Compounding in sign languages

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Sign Languages – general facts

- Natural languages
- Emerge spontaneously in communities with deaf people
- Not universal
- Known sign languages are relatively young

Sign languages and compounding

- What could be special?
- Modality
  - Makes use of space
  - Allows for more simultaneous structure
  - Very different phonological building blocks
- Age
  - Sign languages in general are young languages
  - Allow us to observe emerging linguistic structures

Modality

Phonological structure of the sign

- Basic building blocks (classes of phonemes):
  - Handshape
  - Location
  - Movement

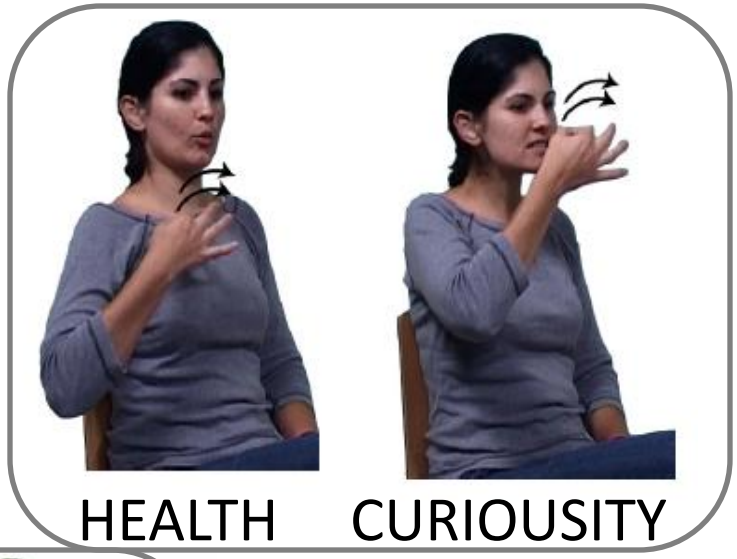
ASK

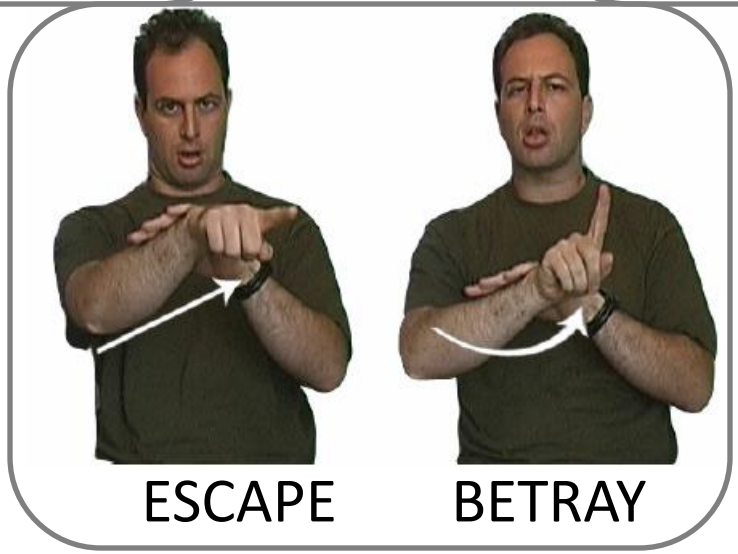
Handshape:

Location: mouth (lower face)

