Can the Comparative Method be used for signed language historical analyses?

Justin M. Power*, David Quinto-Pozos, Danny Law

What is the Comparative Method?

- The CM is an analytical toolkit used by historical linguists to make historical inferences about contemporary languages known to be related.

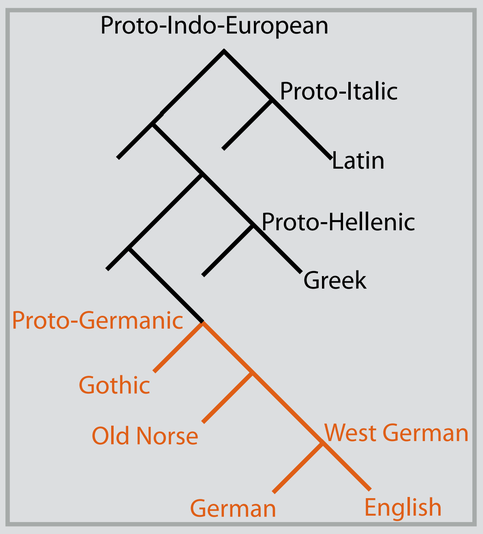


Fig. 1. Simplified tree of Indo-European adapted from Ringe et al. 2002.[1]

What are recurring correspondences?

Grimm's Law:

- Many words with voiceless stops p, t, k (e.g., in Greek and Latin; see Table 1) have corresponding words (with the same meaning) in Germanic languages: (p:f, t:θ, and k:h).
- The correspondences **recur systematically**, i.e., they are found repeatedly throughout the vocabularies of these languages in definable phonetic environments.

Table 1. Selected recurring correspondences from Grimm's Law

		Germanic	
Greek	Latin	Gothic	English
patér	**p**atēr	**f**adar	**f**ather
phrá**t**ēr	frā**t**er	brō**þ**ar	bro**th**er
kúōn	**c**anis [k]	**h**unds	**h**ound

Recurring correspondences provide proof of cognacy, evidence of sound changes, allowing reconstruction of ancestral forms, and evidence for subgrouping related languages based on shared innovations, such as p→f, t→θ, k→h.

Why has the Comparative Method never been applied to sign languages?

- **Insufficient data**:[2] no open historical comparative databases with transcribed signs exist.
- **No systematic correspondences:** scholars have identified patterns in diachronic change,[3] but systematic correspondences have yet to be identified among any putative sign family.
- **Corresponding units in sign language**: Segments are compared in spoken languages. It is not evident which units should be compared for sign languages.
- The CM assumes that sound **change can be regular**, resulting in systematic correspondences; but it is not known whether this holds for sign languages.

Here, we report initial results from an ongoing project applying the CM to transcribed sign data from the putative French sign family.

Data aggregation

Table 2 shows the six sign languages included in this study with sources of data. Languages were chosen because of claims about relatedness in a potential French sign language family.[4]

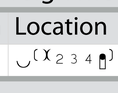
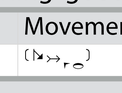
Table 2. Languages in the dataset and sources of videos.

Language	Source
American Sign Language (ASL)	asl-lex.org, spreadthesign.com
Langue des signe de Belgique Francophone (LSBF)	dicto.lsfb.be
La lengua de señas mexicana (LSM)	Data collected by Quinto-Pozos, spreadthesign.com
Langue des signes française (LSF)	spreadthesign.com, sematos.eu/lsf.html
Língua de Sinais Brasileira (Libras)	idsinais.libras.ufsc.br, ines.gov.br/dicionario-de-libras
Vlaamse Gebarentaal (VGT)	gebaren.ugent.be

Transcription

- 284 total signs, forming 37 putative cognate sets, were transcribed using HamNoSys.[5]
- Target: comparing 207 sets using basic vocabulary list.[6]

Table 3. Transcription in HamNoSys of the LSM sign meaning 'good'.

