Multimodality, cognition and language acquisition

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Multimodality in communication

Face-to-face communication is multimodal: auditory modality (speech) and visual modality (facial expressions and gestures including head movements, body posture and hand gestures) are involved.

Speech and gestures are related temporally and semantically, e.g.

- Beat gestures are temporally related with intonation (Kendon 1987, Loher 2007).
- Iconic gestures are related to semantics of referent and language (McNeill 1992, Lis 2014).
- Communication management gestures such as feedback head movements and turn taking signals in part depend on the language (Navarretta et al. 2012, Navarretta and Lis 2014).

Multimodality in language acquisition

- Enacting actions expressed by words and co-speech gestures aid comprehension, memory and recall (Gullberg 2008, Gullberg et al. 2010, Telier 2008, Macedonia et al. 2014, Morett 2014).
- Brain representation of word meaning is not *amodal*: words are grounded in perception and actions. Enactment in L2 reinforces sensorimotor patterns created during L1 acquisition (Macedonia and von Kriegstein 2012).
- Iconic and beat gestures help memorization of words in native English adults. The former gestures help memorization of words in native English children, but the latter do not (So et al. 2010).
- Iconic gestures help memorization of words in L2 English adult speakers, while beat gesture do not (Levantinou and Navarretta 2015).

Other cognitive aspects in language acquisition

Numerous factors influence L2 acquisition, e.g.

- age (Lenneberg 1967, Penfield and Roberts 1959, Major 2014),
- native language (Lightbown and Spada 2006, Macaro 2010)
- number of languages spoken and level of education (Hill and Björk 2008),
- cognitive abilities (Robinson 2001, Nicolay 2013),
- motivation (Dörnyei 2005) and personality (Erton 2010),
- acculturation (Jiang et al. 2009) and sociocultural factors (Ellis 1997, Gass and Selinker 2008).

Crowdsourcing as the platform for

- investigating of individual and cultural differences in language acquisition in order to design user-specific language acquisition tools,
- presenting multimodal data (e.g. videos, speech, text, images) and collecting them (e.g. speech, text typing, mouse tracking, facial expression recordings).

Our research interests and possible research projects

General:

- Investigating through crowdsourcing the importance of co-speech facial expressions and gestures in language acquisition.
- Investigating through crowdsourcing individual and cultural differences in language acquisition.

More specific interests:

- Collection and processing of multimodal data on data acquisition using existing infrastructure CLARIN.
- Acquisition and interpretation of prepositions, anaphora, feedback and turn taking signals in multimodal settings.
- Intonation acquisition and gesturing.
- Code-mixing and code-switching in (fluent) bilinguals or language environments where a large population are fluent bilinguals.

Possible partners:

- Researchers with expertise in crowdsourcing.
- NLP people with interest in cultural and individual differences in language acquisition.
- NLP people with interest/experience in multimodal communication.
- Experience/interest in combining multimodal input and processing multimodal output in crowdsourcing tools.

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