Linguistics 631.01
Speech Perception: Theories, Methods, and Effects
Course information and syllabus

General Information

Instructor: Steve Winters
Social Sciences 814
2500 University Drive NW
Phone: 220-7230
Email: swinters@ucalgary.ca
Office Hours: Tue. & Thu. 1:00-2:00, and by appointment.

Meeting Time & Place: TuTh 3:30-4:45 Education 259 (the phonetics lab)

Note that our meeting time is different from the official meeting time on the university calendar in order to accommodate students who are interested in auditing the course.

This seminar is designed to introduce students to the study and practice of speech perception research. We will focus on reading seminal papers in the field to develop an understanding of the primary theories of speech perception, the perceptual effects they seek to account for, and the experimental methods used to test their validity. Our group discussions of these papers will focus on a critical examination of the assumptions underlying the various theoretical approaches and experimental methods that have developed over time in speech perception research, in an attempt to generate new and compelling research questions throughout the semester. To that end, students will carry out a small perceptual study of their own design during the term, in which they will empirically test a relevant hypothesis about the perception of speech.

Course Web Page:

https://webdisk.ucalgary.ca/~swinters/public_html/ling631/index.html

Readings for each meeting will be posted to the course website. In order to prevent violations of the University's copyright policy, links to papers on this website will be password protected. I will provide students with the password for the website on the first day of class.

Grading

The course grade will be based on your participation in class discussions—including the submission of questions for each paper (25%), presentation of papers (25%), in-class presentation of your term project work (25%) and your final term paper (25%).

Course Requirements

1. Present at least three (3) papers in class. For each presentation, you should prepare

a short summary of the reading for the class and be prepared to lead the class discussion on that reading. As the number of enrolled students in this class is likely to be small, please note that auditors may be assigned to present papers in class, as well. This requirement will be worth 25% of your course grade.

2. Seminar participants (including auditors) who are not leading discussion on a paper are required to send in--to the discussion leader--at least two (2) questions or criticisms for each reading. These questions/criticisms must be submitted at least twenty-four (24) hours before the class meets; we will set up a submission system on the blackboard page for the course. The discussion leader should collect these questions and incorporate them into his/her summary of the paper, to use as a starting point for the class discussion.

3. Course Project. Over the course of the semester, you will be responsible for designing and executing a small perceptual study on speech perception, in which you collect and analyze data that tests a theoretical proposal about the nature of speech perception. A project which you may have already been working on outside of this seminar is acceptable for this purpose. You will produce a final term paper on the study that you have executed (~10-15 pages), and also present the results of your work to the class at the end of the semester.

The topic of this study is left up to each individual student, but I ask that you discuss any potential topics with me before proceeding with any data collection. In order to collect data for this project, you will also have to submit a course-based research ethics proposal to the Faculty of Arts ethics committee. More information on that application can be found here:

http://arts.ucalgary.ca/research/for-researchers/ethics

Please note that you are required to collect some, but not necessarily a lot of data for this project. In many cases, data from two or three subjects will suffice. The main goal of the exercise is to familiarize you with the intellectual process of designing and carrying out a study that tests a perceptual hypothesis empirically.

In the final week of the semester, students will present their project ideas (and results) to the rest of the class. At this point, class members should provide commentary and (helpful) feedback to the presenters on their work. The goal here is not only for everyone to learn from each other's expertise, but to get everybody thinking creatively--and constructively--about novel investigations of perceptual theory.

Your final paper on this project should take the standard form of a scientific research report (introduction-methods-results-conclusion), and effectively describe what you have learned from your experiment (i.e., whether or not it confirmed the hypothesis you were testing).

Further details on the expectations for this project will be provided as we proceed through the term.

Course Schedule

Please note that this schedule is likely to change as we work our way through the semester. There is also some space allotted in the schedule to allow room for other readings that we may decide to add. To that end, requests or suggestions for additional or alternative readings are, of course, welcome and encouraged.

All readings will be made available, in .pdf form, from the course website.

