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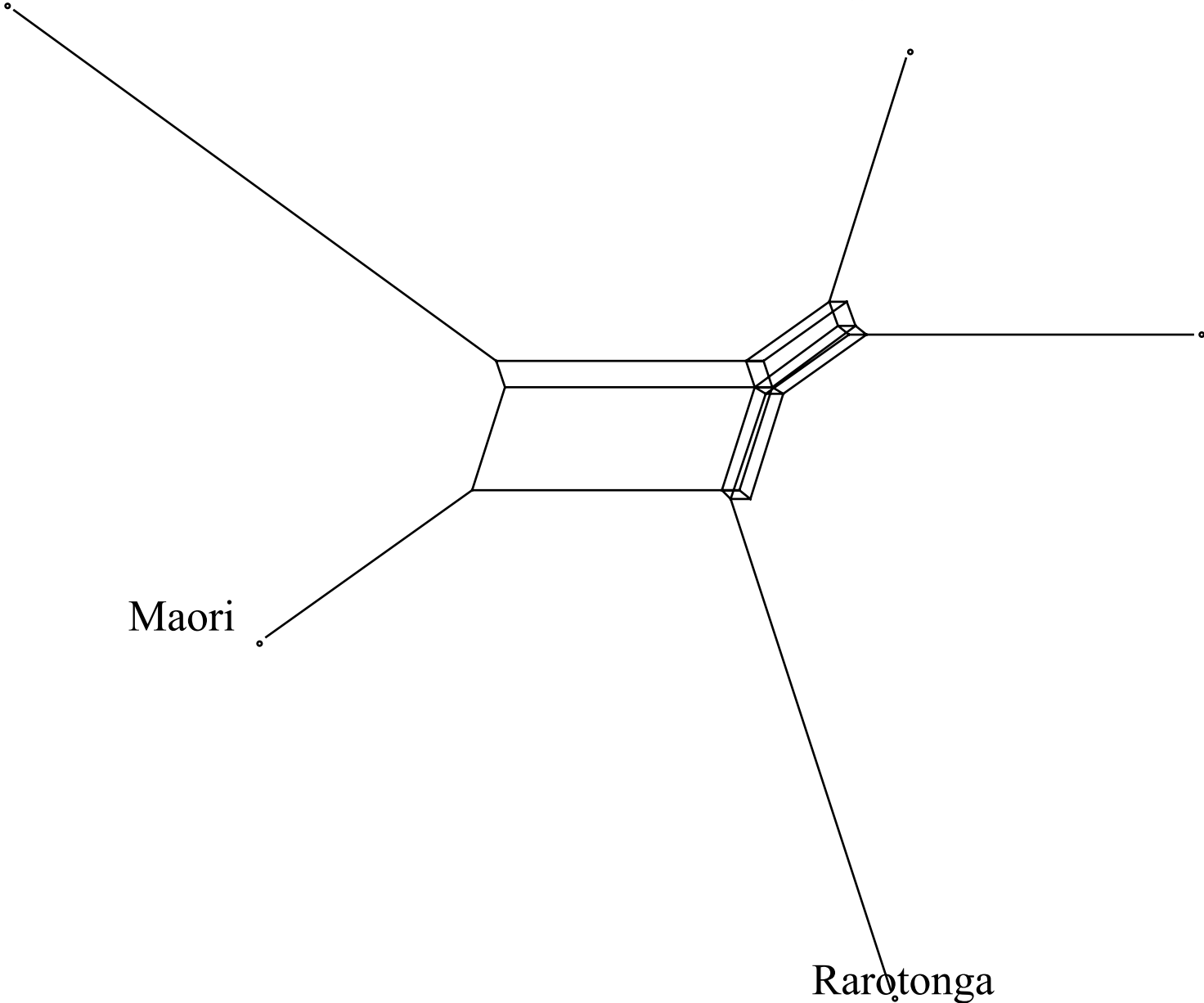
Hawaiian