Movement: arc, outward

Minimal pairs





Syllable template of the sign

HC

L M L

contact [arc] medial

lower head

Sandler, 1989

Iconicity and arbitrariness

- Signs can be iconic, arbitrary or partly iconic

Iconic sign

EAT

Arbitrary sign

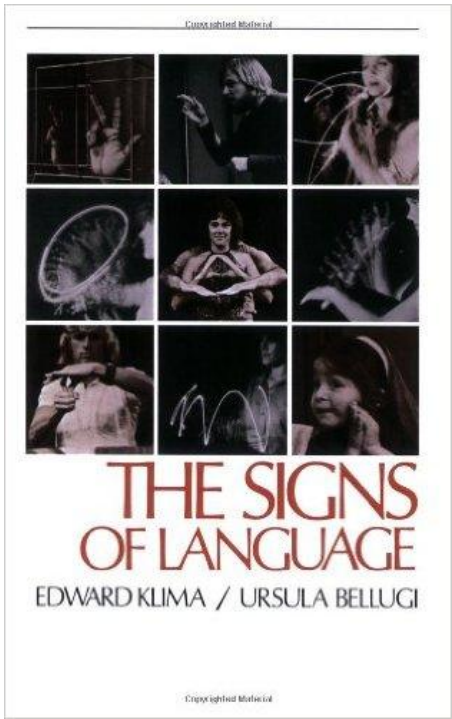
LOAN

Partly iconic

ASK

Compounds in Sign Language

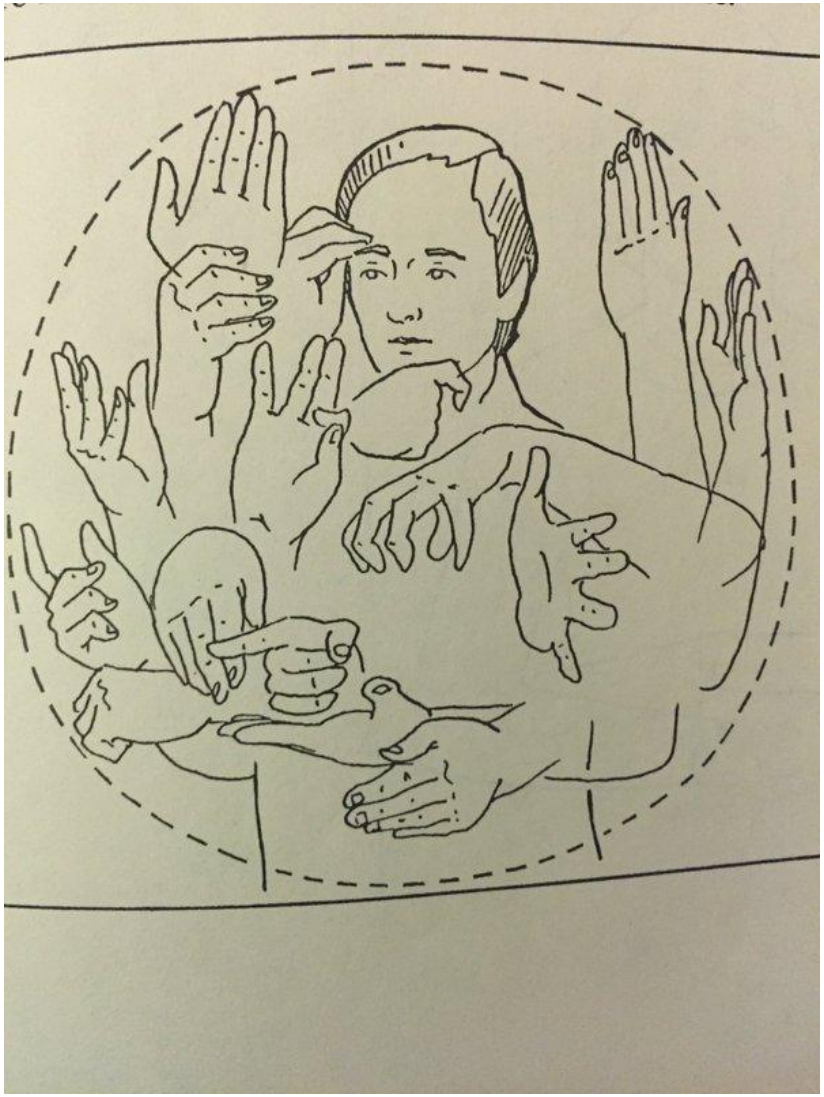
- All sign languages studied to date have compounding
- Wide-spread in and across sign languages
- First described in American Sign Language (ASL) by Klima and Bellugi 1979: *The Signs of Language.*
  - Chapter 9: “On the Creation of New Lexical Items by Compounding,” devoted to lexical compounds
  - Chapter 10: “Linguistic Expression of Category Levels,” devoted to coordinate compounds



Properties of compounds

- Form a lexeme
- Show word properties (rather than phrasal):
  - Lexicalized meaning
  - A single stress unit
  - Phonological reduction
    - Reduced vowels
    - Assimilation
    - omission
  - Structural relations between components (head-modifier)
  - Special morphological properties

How are these properties manifested in sign languages?



Lexical compounds in ASL

- SICK^SPREAD ‘epidemic’
- EAT^NOON ‘lunch’
- SLEEP^SUNRISE ‘oversleep’
- SURE^WORK ‘seriously’
- RED^FLOW ‘blood’
- THINK^TOUCH ‘keep thinking about’
- WRONG^HAPPEN ‘accidentally’

Klima & Bellugi, 1979, ch. 9-10

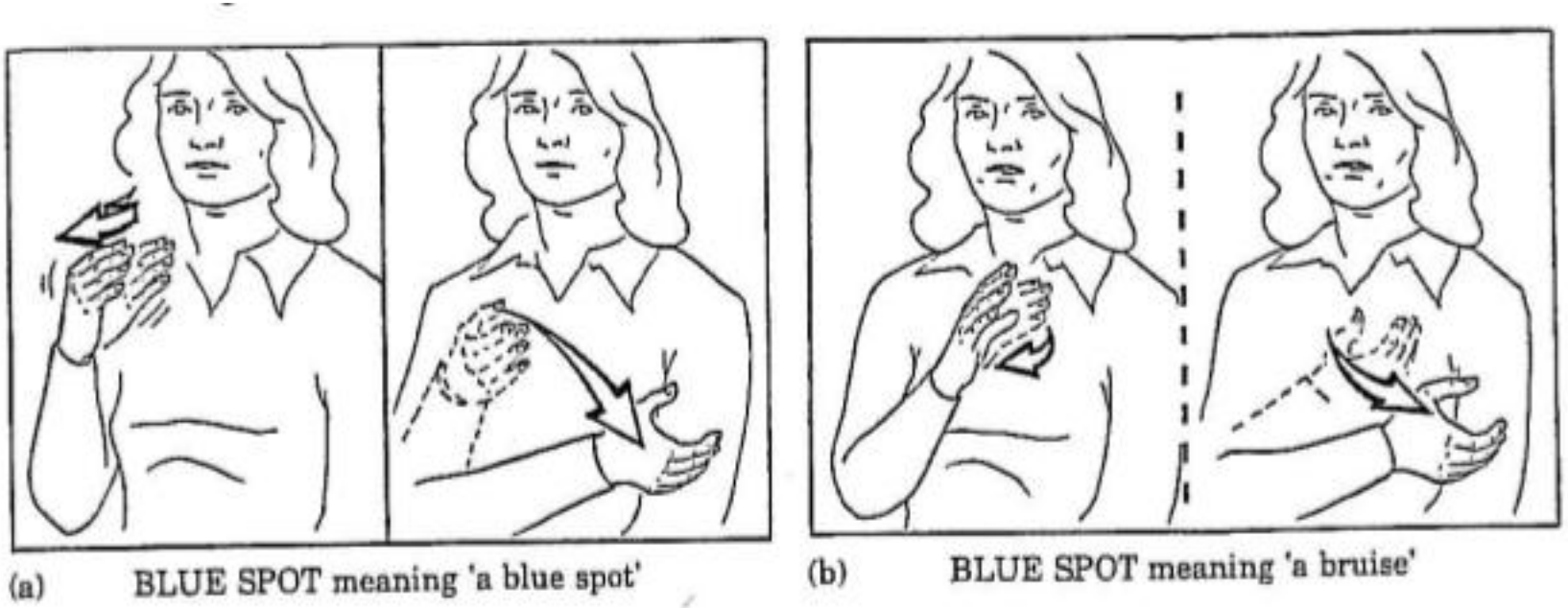
Lexicalization of meaning

- Meaning can be idiosyncratic:

Language	Compound	Meaning
ASL (Klima and Bellugi 1979)	SLEEP^SUNRISE	Oversleep
BSL (Brennan 1990)	WORK^SUPPORT	Service
ISL (Meir and Sandler 2008)	HEART^OFFER	Volunteer
Auslan (Johnston and Schembri 1999)	RED^BALL	Tomato
ABSL (Aronoff et al 2008)	SWAET^SUN	Summer
IPSL (Zeshan 2000)	UNDERSTAND^MUCH	Intelligent
NZSL (Kennedy 2002)	MAKE^DEAD	Fatal

Lexicalization of meaning

BLUE^SPOT ‘bruise’



(a) BLUE SPOT meaning 'a blue spot'

(b) BLUE SPOT meaning 'a bruise'

Klima & Bellugi, 1979, p. 203

A single meaning unit

- Internal components of compounds cannot be modified or interrupted
  - BLUE LARGE SPOT ‘large blue spot’
  - *BLUE-LARGE-SPOT ‘large bruise’
  - BLU-ISH SPOT ‘bluish spot’
  - *BLU-ISH-SPOT ‘?’

Klima & Bellugi, 1979, p. 207

A single meaning unit

- Compound modifiers can contradict internal constituents
  - BLUE^SPOT GREEN, VAGUE YELLOW ‘that bruise is green and yellowish’
  - BED^SOFT HARD ‘my pillow is hard’

Klima & Bellugi, 1979, p. 209

Phonological changes

- Compounds are shorter than equivalent phrases

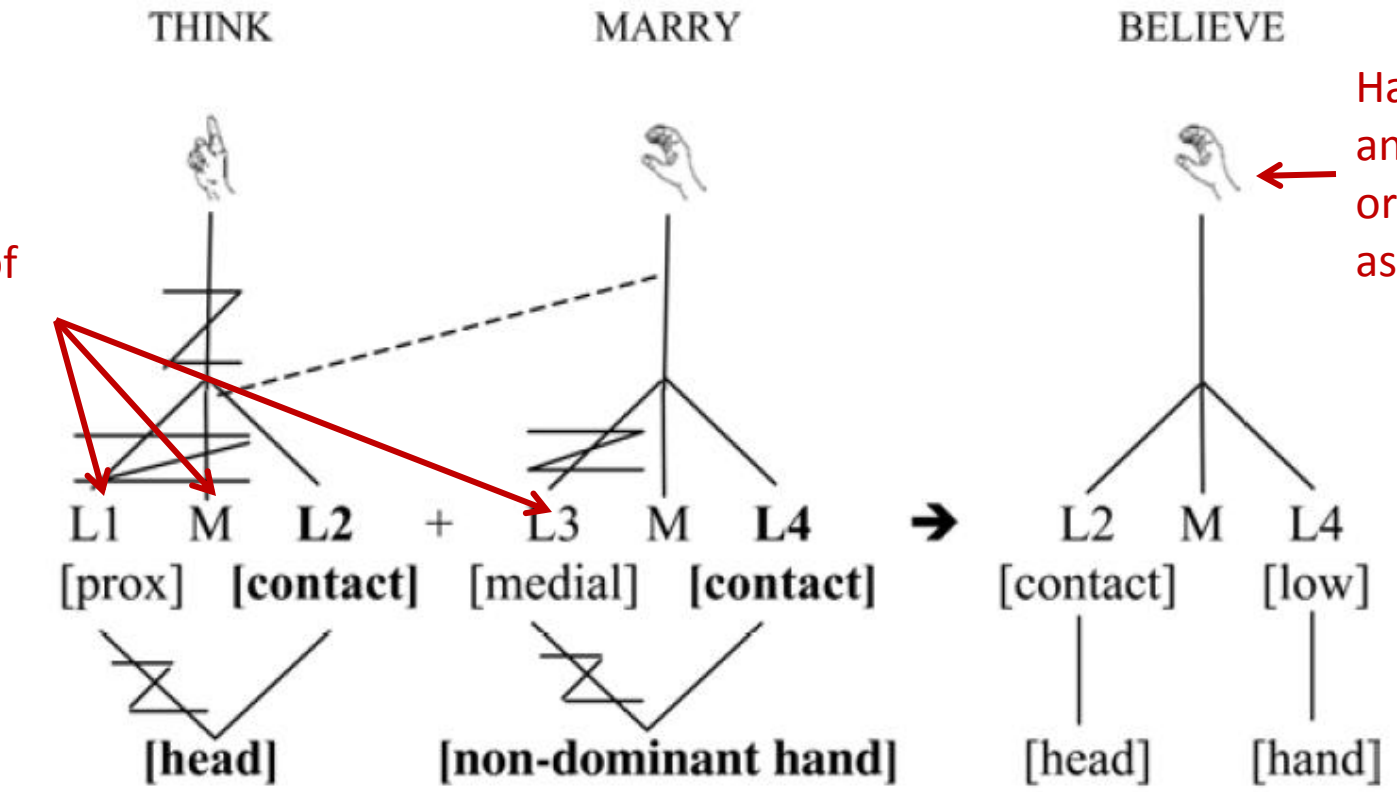
  - GOOD 28 fields
  - ENOUGH 49 fields
  - GOOD ENOUGH 77 fields
  - GOOD^ENOUGH ‘barely adequate’ 38 fields

Klima & Bellugi, 1979, p. 212

Reduction of first component

- The first element of a compound is ‘radically compressed compared with its duration in second position’
- First position mean duration: 9 fields; second position mean duration: 22 fields

Klima & Bellugi, 1979, p. 213



Omission of segments: L1, M1, L3

Handshape and orientation assimilation

Sandler and Lillo-Martin (2006).

