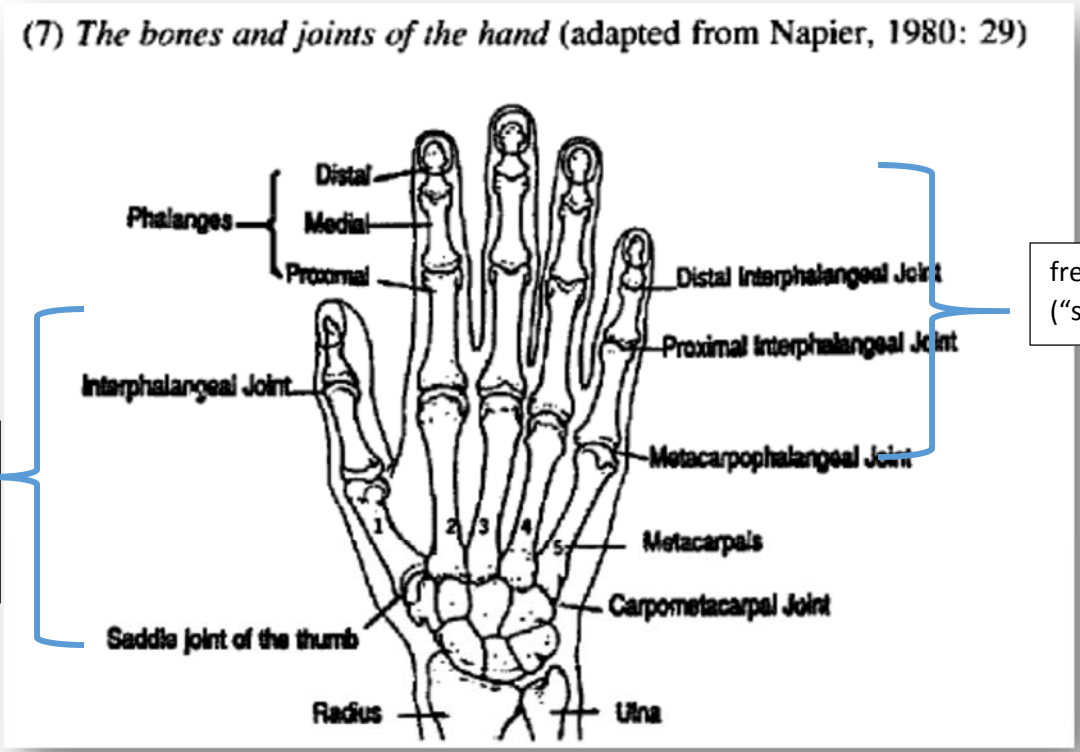
Selected highlights of unclaimed papers
presented by Kie Zuraw, 3 March 2020

Ann 1996: "Is there a correlation between ease of articulation and frequency of occurrence in handshapes in sign languages?"

1. **Handshape taxonomy**
   - Selected fingers can be open, curved, bent, or closed
     - open and curved require two sets of muscles each
     - bent and closed require just one each

(p. 21)

   - A handshape can have two groups of fingers, each group with a different configuration
     - e.g., some fingers closed, the rest bent, curved, or open
   - Ann focusses on handshapes where 4 fingers are closed, and 1 is bent, curved, or open



(p. 24)

2. Physiology

(12) *Physiological results of the anatomy*

(i) The thumb, owing to its *highly moveable carpometacarpal joint*, is the most mobile finger.

(ii) The index and middle are especially agile at the finger joints (that is, the metacarpophalangeal joint, and the distal and proximal interphalangeal joints) owing to the fact that they are *immobile at the carpometacarpal joint*. The ring and pinky are less agile at the finger joints owing to the fact that they are *slightly moveable at the carpometacarpal joint*.

(iii) The *thumb, index and pinky each have two extensors* (an independent extensor, and one tendon of the common extensor). Owing to this, the thumb, index and pinky are capable of full extension when the other fingers are closed. The *middle and ring each have one extensor* (the common extensor). Because of this, the middle and ring are not capable of full extension when the other fingers are closed.

(iv) Because each of the *five fingers has two flexors*, each of the five fingers has about the same ability to flex independently. However, because the *flexor digitorum profundus has a separate muscle head for the index finger*, the index is more independent than the middle, ring and pinky in flexion. For example, the index can be flexed at the distal interphalangeal joint while the rest of the fingers are extended there. (This means that the index can be curved while the rest of the fingers are extended.)

(v) When the *intrinsic muscles contract*, they produce flexion at the metacarpophalangeal (knuckle) joint and extension at the other finger joints.

(vi) The *juncturae tendinum which connect (i) the ring finger to the pinky and (ii) the ring finger to the middle* make the ring finger the most dependent finger.