Samoaan

Tongan

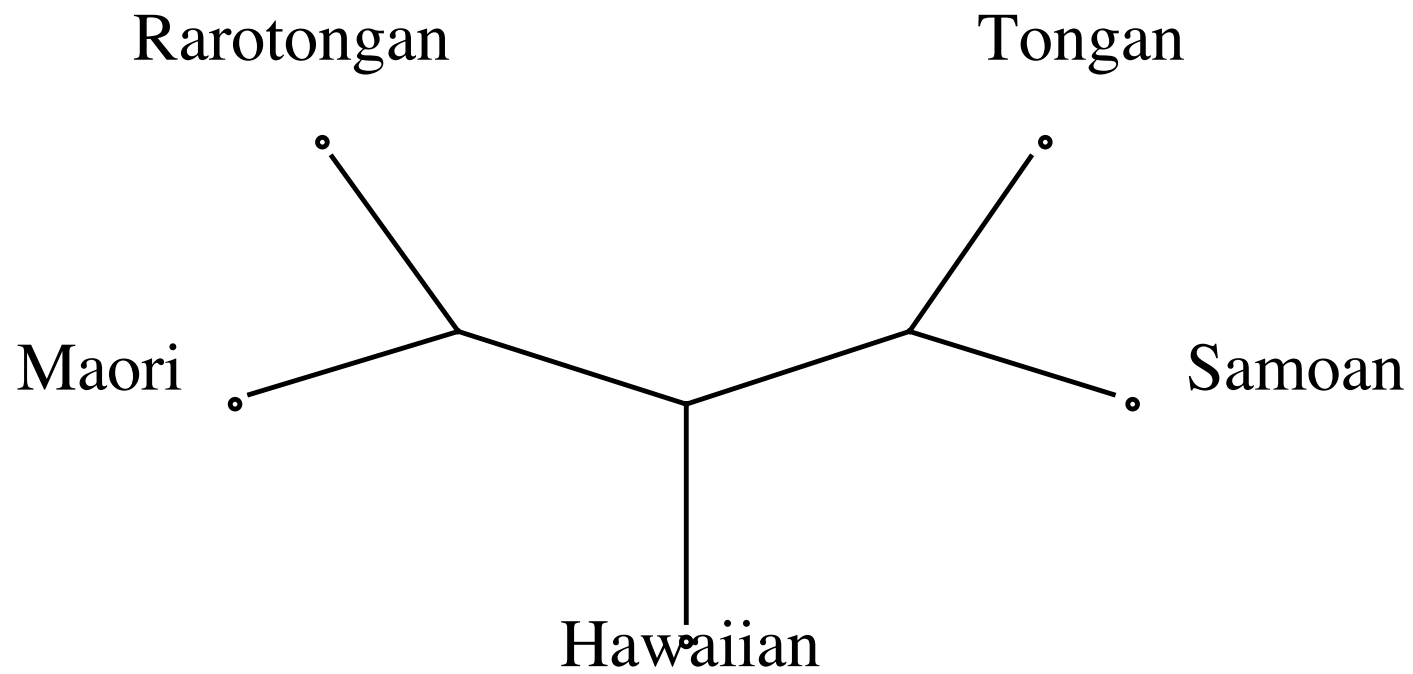
Maori

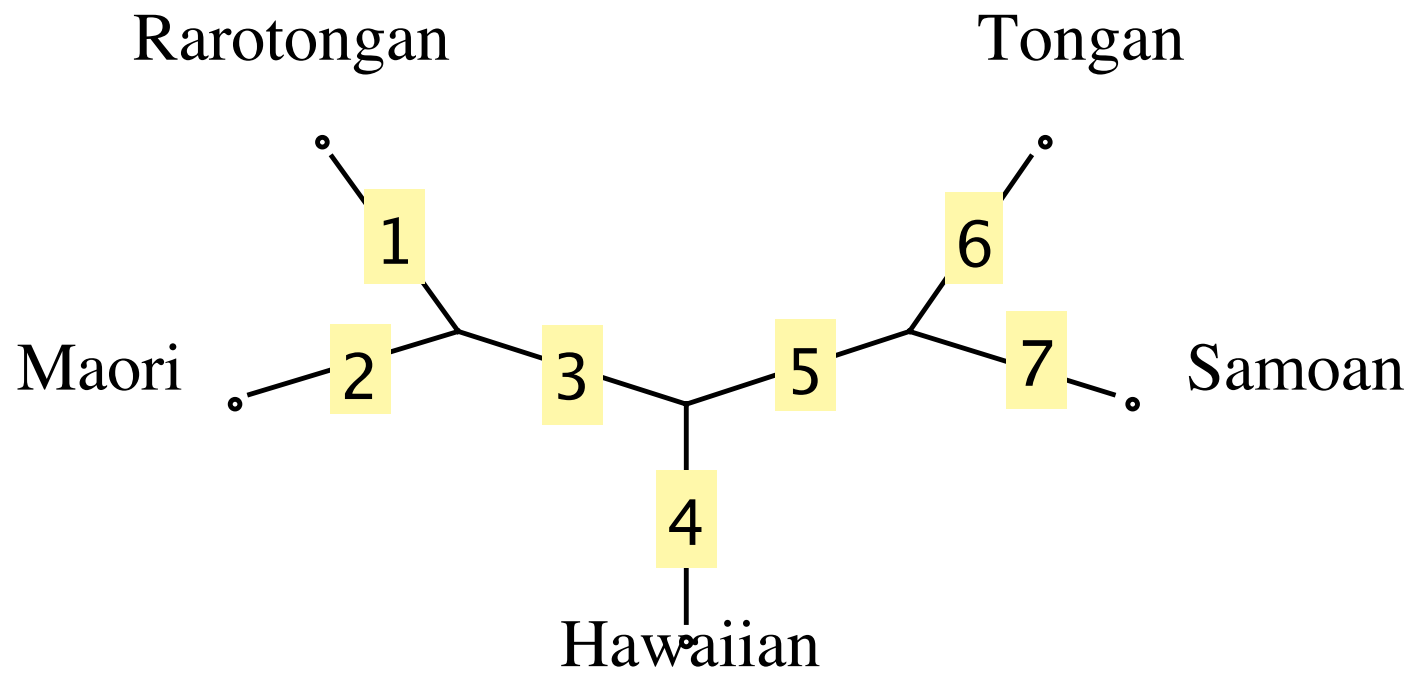
Rarotonga

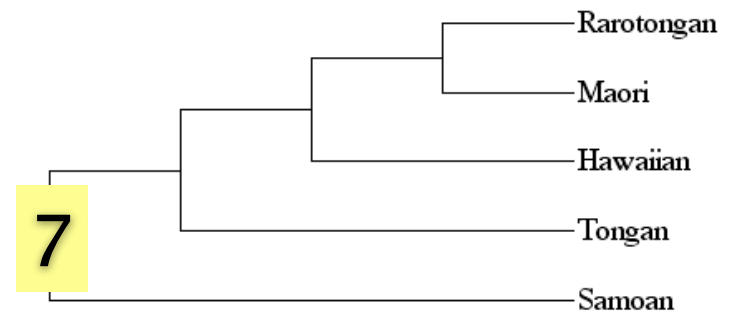
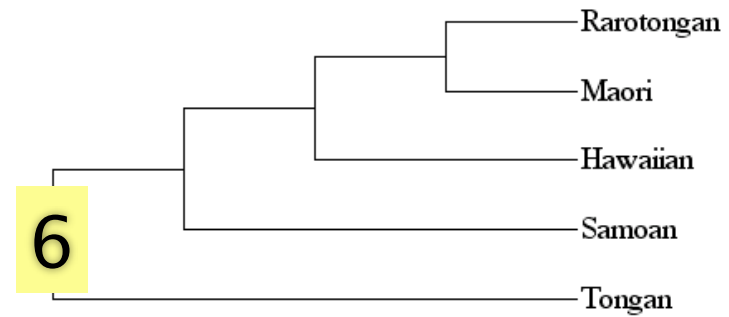
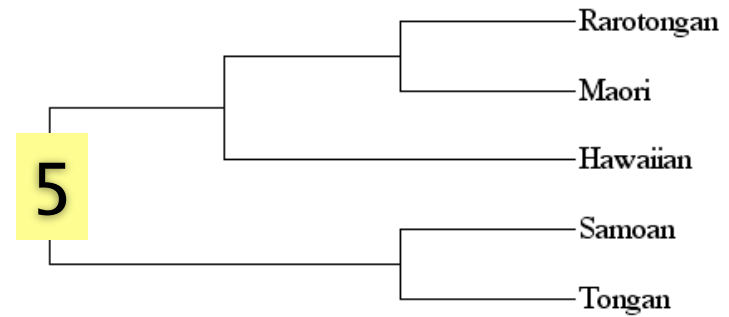
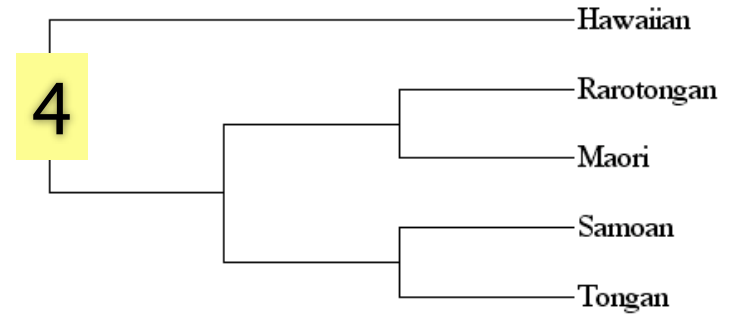
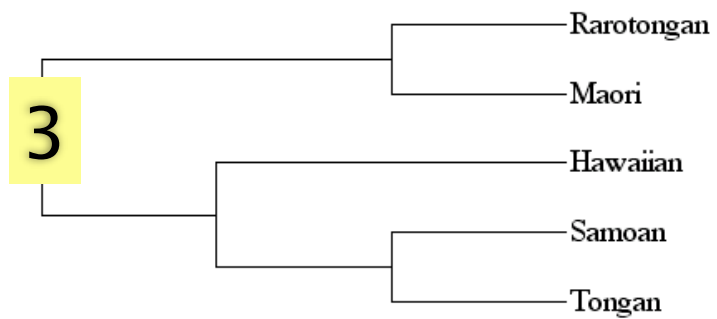
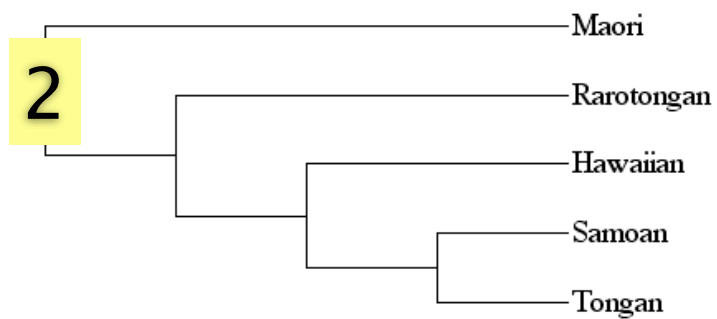
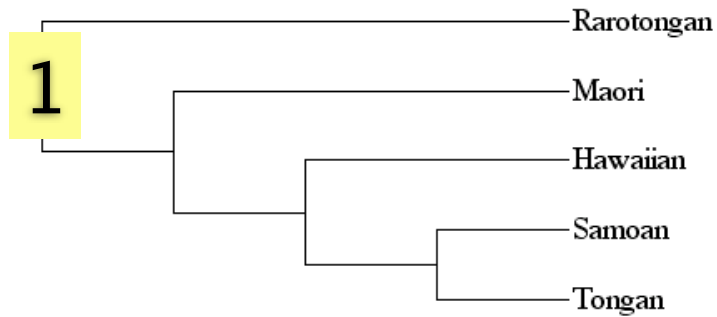
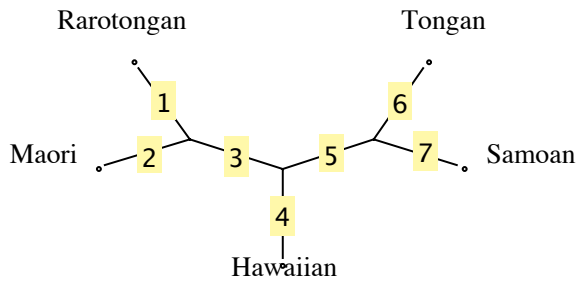


Possible analyses

- Subgrouping
 - ▶ Similarity-based approaches
 - ▶ Parsimony-based approaches
- **Rooting**
 - ▶ Outgroup comparison
 - ▶ Transition probabilities