Sign language	Concept	Handshape	Orientation	Location	Movement
LSM	good				

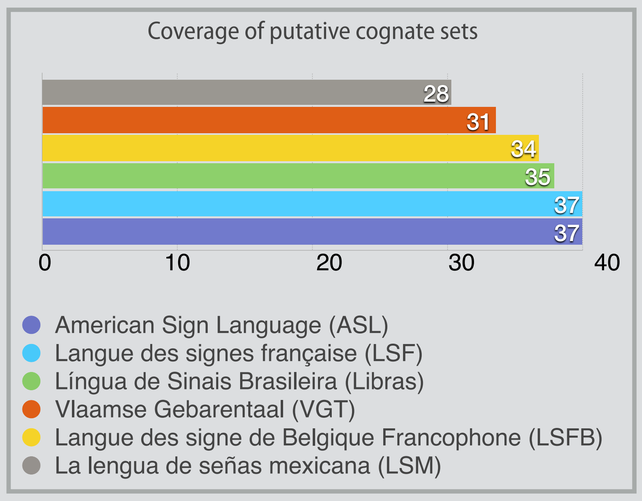


Fig. 2. Data available from each language contributing to the 37 total putative cognate sets.

Putative cognate sets

Organize transcribed signs into putative cognate sets based on meaning (i.e., not considering form), including all sign variants.

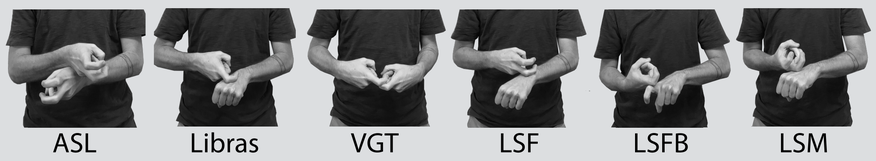


Table 4. Putative cognate sets for the meanings 'good', 'hard' (pictured above), and 'new'.

Language	Concept	Handshape	Orientation	Location	Movement
ASL	good				
Libras	good				
VGT	good				
LSF	good				
LSM	good				
ASL	hard				
Libras	hard				
VGT	hard				
LSF	hard				
LSFB	hard				
LSM	hard				
ASL	new				
Libras	new				
VGT	new				
LSF	new				
LSFB	new				
LSM	new				

Correspondence patterns

List correspondences: Correspondences can be simple lists of parameters for each meaning comparison (e.g., a list of handshapes for each language per meaning); or they can be lists of other phonological details, as in the comparisons of aperture ("open" or "closed" handshapes) or contact in Table 5.

- **Language splits** show how languages pattern together for each correspondence identified. Notice that the correspondence patterns in Table 5 do not recur.

What types of recurring correspondences do we expect to find?

- Unconditioned: In all contexts, one parameter (e.g., handshape) corresponds to another — e.g., :
- Conditioned: Parameters or features correspond in definable contexts — e.g., : only in 1-handed signs

Table 5. Selected correspondence patterns identified using data in Table 4.

Concept	Parameter	Correspondence	ASL	Libras	VGT	LSF	LSFB	LSM	Language split	
good	Handshape	open () : closed ()					?		ASL, VGT, LSM	Libras, LSF
new	Handshape	open () : closed (/)							ASL	Libras, VGT, LSF, LSFB, LSM
new	Location	Contact back no (0) : yes (1)	0	-	0	0	1	0	ASL, VGT, LSF, LSM	LSFB
hard	Location	Contact back no (0) : yes (1)	0	1	0	1	1	1	ASL, VGT	Libras, LSF, LSFB, LSM
new	Symmetry	no (0) : yes (1)	1	-	0	0	1	0	ASL, LSFB	VGT, LSF, LSM
hard	Symmetry	no (0) : yes (1)	1	0	1	0	1	0	Libras, LSF, LSM	ASL, VGT, LSFB
good	Movement	HS no change (0) : change (1)	0	1	0	1	?	0	ASL, VGT, LSM	Libras, LSF
new	Movement	HS no change (0) : change (1)	0	1	1	1	1	1	ASL	Libras, VGT, LSF, LSFB, LSM

Preliminary conclusions

- Based on our preliminary analysis of 284 signs, **no correspondences are clearly regular or recurring** in the dataset.

Why have we yet to find examples of recurring correspondences?

- **Larger dataset**: If horizontal evolutionary processes (e.g., borrowing, iconicity) predominate in the development of these languages, regular correspondences may exist but may be difficult to detect in a small dataset.
- **Transcribed data from other putative language families**: Regular change may be more prevalent in the development of other sign language families.
- **Methods for detecting results of horizontal processes** must be adapted / developed for sign research.

Theoretical relevance

The CM is presumed to be **universally applicable** because all (spoken) languages are presumed to undergo regular (sound) change.[7] Because we have not yet found the predicted results of regular change in sign languages in this exploratory study, the question remains open as to whether there is a sign language parallel to regular sound change.

* Corresponding author: Justin.Power@Utexas.edu

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