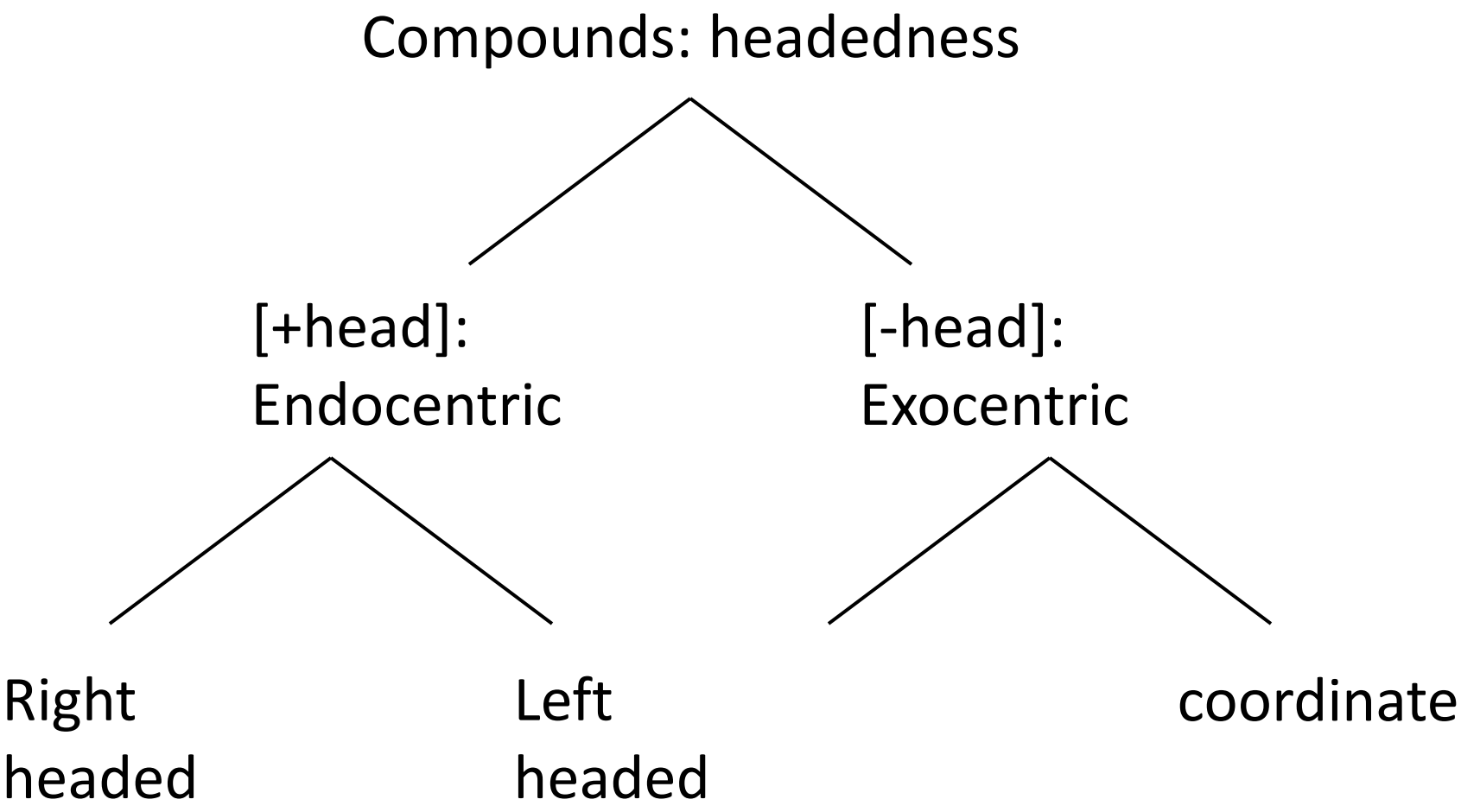
Phonological reduction

- Towards the form of a single sign:
  - One set of handshape specifications (assimilation) (Liddell & Johnson 1986; Sandler 1987, 1989, 1993)
  - A single movement (omission and reduction of segments) (Sandler 1989)
  - Reduction of features of M1 (e.g. reduplication) (Liddell & Johnson 1986)
  - Anticipation of H2 (Klima & Bellugi 1979)

Syntactic Categories of ASL lexical compounds

- EAT/FOOD?-NOON ‘lunch’ V-N
- BLUE-SPOT ‘bruise’ A-N
- FLOWER-GROW ‘plant’ N-V
- WRONG-HAPPEN ‘fate’ A-V
- FACE-STRONG ‘resemble’ N-A
- THINK/MIND?-ALIKE ‘agree’ V-A

Morpho-syntactic structure



Morpho-syntactic structure

- ASL (Klima & Bellugi 1979)
  - Many exocentric compounds
  - Both right-headed and left-headed endocentric compounds

    "The linear position of the head is of limited importance in these types of compounds." (Loos 2009)
- ISL (Meir & Sandler 2008)
  - Many exocentric compounds
  - Endocentric compounds borrowed from Hebrew are usually left-headed: PARTY^SURPRISE 'surprise party'
  - Verbal compounds are often right-headed: HEART^SUGGEST 'volunteer', BREAD^FEED 'provide for'

Coordinate compounds (‘dvandva’)