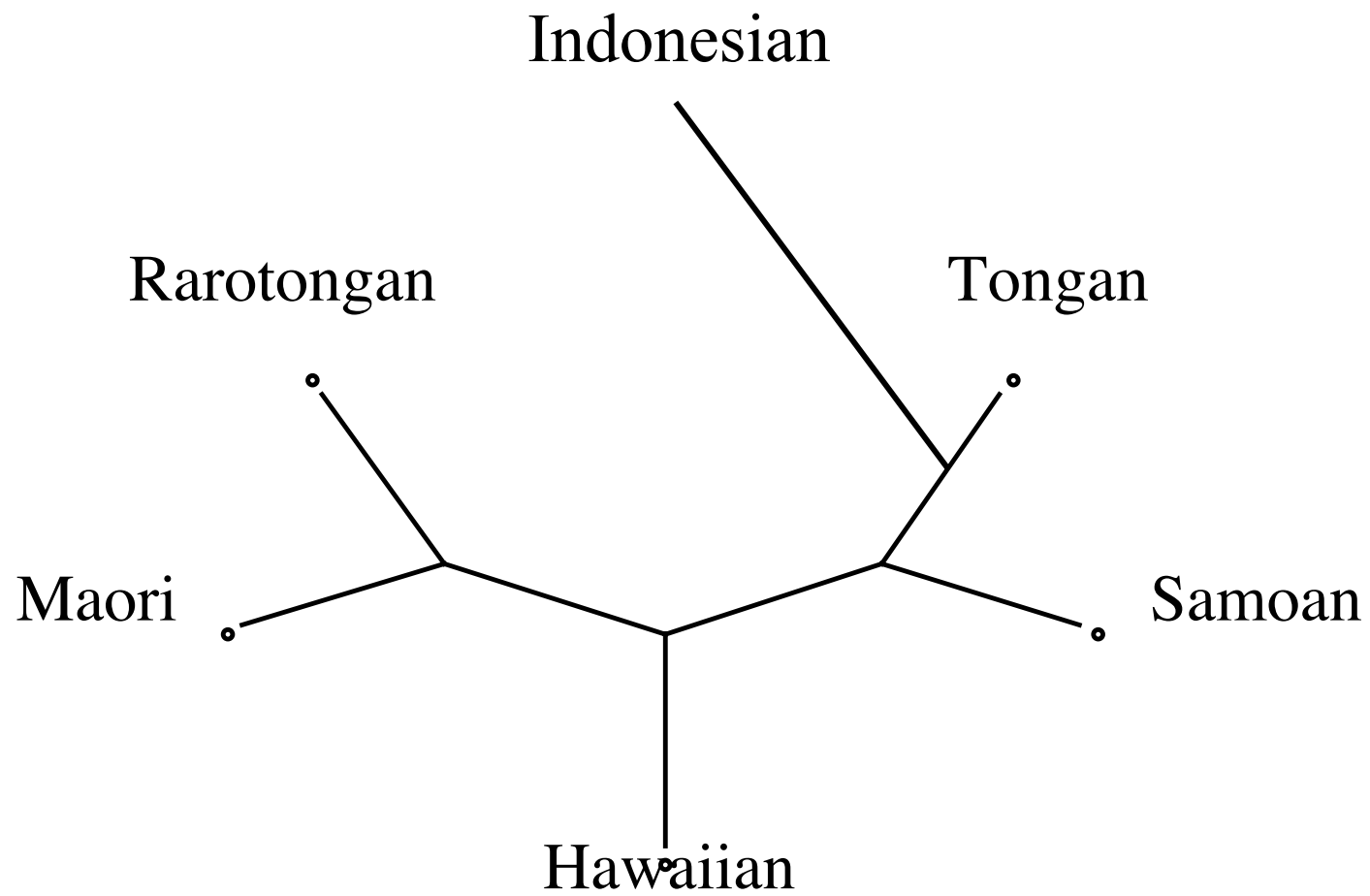






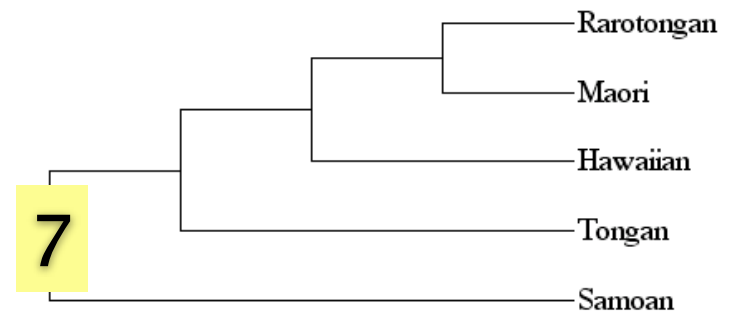
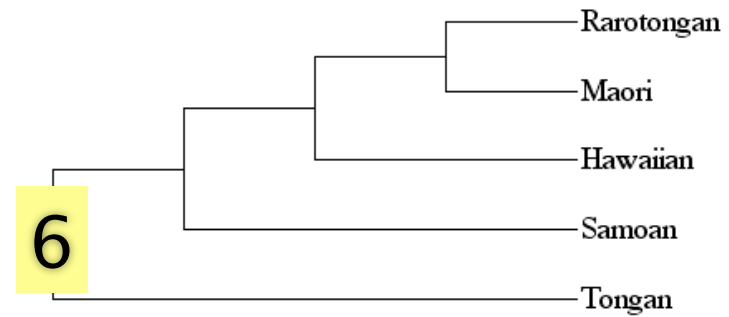
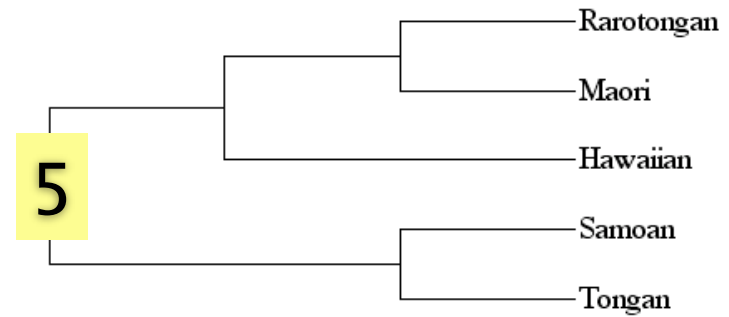
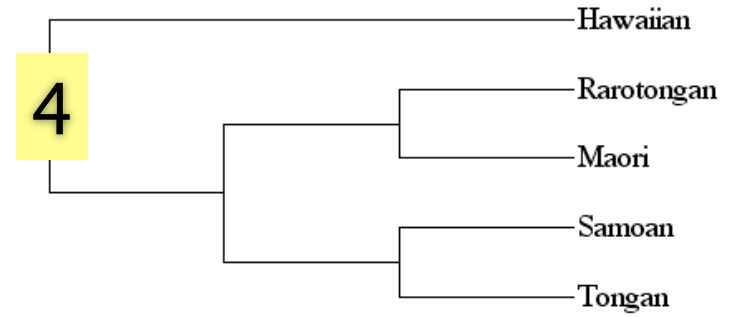
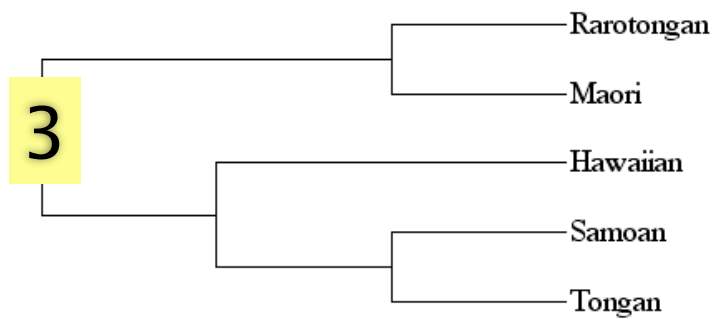
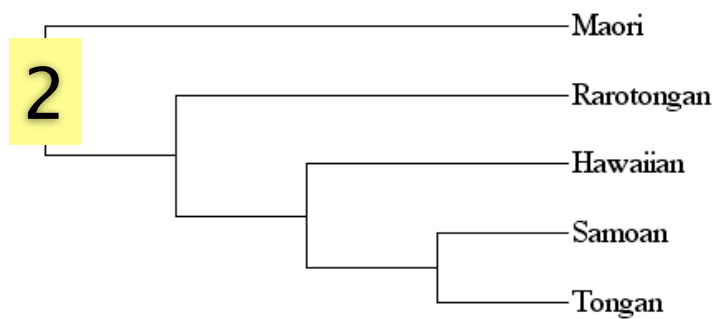
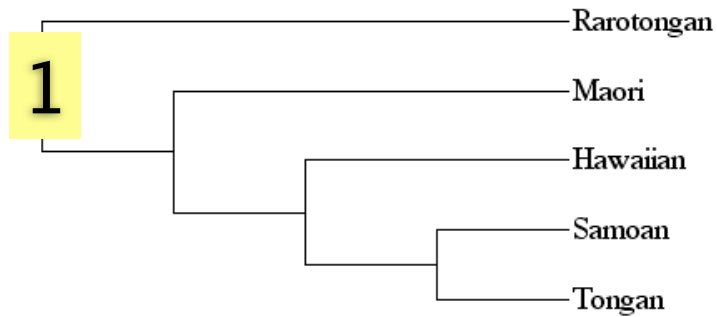
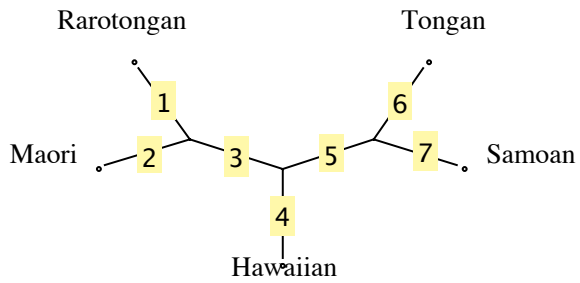
Possible analyses

