AUDIO-VISUAL INTEGRATION IN HUMAN AS REVEALED BY MCGURK EFFECT AND MMN.

Daniel Kislyuk[1,2], Riikka Möttönen[1]

1. *Cognitive technology group, Laboratory of Computational Engineering, Helsinki University of Technology, Finland*
2. *Dept. of Neuroscience, Biological Faculty, Saint-Petersburg State University, Russia*

e-mail: scrofa@yandex.ru

In their article of 1976 McGurk and MacDonald described an experiment, where the participants were presented simultaneously with visual /ba/ and auditory /ga/ which resulted in /da/ percept [1]. Since then the effect was studied a lot but still the site and temporal course of audio-visual integration remain unclear. In our study we try to map the event of integration not in the spatial but in the temporal domain and to understand at which stage of information processing the integration does occur. To achieve these goals we use MMN (mismatch negativity) component,

Auditory MMN is known as a pre-attentive ERP component which is elicited by virtually any repetitive discriminable changes of sound features("deviants"), happening occasionally in the sequence of similar sounds ("standards") [2]. In order to obtain MMN we employ the odd-ball paradigm.

In our experiment participants are presented with the auditory /ba/ dubbed on the visual /va/ which results in the /va/ percept. Such "McGurk" pairs are treated as deviants. They are occasionally presented in the raw of congruent /va/ stimuli (auditory /va/ + visual /va/), which are regarded as standards. So far "McGurk" pairs differ from the congruent ones only in their auditory part, visual part and the percept being the same. Therefore if we observe any MMN-like difference between the standards and the deviants we may attribute it to the difference in the auditory part. Moreover, such a difference would mean that at this point integration has not passed yet, because if it had congruent and incongruent stimuli would be indistinguishable.

ERPs recorded in this session are compared to the ERPs recorded during the auditory-only sessions, when the /ba/ and /va/ stimuli from the auditory parts of audio-visual stimuli are presented in the odd-ball paradigm with a silent movie shown in the background.

Preliminary results suggest that the MMN is not affected by the presentation of visual speech stimuli, which means that the integration of auditory and visual information happens after the MMN is generated.

[1] McGurk, H. and MacDonald, J., 1976. Hearing lips and seeing voices. *Nature* **264**, pp. 746–748.

[2] Naatanen, R., 2003. Mismatch negativity: clinical research and possible applications *International Journal of Psychophysiology* **48**, pp. 179-188