Cognitive Science 2
Multimodality in Communication and Cognition

Teaching plan

Spring 2018

Wednesdays 10:15-12:00 or 10:15-13:00
Classroom: 22.1.49

Patrizia Paggio (PP) and Costanza Navarretta (CN)

The course combines lectures, student presentations, group work and hands-on (bring your laptop).

Literature:
Canning, J. (2013) Statistics for the Humanities (online book):
http://www.statisticsforhumanities.net/book/wp-content/uploads/2014/07/StatisticsforHumanities%205Sept14.pdf
In addition, scientific papers (downloadable). See below.

Software:
Examples of statistical analyses will refer to the R software, which can be downloaded from https://www.r-project.org. A useful package to run together with R is R Studio, available at https://www.rstudio.com.

Examination:
Take-home assignment, optional subject, external examiner, 7-point scale.
Individual: 5-10 standard pages
Group: 8-13 standard pages (2 students), 10-15 standard pages (3 students).
Re-exam: 13-15 standard pages, individual.

I: 7/2	PP **Topics** General course information Introduction to: ● Multimodal communication – terms and definitions ● Multimodality and ICT ● Multimodality and cognition **Readings** Jens Allwood, Bodily Communication Dimensions of Expression and Content, in B. Granström et al. (eds.), *Multimodality in Language and Speech Systems,* 7-26. Kluwer Academic Publishers. Printed in the Netherlands. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.63.4860&rep=rep1&type=pdf Gesture and Communication, section 8.4 from Barbara Dancygier (ed) *The Cambridge Handbook of Cognitive Linguistics* https://www.cambridge.org/core/books/cambridge-handbook-of-cognitive-linguistics/language-body-and-multimodal-communication/1AD773C1D7448C66D43008AE1536B936/core-reader
II: 14/2	PP **Topics** ● Grounding language in the body (discussion of Kelly et al, 2002, see under readings) ● Theory and practice of non-verbal behaviour annotation. ● Classifications of non-verbal behaviour. ● Elements of statistics: measures of central tendency and spread. Statistical hypotheses. **Readings** Canning (2013): pp. 15-33; 47-52. Kelly et al. (2002): Putting Language Back in the Body: Speech and Gesture on Three Time Frames. DEVELOPMENTAL NEUROPSYCHOLOGY, *22*(1), 323–349 http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.503.1082&rep=rep1&type=pdf (Questions to this article will be provided to guide a discussion of the article in class).

	Allwood et al (2007). The MUMIN coding scheme for the annotation of feedback in multimodal corpora: a prerequisite for behavior simulation. In J.-C. Martin et.al. (eds.) *Multimodal Corpora for Modeling Human Multimodal Behavior*, Volume 41, Nr. 3-4:273-287, 2007, Springer, http://www.springerlink.com/content/x745801041m52553/?p=c4b21fe76fd64b748875b790da749795&pi=3
III: 21/2	PP **Topics** ● Multimodal data and corpora. ● Reliability and inter-annotator agreement. ● Machine learning applied to multimodal corpora ● Elements of statistics: the chi-square test. **Readings** Canning (2013): pp. 54-56. Carletta et al. (2006) The AMI Corpus: A Pre-announcement. S. Renals and S. Bengio (Eds.): MLMI 2005, LNCS 3869, pp. 28–39, 2006. Springer-Verlag Berlin Heidelberg 2006 https://link.springer.com/content/pdf/10.1007%2F11677482_3.pdf Rehm et al. (2009) Creating Standardized Video Recordings of Multimodal Interactions across Cultures. In Kipp et al. *Multimodal Corpora, From Models of Natural Interaction to Systems and Applications*, Springer, pp. 138-159. http://link.springer.com/chapter/10.1007/978-3-642-04793-0_9 Paggio, P., and C. Navarretta (2016) The Danish NOMCO Corpus Multimodal Interaction in First Acquaintance Conversations. *Journal of Language Resources and Evaluation*. Springer, pp.1-32. http://link.springer.com/article/10.1007/s10579-016-9371-6/fulltext.html Each student should read one of the three papers, and have especially the following questions in mind while reading: - What has the corpus been used for? - Could it be used for anything else?