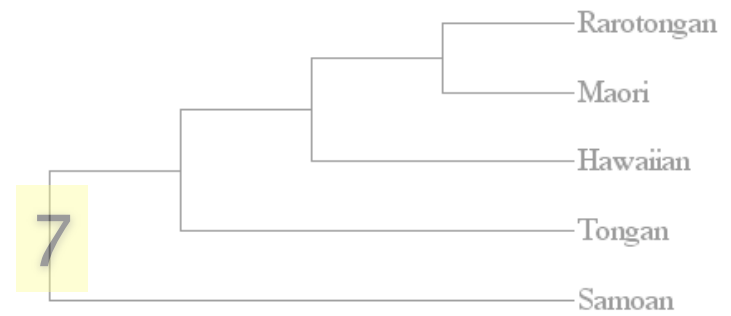
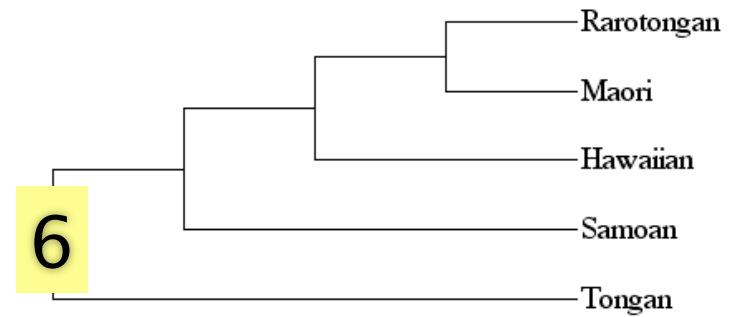
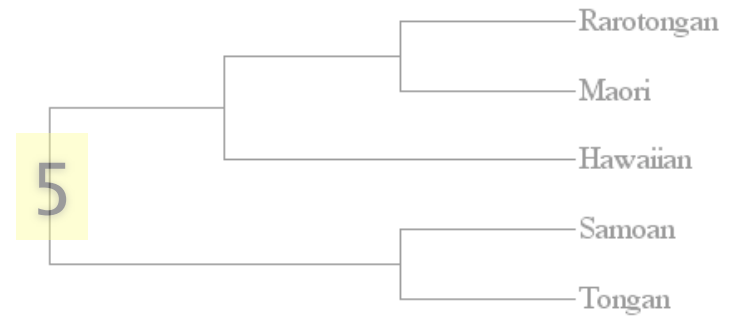
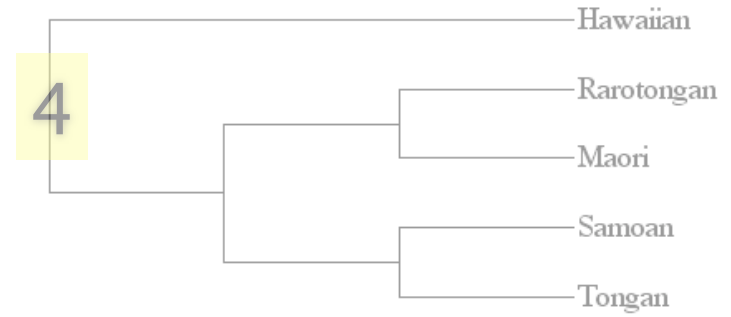
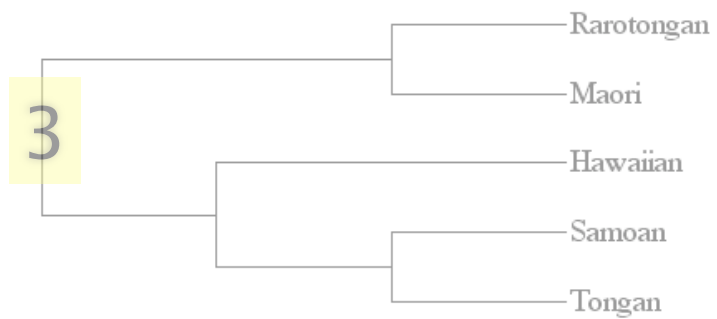
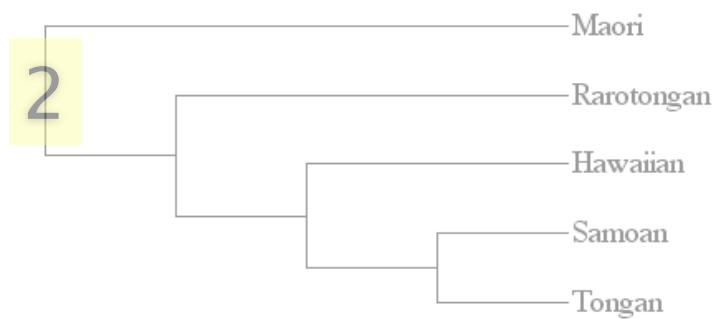
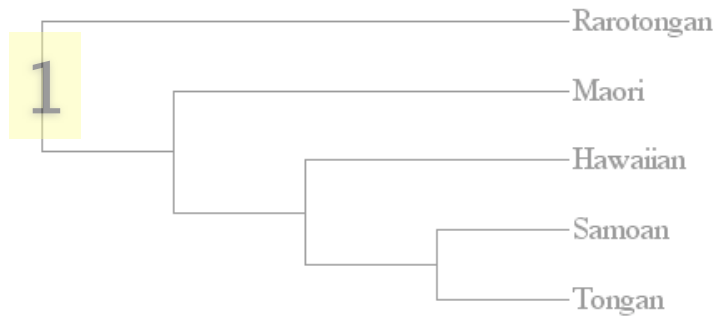
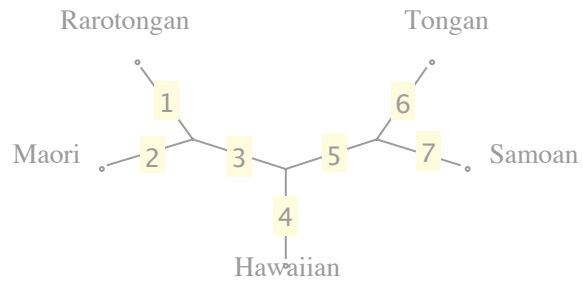
- Subgrouping
 - ▶ Similarity-based approaches
 - ▶ Parsimony-based approaches
- Rooting
 - ▶ **Outgroup comparison**
 - ▶ Transition probabilities



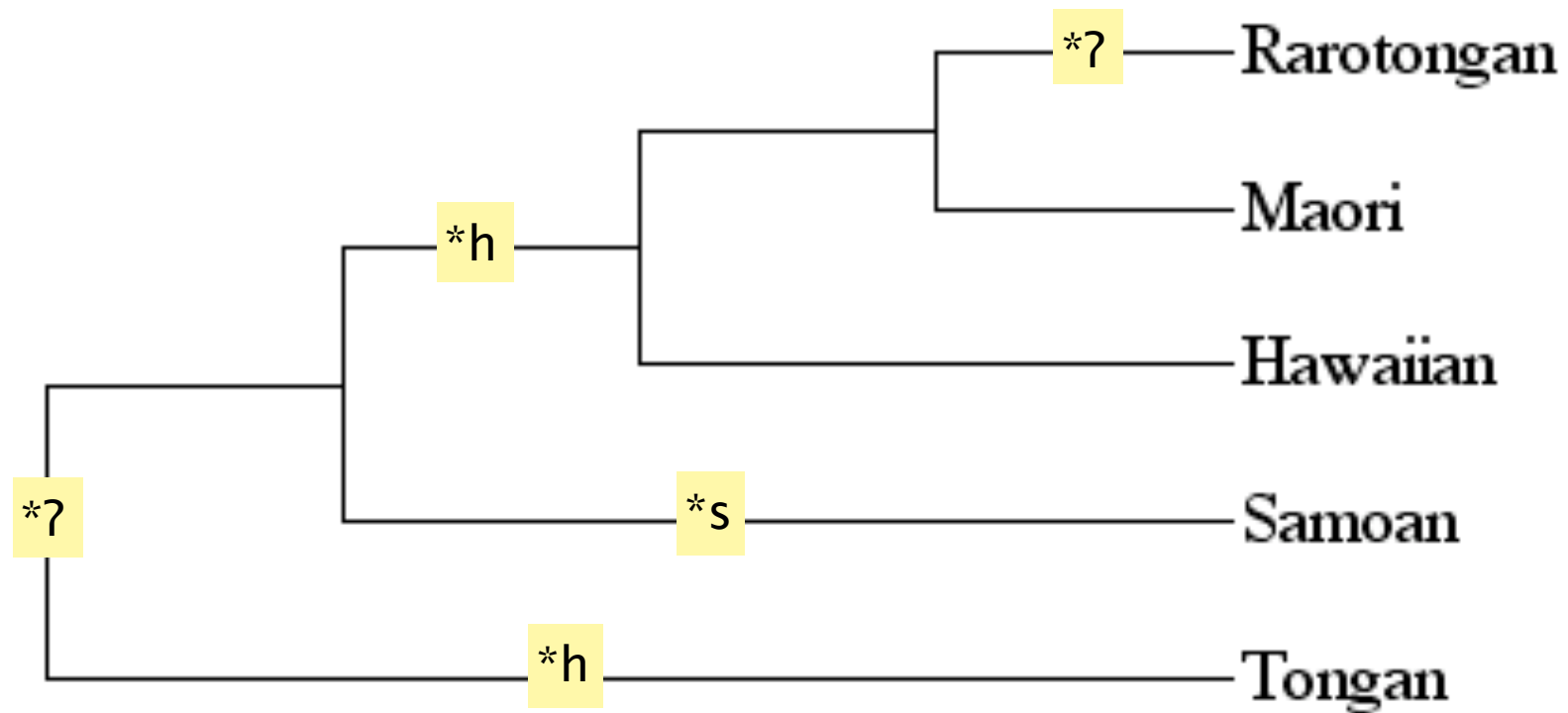
Possible analyses

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 - ▶ Similarity-based approaches
 - ▶ Parsimony-based approaches
- Rooting
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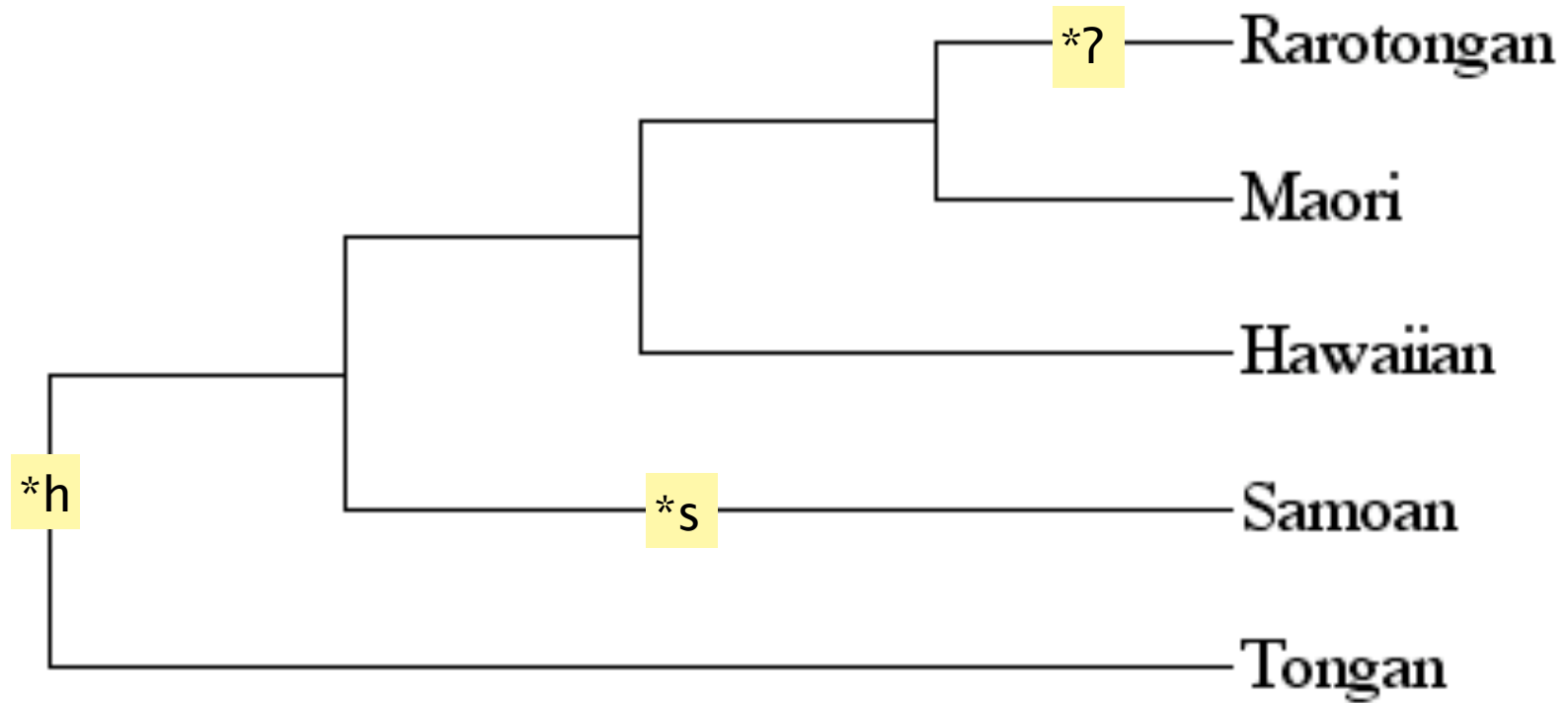


