

Linguistics 820: Developments in Laboratory Phonology
Wednesday 2:30-5:15 PM
Dickinson 206

John Kingston
South College 319
413-545-6833
jkingston@linguist.umass.edu

Office hours: By appointment

1. **Topic:** This course is about the influence of linguistic knowledge on speech perception. This influence is the focus of the research supported by my current NIH grant, so this course is an opportunity for us to present the results of that research and discuss them in relation to other results. The principal goal of the course is not self-promotion, but instead to elicit critical responses from you about the design and interpretation of the studies we're engaged in, and to recruit you into the project, at least for the duration of the semester.

The principal question addressed by this research is whether linguistic knowledge influences the perceptual evaluation of the signal from the very outset, or if there is first an autonomous stage of evaluation during which only the signal's auditory qualities matter. We advocate the latter position, which we've called the "autonomous" model, in contrast to an "interactive" model, in which linguistic knowledge influences the initial evaluation.

Nearly all if not all of the empirical results discussed here concern the influence of a sound's context on its perception. Speech sounds aren't perceived independently of the context in which they occur, any more than they are produced independently, and the ways a sound's context can influence its perception are diverse. Another take on this course's purpose is that it's designed to review the state of our knowledge about how a sound's context affects its perception.

If we step back a bit, it becomes clear that the course is about the perceptual interface between phonetics and phonology. The autonomous model separates the initial phonetic percept from the later phonological decision about a sound's identity, while the interactive model conflates the two into a single, simultaneous percept and decision, determined at once by signal qualities and linguistic knowledge.

2. **Organization** (approximate dates are given for when particular material will be discussed):
 - a. **Background:** We'll begin by reading four papers that lay out the theoretical

and empirical background for the discussion.¹ They are:

- i. Interactive models (14 February 2007):
 - (1) Elman, J. L., & McClelland, J. L. (1988). Cognitive penetration of the mechanisms of perception: Compensation for coarticulation of lexically restored phonemes, *Journal of Memory and Language*, 27, 143-165.
 - (2) McClelland, J. L., Mirman, D., & Holt, L. L. (2006). Are there interactive processes in speech perception? *Trends in Cognitive Science*, 10, 363-369.
 - ii. Autonomous models (21 February 2007):
 - (1) Norris, D., McQueen, J. M., & Cutler, A., (2000). Merging information in speech recognition: Feedback is never necessary, *Behavioral and Brain Sciences*, 23, 299-370.
 - (2) Kingston, J. (2005). Ears to categories: New arguments for autonomy, S. Frota, M. Vigarío, & M. J. Freitas, (eds.) *Proceedings of the First Conference on Phonetics and Phonology in Iberia (PaPI)*, Berlin: Mouton de Gruyter. Ms. 63 pp.
- b. The rest of the semester will focus on the empirical results produced by our work so far. Some projects have reached the manuscript stage; in others, we are still be analyzing and writing up the results; and, in yet others, we are still collecting data. The project names refer to the stimuli. For each project, I've listed essential background reading, and indicated the approximate dates when that material will be discussed.
- i. **DurCont** (28 February 2007): The influence of linguistic experience of patterns of covariation between the durations of neighboring sounds on how the duration of one sound influences the perception of the duration of its neighbor.
 - (1) Manuscript: Kingston, J., Kawahara, S., Chambless, D., Mash, D., & Brenner-Alsop, E. (submitted). Contextual effects on the perception of duration, *Journal of Phonetics*.

¹To the extent possible, the readings for this course will be posted on-line at ???. Other papers will be made available in hard copy.

