Lexical travel maps
A spatial view of semantic change

Alexandre François

Visualizing historical lexicology

- Semantic maps have proven a powerful visual tool for representing polysemy & polyfunctionality:
  - within one language family
  - within one linguistic area
  - as a proposal about universal semantic connections (typology of polysemy)
- The perspective has been mostly synchronic
  - How can we use semantic maps to represent **diachrony**?
  - Can we adopt a **panchronic** perspective?
    - Cf. *panchronic phonology* (Haudricourt 1940, 1978): Highlighting the organic relationship between synchronic variation and long-term historical change.
- This talk illustrates the interest of semantic maps for *studying and representing semantic change in panchrony* – The **typology of semantic change**
  - Preliminary thoughts – Personal interest in etymology and semantic change
    - Can we visualize the findings of **historical lexicology** through a spatial representation?
  - Confronting firsthand data on **Oceanic** lgs with knowledge on other families.
  - Call for ideas for building a database & collaborating on the issue of **diachronic maps**.
    - A workshop titled ***Le DiaSeMa*** — *LExical DIAchronic SEmantic MAps* —
      is a fitting venue for thinking about joint work in the future.

Colexification

- Colexification (François 2008, Georgakopoulos *et al*. 2016) can be understood as a structural property of a language's lexicon, in synchrony.

> (1) A given language is said to COLEXIFY two functionally distinct senses if, and only if, it can associate them with the same lexical form[4]

- Italian ***sentire*** colexifies 'hear' and 'feel'
  - *Non t'avevo sentito*   'I hadn't heard you.'
  - *Sentiva dolore*   'He was feeling pain.'
- Mwotlap ***yoñteg*** (Oceanic) shows the same colex (pattern of colexification)
  - *Nok et yoñteg te nēk*   'I hadn't heard you.'
  - *Kē ni-yoñteg ne-memeh.*   'He was feeling pain.'
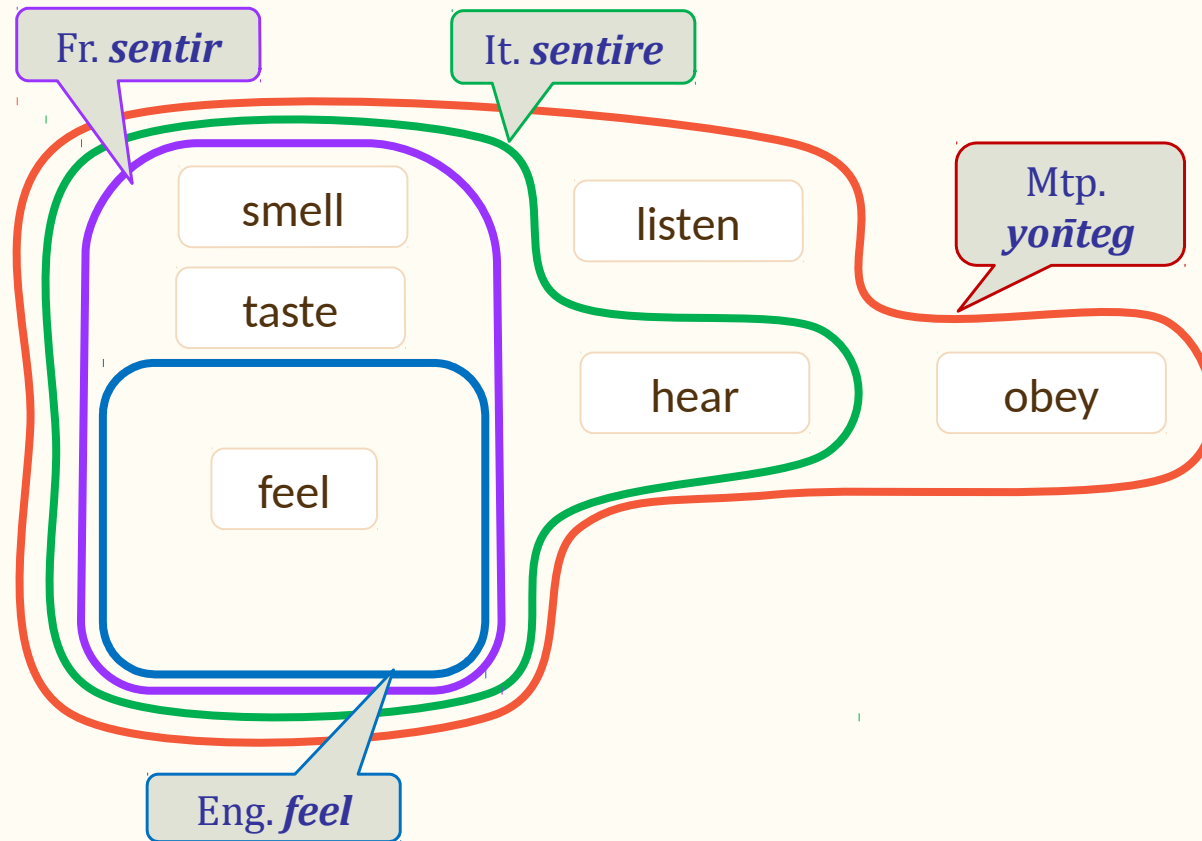- English **dislexifies** (=always distinguishes) the two meanings
  - **I hadn't felt you*   -- **He heard pain*

- Colexification is a property of an individual lexeme (*sentire, yoñteg*…); and by metonymy, of a language (Italian, Mwotlap…)
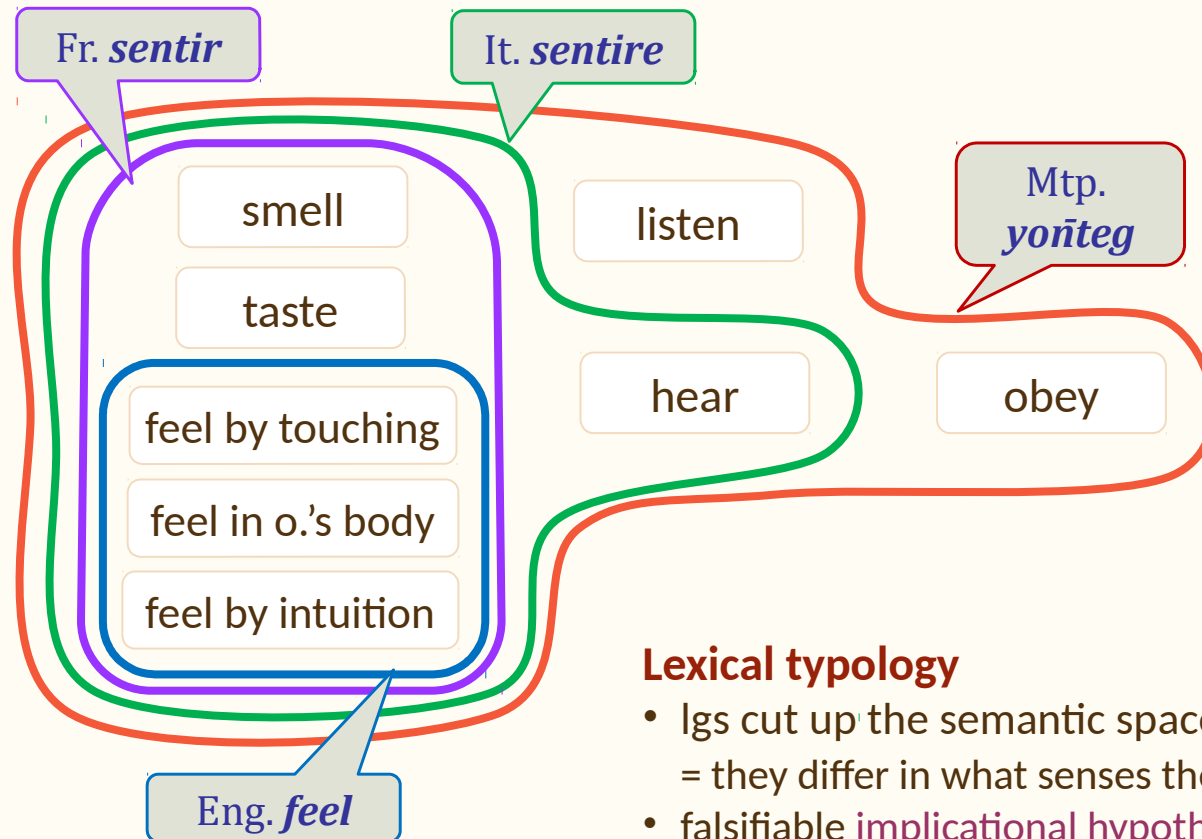
colexification	Mwotlap	Italian	Catalan	French	English
hear = feel	yoñteg	sentire	sentir	–	–