	Maori	Tongan	Samoaan	Raroton.	Hawai'i
C3	h	h	s	?	h



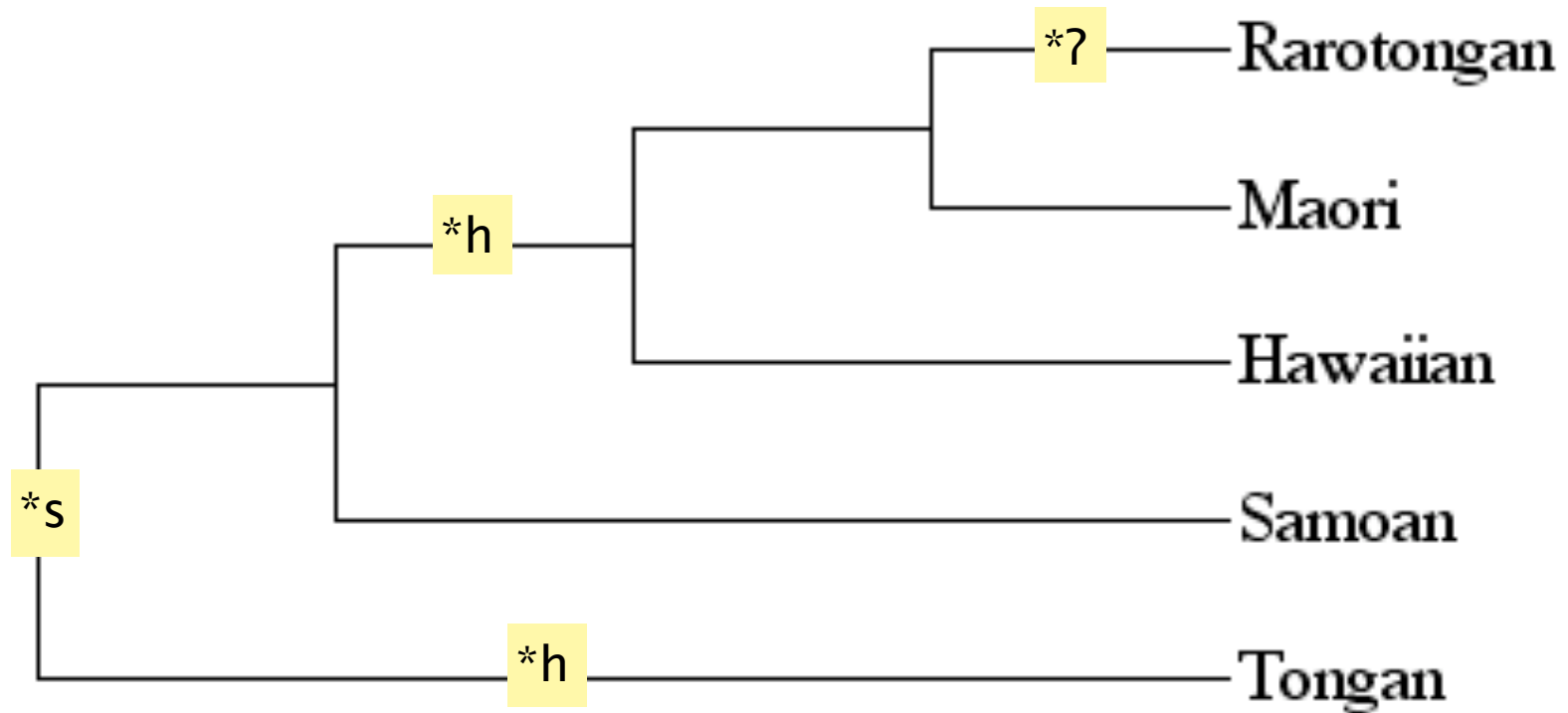
Probability: $0.3 \cdot 0.3 \cdot 0.2 \cdot 0.7 = 0.0126$

	Maori	Tongan	Samoaan	Raroton.	Hawai'i
C3	h	h	s	?	h

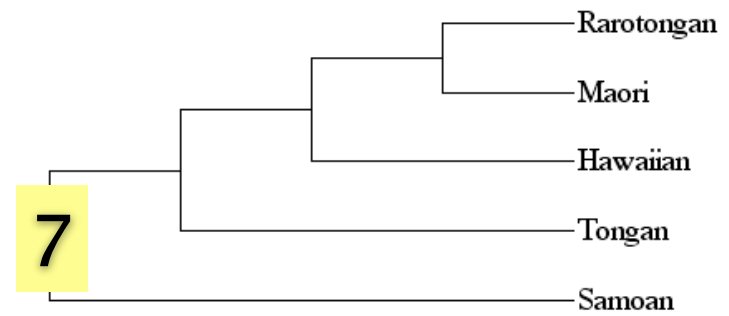
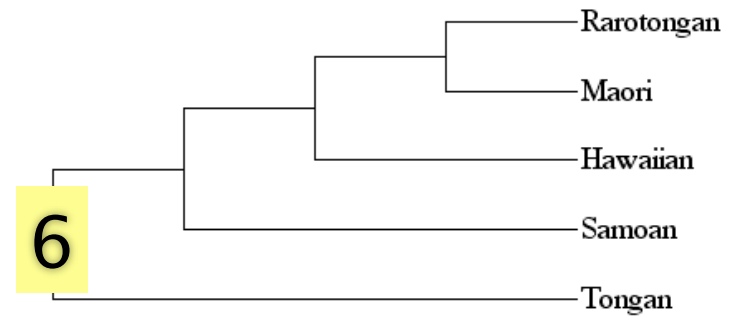
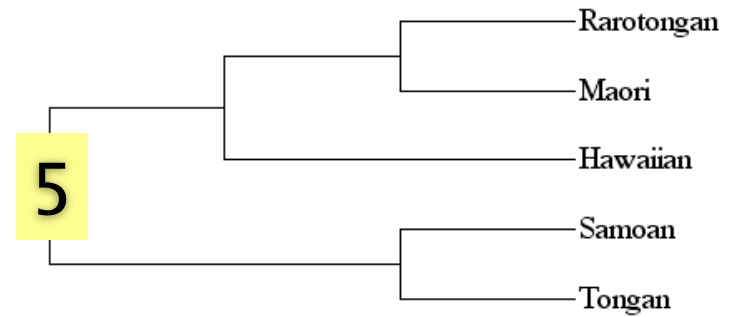
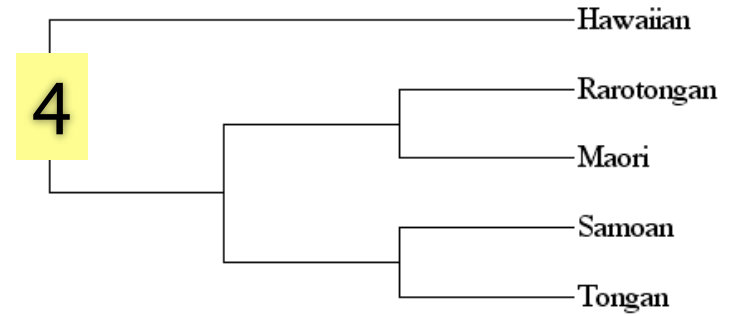
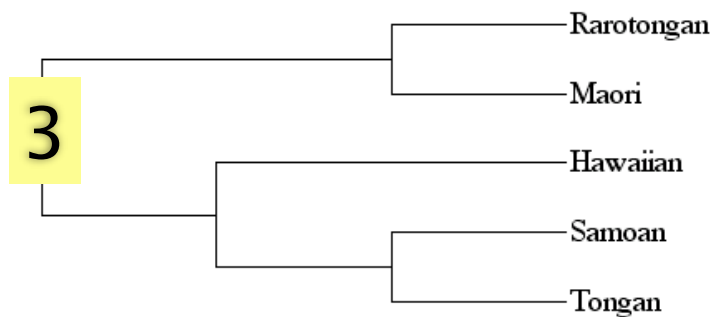
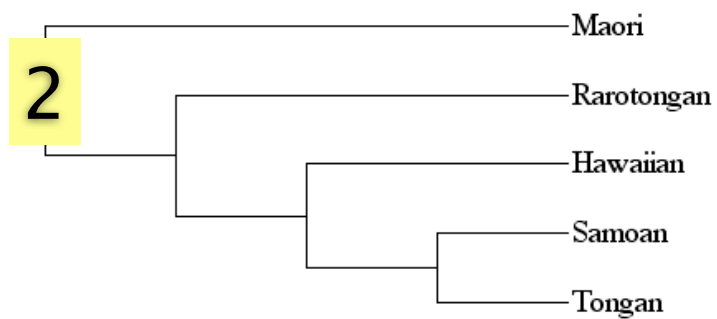
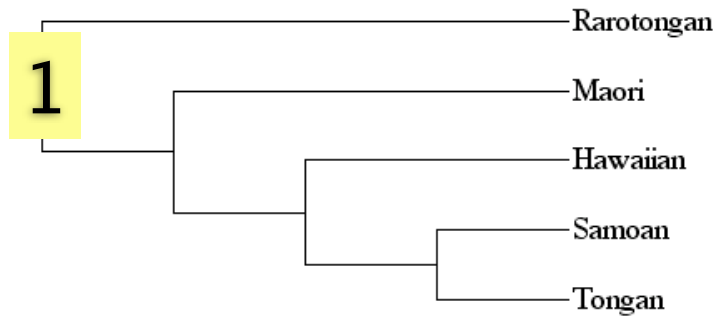
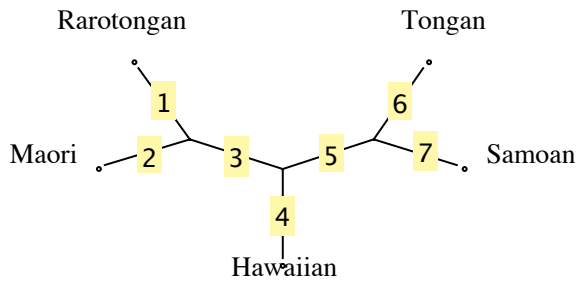