- (2) Kluender, K. R., Diehl, R. L., & Wright, B. A. (1988). Vowel length differences before voiced and voiceless consonants: An auditory explanation, *Journal of Phonetics*, 16, 153-169.
 - (3) Fowler, C. A. (1992). Vowel duration and closure duration in voiced and unvoiced stops: There are no contrast effects here, *Journal of Phonetics*, 20, 143-165.
 - (4) Dommelen, W. A. van. (1999). Auditory accounts of temporal factors in the perception of Norwegian disyllables and speech analogs, *Journal of Phonetics*, 27, 107-123.
- ii. **SSHTK**, pronounced “schtick” (7 March 2007): The influence of lexical and statistical knowledge on how a sibilant’s identity influences the perception of the place of articulation of a following stop.
- (1) Data being collected.
 - (2) Mann, V. A., & Repp, B. H. (1981). Influence of preceding fricative on stop consonant perception, *Journal of the Acoustical Society of America*, 69, 548-558.
 - (3) Elman & McClelland. (1988). See above.
 - (4) Pitt, M. A., & McQueen, J. M. (1998). Is compensation for coarticulation mediated by the lexicon? *Journal of Memory and Language*, 39, 347-370.
 - (5) Samuel, A.G., & Pitt, M.A. (2003). Lexical activation (and other factors) can mediate compensation for coarticulation, *Journal of Memory and Language*, 48, 416–434.
 - (6) Magnuson, J. S., McMurray, B., Tanenhaus, M .K., & Aslin, R. N. (2003). Lexical effects on compensation for coarticulation: the ghost of Christmash past, *Cognitive Science*, 27, 285-298.
 - (7) McQueen, J. M. (2003). The ghost of Christmas future: didn’t Scrooge learn to be good? Commentary on Magnuson, McMurray, Tanenhaus, and Aslin (2003), *Cognitive Science*, 27, 795-799.
- iii. **JSSHTK** (28 March 2007): Extension of **SSHTK** to Japanese, where the difference between sibilants is predictable from the backness of the following vowel, and where that vowel devoices when the next consonant is voiceless, creating clusters like those used in **SSHTK**. The modulation of the sibilant’s influence on the percept of the stop’s place by the prosodic affiliation of the segments.

- (1) Manuscript: Kawahara, S., Kingston, J., Chambless, D., & Mash, D. (submitted). Limiting sequential spectral contrast in Japanese and English, *Perception & Psychophysics*.
 - (2) See papers for *SSHTK*.
 - (3) Dupoux, E., Kakehi, K., Hirose, Y., Pallier, C., & Mehler, J. (1999). Epenthetic vowels in Japanese: A perceptual illusion, *Journal of Experimental Psychology: Human Perception and Performance*, 25, 1568-1578.
 - (4) Dupoux, E., Pallier, C., Kakehi, K., & Mehler, J. (2001). New evidence for prelexical phonological processing in word recognition, *Language and Cognitive Processes*, 16, 491-505.
 - (5) Dehaene-Lambertz, G., Dupoux, E., & Gout, A. (2000). Electrophysiological correlates of phonological processing: A crosslinguistic study, *Journal of Cognitive Neuroscience*, 12, 635-647.
- iv. **LRDG**, pronounced "lerdog"(4 April 2007): Influence of a lateral vs rhotic on the perception of a following stop's place of articulation. Determining whether sequential contrast improves discriminability. Determining whether sequential contrast is auditory or if listeners instead compensate for coarticulation.
- (1) Data being collected and analyzed.
 - (2) Mann, V. A. (1980). Influence of preceding liquid on stop-consonant perception, *Perception & Psychophysics*, 28, 407-412.
 - (3) Lotto, A. J., & Kluender, K. R. (1998). General contrast effects in speech perception: Effect of preceding liquid on stop consonant identification, *Perception & Psychophysics*, 60, 602-619.
 - (4) Fowler, C. A., Brown, J. M., & Mann, V. A. (2000). Contrast effects do not underlie effects of preceding liquids on stop-consonant identification by humans, *Journal of Experimental Psychology: Human Perception and Performance*, 26, 877-888.
 - (5) Fowler, C. A. (2006). Compensation for coarticulation reflects gestural perception, not spectral contrast, *Perception & Psychophysics*, 68, 161-177.
 - (6) Holt, L. L. (2005). Temporally non-adjacent non-linguistic sounds affect speech categorization, *Psychological Science*,