Semantic maps in synchrony

Semantic maps in synchrony

Fr. *sentir*

It. *sentire*

Mtp. *yoñteg*

smell

taste

feel by touching

feel in o.'s body

feel by intuition

listen

hear

obey

Eng. *feel*

Lexical typology

- lgs cut up the semantic space differently
  = they differ in what senses they colexify
- falsifiable implicational hypotheses:
  e.g. if a lg colexifies *hear* = *feel*,
  it will also colexify *hear* = *smell*...
- *see* > *hear* > *smell* > *taste* > *feel*...
  cf. Fr. *sentir*
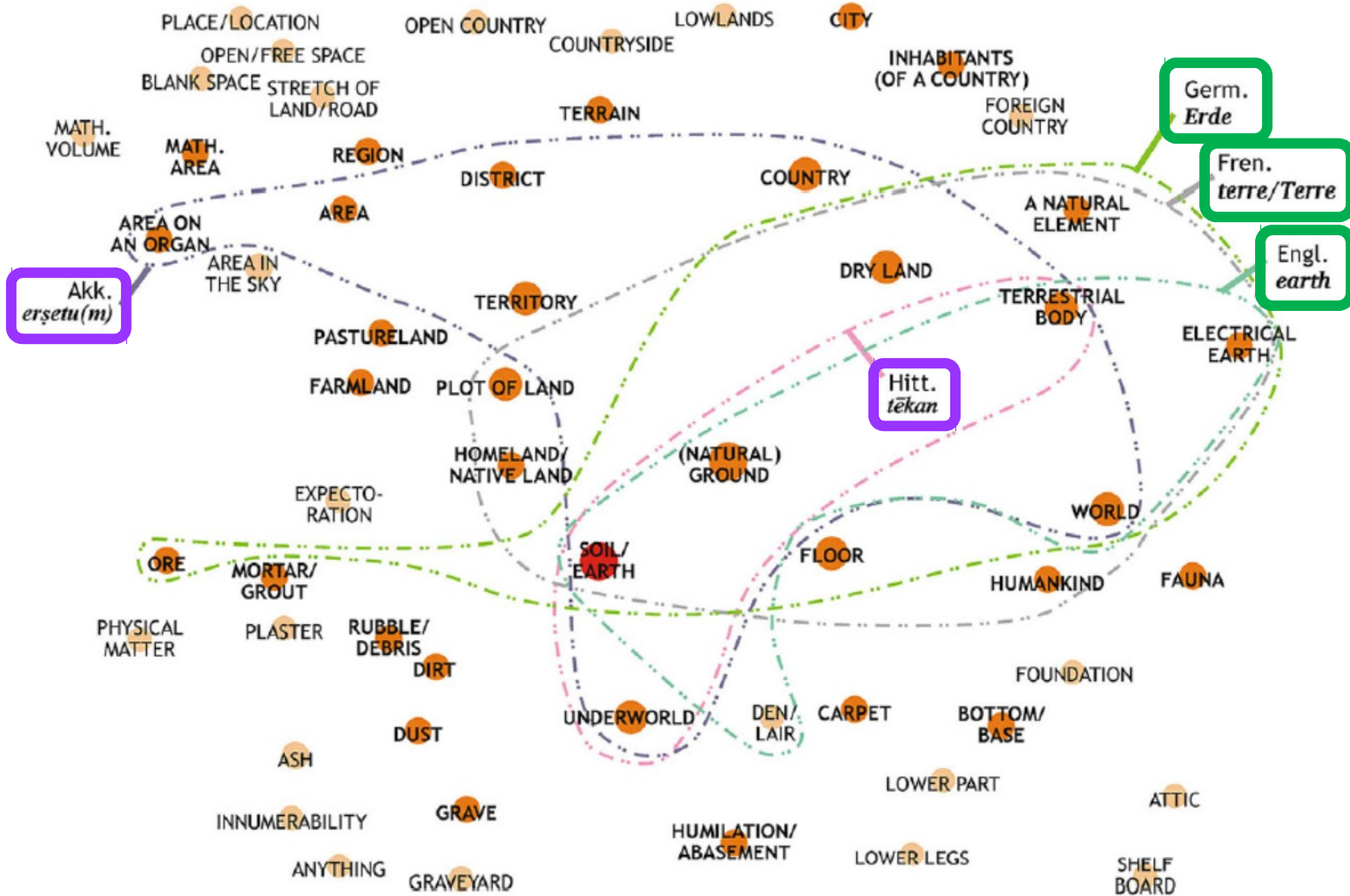
Semantic maps : *earth* lexemes

Fig. 13 | The semantic space of 'earth' lexemes.

Georgakopoulos *et al.* 2016. **The meaning of ancient words for 'earth'**. An exercise in visualizing colexification on a semantic map.
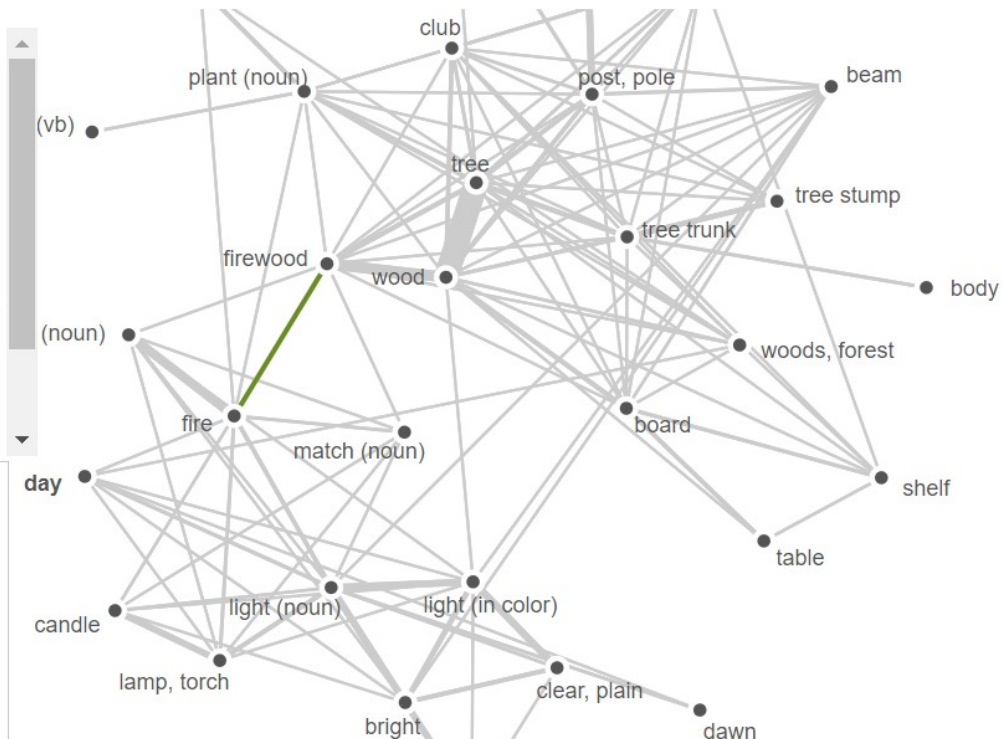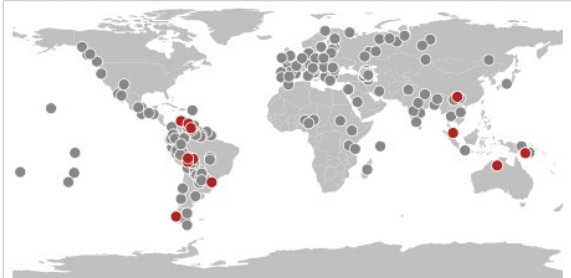
Typology of colexification

- ## CLiCS: Cross-Linguistic Colexifications
  - List, J.-M., Mayer, T., Terhalle, A., & Urban, M. (2014). *CLICS: Database of Cross-Linguistic Colexifications*. Marburg: Forschungszentrum Deutscher Sprachatlas
    - [1.0]   1280 meanings, 221 languages
    - [2.0]   **1521** meanings, **1156** language varieties

13 links for "firewood" and "fire":

Language	Family	Form
1. Qawasqar	Alacalufan	afcʔar
2. Wayuu	Arawakan	siki
3. Yavitero	Arawakan	kaɽi
4. Gurinji	Australian	warlu
5. Cheq Wong	Austro-Asiatic	ʔɔs
6. E'ñapa Woromaipu	Carib	wahto
7. Miao, White	Hmong-Mien	taws
8. Itonama	Language isolate	ubari
9. Tsimané	Language isolate	ʼcih
10. Kaingang	Macro-Ge	pĩ

Typology of colexification

project started in February 2018 – François, Souag, Vanhove
- 320 meanings, 20 languages

Lacito - Base CoLex

Fichier   Édition   Affichage   Insertion   Format   Données   Outils   Modules complémentaires   Aide

id	B	s1	Wnet id1	s2	Wnet id2	English AlexF	Bislama AlexF	Mwotlap AlexF	Hiw AlexF	Teanu AlexF	Japanese AlexF	Dellys Arabic Souag	Korandje Souag
114	AF	healer		doctor		–	–	tēytēybē	temētr̄ōn	taluaito	–		
115	AF	hear		feel		–	harem	yoñteg	r̄ōn	lengi	–	–	–
116	AF	heavy	Adj_heavy#1	solemn, grave	Adj_grave#3	–	–	dēw	mave	motoro			
117	ER	heavy		pregnant		–					–		–
118	AF	help		be with	accompany#4	–	–	biyiñ		samame	–		
119	AF	hip, flank	N_hip#1	river bank	N_bank#1	side	saed	–	–	waluko			
120	SL	sand		river bank									
121	AF	husk fibres		rope		–	–			tenuro	–	–	
122	AF	identical		sufficient		–	stret	haytēyēh	tēnnēr̄	–	–		
123	AF	in front	in front#1	in the past	before#1	(before)	bifo	am̄ag	tuwtōw	noma	mae		
124	AF	inward	Adv_inward#	secret	Adj_secret#1	–		bat					
125	AF	island		country			aelan	napnō	vönyö				
126	AF	join	V_join#3	marry		–	–	–		kila	–		
127	SL	sleep		marry									
128	AF	know	V_know#4	can, be able	able#1	–	save	–	–	ovei	dekiru		
129	AF	leave	V_leave#4	allow	V_allow#2	–	lego	ukēg	moketog	re		xəlli	ks
130	LS	let (s.o. do s.t.)	V_let#3	make (s.o. do s	V_make#4							xəlli	ks
131	AF	leg		foot		–	leg	nayño	r̄ōñō	aele	ashi	rjəl	tsi
132	AF	light in weight	A_light#1	dry		–	–	–		mimione	–	–	
133	AF	like s.th.	V_like#2	want s.th.		–	laekem	mōyōs	ñis	viaene	–	ħəbb	
134	AF	listen		hear		–	harem	yoñteg	r̄ōñ	lengi	kiku	sməʕ	–
135	AF	look		see			luk	et	yō	romo	miru	šuf	
136	AF	make	V_do#2	affect	V_affect#2	–	mekem	ak	ta	ejau			

Typology of colexification

Lacito - Base CoLex

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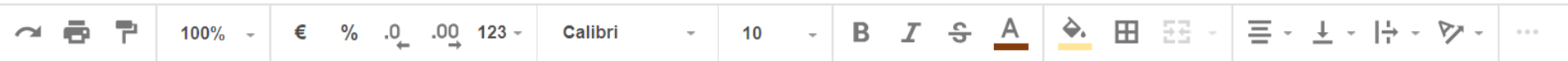| id	B	D	E	F	G	English	Bislama	Mwotlap	Hiw	Teanu	Japanese	Dellys Arabic	Korandje
		s1	Wnet id1	s2	Wnet id2		AlexF	AlexF	AlexF	AlexF	AlexF	Souag	Souag
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130	LS	let (s.o. do s.t.	V_let#3	make (s.o. do s	V_make#4	–	–	–	–	–			
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Bislama (English-based creole of Vanuatu) often aligns with the lexical structures of the **Oceanic** (substrate / adstrate) **languages**.

⇨ **areal signal** in colexification!
+ Theory of **relexification** in creole genesis (Lefebvre 1986)

Typology of colexification

3 Melanesian languages cluster together

Bislama (English-based creole of Vanuatu) often aligns with the lexical structures of the **Oceanic** (substrate / adstrate) **languages**.