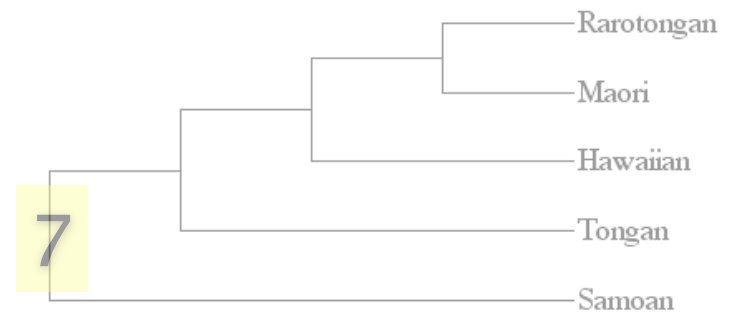
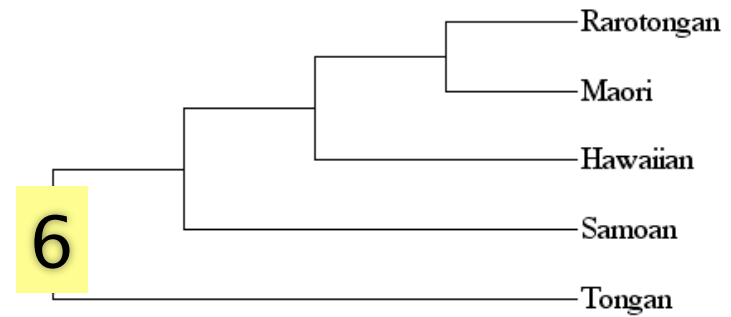
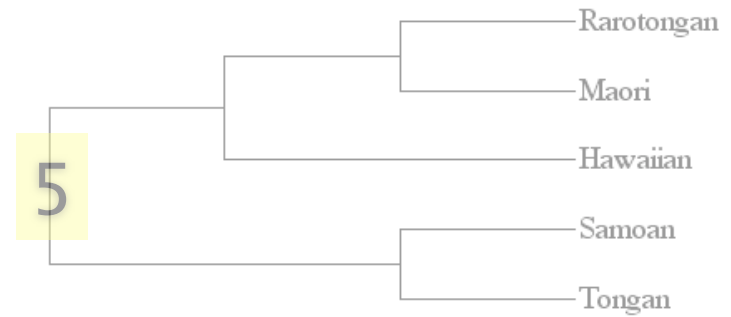
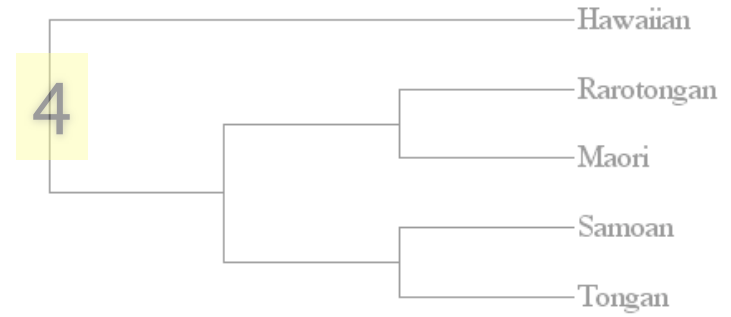
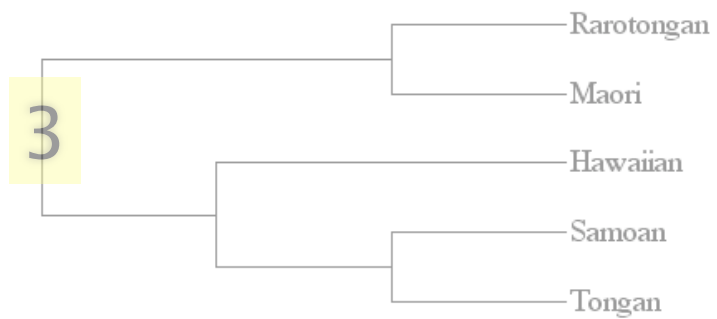
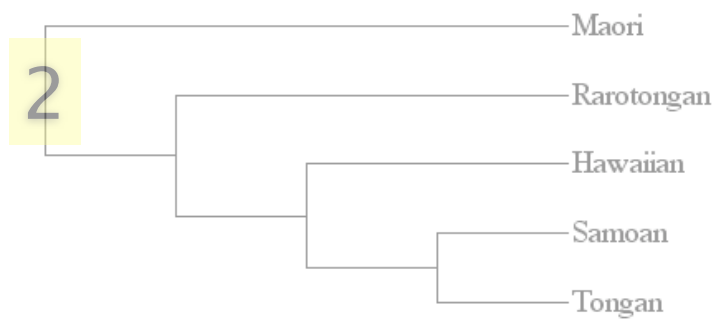
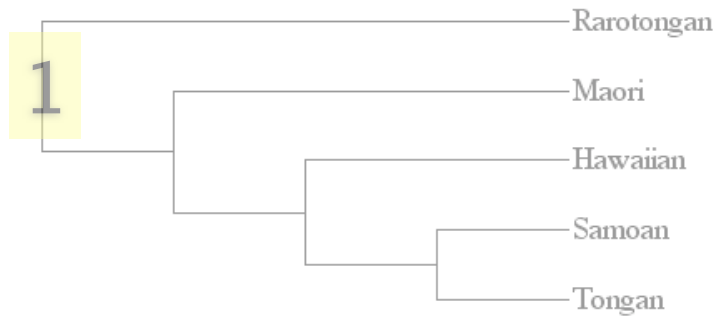
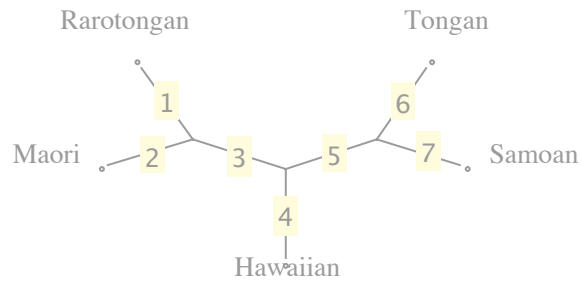
Probability: $0.2 \cdot 0.7 = 0.14$

	Maori	Tongan	Samoaan	Raroton.	Hawai'i
C3	h	h	s	?	h



Probability: $0.8 \cdot 0.8 \cdot 0.7 = 0.448$





Establishing Transition Probabilities

- Scientific discussion
- Collection of examples of change (Juliette Blevins: Handbook of Phonological Change)
- Statistical estimation of probabilities
 - ▶ Estimate similarities
 - ▶ Estimate asymmetry of direction



WALS



The World Atlas of Language Structures

edited by M. Haspelmath, M. S. Dryer, D. Gil, B. Comrie

The Interactive Reference Tool

developed by Hans-Jörg Bibiko

OXFORD
UNIVERSITY PRESS

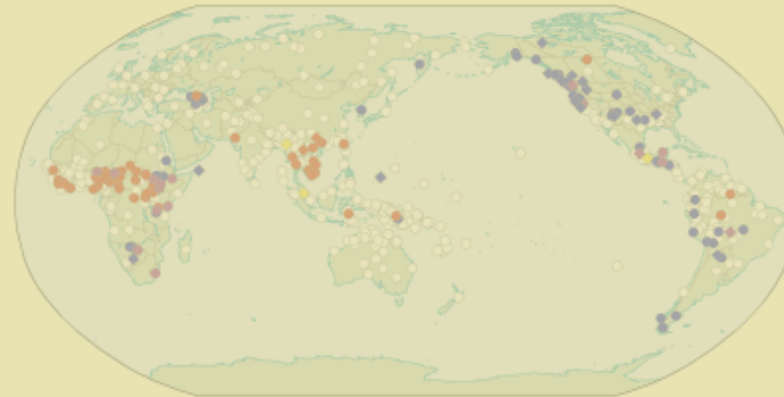
FEATURE VIEWER

LANGUAGE VIEWER

COMPOSER

ABOUT THIS PROGRAM

GUIDED TOUR





LANGUAGE VIEWER

COMPOSER

WALS the Feature Viewer

SHOW MAP

select a feature

- thematically
- alphabetically
- user-defined

SHRINK LIST

search for a feature

51

SEARCH

FEATURE PROFILE area: Nominal Categories

51. Position of Case Affixes

Author: **Matthew S. Dryer**

934 languages

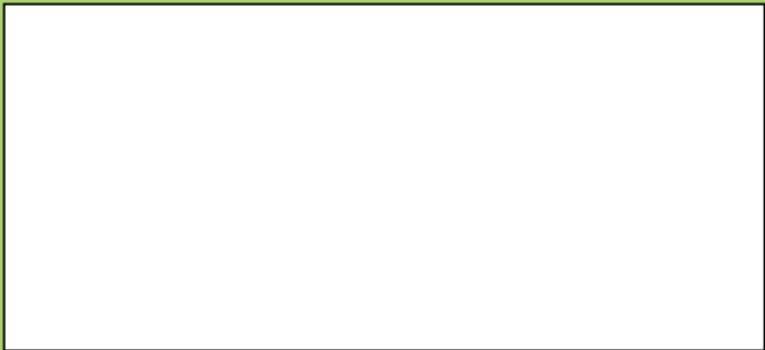
symbol: include: [click to list languages below \[no. of lgs : of genera : of families\]](#)

