

The “Flat Chin” Marker in ASL

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INTRODUCTION

The goal of this research is to investigate functions that the chin can perform as an independent articulator in American Sign Language (ASL).

The Flat Chin (AU-17)

- **Non-manual markers (NMMs)** are facial and body movements grammaticalized in a given sign language
- AU-17 is the FACS code for the NMM ‘flat chin’ [5] (See figures 1 & 2)
- Frequently observed in ASL, but its **linguistic meaning is understudied**



Previous Research

- The lower face is **analyzed as a whole or reduced to the lips**, ignoring the chin
- Lower face NMMs are taken to be **manner adverbials**, like the mouth NMM ‘mm,’ meaning ‘contentedly’ or ‘in a normal way’ [1, 6]
- Limited ASL research on AU-17 suggests that it **correlates with the “NOT face”** [2], but does not provide deeper analysis

Our Question

- **Is the chin an independent articulator in ASL?** If so, what can it mean?

DATA

- We annotated **496 instances of AU-17** in ASL, in both corpus & elicited data
- Some instances co-occur with ‘mm’ or similar mouth gestures
- Most occurrences **don’t seem to behave like manner adverbials**

- (1) #RUG #IF GERMAN STRONG
‘If the rug is German, it’s strong.’



- (2) MAYBE OFFER IDEA MAYBE CAN HAPPEN WILL HAPPEN NOT-KNOW
‘Maybe you introduce an idea that can or will happen— I don’t know.’

- (3) LION IX-3 WOAH HEAVY WEIGH MORE-THAN TWO-HUNDRED
‘Wow, lions weigh even more than 200 pounds.’



- (4) IX-1 MISS MOTHER
‘I miss my mother.’

- (5) IX-3 HEY SEE IX-3 CL:F “spots” SEE NONE
‘He doesn’t see any spots there.’