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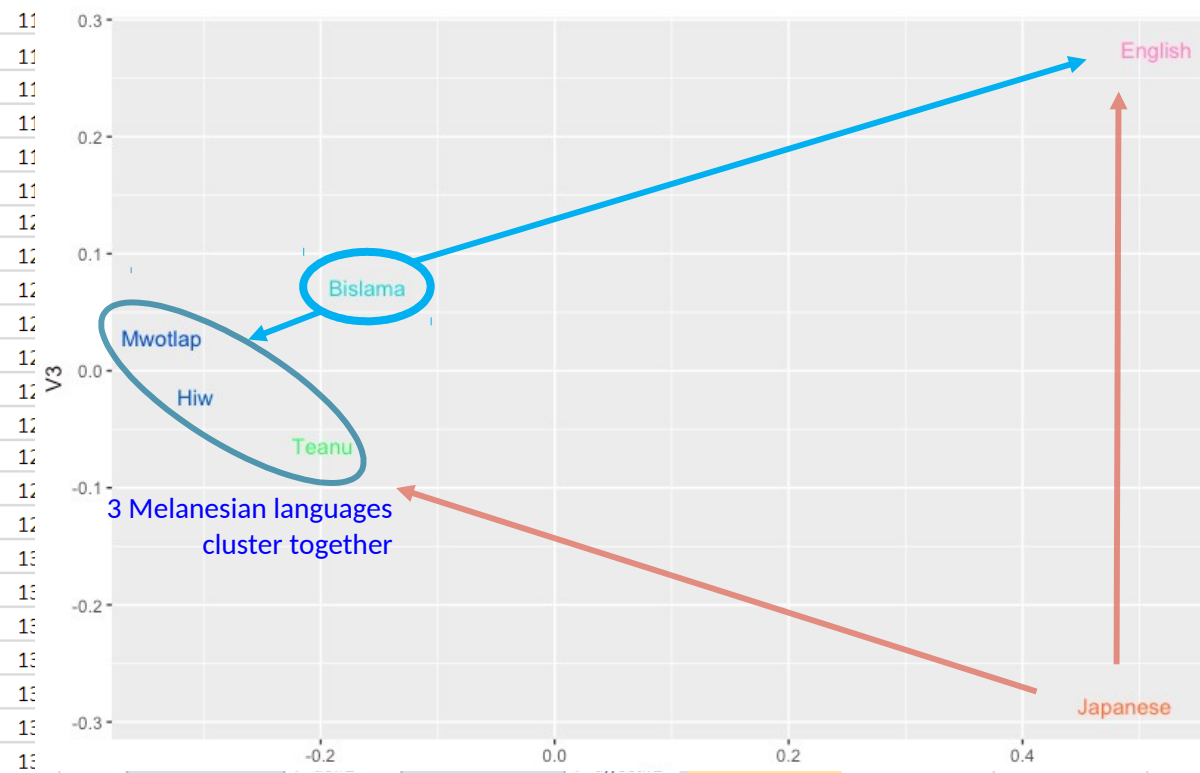+ Theory of **relexification** in creole genesis (Lefebvre 1986)

⇨ **distance measure** (MDS)
("Jaccard coëfficient, acquired differences")
[thanks to Siva Kalyan]

The diachrony of colexification

- Colexification can also be studied in its **historical dynamics**
  - cf. Hear / feel in Romance languages
    - Latin dislexified   *sentīre* 'feel'   vs.   *audīre* 'hear'
    - Spanish is simply **conservative** of earlier lexical structures
    - Cat. and Ital. acquired a new colex, which **disrupted** earlier lexical structures.
      - Lat. *sentīre* 'feel' ⇨ Italian *sentire* 'feel, hear'
      - *sentire* pushed away **audire*, and acquired a new colex meaning
    - Semantic merger = New colex   {A} B ⇨ {A B}
- French
  went through a **double merger**, which ended up **preserving** earlier structures

Language	feel	hear
Latin	sentīre	audīre
Spanish	sentir	oír

Semantic maps in diachrony

- *Senses and cognition*

Lexical travel map

Watching meanings move around across semantic space

smell

taste

feel by touching

feel in o.'s body

feel by intuition

sentire

hear

(Warlpiri+)

know

entendre

understand

comprendere

embrace

seize

capire

see

attend to

intendere

PIE *weyd-
Polyn. *kita
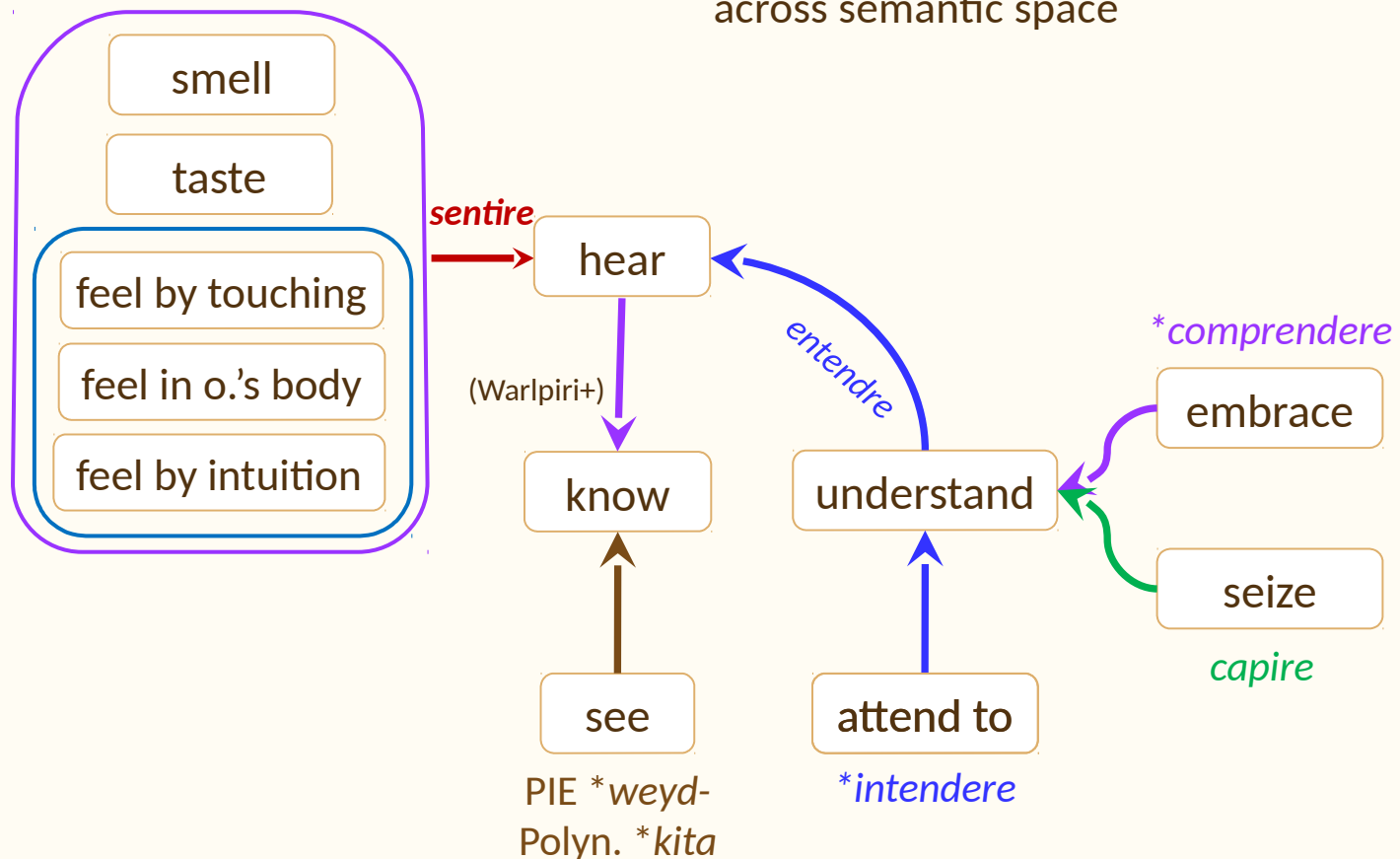
Typology of semantic change

- Semantic **merger** = emergence of new colex
  - {**A**} B ⇨ {**A B**}
    - *sentīre*: 'feel' ⇨ 'feel, hear'
- Semantic **split** = loss of colex
  - {**A B**} ⇨ A {**B**}
    - *entendre*: 'understand, hear' ⇨ 'hear'
- Semantic **shift** = merger then split
  - {**A**} B ⇨ {**A B**} ⇨ A {**B**}
    - *entendre*: 'understand' ⇨ 'understand, hear' ⇨ 'hear'
    - Evans & Wilkins (2000): "semantic change from meaning A to B normally involves a transitional phase of polysemy where a form has both meanings"
- Double **shift** = merger then split, merger then split
  - {**A**} B C ⇨ {**A B**} C ⇨ A {**B**} C ⇨ A {**B C**} ⇨ A B {**C**}
    - O.Fr. *chief*: 'head' ⇨ 'main part' ⇨ 'leader in a group'

Typology of semantic change

- Semantic **shift** = entails a *bridging context*
  - {**A**} B ⇨ {**A B**} ⇨ A {**B**}
    - *entendre*: 'understand' ⇨ 'understand, hear' ⇨ 'hear'

  - Evans & Wilkins (2000):

  > sense (cf. Traugott 1989). That is to say, meaning B often comes into existence because a regularly occurring context supports an inference-driven contextual enrichment of A to B. In these contexts, which we term BRIDGING CONTEXTS, speech participants do not detect any problem of different assignments of meaning to the form because both speaker and addressee interpretations of the utterance in context are functionally equivalent, even if the relative contributions of lexical content and pragmatic enrichment differ. Subsequently this contextual sense may become lexicalized to the point where it need no longer be supported by a given context.