<input checked="" type="checkbox"/>	1. Case suffixes [431:174:90]
<input checked="" type="checkbox"/>	2. Case prefixes [35:19:14]
<input checked="" type="checkbox"/>	3. Case tone [4:2:1]
<input checked="" type="checkbox"/>	4. Case stem change [2:1:1]
<input checked="" type="checkbox"/>	5. Mixed morphological case [8:7:6]
<input checked="" type="checkbox"/>	6. Postpositional clitics [95:59:36]
<input checked="" type="checkbox"/>	7. Prepositional clitics [15:10:8]
<input checked="" type="checkbox"/>	8. Inpositional clitics [6:3:1]
<input checked="" type="checkbox"/>	9. No case affixes or adpositional clitics [338:145:56]

Merge: 1. 2. 3. 4. 5. 6. 7. 8. 9.

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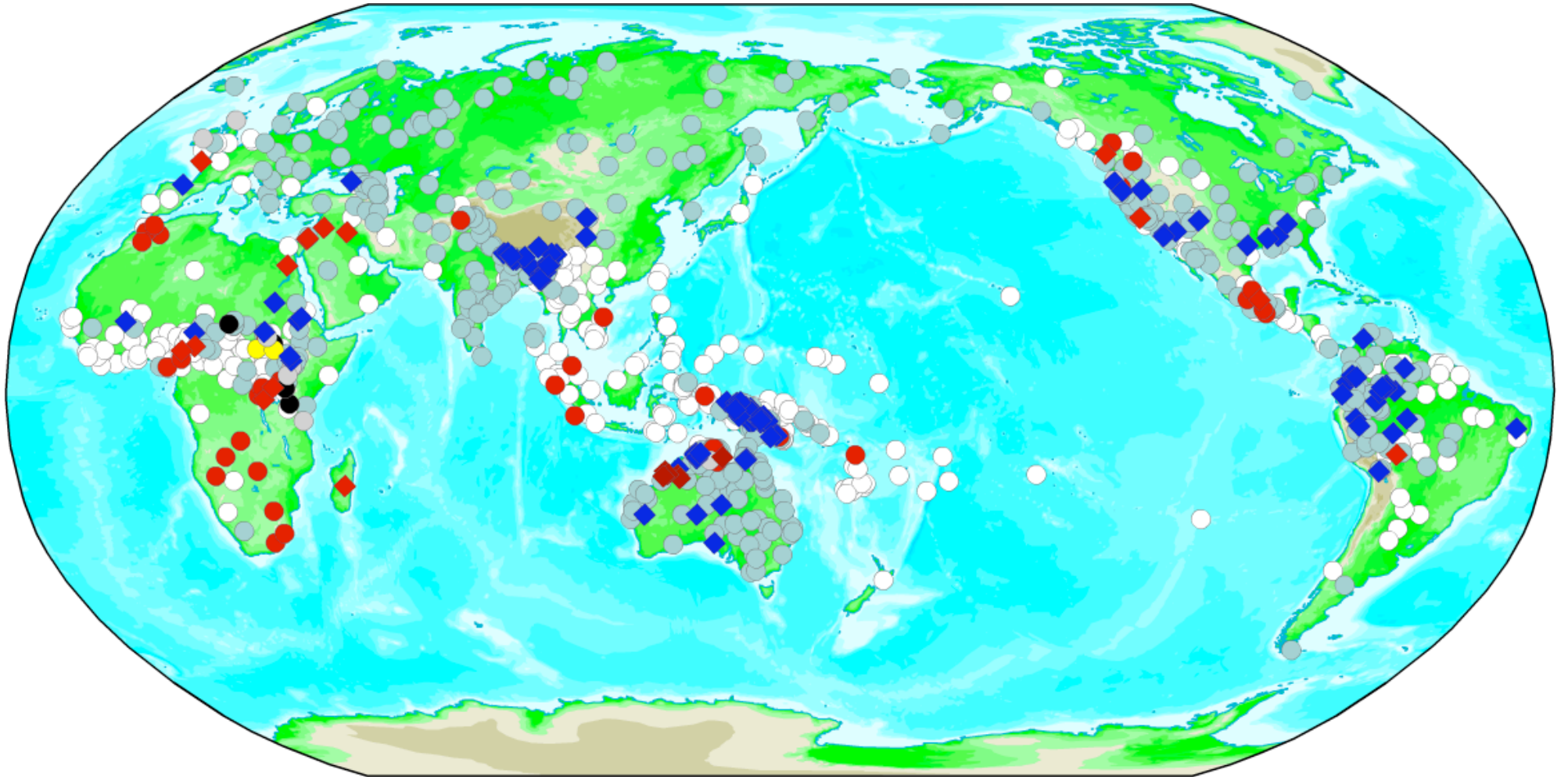
DESCRIPTION



arrange the languages by

languages

COPY LIST

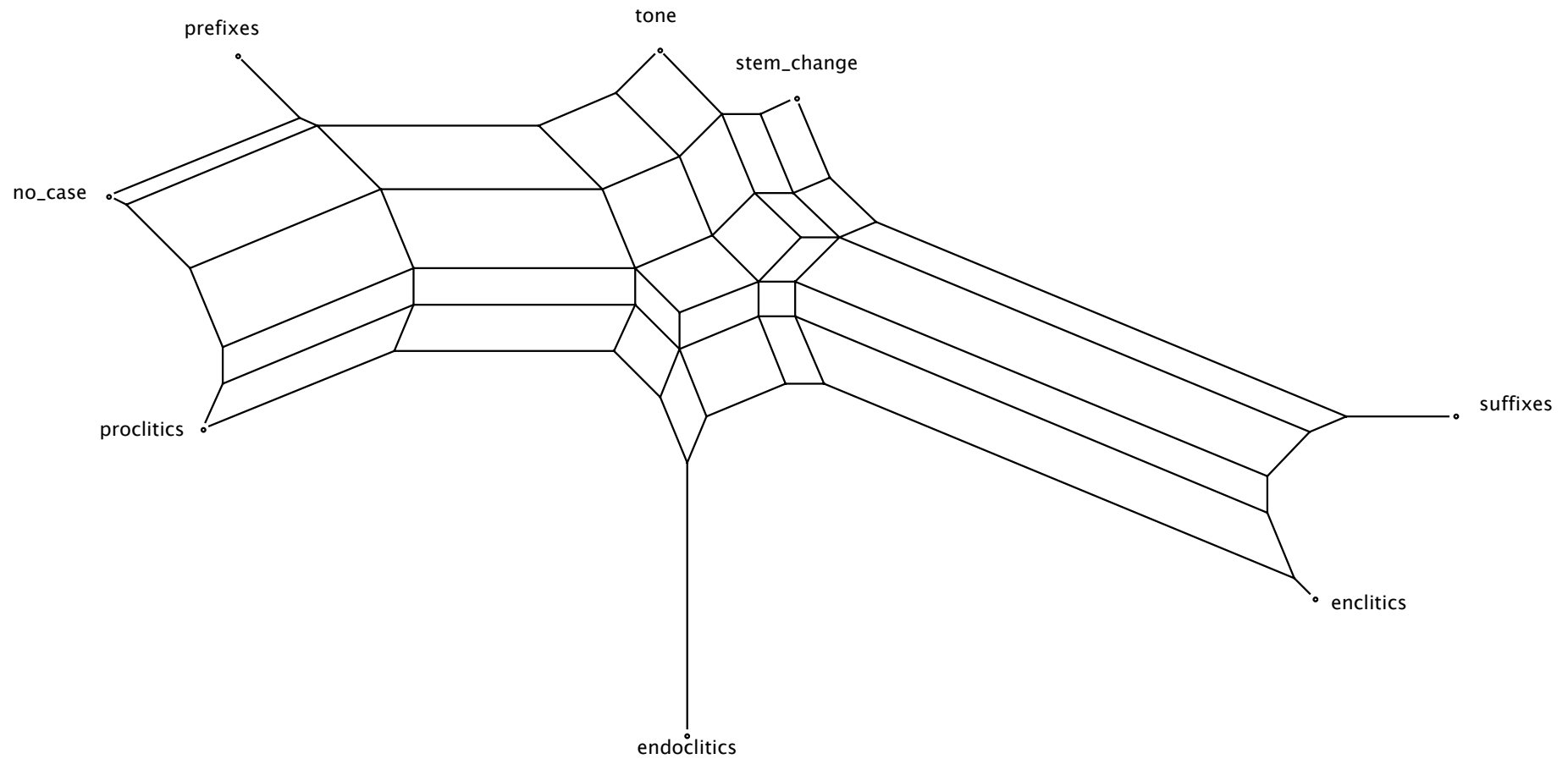


Similarities

	suffix	prefix	tone	stem	mixed	enclit	proclit	endo	no
suffixes	1	0.04	0.67	0.61	0.36	0.80	0.18	0.26	0.00
prefixes	0.04	1	0.72	0.74	0.88	0.21	0.62	0.48	0.88
tone	0.67	0.72	1	0.77	0.75	0.43	0.52	0.53	0.74
stem_change	0.61	0.74	0.77	1	0.76	0.48	0.53	0.53	0.64
mixed	0.36	0.88	0.75	0.76	1	0.29	0.96	0.52	0.86
enclitics	0.80	0.21	0.43	0.48	0.29	1	0.26	0.43	0.18
proclitics	0.18	0.62	0.52	0.53	0.96	0.26	1	0.52	0.89
endoclitics	0.26	0.48	0.53	0.53	0.52	0.43	0.52	1	0.29
no_case	0.00	0.88	0.74	0.64	0.86	0.18	0.89	0.29	1

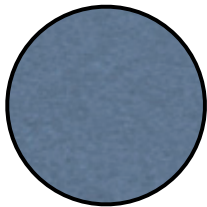


Network of Types



- Estimating similarities is relatively easy
(assuming a stationary linguistic world !)
- Transition probabilities are the extent of
asymmetry of these similarities
- Estimating these asymmetries is not easy !

