

## Aphasia and Gesture: Gaze behaviour in naturalistic dialogues

Basil C. Preisig<sup>1</sup>, Noëmi Eggenberger<sup>1</sup>, Tim Vanbellingen<sup>1</sup>, Rahel Schumacher<sup>1</sup>, Simone Hopfner<sup>1</sup>, Manuel Bertschi<sup>1,2</sup>, Thomas Nyffeler<sup>1,4</sup>, Klemens Gutbrod<sup>2</sup>, Stephan Bohlhalter<sup>1,3</sup>,  
Claudio L. Bassetti<sup>1</sup>, and René M. Müri<sup>1,2</sup>

<sup>1</sup>Departments of Neurology and Clinical research, Inselspital, University Hospital Bern,

<sup>2</sup>Division of Cognitive and Restorative Neurology, Department of Neurology, Inselspital,

Bern University Hospital, and University of Bern, Switzerland, <sup>3</sup>Neurology and

Neurorehabilitation Center, Department of Internal Medicine, Luzerner Kantonsspital,

Switzerland

**Background:** Aphasia is a common disorder typically occurring after left hemisphere brain damage. Patients with aphasia are restricted in their verbal abilities, and may compensate their shortcomings by using gestures. Gesturing is a form of non-verbal communication which can complement, supplement, or even substitute verbal language. It has been shown that some patients make well use of gestural compensatory strategies (i.e. Herrmann et al., 1988), while others do not (i.e. Cicone et al., 1979). The present project will not only encompass the behavioural analysis of co-speech gestures in naturalistic dialogue situations, it will also extend previous research in aphasic patients investigating visual fixation behaviour by means of eye tracking. Besides, we will carry out lesion syndrome mapping to get further knowledge about the cortical organization of the network controlling co-speech gestures and language.

**Methods:** In a first experiment, we will compare the visual exploration behaviour of aphasic patients with aged-matched controls during dialogue presentation. Fixation data will be collected by means of an infra-red eye tracking system. In a second experiment, interactive behaviour, with respect to gesture perception and gesture production, will be compared between dyads of an aphasic patient with a healthy control subject and dyads assembled by healthy controls only. Fixation behaviour will be registered by a portable eye tracking device. Speech and gesture production will be qualitatively assessed using an event logging software and correlated with eye tracking data. For lesion mapping of structural MRI data, MRIcron software (Rorden et al., 2007) will be employed for both experiments.

**Outlook:** In general, we assume that aphasic patients will fixate more on gestures in order to improve language comprehension and will exert more meaningful gestures to express themselves intelligibly.

**Keywords:** Aphasia, gesture, speech, dialogue, eye tracking