1. Tu 1/8 **Organization, Introduction, Overview**
2. Th 1/10 **Categorical Perception**
   - Liberman et al. (1957)
   - Pisoni (1973)

3. Tu 1/15 **Motor Theory and Modularity**
   - Liberman (1957)
   - Liberman et al. (1967)
4. Th 1/17 Liberman and Mattingly (1985)

5. Tu 1/22 **Variance and Invariance**
   - Peterson & Barney (1952)
   - Stevens & Blumstein (1981)
6. Th 1/24 Delattre et al. (1955)
   - Fruchter & Sussman (1997)

7. Tu 1/29 **Normalization**
   - Ladefoged & Broadbent (1957)
   - Verbrugge et al. (1976)
8. Th 1/31 Johnson (1989)
   - Halberstam & Raphael (2004)

9. Tu 2/5 **Direct Realism**
   - Cherry (1966)
   - Gibson (1977)
10. Th 2/7 Fowler (1986)
    - Studdert-Kennedy (1986)

11. Tu 2/12 **Multi-Modal Speech Perception**
    - Heider (1940)
    - Sumby & Pollack (1954)
12. Th 2/14 McGurk & MacDonald (1976)
    - Fowler & Dekle (1991)

13. Tu 2/19 Reading Week: No Class
14. Th 2/21 Reading Week: No Class

15. Tu 2/26 **Exemplar Theory**

Hintzman (1986)
Johnson (1997)

16. Th 2/28 Goldinger (1996)
Goldinger (1998)

17. Tu 3/5 **Auditory Theories**
Nearey (1990)
Kingston & Diehl (1995)
Nearey (1995)

18. Th 3/7 Klatt (1979)

19. Tu 3/12 **L2 Speech Perception**
Best (1995)
Flege (1995)

20. Th 3/14 Logan et al. (1991)
Bradlow et al. (1997)

21. Tu 3/19 **Perception in Phonology**
Liljencrants & Lindblom (1972)
Stevens (1972)

22. Th 3/21 Ohala (1981)
Hume & Johnson (2001)

23. Tu 3/26 **Methods**
Miller & Nicely (1955)
Grosjean (1980)

24. Th 3/28 Warren (1970)
Cole (1973)
Remez et al. (1981)

25. Tu 4/2 **More Methods**
Shankweiler & Studdert-Kennedy (1967)
Fujimura et al. (1978)

26. Th 4/4 Elman & McClelland (1988)
McLennan et al. (2003)

27. Tu 4/9 **Perception of Prosody**
Fry (1958)

28. Th 4/11 Hermes & Rump (1994)
Turk & Sawusch (1996)

29. Tu 4/16 **Student Presentations**

Final paper due: Monday, April 22nd, 5:00 pm

Reading List (subject to change)

Best, C.T. (1995). A direct realist perspective on cross-language speech perception. In W. Strange (ed.), Speech Perception and Linguistic Experience: Theoretical and Methodological Issues in Cross-Language Speech Research. Timonium, MD: York Press, 171-204.

Bradlow, A.R., Pisoni, D.B. ,Akahane-Yamada, R. & Tohkura, Y. (1997). Training Japanese listeners to identify English /r/ and /l/: IV. Some effects of perceptual learning on speech production. Journal of the Acoustical Society of America, 101, 2299-2310.

Cherry, C. (1966) On Human Communication. Cambridge, MA: MIT Press. 2nd edition.

Cole, R.A. (1973). Listening for mispronunciations: A measure of what we hear during speech. Perception & Psychophysics, 13, 153-156.

Delattre, P.C., Liberman, A.M., and Cooper, F.S. (1955). Acoustic loci and transitional cues for consonants. Journal of the Acoustical Society of America, 27, 769-773.

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.

Flege, J.E. (1995). Second language speech learning: Theory, findings, and problems. In W. Strange (ed.), Speech Perception and Linguistic Experience: Theoretical and Methodological Issues in Cross-Language Speech Research. Timonium, MD: York Press, 233-277.

Fowler, C.A. (1986). An event approach to the study of speech perception from a direct-realist perspective. Journal of Phonetics, 14, 3-28.

Fowler, C. & Dekle, D. (1991). Listening with eye and hand: Crossmodal contributions to speech perception. Journal of Experimental Psychology: Human Perception and Performance, 171, 816-828.

Fruchter, D. and Sussman, H.M. (1997). The perceptual relevance of locus equations. Journal of the Acoustical Society of America, 102, 2997-3008.Fry, D.B. (1958). Experiments in the perception of stress. Language & Speech, 1, 126-152.

Fujimura, O., Macchi, M.J. and L.A. Streeter. 1978. "Perception of stop consonants with conflicting transitional cues: a cross-linguistic study." Language and Speech, 21(4), 337-346.

Gibson, J.J. (1977). The theory of affordances. In R. Shaw & J. Bransford (eds.), Perceiving, Acting, and Knowing: Toward an Ecological Psychology. Hillsdale, NJ: Lawrence Erlbaum.