- Compound members are of equal rank
  - *Hunter-gatherer, bittersweet*
- A special type: hyponyms of a superordinate term
  - Sanskrit *ma:ta:ra-pita:ra* mother-father ‘parents’
  - Sanskrit *pa:ṇi-pa:dam* hand-foot ‘limbs’

Coordinate compounds in ASL

- CAR-PLANE-TRAIN ‘vehicle’
- CLARINET-PIANO-GUITAR ‘musical instrument’
- RING-BRACELET-NECKLACE ‘jewelry’
- CHAIR-TABLE-LAMP ‘furniture’
- KILL-STAB-RAPE ‘crime’
- MOTHER-FATHER-BROTHER-SISTER ‘family’

Klima & Bellugi, 1979, pp. 324-235

ASL dvandva compounds are single units

- The movement of each component sign is reduced (compressed) in time, space, and repetition
- Pauses between signs are minimal or eliminated
- Transitions between signs are minimal

ASL dvandva compounds are not fixed

- Different members of a superordinate category may be used:
  - CLARINET-PIANO-GUITAR or
  - DRUM-FLUTE-VIOLIN
- The order of elements may vary:
  - RING-BRACELET-NECKLACE-EARRING
  - EARRINGS-NECKLACE-BRACELET-RING
  - *RING-BRACELET-NECKLACE-EARRINGS (difficult transitions between signs)

Fixed dvandva compounds

- Are few in number
- Have two elements: KNIFE^FORK
- Have invariable order, i.e., they behave like ‘regular’ compounds

ASL dvandva compounds as a construction

- Some ASL signers use productive dvandva compounds more than others
- Social class distinctions have been reported
- Younger signers use dvandva compounds very little and may consider them to be old fashioned or socially stigmatized

Simultaneous compounding

- Each hand produces a different sign, simultaneously
  - BSL:

  AIRPLANE^ROCKET = SPACE-SHUTTLE (Sutton-Spence & Woll 1999)

  TELEPHONE^TYPE = MINICOM (Brennan 1990)
- Exceedingly rare

Productive compounding

- Is compounding a productive word formation process in a given sign language?

- A study of novel compounding in Israeli Sign Language (5 signers) and Al-Sayyid Bedouin Sign language (8 signers) (Tkachman & Meir 2015)

Task

- Object naming (26 pictures)
  - all of easily recognizable objects with no established name in the language
  - therefore their naming is likely to elicit a *subordinate category level* of description (Rosch 1975), such as a basic-level sign plus some other sign (Newport & Bellugi 1978)
  - ISL responses:
    - CL-SYLINDRICAL+SPRAY+POISON
    - POISON+SPRAY
    - RESTROOM+SPRAY
    - SPRAY+SMELL+RESTROOM

Results

- Form:
  - In ~70% of the responses, both signs were signed at the same height

(a) Phrase: TAP WATER ‘tap’

(b) Compound: TAP+WATER ‘tap’

Results

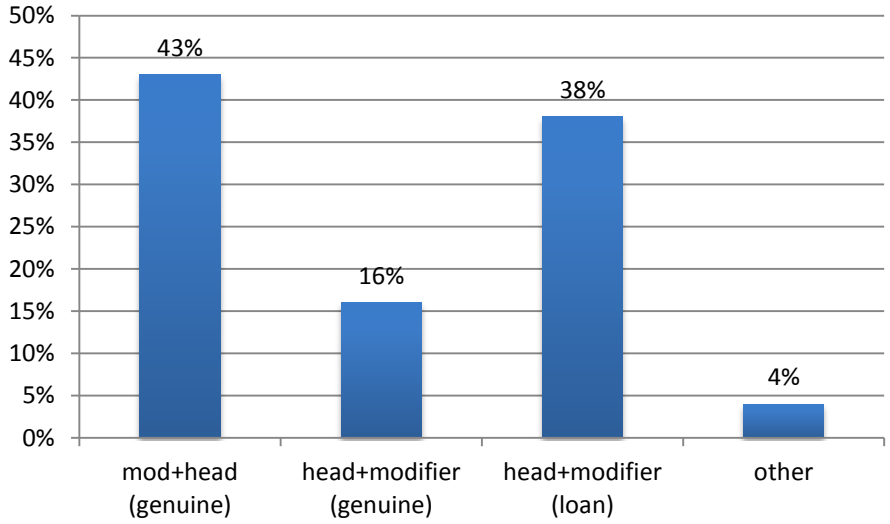
- Form:
  - Spread of non-dominant head (in ~80% of the responses with a 2-handed sign)

TREE APPLE

'apple tree'

Results

- Structure: order of constituents
  - 43% of all compounds (69% of all genuine compounds, 48.6% *overall*) are modifier+head



Conclusions form study

- Formational properties of compounding seem to arise before syntactic structure is conventionalized

Modality: Interim summary

- Across sign languages:
  - Tendency towards single-word properties
  - Phonological reduction of various types
  - Order of components seem to vary
  - Prevalence of exocentric compounds
  - Simultaneous compounding is very rare
- Comparison with spoken languages:
  - Once we factor out the physical differences caused by the different modality, there is little difference between compounds in sign languages and compounds in spoken languages
  - Is prevalence of exocentricity modality-related?
  - Are exocentric compounds more common in newer languages (e.g. pidgins or creoles)?

Age: Al-Sayyid Bedouin Sign Language (ABSL)

Wendy Sandler

Carol Padden

Mark Aronoff

Irit Meir

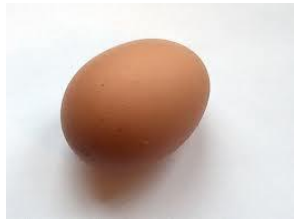
Al-Sayyid Bedouin Sign Language

- Over 130 deaf people in ~4,000 member community (Kisch 2012)
- ABSL is currently in its third generation
- Different in lexicon and structure from surrounding languages (Sandler et al 2005, Al-Fityani and Padden 2007)
- Widely used by deaf and hearing (Kisch 2000, 2012)
- Emerged and developed with minimal contact with other languages
- Therefore it is the clearest case of the emergence of a language *de novo*

Compounds in a new language
(Meir et al 2010)

- When do compounds arise in the development of a language?
- How do compounds arise?
- How do they get conventionalized?
- What kind of structure do they get, and how?