- 16, 305–312.
- (7) Lotto, A. J. & Holt, L. L. (2006). Putting phonetic context effects into context: A commentary on Fowler (2006), *Perception & Psychophysics*, 68, 178-183.
- v. **LEX** (11 April 2007): Competition between lexical and auditory biases. Determining whether linguistic knowledge alters cumulative discriminability.
- (1) Results being written up, there will possibly be a manuscript by the time we get to this topic.
- (2) Holt, L. L., Lotto, A. J., & Kluender, K. R. (2000). Neighboring spectral context influences vowel identification, *Journal of the Acoustical Society of America*, 108, 710-722.
- vi. **AMGA** (18, 25 April 2007): Does knowledge of a phonological rule determine a listener's ability to undo its effects?
- (1) Data being collected.
- (2) Gaskell, M. G., & Marslen-Wilson, W. D. (1996). Phonological variation and inference in lexical access, *Journal of Experimental Psychology: Human Perception and Performance*, 22, 144-158.
- (3) Gaskell, M. G., & Marslen-Wilson, W. D. (1998). Mechanisms of phonological inference in speech perception, *Journal of Experimental Psychology: Human Perception and Performance*, 24, 380-396.
- (4) Gaskell, M. G. (2001). Phonological variation and its consequences for the word recognition system, *Language and Cognitive Processes*, 16, 723–729.
- (5) Gow, D. W. (2001). Assimilation and anticipation in continuous spoken word recognition, *Journal of Memory and Language*, 45, 133-159.
- (6) Gow, D. W. (2002). Does English coronal place assimilation create lexical ambiguity?, *Journal of Experimental Psychology: Human Perception and Performance*, 28, 163-179.
- (7) Darcy, I. (2003). *Assimilation phonologique et reconnaissance des mots*, Ph.D. dissertation, Ecole des Hautes Etudes en Sciences Sociales.
- (8) Darcy, I., Peperkamp, S., & Dupoux, E. (to appear). Bilinguals play by the rules: perceptual compensation for

- assimilation in late L2-learners. J. Cole & J. Hualde (eds.), *Laboratory Phonology 9*, Berlin: Mouton de Gruyter.
- (9) Darcy, I., Ramus, F., Christophe, A., Kinzler, K., & Dupoux, E. (to appear). Phonological knowledge in compensation for native and non-native assimilation, F. Kügler, C. Féry & R. van de Vijver, (eds.), *Variation and gradience in phonetics and phonology*. Berlin: Mouton De Gruyter.
- c. Other informative reading. (i-iv) are concerned with the influence of phonotactic knowledge on perception, while (v-vi) address the direction of contextual effects.
- i. Massaro, D. W., & Cohen, M. M. (1983). Phonological context in speech perception, *Perception & Psychophysics*, 34, 338-348.
 - ii. Moreton, E. (2002). Structural constraints in the perception of English stop-sonorant clusters, *Cognition*, 84, 55-71.
 - iii. Hallé, P. A., Segui, J., Frauenfelder, U., & Meunier, C. (1998). Processing of illegal consonant clusters: A case of perceptual assimilation? *Journal of Experimental Psychology: Human Perception and Performance*, 24, 592-608.
 - iv. Hallé, P. A., Best, C. T., & Bachrach, A. (2003). Perception of /dl/ and /tl/ clusters: A cross-linguistic perceptual study with French and Israeli listeners, *Proceeding of the XVth International Congress of Phonetic Sciences*, Barcelona, 2893-2896.
 - v. Mitterer, H. (in press). On the causes of compensation for coarticulation: Evidence for phonological mediation, *Perception & Psychophysics*.
 - vi. Wade, T., & Holt, L. L. (2005). Effects of later occurring nonlinguistic sounds on speech categorization, *Journal of the Acoustical Society of America*, 118, 1701-1710.
3. On 14 March 2007, enrolled students will present a description of their proposed experiments for comments and critique by the seminar participants.
 4. The remaining meetings of the semester, 2 and 9 May will be devoted to student presentations of the results of their experiments.
 5. Your responsibilities:
 - a. **Read** the papers for each segment of the course so that you can **discuss** them and the results of the experiments they inspired.

- b. Students enrolled in the seminar will take it in turn to **present** and **run** the discussion of one of the papers for each meeting.
- c. If enrolled in the course, to carry out and write up the results of an experiment that addresses the influence of linguistic knowledge on speech perception. You and I will meet early in the semester to discuss possible experiments and work out a plan for carrying them out.