  - Enfield (2003):

Bridging contexts mask the distinction between an individual's being at Stage 2 and Stage 3, allowing speakers to co-exist over periods while at different stages

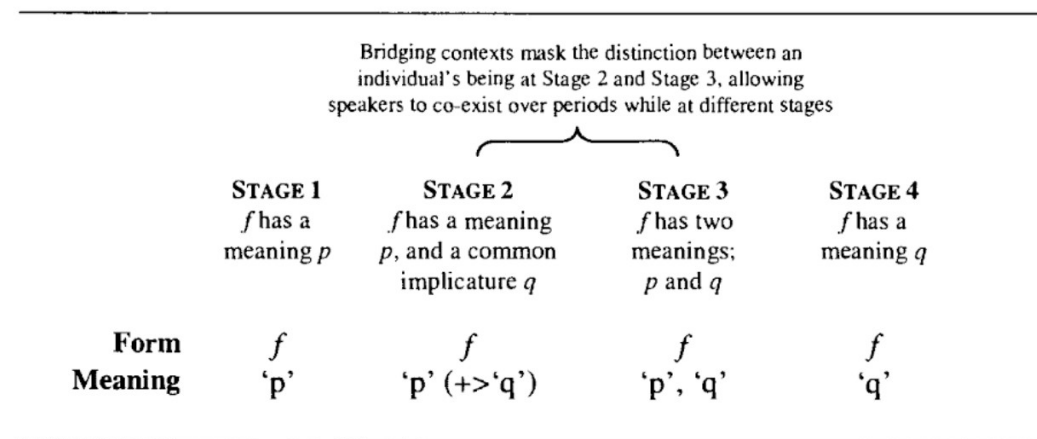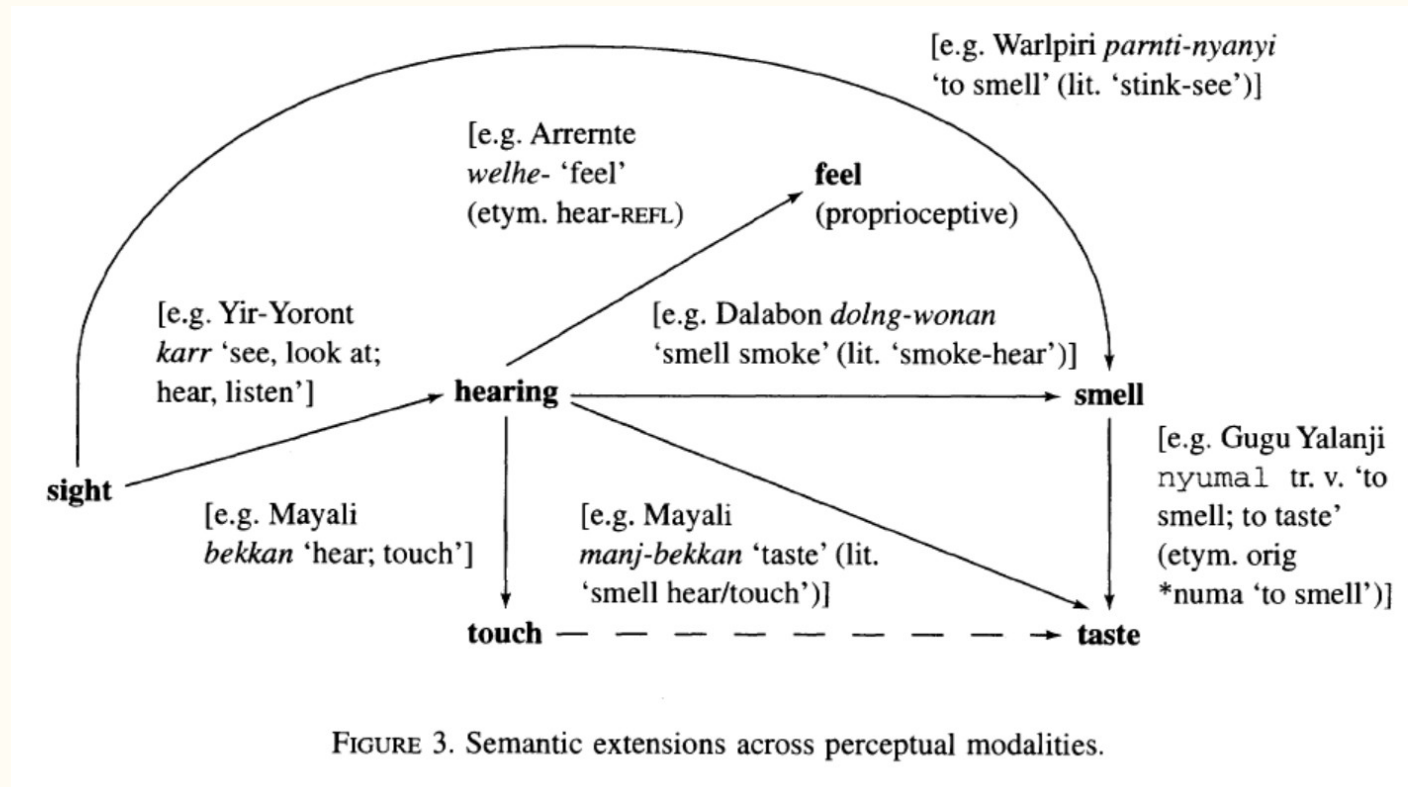|	STAGE 1 f has a meaning p	STAGE 2 f has a meaning p, and a common implicature q	STAGE 3 f has two meanings; p and q	STAGE 4 f has a meaning q
Form	f	f	f	f
Meaning	'p'	'p' (+>'q')	'p', 'q'	'q'

Figure 1.7 Stages in semantic change, where 'bridging contexts' mask the transition from online pragmatic implicature to genuine polysemy

Semantic maps in diachrony

- **Australian languages**:
  - Semantic extensions across perceptual modalities

[e.g. Warlpiri *parnti-nyanyi* 'to smell' (lit. 'stink-see')]

[e.g. Arrernte *welhe-* 'feel' (etym. hear-REFL)]

feel (proprioceptive)

[e.g. Yir-Yoront *karr* 'see, look at; hear, listen']

[e.g. Dalabon *dolng-wonan* 'smell smoke' (lit. 'smoke-hear')]

hearing → **smell**

[e.g. Gugu Yalanji nyumal tr. v. 'to smell; to taste' (etym. orig *numa 'to smell')]

sight

[e.g. Mayali *bekkan* 'hear; touch']

[e.g. Mayali *manj-bekkan* 'taste' (lit. 'smell hear/touch')]

touch — — — — — — → **taste**

FIGURE 3. Semantic extensions across perceptual modalities.

Evans, Nicholas & David Wilkins. 2000. In the mind's ear: the semantic extensions of perception verbs in Australian languages. Language 76, 546-592.

Semantic maps

- **Australian languages**:
  fire – camp – country ++

Evans, Nicholas. 1992. Multiple semiotic systems, **hyperpolysemy**, and the reconstruction of semantic change in Australian languages. In Günter Kellerman & Michael Morrissey (eds.), *Diachrony within Synchrony* 475-508. Bern: Peter Lang Verlag, 546-592.

"Should information on the **directionality of change** become available, 'links' could also represent [semantic change]. At this early stage of research, however, it is often difficult to decide on the direction of change." (p.490)
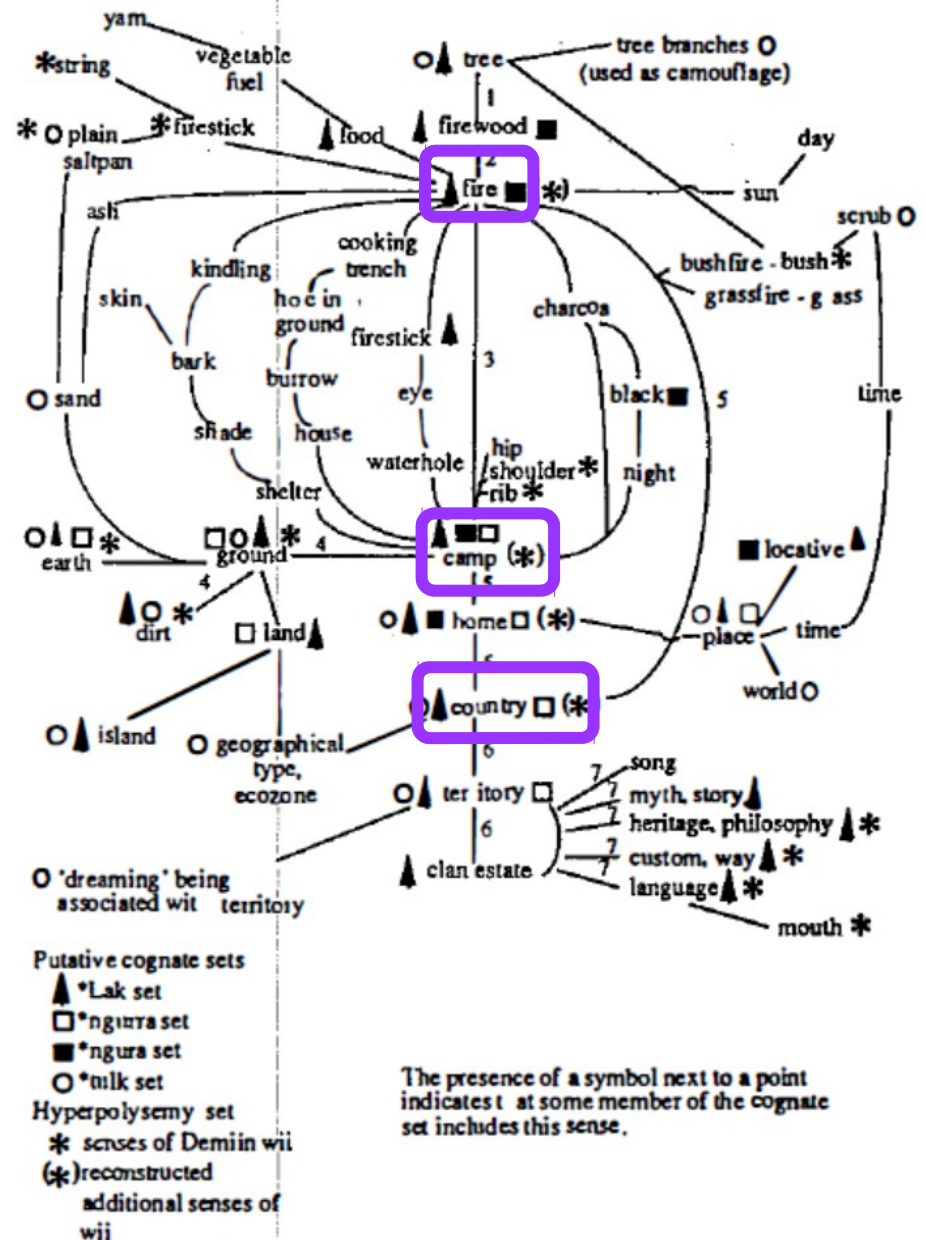