Type A



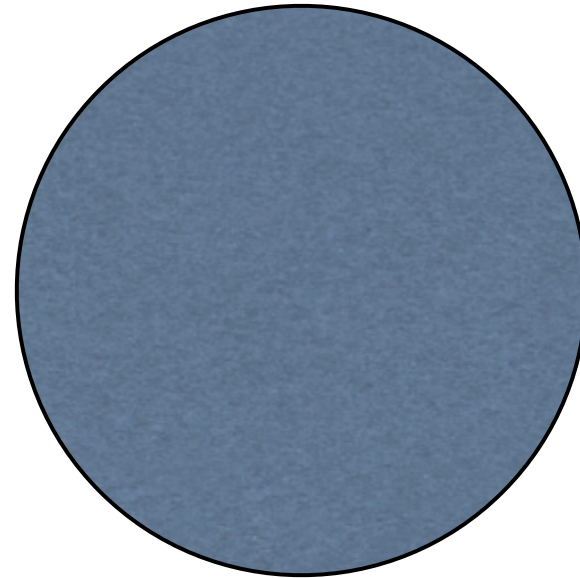
Relatively high probability

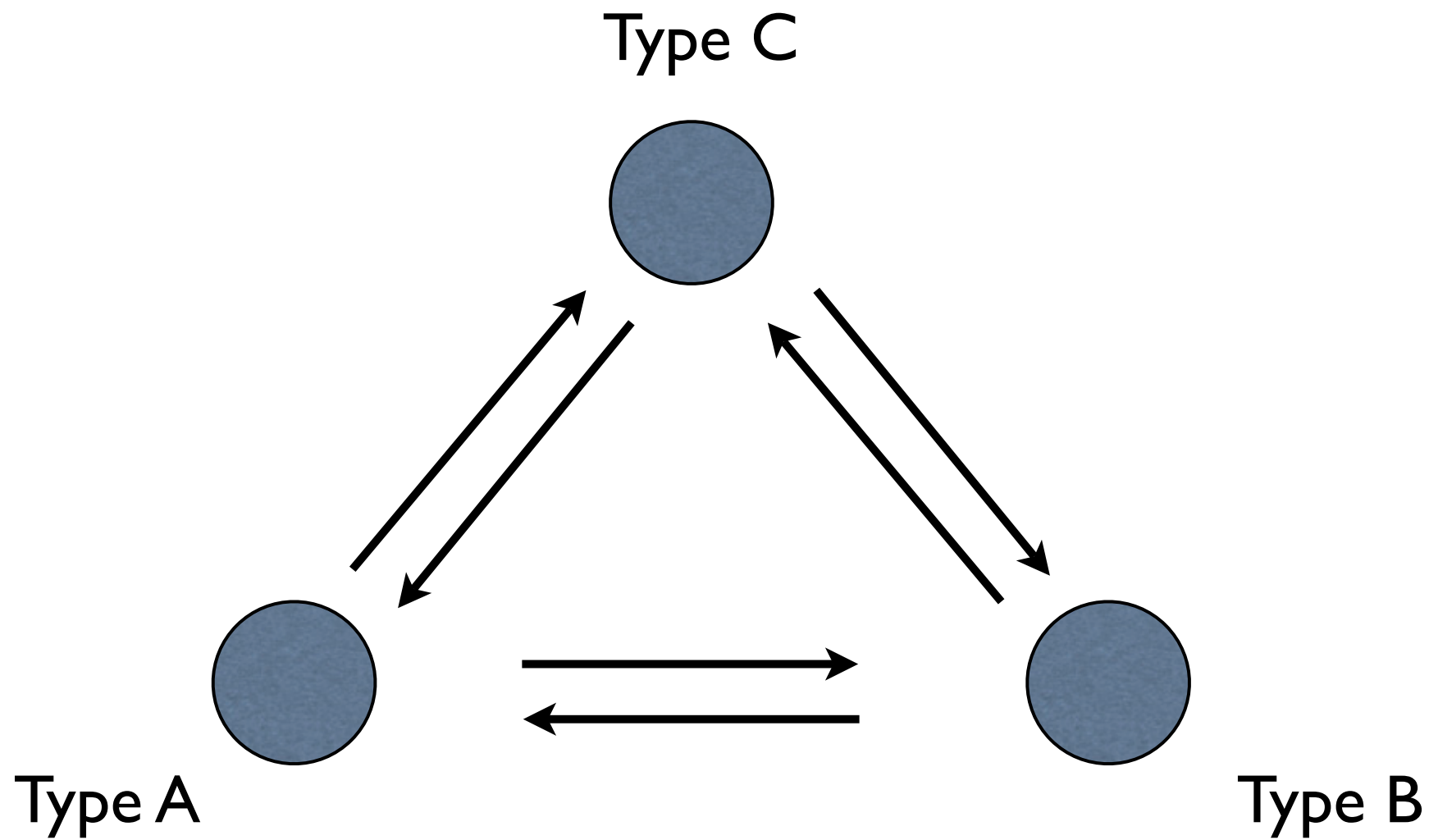


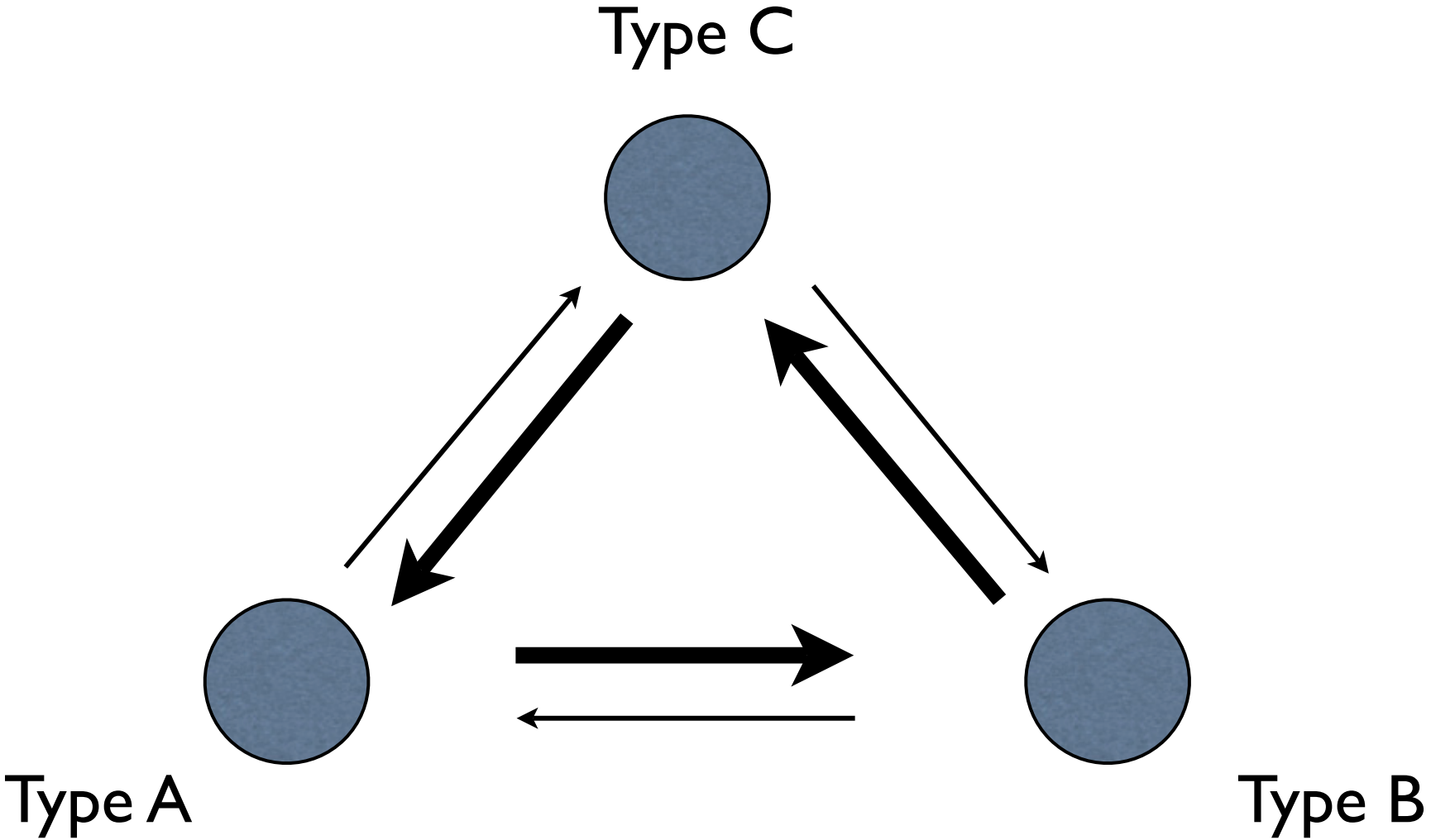
Relatively low probability



Type B









MAX-PLANCK-GESELLSCHAFT