(p. 28)

3. Markedness

- **Independent Extensor Criterion**: middle and ring fingers don't have independent extensor muscles

  → having one of those fingers flexed/bent/curved while the rest are closed is hard

- **Profundus Criterion**: flexor digitorum profundus muscle has just one muscle head for middle, ring & pinky fingers

  → if one of those three fingers is in the more-flexed group, then all three must be in the more-flexed group, or else the handshape is hard

- **Muscle Opposition in the Configuration of Selected Fingers Criterion**

  → bent and closed are easiest, curved is hardest

4. **Plus one more criterion with no name**

(13) *The muscle groups required to articulate each configuration*

Configuration	Extrinsic		Intrinsic
	Extensors	Flexors	Lumbricals/Interossei
Closed		X	
Extended	X		X
Bent			X
Curved	X		X

(p. 29)

- Within the one-muscle-group configurations, bent is harder than closed
    - closed is pure flexion
    - bent is extension at some joints and flexion at others

5. **Harmonic-Grammar-esque scoring system**
    - Each handshape gets a difficulty score
        - 1 point if Independent Extensor Criterion violated
        - plus 1 point if Profundus Criterion violated
        - multiply that sum by 3 if curved, 2 if extended, 1 if bent, 0 if closed

sample calculations for the sum

(21) *Application of IEC and PC to logically possible finger groupings for one-finger handshapes*

Fingers in least flexed group	Independent Extensor Criterion (IEC)	Fingers in most flexed group	Profundus Criterion (PC)	Sum of values of IEC and PC
T	+(0)	IMRP	+(0)	0
I	+(0)	TMRP	+(0)	0
M	−(1)	TIRP	−(1)	2
R	−(1)	TIMP	−(1)	2
P	+(0)	TIMR	−(1)	1

(p. 34)

sample calculations for the final product

(22) *Application of MOC of SFC and final ease score for logically possible one-finger handshapes*

Fingers/least flexed group	Fingers/most flexed group	Sum of values of IEC and PC	Value of MOC of SFC if BENT (×1) (Final Ease Score)	Value of MOC of SFC if EXTENDED (×2) (Final Ease Score)	Value of MOC of SFC if CURVED (×3) (Final Ease Score)
T	IMRP	0	0	0	0
I	TMRP	0	0	0	0
M	TIRP	2	2	4	6
R	TIMP	2	2	4	6
P	TIMR	1	1	2	3

(p. 35)

- Ann takes handshapes with difficulty score of 4 or more to be physically impossible

6. Correlation with lexicon

- How often does each of these handshapes occur in dictionaries of Taiwan Sign Language, American Sign Language?
    - * cells: impossible handshapes (score $\geq$ 4)
    - boxed cells: "hard" handshapes (0 < score < 4)
    - parentheses: bent variant possible for extended citation form
        - I didn't understand why for TSL bent and extended numbers match, but for ASL they don't

(24) *Frequency of occurrence of one-finger handshapes in TSL and ASL (one finger bent, extended, curved, rest of fingers closed)*

	TSL			ASL		
	Bent	Extended	Curved	Bent	Extended	Curved
Thumb	(101)	101	6	(68)	81	0
Index	(196)	196	28	(270)	303	137
Middle	4	*0	*0	0	*0	*0
Ring	3	*0	*0	0	*0	*0
Pinky	(20)	20	5	(31)	31	0

(p. 36)

- Overall the hard handshapes are rarer
    - though there are also some easy shapes that are rare, unexpectedly
    - Ann proposes that the rarity of bent-thumb might be explained **perceptually**:
        - because thumb has only one interphalangeal joint, it's hard to see that it is curved

(Sandler 1999): cliticization and prosodic words in Israeli Sign Language

We've seen these examples before just not the OT analysis, so I will fold this in to the example-bank handout for those Sandler papers.

7. Constraints relevant to combining a word and a pronoun clitic into a single prosodic word

- **SELECTEDFINGER**: "Only one specification for selected fingers is allowed in a prosodic word" (p. 6)
- **PLACE**: "Only one place of articulation may be specified in a prosodic word" (p. 6)
- **MONOSYL**: "one syllable per prosodic word" (p. 7)
- **SYMMETRY**: it's not allowed for each hand to simultaneously have different movements or locations
    - always obeyed within the citation form of a single lexical word

8. Coalescence

- tends to happen at end of phonological phase (prominent position)
- SHOP plus enclitic THERE: compressed into one syllable, at the expense of symmetry

(16a) SHOP (beginning) (16b) SHOP (end)

(17a) SHOP (beginning) (17b) SHOP-THERE (ending, cliticized form)

(p. 19)

	SHOP + THERE	MONOSYL	MAX-location	SYMMETRY
	faithful (concatenate the two citation forms)	*!		
☞	start: as usual for SHOP end: dominant hand as usual for THERE, weak hand as usual for SHOP			*
	start: as usual for SHOP end: as usual for THERE (weak hand just drops out after beginning, instead of lowering as for SHOP)		*!	

9. Dominant handshape assimilation

- Tends to happen at beginning of phonological phrase (weak position)

Sandler gives an OT analysis in prose. These tableaux are translations of that prose.

(19) I (citation form)

(p. 24)

(20a) I (clitic)

(20b) READ (beginning)

(20c) READ (end)

(p. 25)

	I + READ	SELECTED FINGER	MAX-handshape-LexicalWord	MAX-location	MONOSYL	MAX-handshape
	faithful (concatenate the two citation forms)	*!			*	
☞	use V handshape throughout				*	*
	use 1 handshape throughout		*!		*	*
	compress into one syllable by signing READ but with 1 handshape			*!		