Figure 1:   The fire/camp/country nexus

Semantic maps :
territory in Oceanic

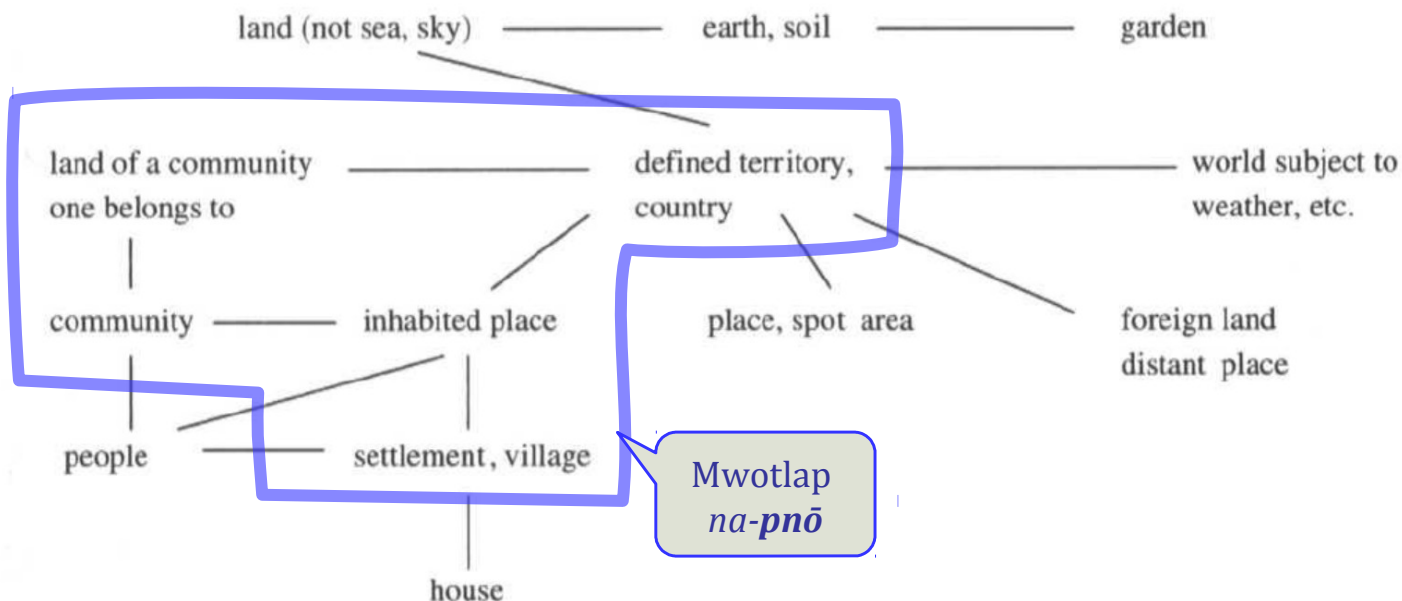THE MEANING(S) OF PROTO OCEANIC *panua

Figure 3. Network of senses associated with reflexes of *panua

- **Austronesian languages**: Lexical domain of *panua
  Pawley, Andrew. 2005. The meaning(s) of Proto Oceanic *panua. In Claudia Gross, Harriet D. Lyons & Dorothy A. Counts (eds.), *A Polymath Anthropologist: Essays In Honour of Ann Chowning*. University of Auckland: Department of Anthropology.

Semantic maps in diachrony
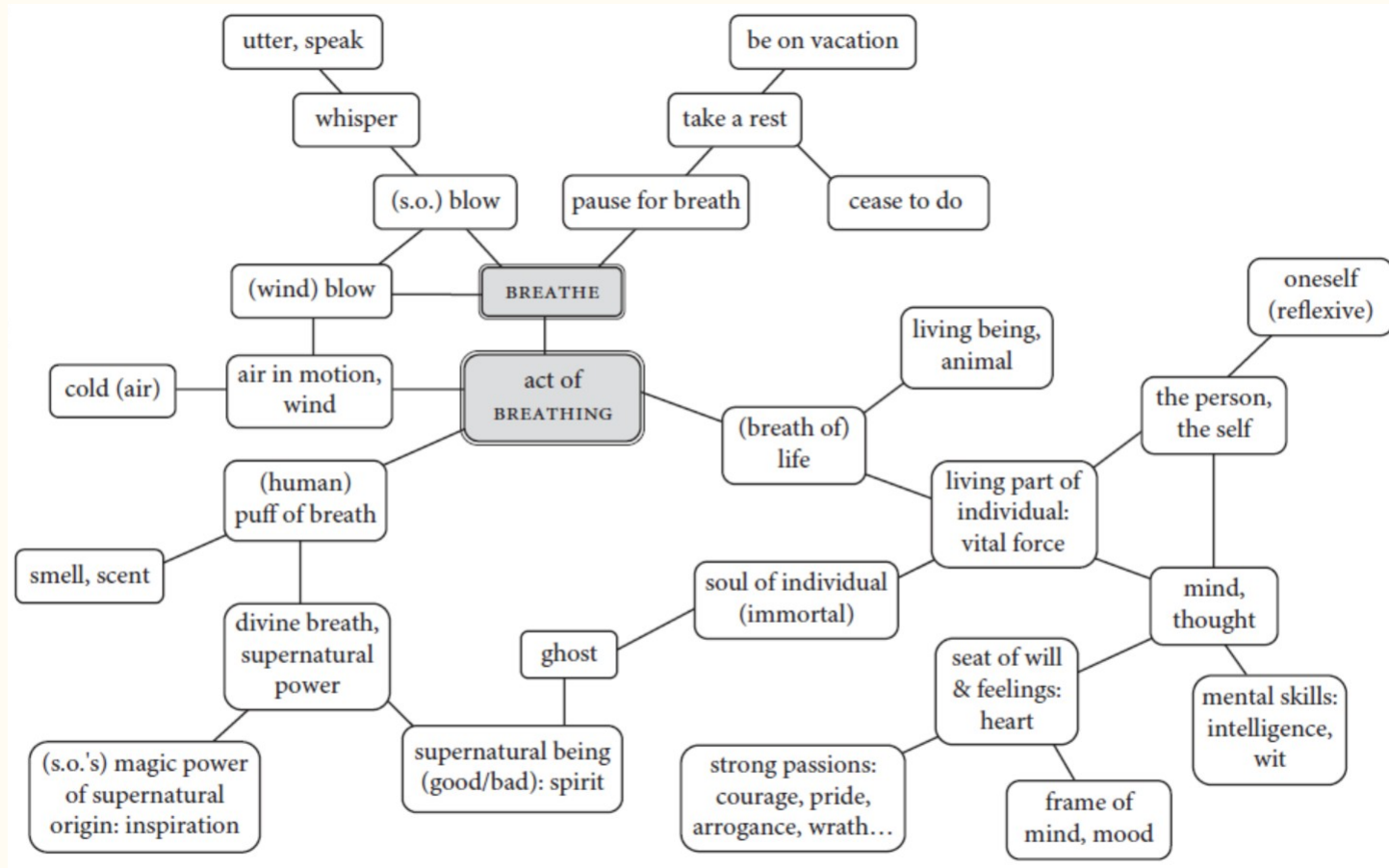
A semantic map for *breathe* (François 2008)

Semantic maps in diachrony
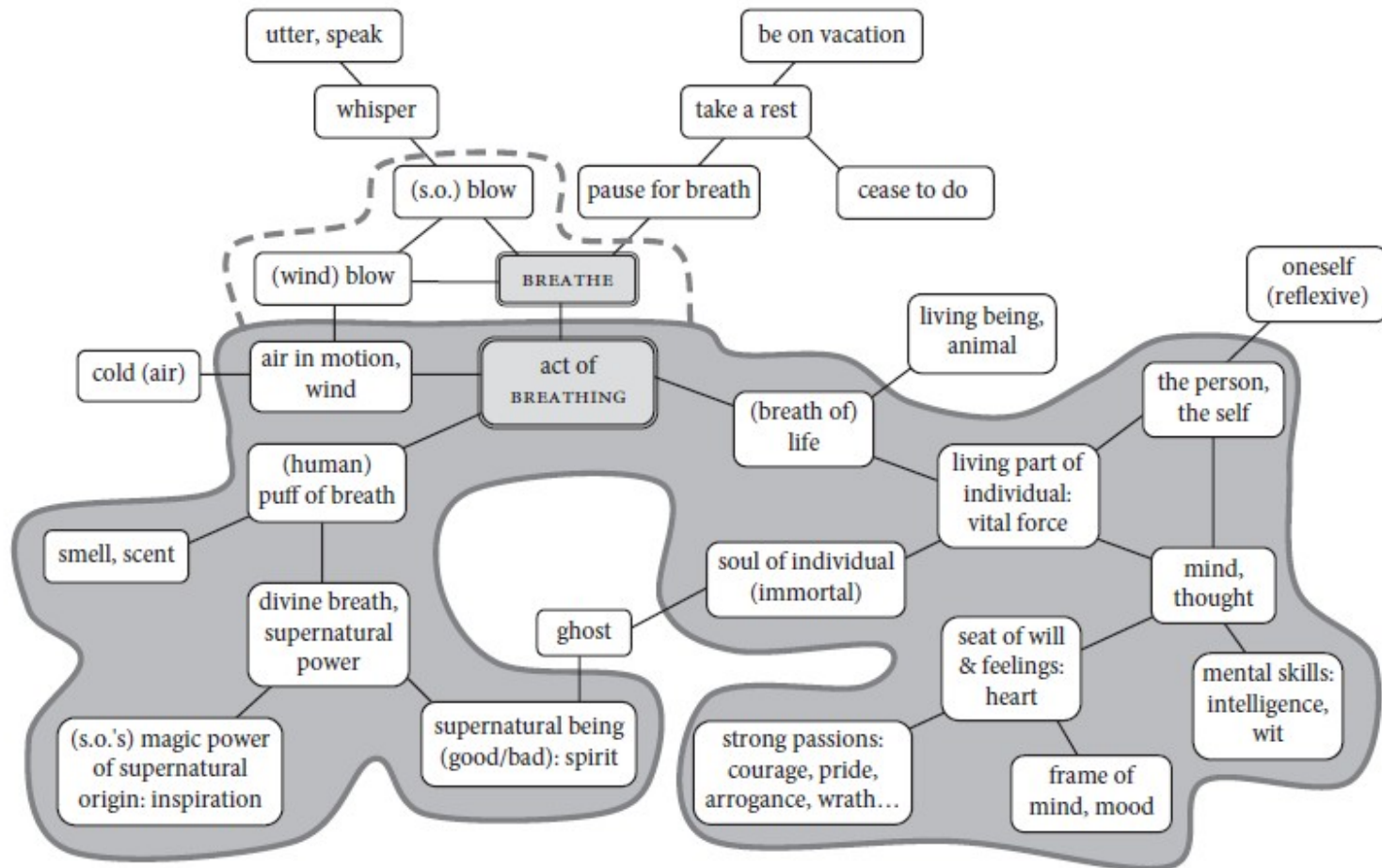
Latin *spīritus*

