



Chimpanzees Modulate Signs Emphatically

Kailie Dombrausky¹, Grace Coffman¹, E. Chadwick de Bree¹, Emily Patton¹, Mary Lee Jensvold^{1,2}

¹Central Washington University, ²Friends of Washoe

Correspondence: kailie.dombrausky@cwu.edu



Introduction

Native signers of American Sign Language (ASL) modulate the form of signs to alter meaning. Emphatic signs co-occur with modulations of reiteration (repeating the sign), duplication (signing with both hands), held sign (holding the hands in sign position), and enlarged size (outside the signing space).¹ Five signing chimpanzees lived at the Chimpanzee and Human Communication Institute (CHCI) at Central Washington University (CWU) from 1980 – 2013. As infants Washoe, Moja, Tatu, and Dar were raised like children and immersed in ASL. Loulis acquired his signs from chimpanzees. Human caregivers recorded detailed observations of the chimpanzees' signed utterances and the context of those utterances in sign logs. Throughout their lives, the chimpanzees modulated their signs through reiteration, duplication, held sign, and enlarged size.^{2, 3, 4, 5} We were interested to see whether the chimpanzees used these modulations in emphatic utterances.

Methods and Materials

- As adults, Washoe, Moja, Tatu, Dar and Loulis lived at CHCI during the time of this study.
- We queried all sign logs recorded by reliable caregivers at CHCI from the years 2000-2007.
- Caregivers recorded notes on the form of signs including reiteration, duplication, enlarged, held, small, fast, and many others. They wrote a narrative description of the interaction and could include terms such as emphatic, or question.
- We scanned logs for 1) instances of the modulations to form: reiteration (“X”), duplication (“B”), enlarged (“ENLARG”), 2) held; notes for emphatic in the text and 3) co-occurrences of the modulations or notes.
- We classified each utterance by a single or co-occurrence of modulation, which we then counted.

Examples from the Sign Logs

Note of Emphatic:

“Moja was sitting on the platform looking into the classroom. She first signed SHOE/ and then leaning forward toward the window she began signing **SODA POP/** very **emphatically.**” (1127)

Hold:

“I asked Tatu SIGN WRISTWATCH/? Tatu signed THAT LISTEN **held** it there for a second and signed **LISTEN holding** it again looking at the watch and then at me.” (1649)

Reiteration:

“Washoe wanted the crackers so she collected 2 bowls and moved to return them. Loulis was sitting on the bench in C1 finishing off the remains of dinner when Washoe tried to take it from him. Loulis moved away, not wanting to give the bowl up. Washoe signed **STUPID XL HURRY.**” (95)

Results

Table 1. Frequency of Modulations and Co-occurrence with Emphatic

| | Overall Modulation | Occurrence with Emphatic |
|------------------------------------|---------------------|--------------------------|
| Duplication | 15 (1.7%) | 2 (2.25%) |
| Held | 22 (2.49%) | 1 (1.12%) |
| Reiteration | 812 (92.06%) | 81 (91.01%) |
| Enlarge | 2 (0.23%) | 0 (0%) |
| Reiteration and Duplication | 17 (1.93%) | 4 (4.49%) |
| Reiteration and Enlarge | 5 (0.57%) | 1 (1.12%) |
| Reiteration and Held | 9 (1.02%) | 0 (0%) |
| Total | 882 (100%) | 89 (100%) |

Conclusions and Discussion

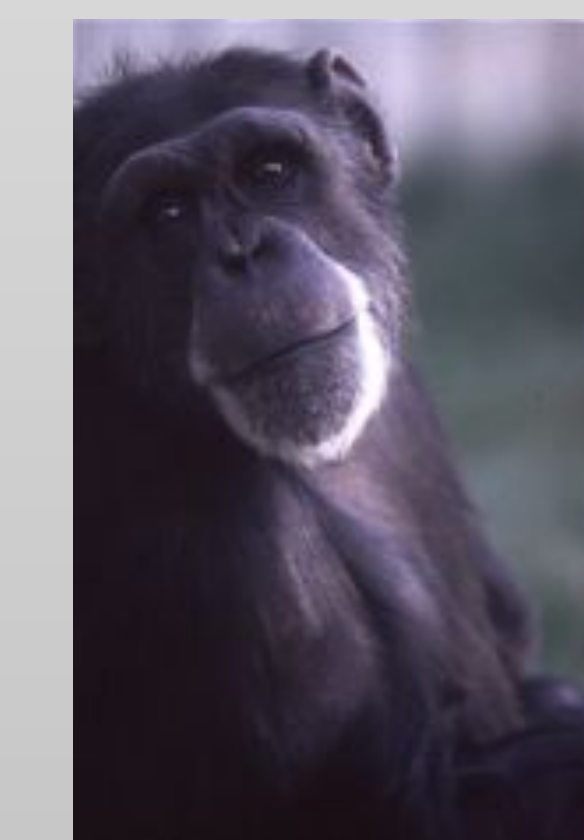
- Modulations were highly prevalent in the chimpanzees' emphatic utterances, suggesting that reiteration, duplication, held signs, and enlarged size can add stress and clarify the signers' intended meanings.
- Reiteration co-occurring with duplication occurred in 4% of records with notes of emphatic versus 2% overall, indicating that the chimpanzees may have used modulations slightly differently in emphatic signing.
- This study adds to our understanding of the patterns of sign modulation in chimpanzee signers. Using a larger sample of sign logs might illuminate these patterns further.



Dar



Loulis



Washoe



Tatu signs rice



Moja

- Of a corpora of 2,729 signs, 32% were modulated and 4% were noted as emphatic
- Of the 109 signs noted as emphatic, 82% included modulations
- Reiteration was the most frequent modulation, both alone and in conjunction with notes on emphatic

References

1. Wilbur, R. B., & Schick, B. S. (1987). The effects of linguistic stress on ASL signs. *Language and Speech*, 30(4), 301-323.
2. Chalcraft, V. J., & Gardner, R. A. (2005). Cross-fostered chimpanzees modulate signs of American Sign Language. *Gesture*, 5, 107-132.
3. Gardner, B. T., & Gardner, R. A. (1989). Cross-fostered chimpanzees: II. Modulation of meaning. In P. G. Hellne & L. A. Marquardt (Eds.), *Understanding chimpanzees* (pp. 234-241). Cambridge, MA: Harvard University Press.
4. Rimpau, J. B., Gardner, R. A., & Gardner, B. T. (1989). Expression of person, place, and instrument in ASL utterances of children and chimpanzees. In R. A. Gardner, B. T. Gardner, & T. E. Van Cantfort (Eds.), *Teaching sign language to chimpanzees* (pp. 240-268). Albany, NY: SUNY Press.
5. Shiau, J. (2005). Chimpanzee use of modulation in response to questions. (Master's thesis). Central Washington University, Ellensburg, WA.