(Frishberg 1975): diachronic change in ASL

- This is a repeat of what we saw in Frishberg's chapter in Klima & Bellugi 1979
  - except that the drawings are of a different signer
  - and about half of the examples are not found in the 1979 chapter
    - TRAVEL, FEEL, BIRD, PATIENT

- Compares 1918 ASL manual to Stokoe & al. 1965 dictionary

10. Weak hand's shape has often changed to match dominant hand's

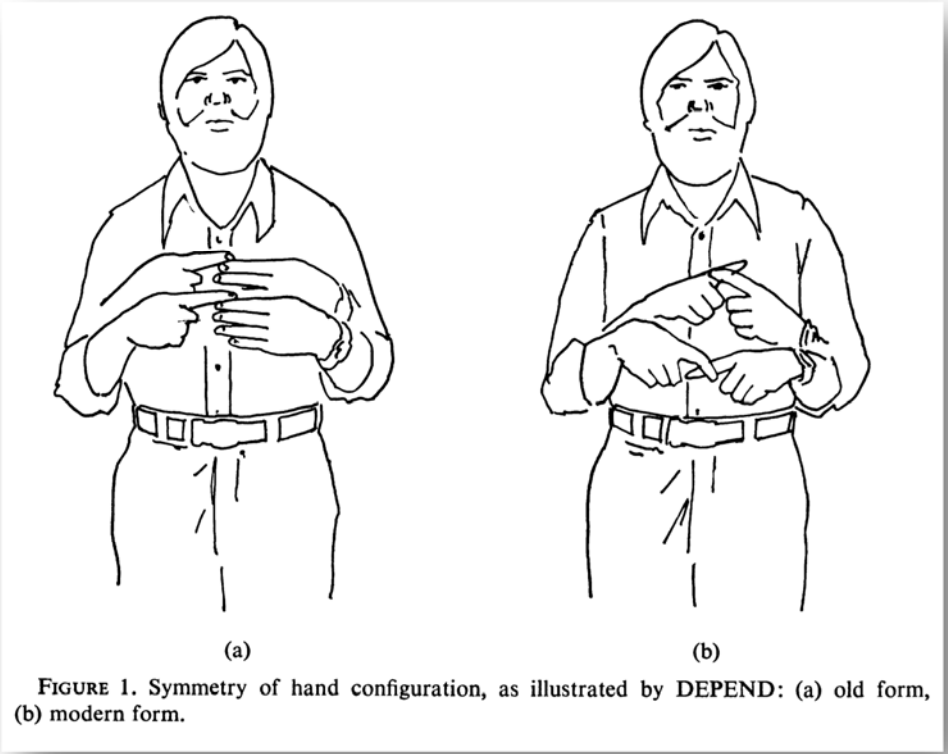
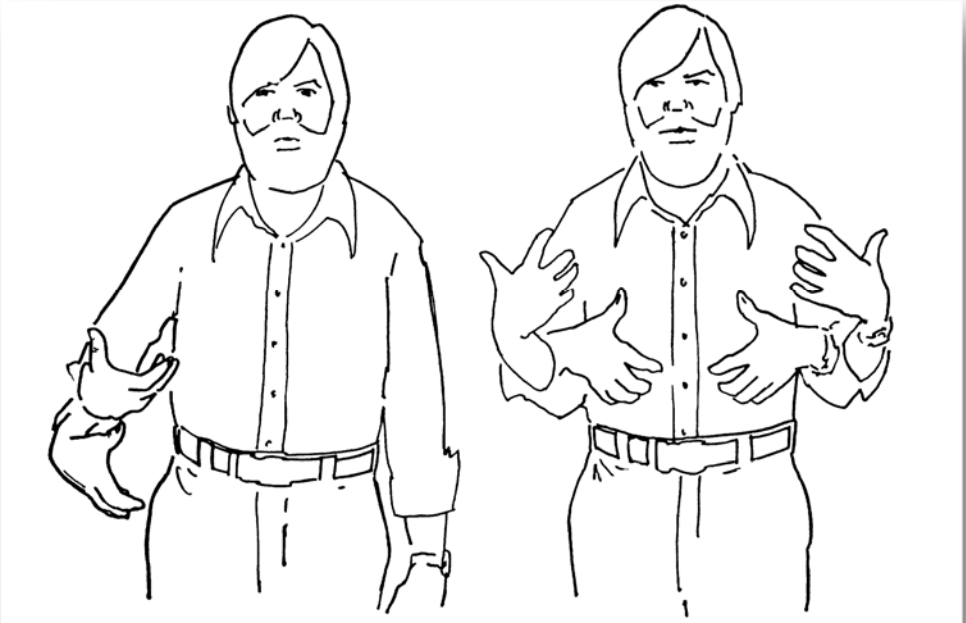


FIGURE 1. Symmetry of hand configuration, as illustrated by DEPEND: (a) old form, (b) modern form.