	- Should anything have been different?
IV: 28/2	**PP** **Topics** ● Cognitive theories of speech-gesture co-production, and speech-gesture synchronisation. ● Group work based on the two papers in the reading list. ● Elements of statistics: the t-test. **Readings** Canning (1013): pp. 59-65. Giorgolo, G: and F. A. J. Verstraten (2008) Perception of 'Speech-and-Gesture' Integration, "International Conference on Auditory-Visual Speech Perception 2008". http://xerxes.carleton.ca/~giorgolo/papers/avsp2008.pdf Leonard, T. and Cummins, F. (2010) The temporal relation between beat gestures and speech. Language and Cognitive Processes. v. 26(10), 1457-1471. http://cspeech.ucd.ie/Fred/docs/cumminsLeonard2010Preprint.pdf
V: 7/3 **NB:** **10-13** **3 hours**	PP **Topics** ● Simulating gestural expression in text: the use of emoji. ● Class discussion of articles in reading list (questions to be posted). ● Elements of statistics: correlations. ● Exam preparation (1) **Readings** Canning (1013): pp. 75-78. Lu et al. (2016) Learning from the ubiquitous language: an empirical analysis of emoji usage of smartphone users. Ubicomp '16, Heideberg, DE, p. 770-780. http://www-personal.umich.edu/~qmei/pub/ubicomp2016-emoji.pdf

	Barbieri et al. (2016) What does this emoji mean? A vector space skip-gram model for twitter emojis. Proceedings of LREC 2016, p. 3967-3972. http://sempub.taln.upf.edu/tw/emojis/Barbieri__What_does_this_emoji_mean_LREC2016.pdf Giulia Donato and Patrizia Paggio (2018) Classifying the Informative Behaviour of Emoji in Microblogs. To be published in *Proceedings of LREC 2018*.
VI: 14/3 **NB:** **10-13** **3 hours**	PP **Topics** ● The role of non-verbal behaviour on attention, memory, and language learning. ● Elements of statistics: analysis of variance. ● Exam preparation (2) ● Mid-term evaluation. **Readings** Canning (2013): pp. 67-73. In addition, one of the following papers (student's choice), which must be summarised in written form. The summaries will be discussed in class (group work). Marianne Gullberg and Sotaro Kita. Attention to Speech-Accompanying Gestures: Eye Movements and Information Uptake. Journal of Non-verbal Behavior (2009) 33: 251-277 Springer Verlag http://pubman.mpdl.mpg.de/pubman/item/escidoc:61361:11/component/escidoc:69889/gul Lberg_2009_attention.pdf Wing Chee So, Colin Sim Chen-Hui & Julie Low Wei-Shan. Mnemonic effect of iconic gesture and beat gesture in adults and children: Is meaning in gesture important for memory recall? Language and Cognitive Processes 2011, 1-17, Psychology Press, Taylor & Francis Group. Downloades gennem Kgl Bibl/Univ. Bibl.

	http://www.tandfonline.com/doi/abs/10.1080/01690965.2011.573220 Manuela Macedonia & Katharina von Kriegstein Gestures Enhance Foreign Language Learning Biolinguistics 6.3–4: 393–416, 2012 http://www.biolinguistics.eu/index.php/biolinguistics/article/view/248/269
VII: 21/3 **2 hours** **10-12**	CN **Topics** Motor action and mental action, cross-modal inhibition, cross-modal integration **Readings:** ● Rizzolatti and Craigheri The Mirror-Neuron System *Annu. Rev. Neurosci*. 2004. 27:169–92 http://psych.colorado.edu/~kimlab/Rizzolatti.annurev.neuro.2004.pdf ● Strayer, D-L and Drews, F.A Cell -Phone–Induced Driver Distraction, Current Directions in Psychological Science Volume: 16 issue: 3, page(s): 128-131 http://journals.sagepub.com/doi/pdf/10.1111/j.1467-8721.2007.00489.x ● Rizzolatti and Arbib: Language within our grasp. *Trends in neurosciences*, 21(5):188–194, 1998. http://www.liralab.it/teaching/ROBOTICA/docs/rizzolatti.arbib.1998.pd
28/3: Easter vacation	