Semantic maps in diachrony

Latin *spīritus* > French ***esprit***

Semantic maps in diachrony

Latin *spīritus* > French ***esprit***

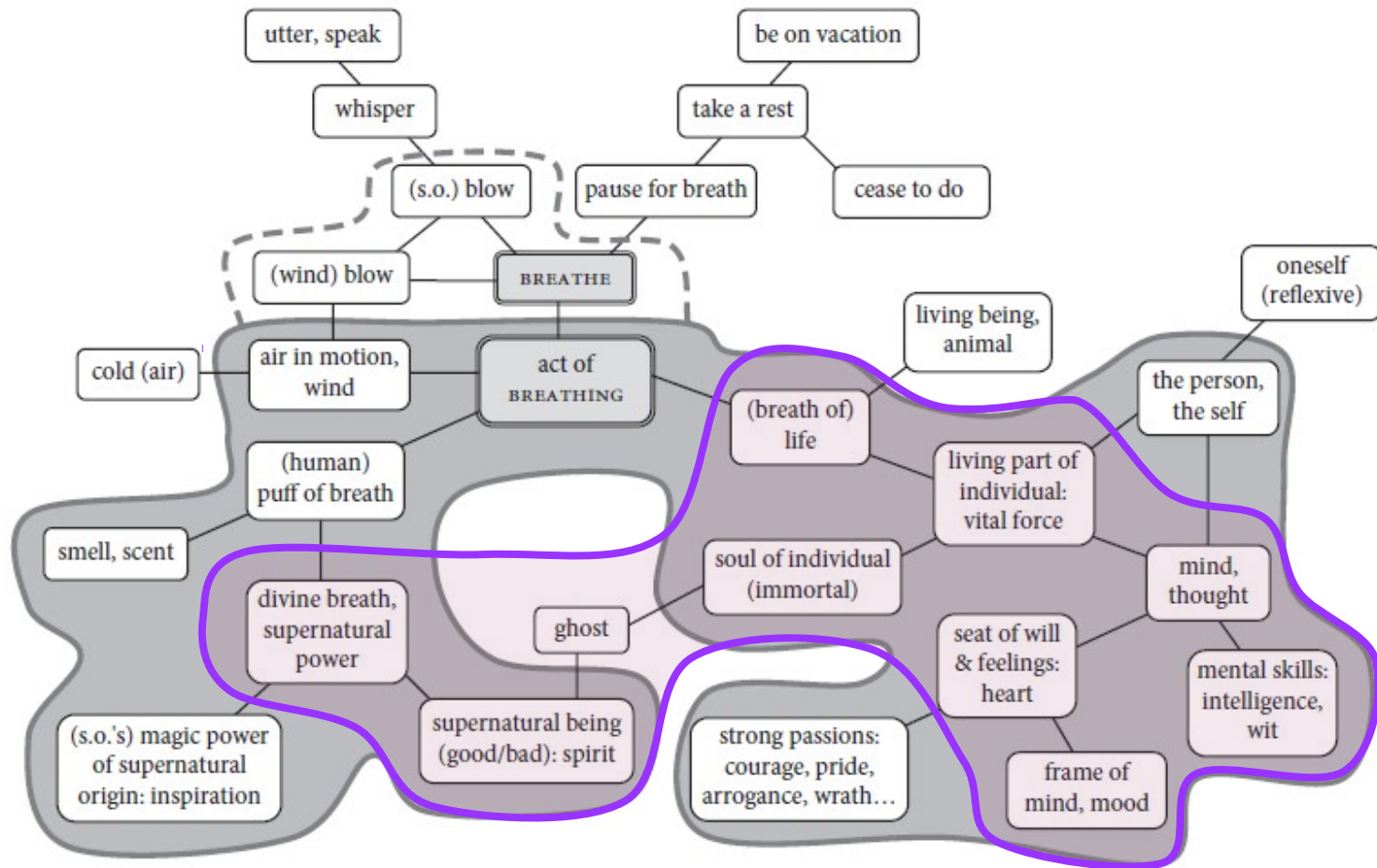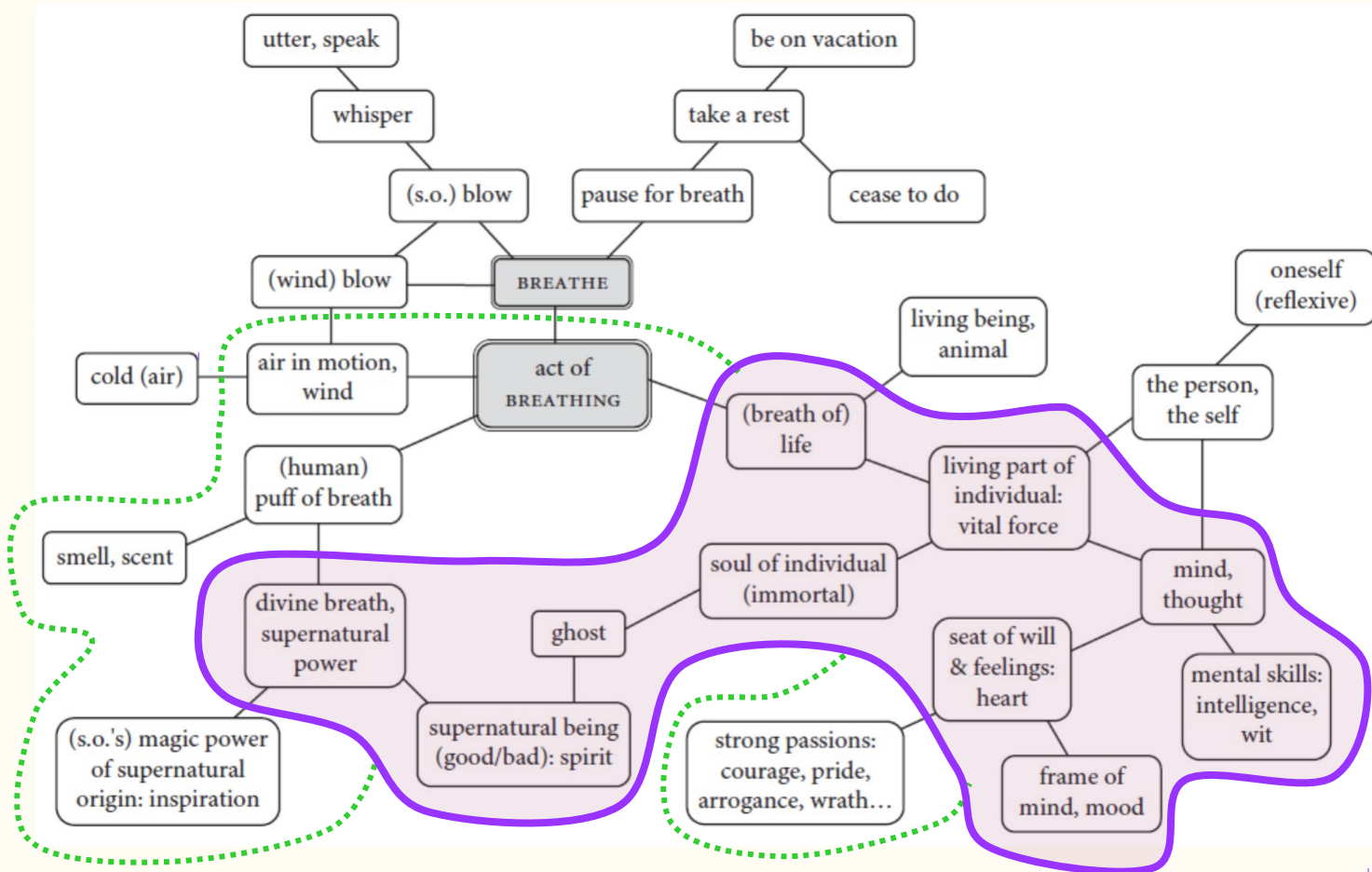# *tabu: The adjective *toq* in Hiw

toq [tɔkʷ] ADJ. (1) (stg) endowed with special status inducing awe and special respect: sacred.

(2) ‹Christ› sacred, holy. ▷**Mama te r̆ene, ne ya nĕ toq.** *Our father in Heaven, hallowed be Thy name.*

♦ **gengon toq** N. *lt.* "holy food": altar bread, host. ▷**ne oye-vĕ-gengon-toq** *[the consumption of holy bread] the Eucharist*

(3) (place) unapproachable, off limits, *typic.* due to being haunted by ghosts (**temët**).

♦ **n̄wute toq** N. *lt.* "taboo place": locations on the island known to be haunted by ghosts and spirits (**temët**), and to which visits are advised against.

(4) (topic) taboo, not meant to be mentioned in public. ▷**Ne voygë pe nëne nëgë toq, tite tat vegevage vitikëyë ie n̄wute pe tuquñ-kë ve toge ie mi tun̄wuyegë.** *Subjects like that are a bit taboo: you can't just mention it randomly when kids or women are around.*

(5) (s.o.) endowed with supernatural powers (*cf.* **mane**). *Syn.* **tr̆ane**.

♦ **tayö toq** N. *lt.* "sacred person": a man endowed with supernatural, magic powers, *hence* worthy of higher status in the grade-taking system (**suqe**). ▷**Sise kar̆' ike r̆e tuye tom n̄wë tom ike on r̄ōw wr̄og, ike ne tayö toq.** (ritual pedestal **tuye**) *They'll shoot arrows at you [as you stand] on the stone pedestal; if you survive, this means you're a magic man.*
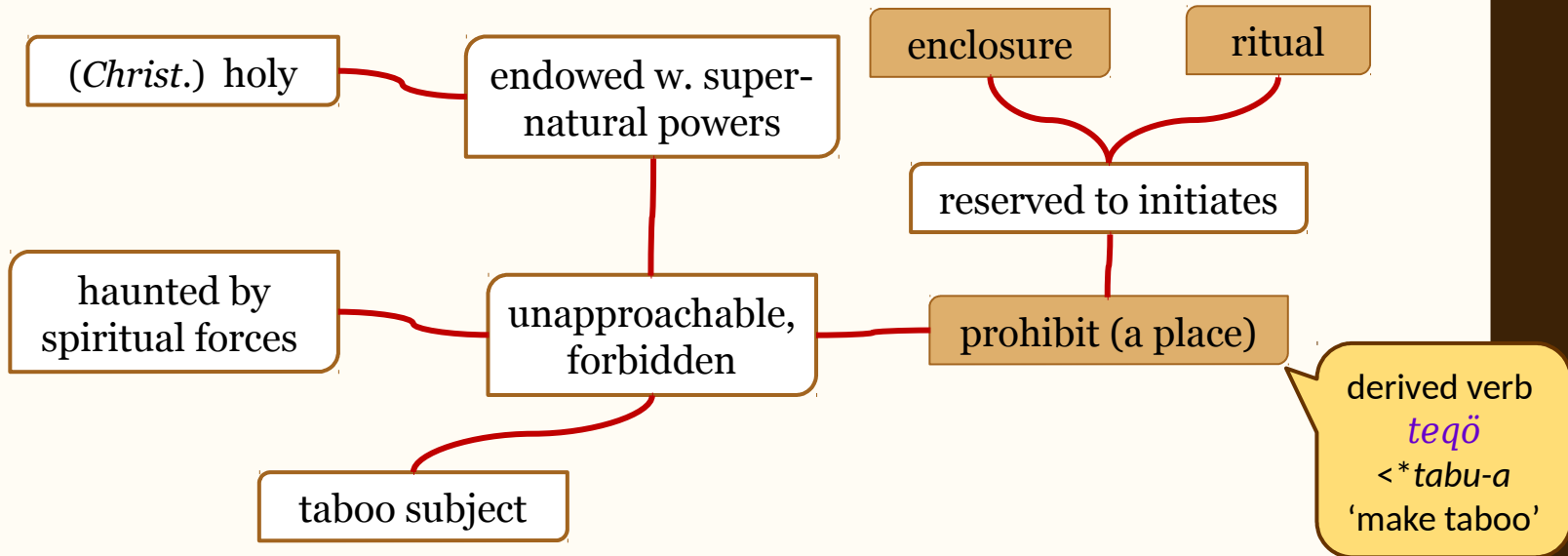
(6) (s.th., location) of restricted access, due to its association with initiation rituals *or* grade-taking ceremonies. ▷**Tekn̄wa pe sise ve suqe piti, sise tan̄wöy on r̆ak ne temët yö teqö toq.** *Only those who have gone through initiation are entitled to handle spirits in the sacred enclosure.* Cf. **teqtoq** 'piously'.