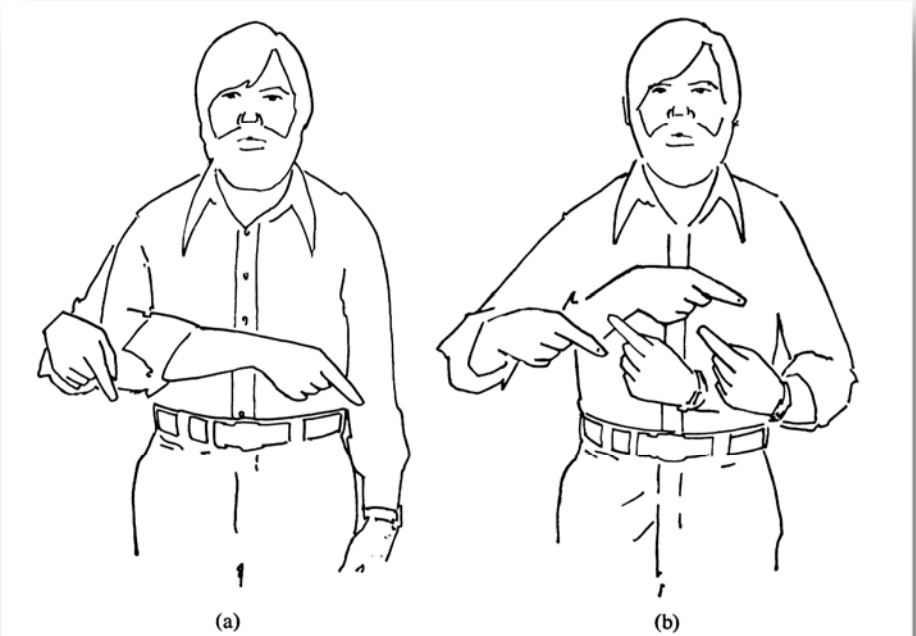
(p. 701)

11. In signs that have become two-handed (or optionally so), weak hand obeys symmetry



(a) (b)

FIGURE 2. Bilateral symmetry of location, as illustrated by ANGRY: (a) old form, (b) modern form.

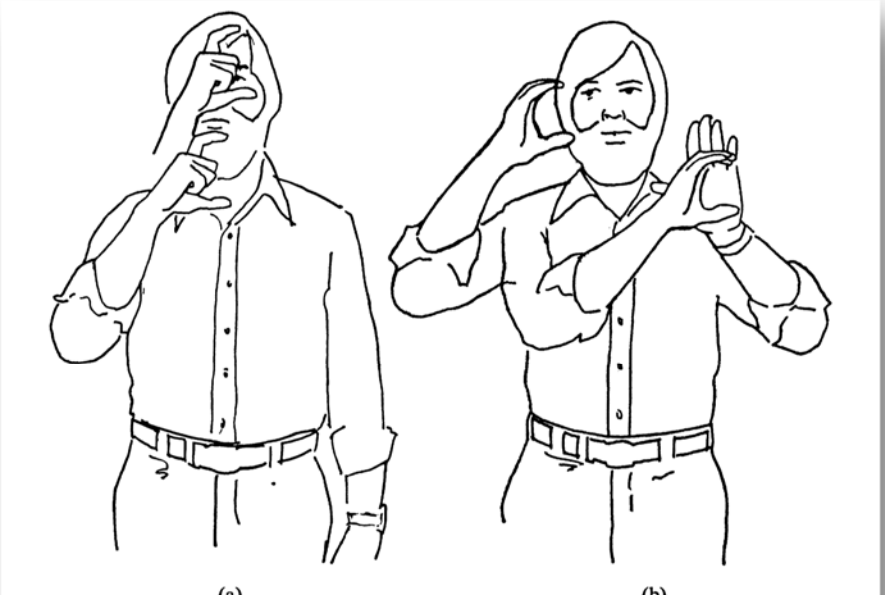


(a) (b)

FIGURE 3. Symmetry of hand configuration (identity) and orientation (reciprocity), as illustrated by TRAVEL: (a) old form, (b) modern form.

(p. 702)

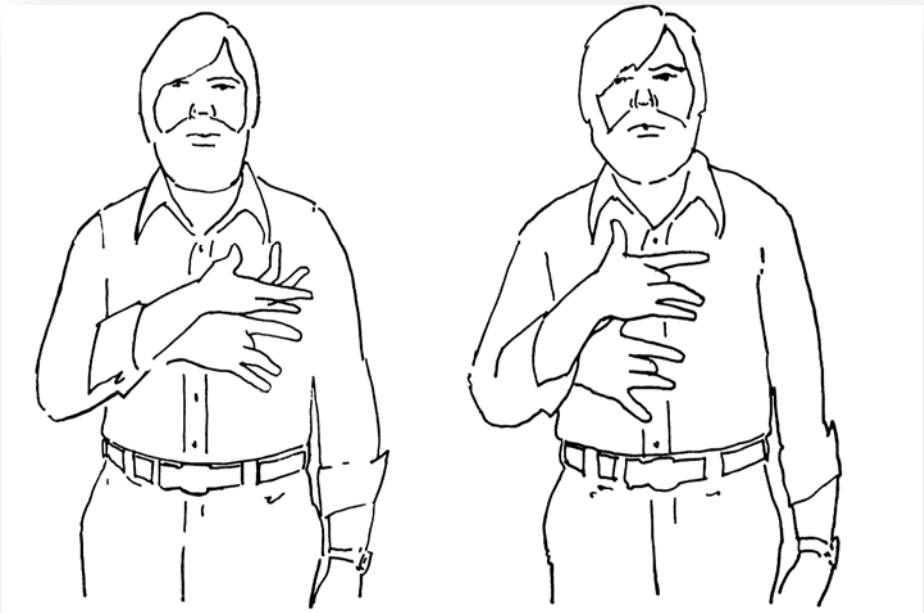
12. Other examples—explained by Frishberg's captions