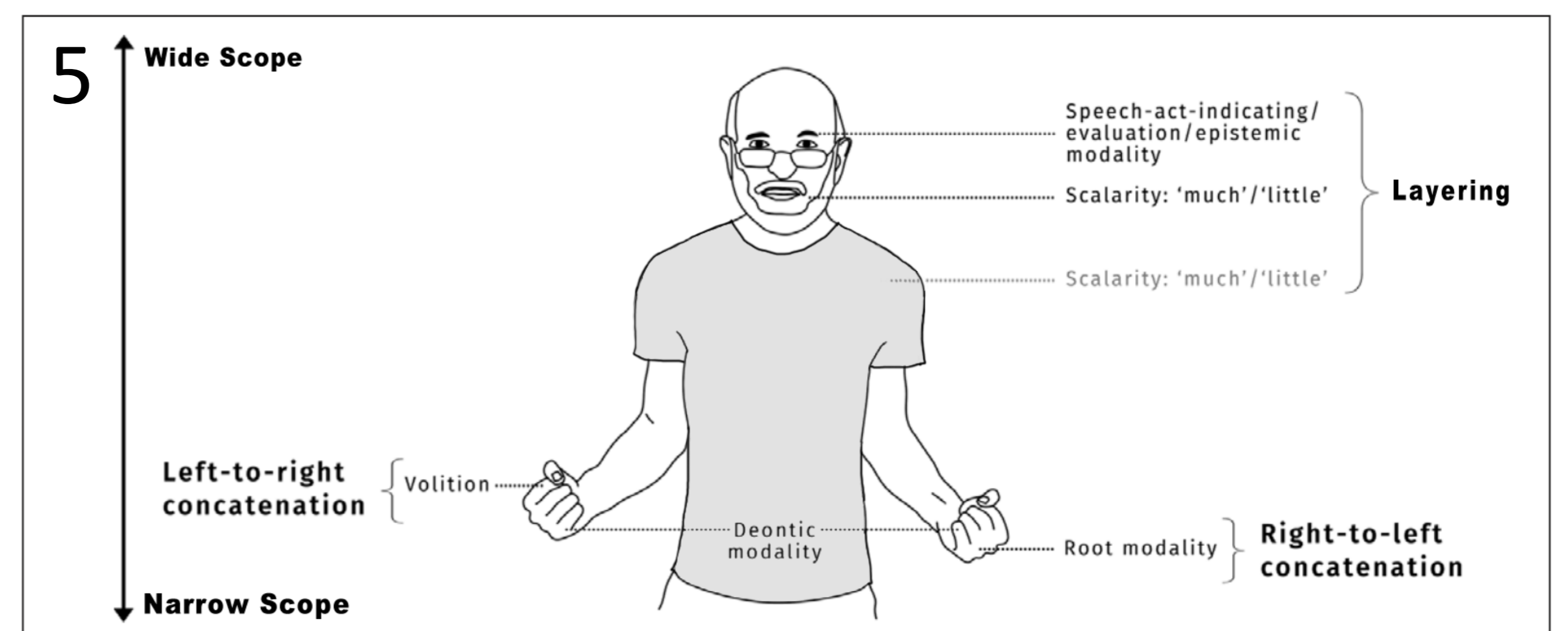
SUMMARY & DISCUSSION

Interpreting the Data

- In addition to acting with the lips to form manner adverbials, the chin acts as an **articulator separate from the lips** in ASL to contribute additional functions
- AU-17 appears to have **functions beyond acting as a manner adverbial**, such as:
 1. Indicating **speaker evaluation** (see example (1) & figure 3)
 2. Indicating **uncertainty or possibility** (see example (2))
 3. Indicate **scolarity** (see example (3) & see figure 4)
 4. **Marking a lexical item** (see example (4))
 5. A function possibly linked with negation (see example (5))
- Instances like (1) & (3) were most prevalent, but instances like (2), (4), & (5) were also common.

Questions to Answer

- What are **all of AU-17’s functions**? How, if at all, are these functions connected?
- How does AU-17 **interact with other lower face NMMs**, such as the lips?
- Which **other parts of the lower face** are independent articulators in ASL?
- Do all associated functions fit with the **bodily-mapping hypothesis**?
 - The bodily-mapping hypothesis predicts that “the wider/higher the scope of a clausal operator [is], the more likely its expression will occur with a high body part by way of layering” [4] (See figure 5)
 - So far, speaker evaluation (as in (1)) and scolarity (as in (3)) **align with this hypothesis**



APPLICATIONS

Automated Sign Language Translation

- We are collaborating with engineers at the OSU to develop software to **accurately identify AUs in ASL videos**
- Moving from identification to translation requires knowledge of an AU’s functions
- Knowledge of AU-17’s functions will make automated ASL translation **attainable**

Improved Education

- ASL **second language instruction** and **first language interpretation** will benefit as teachers and interpreters gain **explicit knowledge of each NMM’s function(s)**

FIGURE DESCRIPTIONS

- 1: An instance of AU-17 in our corpus, *The Face of ASL* [3]
- 2: An instance of AU-17 in our elicited data
- 3: Sentence (1), which expresses speaker evaluation & contains AU-17
- 4: Sentence (3), which expresses scolarity & contains AU-17
- 5: A visual representation of the bodily mapping hypothesis [4], with examples from DGS

REFERENCES & ACKNOWLEDGEMENTS

- [1] Baker, C., & Cokely, D. (1980). *American Sign Language. A Teacher's Resource Text on Grammar and Culture*. Silver Spring, MD: TJ Publ.
- [2] Benitez-Quiroz, C. F., Wilbur, R. B., & Martínez, A. M. (2016). The NOT face: A grammaticalization of facial expressions of emotion. *Cognition*, 150, 77-84.
- [3] Bienvenu, M. J., & Colonosmos, B. (Directors). (1991). *Face of ASL* [Motion picture on VHS]. United States of America: Sign Media, Inc.
- [4] Bross, F., & Hole, D. (2017). Scope-taking strategies and the order of clausal categories in German Sign Language. *Glossa: A journal of general linguistics*, 2(1), 1-30.
- [5] Ekman, P., & Friesen, W. V. (1978). *Facial action coding system: A technique for the measurement of facial movement*. Palo Alto, California: Consulting Psychologists Press.
- [6] Liddell, S. K. (1980). *American sign language syntax* (Vol. 52). Mouton De Gruyter.

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