♦ **vönyö toq** N. ‹Hist› *lt.* "sacred land": area in a village that was restricted to initiated men, and forbidden to non-initiates. ▷**Ne qor̆ ve toge takē vönyö toq. Takē vönyö toq pe takē n̄wute pe ne gemoy vĕ ēn eye.** *Stone mausoleums [for high chiefs] are erected on sacred land. We call 'sacred land' the area around the house of initiated men (**gemoy**).*

[< *ta^mb^wu; POc *ta^mbu 'unapproachable, off limits']

cf. François, Alexandre. f/c. **Awesome forces and warning signs: the semantics of *tabu*-related words in Vanuatu**.
in P. McConvell & R. Hendery (eds), *Diffusion & change in lexical semantics: restriction, avoidance and 'tabu'*. Special issue of *Oceania*..

A semantic map of *tabu

- The polysemy of Hiw *toq* [tɔkʷ]

(*Christ.*) holy

endowed w. super-
natural powers

enclosure

ritual

reserved to initiates

haunted by
spiritual forces

unapproachable,
forbidden

prohibit (a place)

taboo subject

derived verb
teqö
<*tabu-a*
'make taboo'

cf. François, Alexandre. f/c. **Awesome forces and warning signs: the semantics of *tabu*-related words in Vanuatu**.
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A semantic map of *tabu

- Meanings found in Mota [tap]

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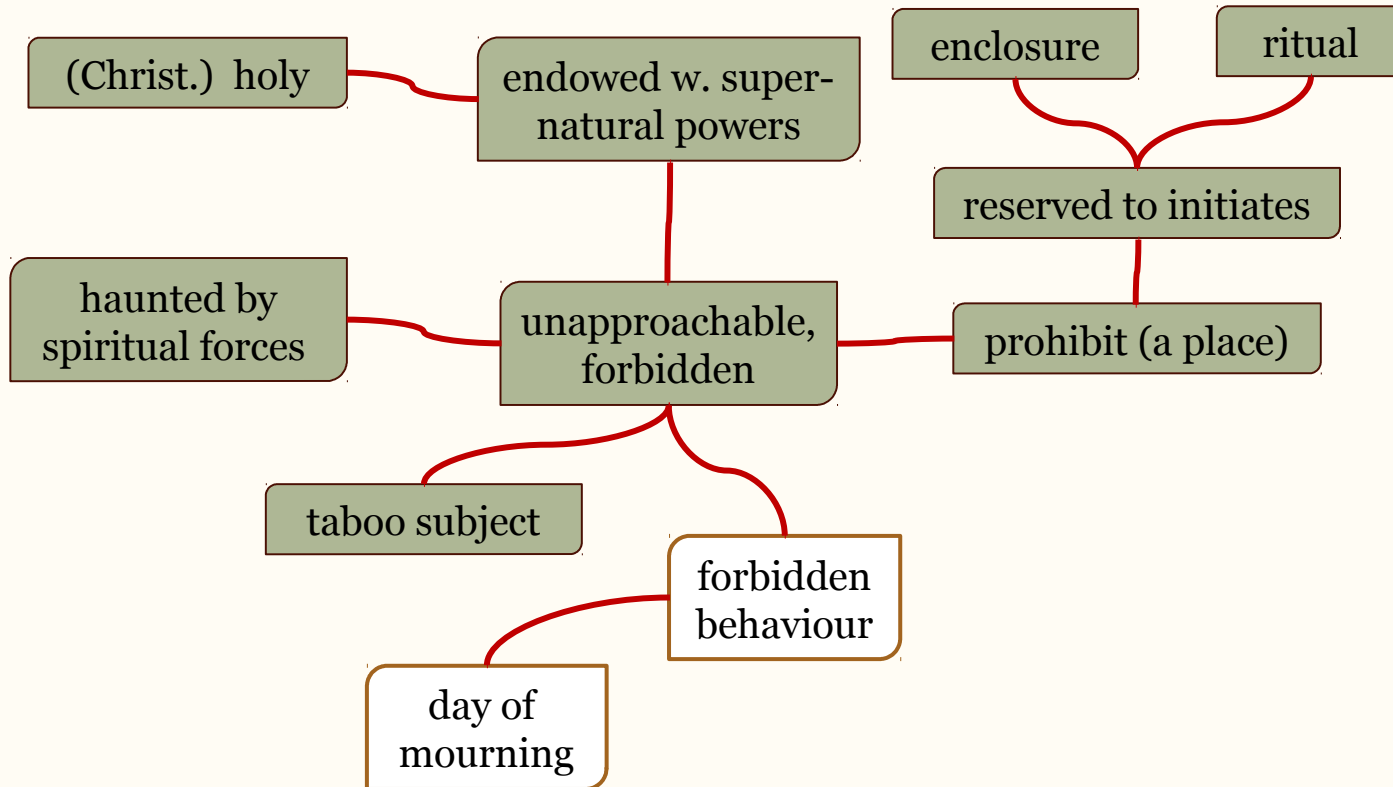
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- Meanings found in Mwerlap [nɔ-tɔm]

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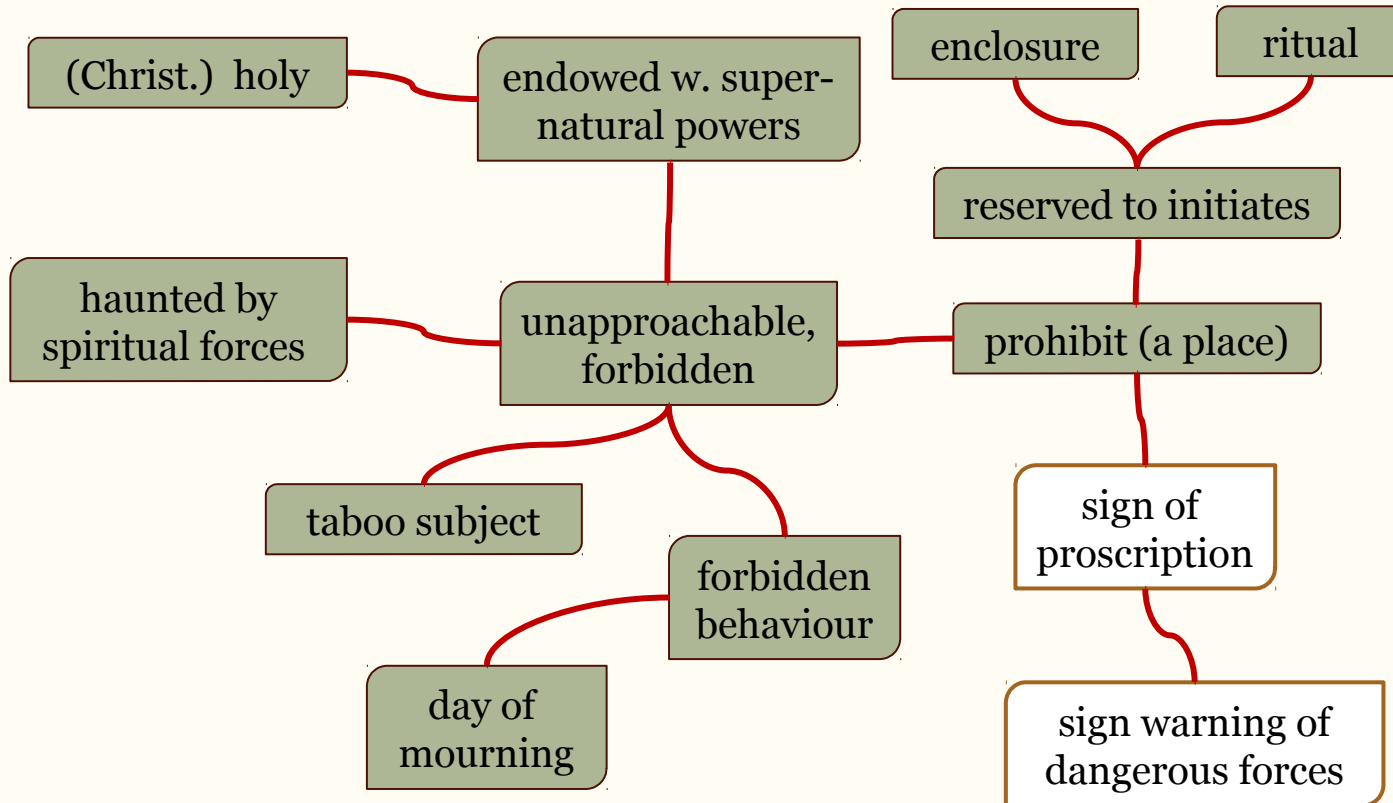
A semantic map of *tabu

- Meanings found in Mwotlap [nɛ-tɛkp͡ʷ]

(Christ.) holy — endowed w. super-natural powers

enclosure   ritual

reserved to initiates

haunted by spiritual forces — unapproachable, forbidden — prohibit (a place)

derived verb
tok͡ʷo
<*tabu-a*
'make taboo'

taboo subject

graveyard

grave, tomb

day of mourning

forbidden behaviour

sign of proscription

sign warning of dangerous forces

cf. François, Alexandre. f/c. **Awesome forces and warning signs: the semantics of *tabu*-related words in Vanuatu.**
in P. McConvell & R. Hendery (eds), *Diffusion & change in lexical semantics: restriction, avoidance and 'tabu'*. Special issue of *Oceania.*.

A semantic map of *tabu

- Lexical replacement for certain meanings (ex. Mwotlap)

halɣɔj < *salaɣoro ʻforbidden roadʼ

jɔŋ < *roŋo ʻquietʼ (< ʻlisten' ?)