(a) (b)

FIGURE 4. Head displacement, from center of face to perimeter, as illustrated by PICTURE/PHOTOGRAPH: (a) old form, first part of compound only; (b) modern form, second part of compound identical at both stages.

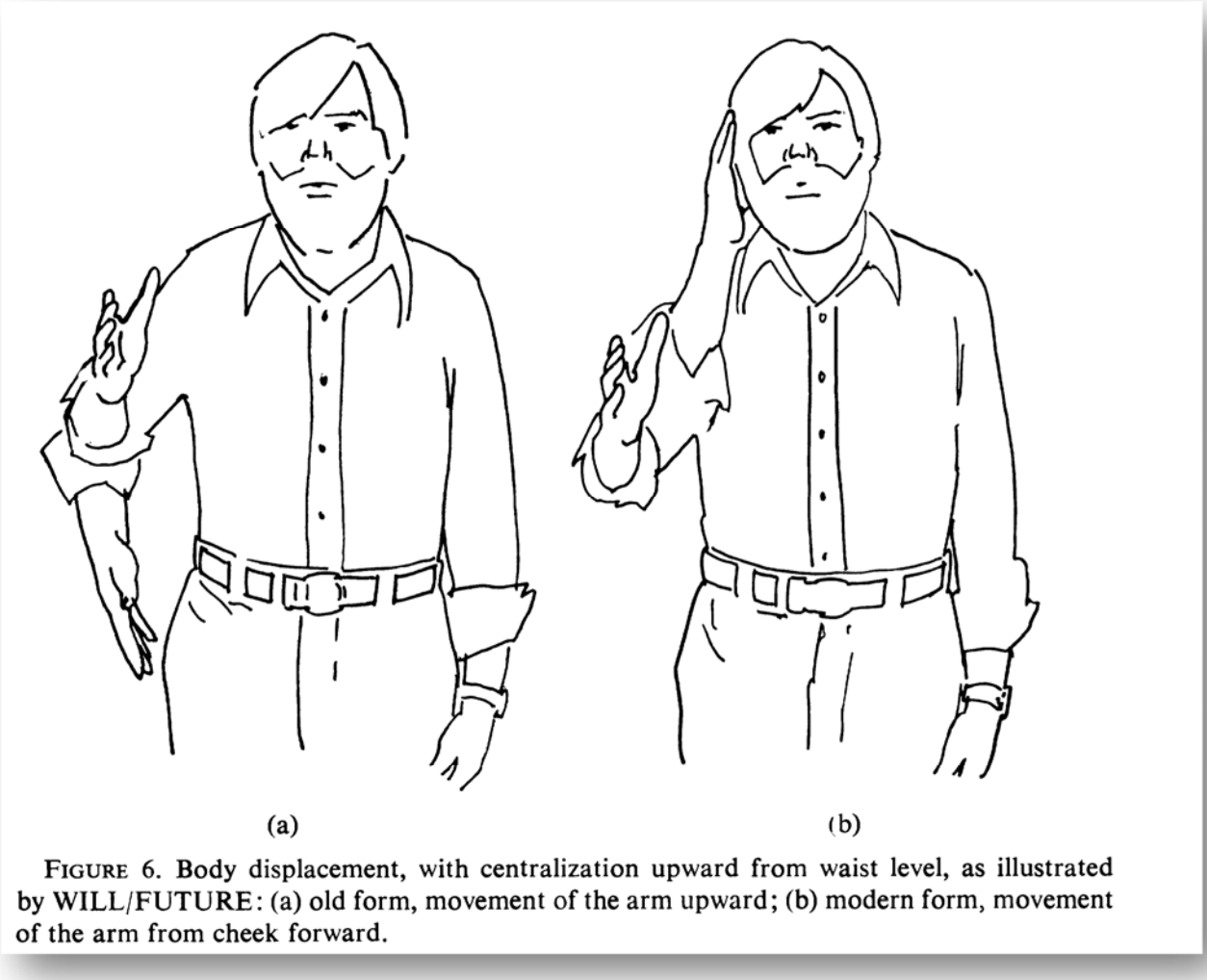
(p. 704)



(a) (b)

FIGURE 5. Body displacement, with centralization toward line of bilateral symmetry, as illustrated by FEEL: (a) old form, (b) modern form.

