



## THEME 3 – SINGING AND WELL-BEING

### SUB-THEME: 3.3 HEALTH BENEFITS OF SINGING

#### Alzheimer's hand gestures and speech disorders in spoken and sung modalities

**Diane Caussade** (Univ. Grenoble Alpes, GIPSA-Lab, F-38000 Grenoble, France / CNRS, GIPSA-Lab, F-38000 Grenoble, France / LIDILEM, Univ. Grenoble 3, Saint Martin d'Hères, France)

[Dianne.Cassaude@gipsa-lab.fr](mailto:Dianne.Cassaude@gipsa-lab.fr)

**Fanny Gaubert** (Centre de formation en orthophonie, ISTR, Univ. Claude Bernard Lyon 1, Lyon, France) [fanny-nathalie.gaubert@orange.fr](mailto:fanny-nathalie.gaubert@orange.fr)

**Maud Serieux** (Centre de formation en orthophonie, ISTR, Univ. Claude Bernard Lyon 1, Lyon, France) [maud.serieux@gmail.com](mailto:maud.serieux@gmail.com)

**Nathalie Henrich-Bernardoni** (Univ. Grenoble Alpes, GIPSA-Lab, F-38000 Grenoble, France / CNRS, GIPSA-Lab, F-38000 Grenoble, France) [nathalie.henrich@gipsa-lab.grenoble-inp.fr](mailto:nathalie.henrich@gipsa-lab.grenoble-inp.fr)

**Nathalie Vallee** (Univ. Grenoble Alpes, GIPSA-Lab, F-38000 Grenoble, France / CNRS, GIPSA-Lab, F-38000 Grenoble, France) [nathalie.vallee@gipsa-lab.grenoble-inp.fr](mailto:nathalie.vallee@gipsa-lab.grenoble-inp.fr)

**Jean-Marc Colletta** (LIDILEM, Univ. Grenoble 3, Saint Martin d'Hères, France) [jean-marc.colletta@u-grenoble3.fr](mailto:jean-marc.colletta@u-grenoble3.fr)

#### **Abstract:**

In Alzheimer's disease (AD), studies on bimodal language production like that of Carlomagno et al. (2005) do not treat aspects of speech and hand gestures in a concomitant way. We propose an original protocol to evaluate the correlation between hand gestures and articulatory gestures in speech and singing of 4 persons diagnosed with AD by our hospital partner and paired with 4 control participants. Participants were asked to repeat 8 nursery rhymes created for this protocol: 4 nursery rhymes were spoken while the other 4 were sung. In each sung or spoken modality, 2 nursery rhymes were completed with four iconic and two deictic hand gestures. The protocol was completed with several clinical tests. Speech apraxia was evaluated by means of the MT86 clinical protocol (Joanette et al., 1998) and manual praxis by the Mahieux's battery (Mahieux-Laurent et al., 2009). The MBLF software was adapted to test the bucco-linguo-facial motor skills (Gatignol & Lannadère, 2011). Each participant was recorded at home using a camcorder and a lapel microphone. The speech productions were annotated and analyzed via Praat©, and the hand gestures via ELAN©. We did not evidence any manual or speech apraxia in our patient population. However, significant differences were observed on productions of hand gestures and speech between the patients and the control participants. Regarding patients, the movement, configuration and orientation of hand gestures were slightly altered. This alteration seemed to depend on the gesture value but not on the modality (speech or singing). The requirement to produce specific hand gestures affected speech production: patients produced more errors with connected hand gestures. Speech productions were influenced at different degrees by spoken and sung modalities. Patients made more errors in singing, and the more with connected hand gestures, showing a double task effect likely due to an attention deficiency typical of AD (Siéoff & Piquard, 2004).

#### **Biographies:**

**Diane Caussade** is a PhD student in Sciences of languages since 2013. She worked as a teacher of French as a Second/Foreign Language and intervened as a musician and as a music teacher in many countries (Austria, Bosnia and Herzegovina, Italy, France, Germany, Hungary, Portugal, Romania, Turkey, ...) since 2007. She studied musicology at the University of Strasbourg and music, in particular singing and violin, at the Conservatory of Strasbourg. She is also a member of Jeunesses Musicales International (International Musical Youth) and intervenes as a musician in schools, hospitals and social



environments within the organization Ballade which aim is to create links between populations through ethno musics. Her PhD work concerns the study of gestures-hands coordination/synchronization in the Alzheimer's disease in speech and singing in collaboration with laboratories GIPSA-lab (CNRS), LIDILEM (Stendhal University), the CMRR (teaching hospital of la Tronche) and the LPNC (CNRS), supported by the SFR Foundation and the Cognition Pole.

**Fanny Gaubert** is a Speech Therapy student at the Univ. Claude Bernard Lyon.

**Maud Serieux** is a Speech Therapy student at the Univ. Claude Bernard Lyon.

**Nathalie Henrich-Bernardoni** is a research Fellow at CNRS. Nathalie graduated from Ecole Normale Supérieure in fundamental Physics, Professor in physics, MA-level degree in fundamental physics, PhD in acoustics of music

**Nathalie Vallee** is a research fellow at CNRS.

**Jean-Marc Colletta** is a professor at Univ. Grenoble .