(Christ.) holy

endowed w. super-natural powers

enclosure

reserved to initiates

haunted by spiritual forces

unapproachable, forbidden

prohibit (a place)

taboo subject

forbidden behaviour

sign of proscription

graveyard

day of mourning

sign warning of dangerous forces

grave, tomb
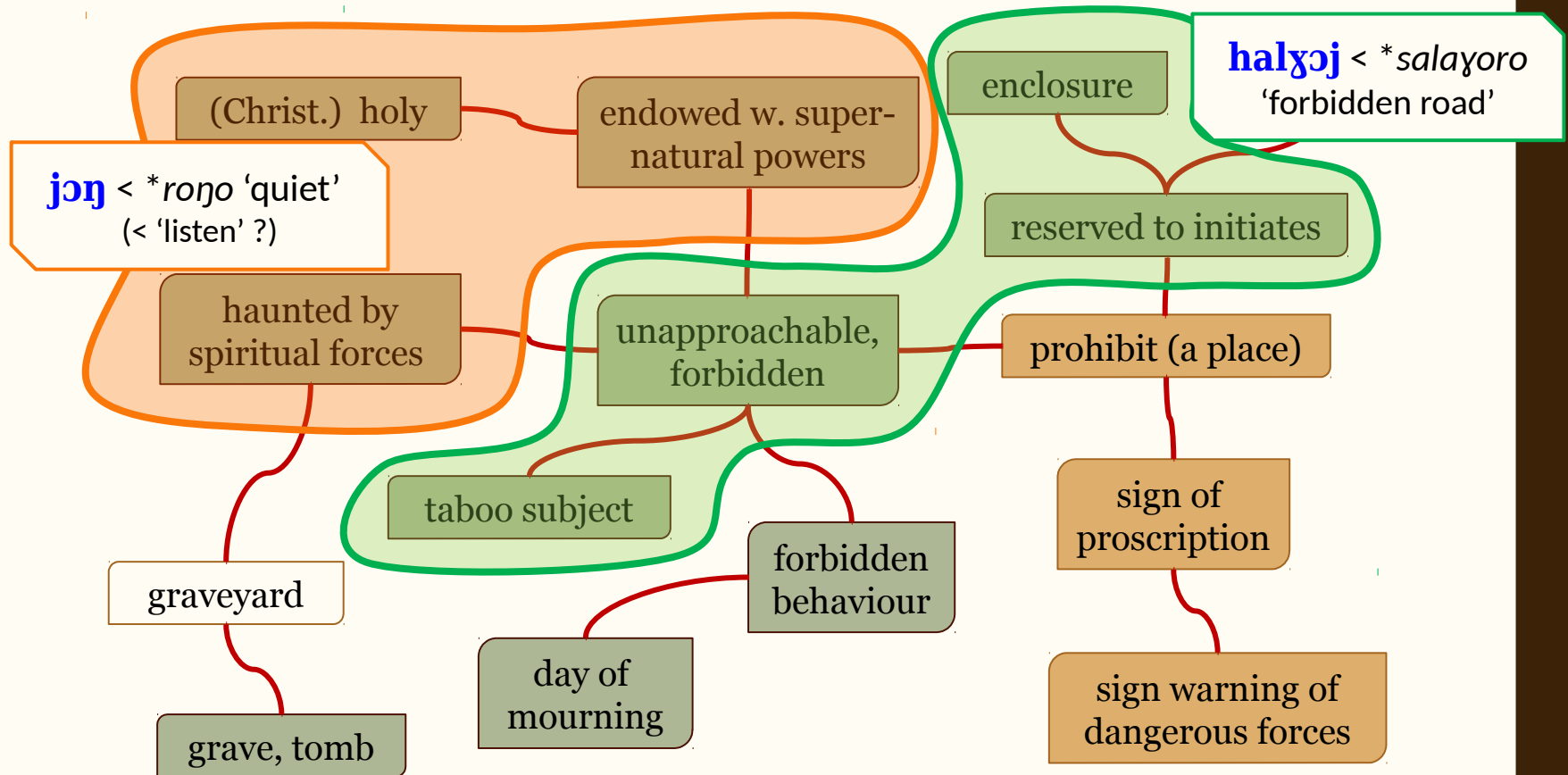
Moving along the map

- Words constantly move across a **multi-dimensional semantic space**, following paths of likeliest pragmatic inference, cultural or cognitive association, discourse-based "bridging contexts".

- The historical linguist can **reconstruct the travels of words** as they evolve in semantic space, as they concede older meanings and gain new territory, as they expand or disappear forever.

- At any point in time, a language's lexicon is a **battlefield** of words competing with each other for a chunk of semantic territory [*synchronic variation*]
  - Shall I encode the auditory perception using *audīre* or *sentīre* ?
  - Shall I translate "holy" with a word meaning '**quiet**' or '**taboo**'?
  - Should this portion of soil be called '**place**', '**area**', '**ground**', '**land**', '**earth**', '**country**'?

- The semantic maps developed by (synchronic) lexical typology design the territory. The **typology of lexical change** show us how the world's languages **navigate this territory** in a dynamic fashion; what are the main roads for semantic change, the narrow paths, the dead ends, the steep slopes…
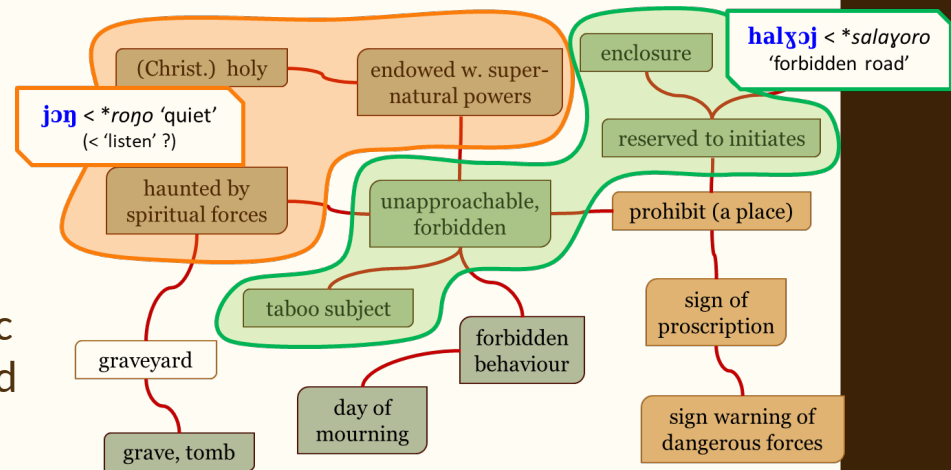
Final discussion (1/2)

- Remaining issues
  - Can we always assess the **directionality** of change?
    - Cf. **sound** change: Some changes are intrinsically directional (*s>h),
      but other changes can go either way (*u > o, *o > u…)
    - Can we formulate general rules in the directionality of semantic change?
  - Should we treat **attested** semantic change (<philology, **written** languages)
    in the same way as reconstructed change (<historical linguistics, **unwritten** languages)
  - Should we aim at **universal concepts**? or accommodate culture-specific semantic links?
  - Should we aim exclusively for **diachronic** maps?
    or blend synchronic and diachronic maps into a **panchronic** representation?

- Conventions for our graphs
  - Should we define principles for **laying out** senses in space?
    - avoid edges to crosscut
  - Should we aim towards **2D** representations? **3D**? *n*D?
  - What are our principles for linking senses together? (presence vs. absence of a link)
  - Should **distance** (length of edge) be significant?
  - Should the **thickness** of edge be correlated with frequency?
  - Could we **combine several lexical maps** into a giant map of the whole lexicon??

Final discussion (2/2)

- What we need
  - a database of semantic change
    - Zalizniak *et al*. (2012) [DatSemShift]? CLiCS 2.0 ? CoLex ?
  - tools to generate (panchronic) semantic maps
  - tools to visualize the **span of a given lexeme** in synchrony
  - tools to visualize the **evolution of a lexeme** in history
    - exploiting the potential of **animation** technology?
  - This dynamic visualization of semantic change would be …
    - of potential interest to a general audience
    - and also useful for the (historical / cognitive) linguist

- **Panchronic lexical typology**
  - This knowledge can inform our semantic reconstructions
    - some paths of change are frequent : the "highways" of lexical change
    - some paths are rare, many are not attested
  - This line of research can help us reconstruct the **cognitive and functional processes** of semantic change as they take place in minds and in conversations.

Thank you.

References

- Evans, Nicholas. 1992. Multiple semiotic systems, hyperpolysemy, and the reconstruction of semantic change in Australian languages. In Günter Kellerman & Michael Morrissey (eds.), *Diachrony within Synchrony*, 475-508. Bern: Peter Lang Verlag.

- Evans, Nicholas & David Wilkins. 2000. In the mind's ear: the semantic extensions of perception verbs in Australian languages. *Language* 76, 546-592.

- François, Alexandre. 2008. Semantic maps and the typology of colexification: Intertwining polysemous networks across languages. In Vanhove (ed.), *From Polysemy to Semantic Change*. (Studies in Language Companion Series 106). Amsterdam: John Benjamins. 163–215.

- Georgakopoulos, Thanasis & Stéphane Polis. 2017. The diachrony of polysemy networks. Cognitive and cultural motivations for the semantic extension of time-related lexemes in Ancient Greek and Ancient Egyptian – Coptic. Paper read at *7th International Conference of the French Association for Cognitive Linguistics*. Liège, Belgium.

- Georgakopoulos, T., Werning, A. D., Hartlieb, J., Kitazumi, T., van de Peut, E. L., Sundermeyer, A., & Chantrain, G. 2016. The meaning of ancient words for 'earth'. An exercise in visualizing colexification on a semantic map. *eTopoi. Journal for Ancient Studies*, 6, 1–36.

- Hagège, Claude & André-Georges Haudricourt. 1978. *La phonologie panchronique*. (Le linguiste). Paris: Presses Universitaires de France.

- Koch, Peter. 2016. Meaning change and semantic shifts. In P. Juvonen & M. Koptjevskaja-Tamm, eds. *The Lexical Typology of Semantic Shifts*. Berlin: de Gruyter. 21-66.

- List, J.-M., Mayer, T., Terhalle, A., & Urban, M. 2014. *CLICS: Database of Cross-Linguistic Colexifications*. Marburg: Forschungszentrum Deutscher Sprachatlas (Version 1.0, http://clics.lingpy.org).

- Lefebvre, Claire. "Relexification in creole genesis revisited: The case of Haitian Creole." *Substrata versus universals in creole genesis* (1986): 279-300.

- Pawley, Andrew. 2005. The meaning(s) of Proto Oceanic *panua. In Claudia Gross, Harriet D. Lyons & Dorothy A. Counts (eds.), *A Polymath Anthropologist: Essays In Honour of Ann Chowning*. University of Auckland: Department of Anthropology.

- Zalizniak A., Bulakh M., Ganenkov D., Gruntov I., Maisak T., & Russo M. 2012. The catalogue of semantic shifts as a database for lexical semantic typology. *Linguistics*, 50(3), 633–670.