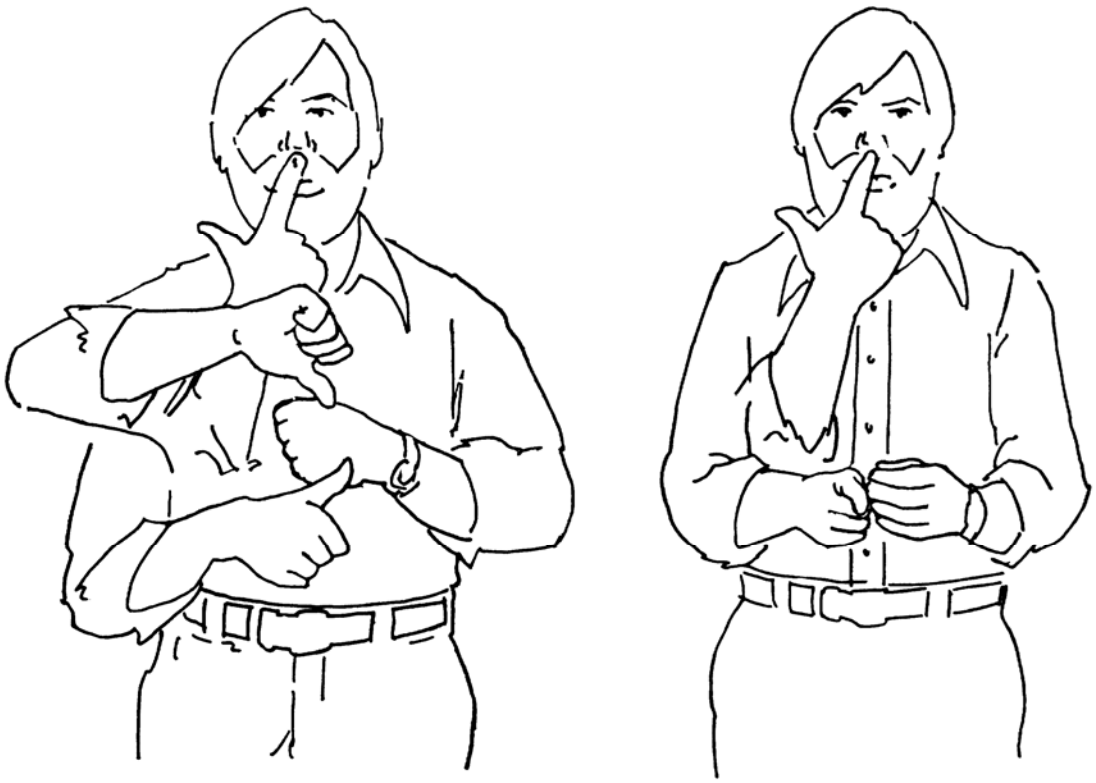
(p. 705)



(a) (b)

FIGURE 6. Body displacement, with centralization upward from waist level, as illustrated by WILL/FUTURE: (a) old form, movement of the arm upward; (b) modern form, movement of the arm from cheek forward.

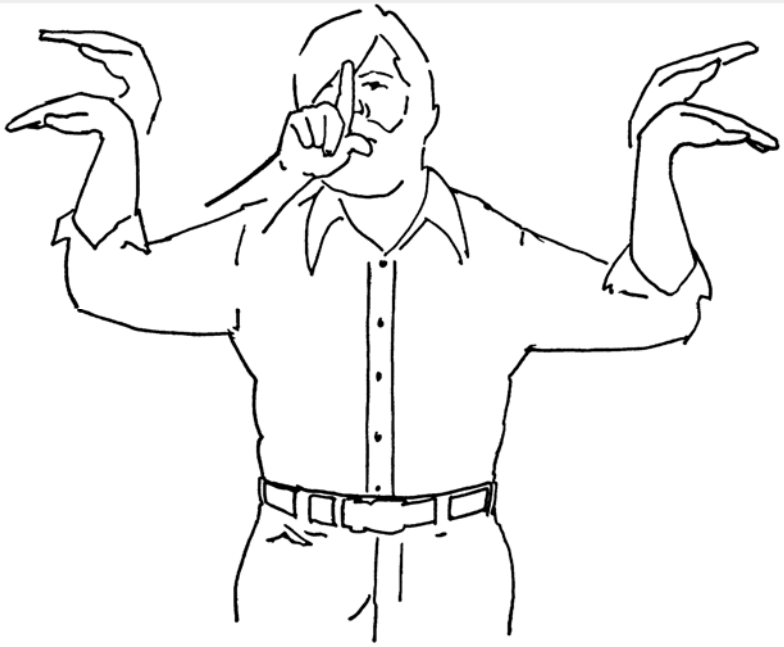
(p. 706)



(a) (b)

FIGURE 7. Assimilation, with hand-shape maintained from first part of compound (at the mouth) to second part (two hands in contact), as illustrated by TOMATO: (a) old form, (b) modern form. The thumb extension illustrated in (a) may not be historically accurate; for a discussion of this variable feature in ASL, see Battison et al. 1973. In (b), the modern form illustrated shows only the perseverative hand-shape assimilation, not the anticipatory assimilation of orientation described in the text (Woodward & Erting 1974 discuss lectal variations in the formation of TOMATO).