Elicitation material: picture naming



Compound Elicitation

- Picture naming

Group 1	Group 2	Group 3
5 signers	8 signers	10 signers
2 second generation	4 second generation	3 second generation
3 third generation	4 third generation	7 third generation
60 pictures	66 pictures	40 pictures
29 compounds	14 compounds	8 compounds

- Translation of vocabulary items
  - 1 signer, 218 Hebrew lexemes, 55 compounds

Challenges in analyzing compounds

- How can we tell whether a string of words is a compound, a phrase or just a list of words?
- In a newly studied language
  - No data to rely on (e.g. regarding the structure of compounds)
  - Large degree of variation in the community

  →Hard to use uniformity as a criterion

Criteria for identifying compounds

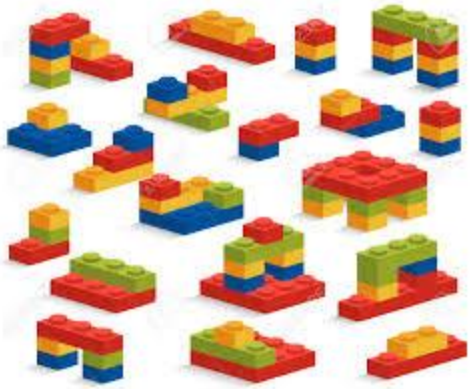
- Uniform across at least some signers
- Share at least two components with some signers
- Produced with a fluidity and ease

When do compounds arise?

- Only 2 minute recording of a 1st generation signer
- Compounds are prevalent in the language of 2nd generation

How do compounds arise?

- Two possible scenarios:



  – combining two words

  – reduction of longer strings to two-word strings

Reduction of longer strings

- When there is no lexical item for a concept, ABSL signers use long string of words related to the concept.
- CALENDAR:
  - TIME+SEE+COUNT-ROWS+WRITE+ TIME+CONTINUE+FLIP+SEE+COUNT-ROWS
  - WRITE+ROW+MONTH+ROW+WRITE
  - NUMBERS+ROW+MONTH+ FLAT-ON-WALL+FLIP
  - FLIP+WRITE+FLIP

Reduction of longer strings

- Some degree of conventionalization: fewer lexical items, variation in terms of choice and order.

– STOVE-RANGE:
  - Lexical choices: COOK, TURN, WIDE-OBJECT, INSERT
  - Variation:
    – TURN+COOK+WIDE-OBJECT
    – TURN+FIRE+4+BURNER+ FIRE
    – TURN+WIDE-OBJECT
    – COOK+INSERT
    – COOK+WIDE-OBJECT

Reduction of longer strings

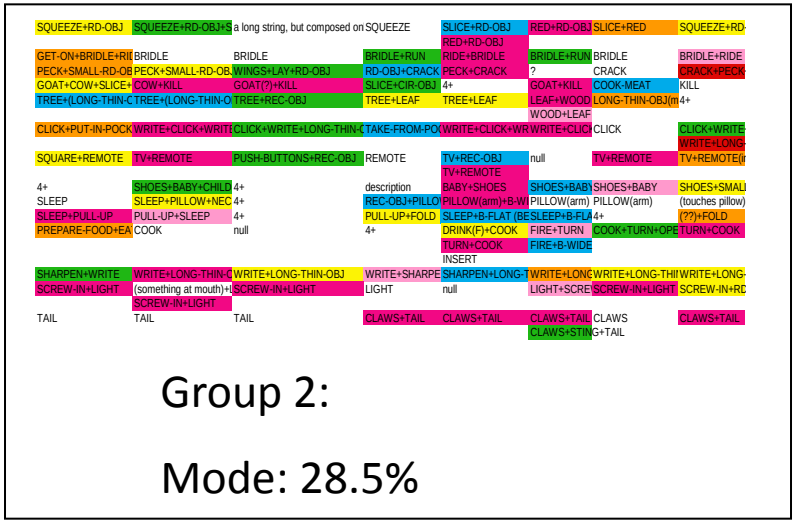
- Very few signs in our data have (relatively) fixed forms (for some signers):
  - LEMON, KETTLE, TOMATO, EGG

KETTLE

Degrees of conventionalization

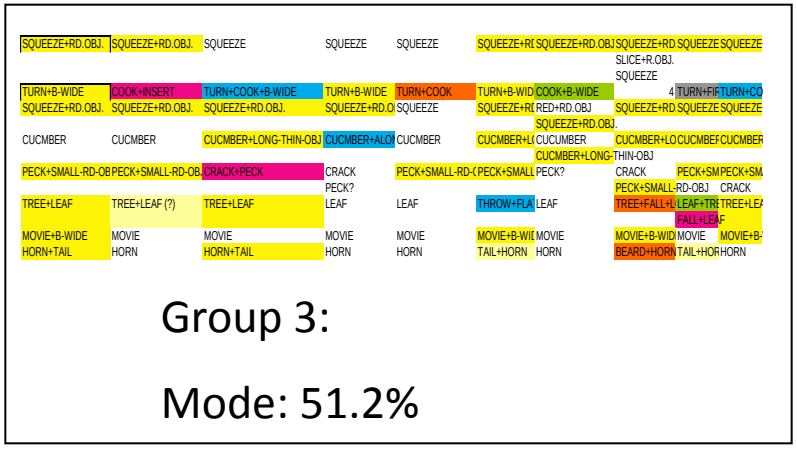
Group 1:

Mode: 51.2%



Group 2:

Mode: 28.5%



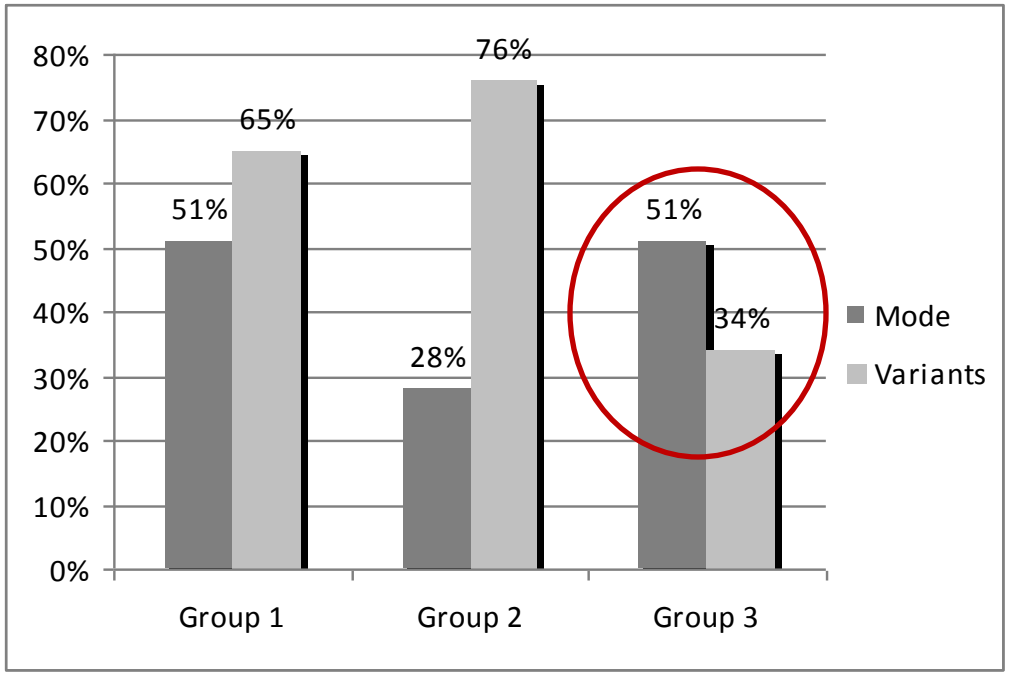
Group 3:

Mode: 51.2%

Measuring variation

- Mode: *the most common value in a set*
  - The percentage of users using the most common form in a set expressing the same notion
  - High percentage → more uniformity
- Number of variants
  - Mean percentage of variants out of the number of forms
  - High percentage → less uniformity

Degree of variation



- Degrees of variation in ABSL compounds according to two measures: mean values for mode and number of variants in three ABSL groups

Degrees of conventionalization

- Higher uniformity score goes hand in hand with:
  - Phonological reduction
  - Increased structure

Phonological reduction

- Phonological reduction is evidenced in the three most uniform signs:
- TOMATO, LEMON, EGG
  - Smoother transitional movement
  - Reduced movement of 1st component (TOMATO, LEMON)
  - Handshape assimilation (EGG)

Increased structure

- Two salient structural tendencies (one much stronger than the other):
  - SASS final compounds
  - Mod-Head order