VIII: 4/4	CN **Topics** Emotions and Cognition (learning, memory, attention, social behavior); Emotion classification systems **Readings** ● Ekman, P. (1992). An Argument for Basic Emotions. Cognition and Emotion, 1992, 6 (3/4) 169-200. https://www.paulekman.com/wp-content/uploads/2013/07/An-Argument-For-Basic-Emotions.pdf ● Mather M, Sutherland MR. Arousal-biased competition in perception and memory. Perspectives on psychological science: a journal of the Association for Psychological Science. 2011;6(2):114-133. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3110019/ ● Fritz, T. , Sebastian Jentschke, Nathalie Gosselin,Daniela Sammler, Isabelle Peretz, Robert Turn. Universal Recognition of Three Basic Emotions in Music. *Current Biology* 19, 573–576, April 14, 2009 Elsevier Ltd All rights reserved DOI 10.1016/j.cub.2009.02.058 http://www.kognitywistyka.umk.pl/2009/texts/sdarticle-305.pdf **Hands on**: **Have ear-phones with you**
IX: 11/4 **NB** **3 hours** **10-13**	CN **Topics** Affective computing; Emotion identification; Emotion databases; Face identification – cognitive aspects **Readings:** - Michael Kipp and Jean-Claude Martin. Gesture and Emotion: Can basic gestural form features discriminate emotions? In: *Int. Conf. on Affective Computing and Intelligent Interaction. IEEE* Press, 2009. http://www.limsi.fr/Individu/martin/papers/KippMartin09.pdf - Ginevra Castellano, Santiago D. Villalba, and Antonio Camurri. Recognising Human Emotions from Body

	Movement and Gesture Dynamics. In A. Paiva, R. Prada, and R.W. Picard (Eds.): *ACII 2007*, LNCS 4738, pp. 71–82, 2007, Springer-Verlag Berlin Heidelberg. http://www.springerlink.com/content/aj246lvw0635g238 - Patrik N. Juslin and Petri Laukka 2003. Communication of Emotions in Vocal Expression and Music Performance: Different Channels, Same Code? *Psychological Bulletin* 2003, Vol. 129, No. 5, 770–81 http://www.brainmusic.org/EducationalActivitiesFolder/Juslin_emotion2003.pdf - Catherine Pelachaud Modelling multimodal expression of emotion in a virtual agent *Phil. Trans. R. Soc.* B 12 December 2009 vol. 364 no. 1535 3539-3548 http://rstb.royalsocietypublishing.org/content/364/1535/3539.full.pdf+html - C.P. Sumathi, T. Santhanam and M.Mahadev Automatic Facial Expression Analysis a Survey *International Journal of Computer Science & Engineering Survey* (IJCSES) Vol.3, No.6, December 2012. http://airccse.org/journal/ijcses/papers/3612ijcses04.pdf **Hands on**
X: 18/4	CN **Topics** Personality and Cognition; Personality and affective computing; Datasets (Emotion databases) **Readings** ● Angelo Cafaro, Hannes Högni Vilhjálmsson, Timothy Bickmore, Dirk Heylen, Kamilla Rún Jóhannsdóttir, Gunnar Steinn Valgarðsson. First Impressions: Users' Judgments of Virtual Agents' Personality and Interpersonal Attitude in First Encounters. *In Intelligent Virtual Agents* Lecture Notes in Computer Science Volume 7502, 2012, pp 67-80. http://link.springer.com/chapter/10.1007/978-3-642-33197-8_7 **Hands on**

XI: 25/4	CN **Topics** Exam preparation workshop: programme will be posted later.
XII: 2/5 **3 hours** **(10-13)**	**CN** **Topics** Multimodality in human-computer interface – background and development, The Uncanny valley **Readings:** - John M. Carrol Human Computer Interaction- brief Intro. In *The Encyclopedia of Human-Computer Interaction*, 2nd Ed. **h**ttps://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/human-computer-interaction-brief-intro - Pages from Oviatt and Cohen (2015) *The Paradigm Shift to Multimodality in Contemporary Computer Interfaces* - Ho, C.-C., MacDorman, K. F., & Pramono, Z. A. D. (2008). Human emotion and the uncanny valley: A GLM, MDS, and ISOMAP analysis of robot video ratings. *Proceedings of the Third ACM/IEEE International Conference on Human-Robot Interaction* (pp. 169–176). March 11–14. Amsterdam. http://www.macdorman.com/kfm/writings/pubs/Ho2007EmotionUncanny.pdf **Deadline for approval of projects**
8/5 and 16/5: Cancelled because of conference attendance	

XIII: 23/5 10-11	**CN** **Questions to projects**