(p. 708)



(a)

(b)

FIGURE 8. Deletion of part of compound. Where assimilation processes cannot apply, one part of a compound sign is often deleted, as illustrated in BIRD: (a) old form; (b) modern form, second part of compound deleted.

(p. 709)

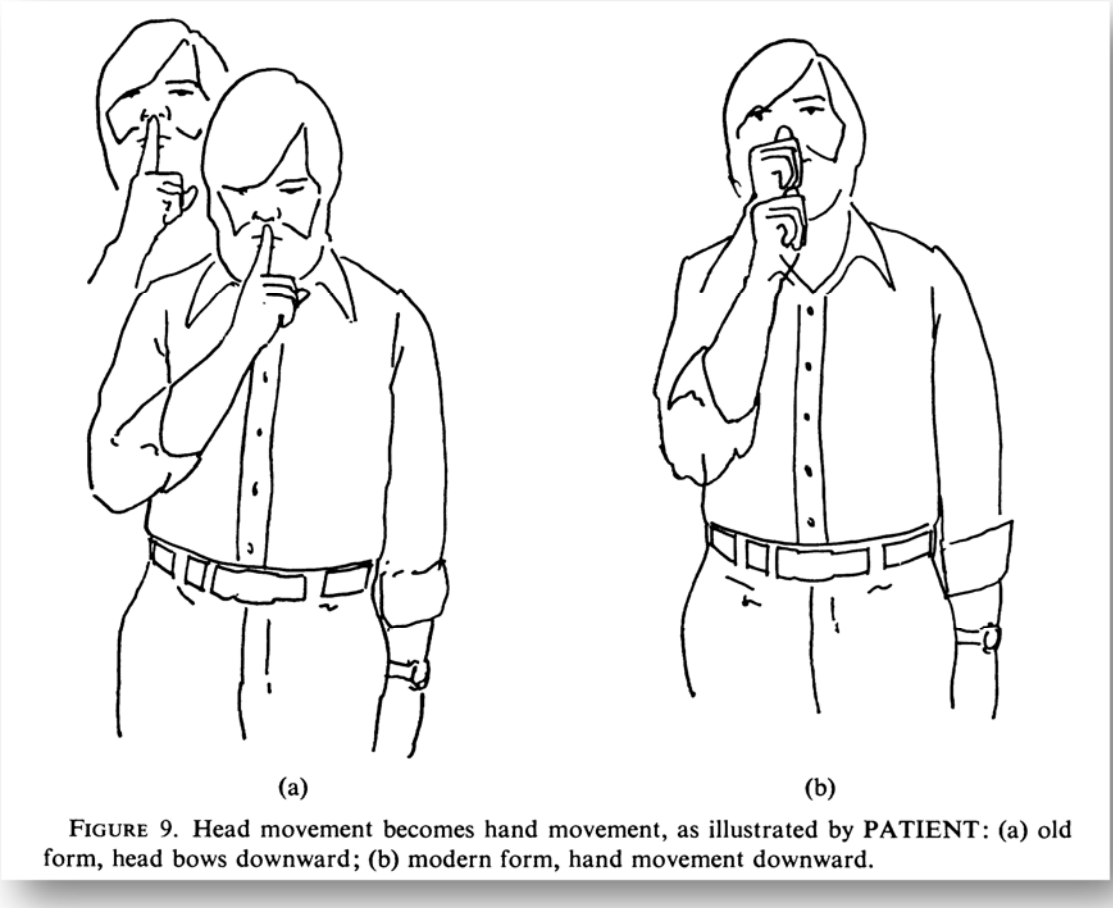


FIGURE 9. Head movement becomes hand movement, as illustrated by PATIENT: (a) old form, head bows downward; (b) modern form, hand movement downward.

(p. 712)

- Bent-V handshape for modern STEAL "link[s] it to many other signs denoting offensive behavior, e.g. RASCAL, MISCHIEVOUS, SELFISH, NERVY, and STRICT" (p. 714)