Increased structure: SASS compounds

Size and shape specifiers: signs expressing the shape of an object

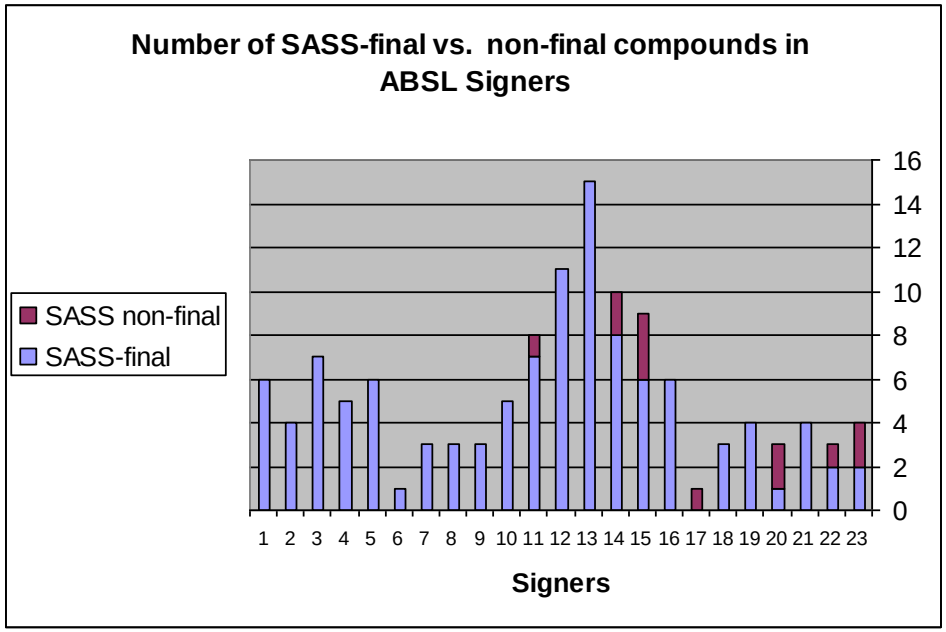
Remote control

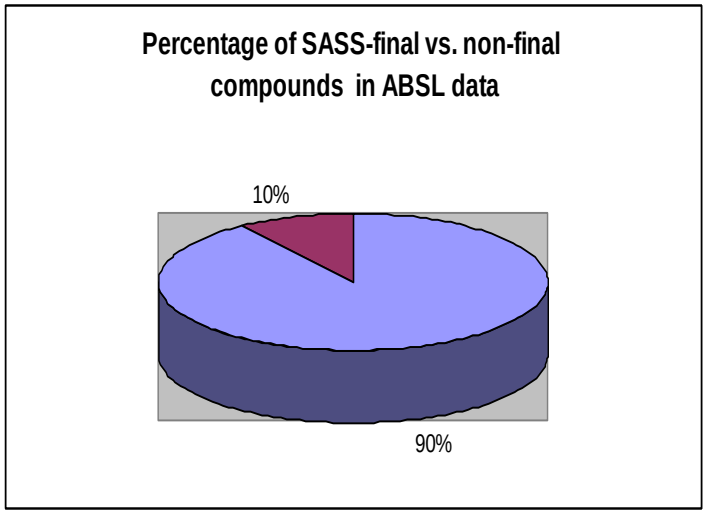
TV+FLAT-RECTANGUALR-OBJECT

Pencil

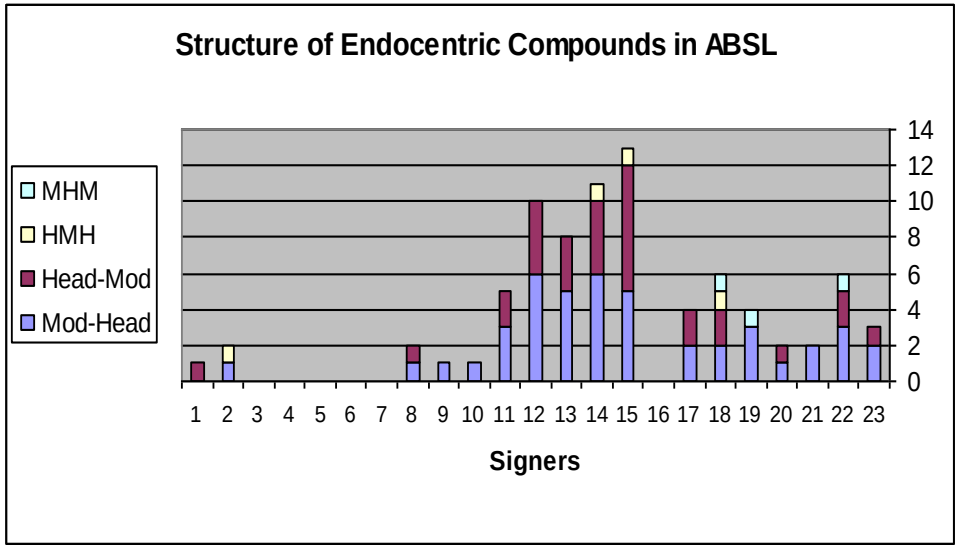
WRITE +LONG-THIN-OBJECT

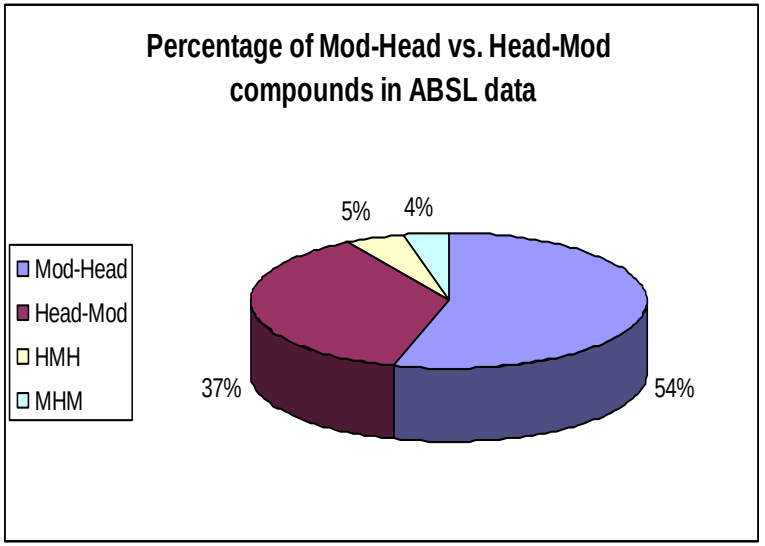
Increased structure: SASS is final





Increased structure: Mod-Head





Increased structure

- Signs that got higher scores on the uniformity scale are SASS-final and (almost always) Mod-Head:
  - SASS-final: LEMON, TOMATO, EGG, KETTLE, CLOCK, RADIO
  - Mod-Head: BABY-CLOTHES, COFFEE-POT, LIGHT-BULB

Other types of compounds

- Sense-sign+sign:
  - Smart: HEAD+GOOD
  - Stupid: HEAD+"SO-SO"
  - Wait: EYE+SOON
  - Mistake: HEAD+OPPOSITE
- Place names:
  - Jerusalem: PRAY+THERE
  - Jordan: F-on-forehead+THERE
  - Lebanon: BEARD+THERE
  - Palestine: KEFIYYE+THERE

Other types of compounds

- Predication relationship:
  - Beautiful: FACE+GOOD
  - Empty: NOTHING+AROUND
  - Expensive: MONEY+A LOT
- Verb+argument:
  - Sell: MONEY+LET-GO
  - Operation: CUT(on body)+DOCTOR
- Others:
  - How much: 1,2,3,4+Question-word
  - Travel: CAR+AWAY
  - Soldier: GUN+POLICE
  - Iron: TAP-ON+STRONG
  - Summer: SWEAT+SUN

Conclusions

- Conventionalization – a gradual process
- Happens first in small sub-domains (SASS compounds, place names)
- Conventionalization ↔ word-like properties
  - Stable structure, more compact phonology

Conclusions

- ABSL shows the beginnings of phenomena that are well established in ASL
- ABSL thus provides us with a window on the development of compounding as a phenomenon in a language that is emerging almost before our eyes

Thanks

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