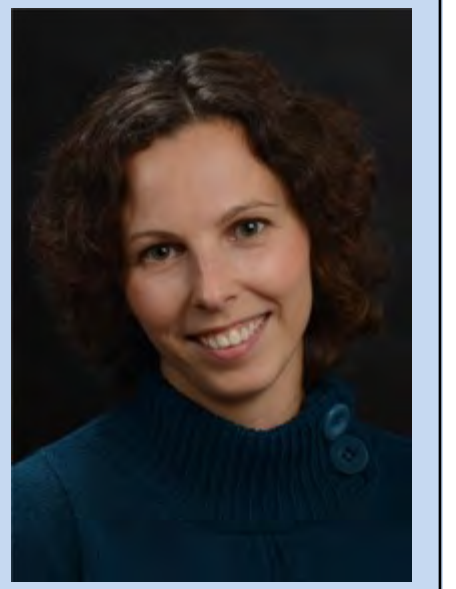


Compositionality in emotional expressions of chimpanzees

On-going project: 2014 - 2018 (Linda Scheider)



This project is part of a multi-disciplinary project (GRAMBY - The Grammar of the Body) in which we aim to reveal the foundations of compositionality in human language. **Compositionality is a fundamental principle of language structure, according to which the meanings of complex expressions are determined by the meanings of their constituents and the way in which they combine (e.g. Jackendoff, 2011).** The GRAMBY framework is inspired by sign language, in which different components of language are signalled by the hands, face and body (Sandler, 2012). This paradigm is taken a step further by investigating a more basic level of human communication: the expression of extreme emotion by different parts of the face and body (Cavichio & Sandler, 2015).

It has been shown clearly that communication in our closest living relatives, the great apes, is multimodal (Liebal et al., 2014). However, it is not known how signals from different modalities (face, hands, body) combine. In this project, we seek precursors of linguistic compositionality in the emotional and communicative bodily signals of chimpanzees.

Our hypothesis is that the compositionality of embodied emotional communication played a role in the evolution of the compositionality of language.

The Grammar of the Body
PI: Wendy Sandler
Sign Language Research Lab, University of Haifa

Home

- head: topic, marking, question, marking, prominence, coordination, dependency, referential shift, constituent, boundary marking
- upper face (brow, eye, cheek): utterance type and information status (question, old information, focus), constituent boundary marking (with blink), character, gender
- lower face (lip, chin, cheek): adv. modification, mood, or spoken words
- torso: referential shift, discourse contrast
- hand(s): words (phonology, morphology), rhythm, prominence, boundary strength
- non-dominant hand: phonological element in words, independent classifier, morpheme, discourse topic, continuity

The most distinctive and powerful characteristic of human language is compositionality: the ability to create and interpret complex expressions in terms of their meaningful parts and the ways in which they combine. The Grammar of the Body project, inspired by sign languages of deaf people, is working to create a model of linguistic compositionality that emanates from the human body – embodied compositionality – and to provide clues to its evolutionary origins.

What can we learn from sign languages? When humans create visual languages, symbolic concepts (words) are conveyed by the hands, and these words combine into complex, compositionally organized sentences. However, humans use more than the hands to create this structure. Like all biological entities, humans take full advantage of the affordances of the physical system in creating visual language, recruiting not only the hands, but also the face, head, and body in the organization of information into complex linguistic messages.

Is this embodied compositionality, which unfolds gradually in newly emerging sign languages, the foundation of all language?

We explore this question in five subprojects:

- SIGN LANGUAGE EMERGENCE
- DISPLAYS OF EXTREME EMOTION
- CHIMPANZEE COMMUNICATION
- BRAIN ACTIVITY
- SIGN LANGUAGE THEATRE LABORATORY

erc
European Research Council
Established by the European Commission

Methods (chimpanzee project)

Observational Data

- Chimfunshi Sanctuary
- Social interactions

Contexts

Conflict (Negative Valence) & Play (Positive Valence)

Eye-tracking Data

- Picture and video stimuli
- Fixation patterns

Production

- Unimodal: body posture
- Multimodal: body posture and gesture

Perception

Aims

We wish to identify

- individual compounds of single signals by using ChimpFACS and a newly-established structure-based chimp body coding system (Scheider, 2015) and**
- combinations of signals from different modalities (face, hands, body) to see if and how chimpanzees use such combinations in interactions with conspecifics and how their use influences the response of the recipient.**

We hypothesize that the observed multimodal signals of chimpanzee communication are combined compositionally. We seek evidence for this hypothesis by rigorous analysis of the signals themselves, of the social contexts in which they occur, and of the responses of the other individuals involved, both in semi-wild conditions and in experimental paradigms described above. Evidence for compositionality in chimpanzee communication would be indicative of another layer of flexibility in their communicative system, and a potential precursor of language.

References

- Cavichio F & Sandler W (2015). Towards a theory of compositionality in displays of extreme emotion. In Ferré, G., Tutton, M. (Eds.), Proceedings of Gesture and Speech in Interaction (GESPIN 4). University of Nantes, Nantes, France.
- Jackendoff R (2011). What is the human language faculty?: Two views. *Language* 87/3: 586-624.
- Liebal K, Waller BM, Burrows AM, Slocombe K (2014) Primate communication. A multimodal approach. Cambridge University Press.
- Sandler W (2012). Dedicated gestures and the emergence of sign language. *Gesture* 12/3: 265-307.
- Scheider L (2015). Manual for the Chimpanzee Body Arrangement Coding System (cBACS). Freie Universität Berlin.