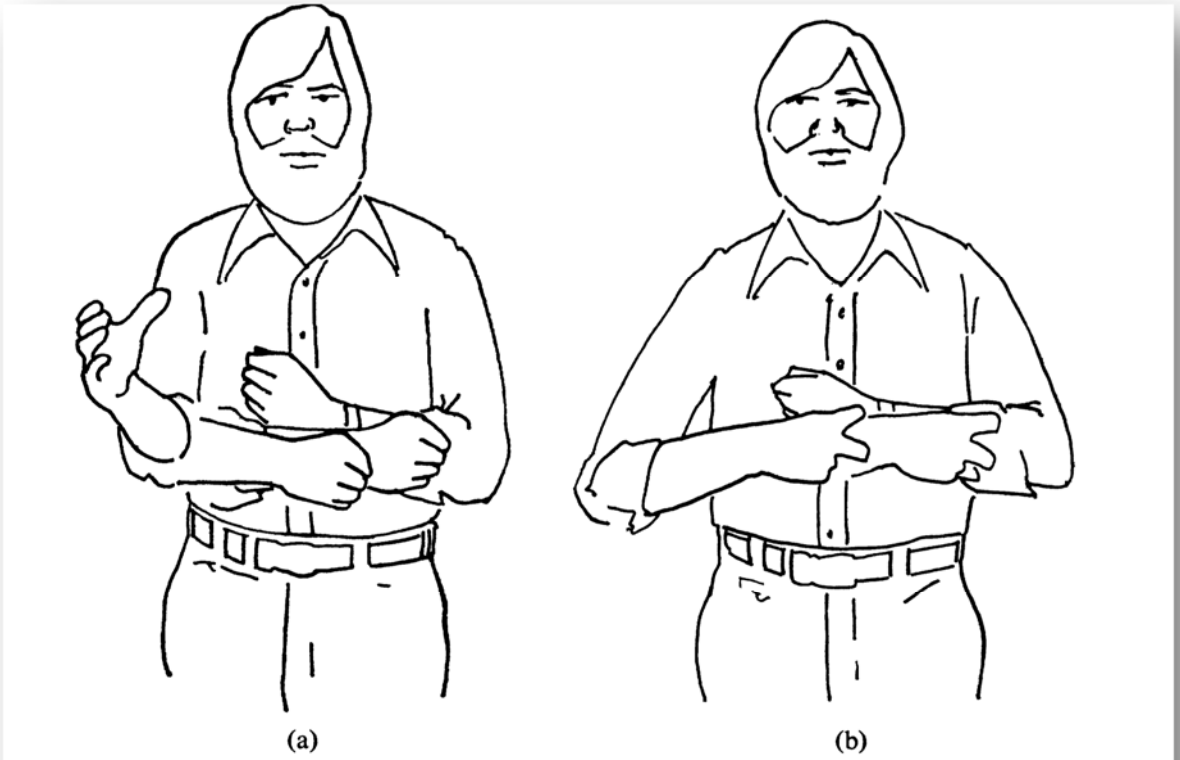


FIGURE 11. Morphologically motivated active hand-shape change, as illustrated by STEAL: (a) old form, grasping movement of whole hand; (b) modern form, using two fingers.

(p. 715)

13. Fun fact

- No picture, but three signs in Old French Sign Language ABLE, PRESENT, and THEREFORE "required signers to strike the table in front of them" (p. 713)
    - have been completely replaced by unrelated signs
    - no modern ASL signs "require contact with elements of the environment" (p. 713)
- "one wonders what the children of the Paris deaf school did to sign these words outdoors" (p. 713)
    - On the one hand, you could guess that if there's no table, you just strike an imaginary spot somewhere in front of the ribcage
    - But if it's that easy, why did the signs disappear instead of evolving in that way?
- Reminds me of how spoken languages don't make use of hand+mouth sounds
    - e.g., using a finger to make popping noise with cheek
    - Maybe these got eliminated in the first few generations of speakers

(Wilcox & Occhino 2016): I'm just extracting one bonus fact

- I think I mentioned this example in class once but couldn't remember where I'd read it
- Here is a still from 1918 ASL film "Preservation of the Sign Language" (viewable on YouTube)
    - Signer is George W. Veditz
    - President of (U.S.) National Association of the Deaf (NAD)
    - Produced several films aiming at documenting and preserving ASL
    - Was a leader of the eventually-successful campaign to get the U.S. federal government to stop banning deaf people from the civil service

"Veditz actually opens his mouth and bites down on the tip of the index finger […] Today […] it is never put into the mouth; instead, the handshape is rocked by slight supination/pronation of the forearm" (p. 7)

- Signing Savvy does give this variant, saying "This sign is an older sign and while you may see people use it, it has become outdated"
    - (https://www.signingsavvy.com/sign/ENVY/1282/1)

Figure 1: ASL sign ENVY/JEALOUS

(p. 8)

- Let's watch a brief excerpt from the film that has been enhanced with English subtitles and modern ASL picture-in-picture by members of Jr. NAD
    - https://youtu.be/XS2c07HCdyo

References

Ann, Jean. 1996. On the relation between ease of articulation and frequency of occurrence of handshapes in two sign languages. *Lingua* (Sign Linguistics Phonetics, Phonology and Morpho-Syntax) 98(1). 19–41. doi:10.1016/0024-3841(95)00031-3.

Frishberg, Nancy. 1975. Arbitrariness and Iconicity: Historical Change in American Sign Language. *Language* 51(3). 696–719. doi:10.2307/412894.

Klima, Edward & Ursulla Bellugi. 1979. *The Signs of Language*. Cambridge, Mass.: Harvard University Press.

Sandler, Wendy. 1999. Cliticization and prosodic words in a sign language. In T Alan Hall & Ursula Kleinhenz (eds.), *Studies on the phonological word*, 223–255. Amsterdam: John Benjamins.

Wilcox, Sherman & Corrine Occhino. 2016. Historical Change in Signed Languages. doi:10.1093/oxfordhb/9780199935345.013.24 (31 December, 2019).