Goldinger, S.D. (1996) Words and Voices: Episodic traces in spoken word identification and recognition memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, **22**, 1166-1183.

Goldinger, S.D. (1998) Echoes of echoes? An episodic theory of lexical access. *Psychological Review*, **105**, 251-279.

Grosjean, F. (1980). Spoken word recognition processes and the gating paradigm. Perception & Psychophysics, 28, 267-283.

Halberstam, B. and Raphael, L.J. (2004). Vowel Normalization: The Role of Fundamental Frequency and Upper Formants. Journal of Phonetics, 32, 423-434.

Heider, F. & Heider, G.M. (1940). An experimental investigation of lip-reading. Psychological Monographs, 52, 124-153.
Hermes, D.J. and Rump, H.H. (1994). Perception of prominence in speech intonation induced by rising and falling pitch movements. Journal of the Acoustical Society of America, 96, 83-92.
Hintzman, D. (1986) “Schema abstraction” in a multiple-trace memory model. *Psychological Review*, **93**, 411-428.
Hume, E. & Johnson, K. (2001). A model of the interplay of speech perception and phonology. In The Role of Speech Perception in Phonology (E. Hume & K. Johnson, eds.), pp. 3-26. New York: Academic Press.
Johnson, K. (1989). Contrast and normalization in vowel perception. Journal of Phonetics, 18, 229-254.
Johnson, K.A. (1997) Speech perception without speaker normalization. In *Talker Variability in Speech Processing* (K. Johnson & J. Mullennix, eds.), 145-165. San Diego: Academic Press.
Kingston, J. & Diehl, R.L. (1995). Intermediate properties in the perception of distinctive feature values. In Phonology & Phonetic Evidence, Papers in Laboratory Phonology 4 (B. Connell & A. Arvaniti, eds.), pp. 7-27. Cambridge: Cambridge University Press.
Klatt, D.H. (1979). Speech perception: a model of acoustic-phonetic analysis and lexical access. Journal of Phonetics, 7, 279-312.
Ladefoged, P. and Broadbent, D.E. (1957). Information conveyed by vowels. Journal of the Acoustical Society of America, 39, 98-104.
Liberman, A.M. (1957). Some results of research on speech perception. Journal of the Acoustical Society of America, 29, 117-123.
Liberman, A.M., Harris, K.S., Hoffman, H.S. & Griffith, B.C. (1957). The discrimination of speech sounds within and across phoneme boundaries. Journal of Experimental Psychology, 54, 358-368.
Liberman, A.M., Cooper, F.S., Shankweiler, D.P. & Studdert-Kennedy, M. (1967). Perception of the speech code. Psychological Review, 74, 431-461.Liberman and Mattingly (1985)
Liljencrants, J. & Lindblom, B. (1972). Numerical simulation of vowel quality systems: The role of perceptual contrast. Language, 48, 839-862.
Logan, J.S., Lively, S.E. & Pisoni, D.B. (1991). Training Japanese listeners to identify English /r/ and /l/: A first report. Journal of the Acoustical Society of America, 89, 2, 874-886.
McGurk, H. & MacDonald, J. (1976). Hearing lips and seeing voices. Nature, 264, 746-748.
McLennan, C.T., Luce, P.A. & Charles-Luce, J. (2003). Representation of lexical form. Journal of Experimental Psychology: Learning, Memory & Cognition, 29, 539-553.
Miller, G.A. & Nicely, P.E. (1955). An analysis of perceptual confusions among some English consonants. Journal of the Acoustical Society of America, 27, 338-352.
Nearey, T.M. (1990). The segment as a unit of speech perception. Journal of Phonetics, 18, 347-373.
Nearey, T.M. (1995). A double-weak view of trading relations: comments on Kingston and Diehl. In Phonology & Phonetic Evidence, Papers in Laboratory Phonology 4

(B. Connell & A. Arvaniti, eds.), pp. 7-27. Cambridge: Cambridge University Press.
Ohala, J.J. (1981). The listener as a source of sound change. In Papers from the Parasession on Language and Behavior (C.S. Masek, R.A. Hendrick, and M.F. Miller, eds.), pp. 178-203. Chicago: Chicago Linguistic Society.
Peterson, G.E. & Barney, H.L. (1952). Control methods used in a study of the vowels. Journal of the Acoustical Society of America, 24, 175-184.
Pisoni, D.B. (1973). Auditory and phonetic memory codes in the discrimination of consonants and vowels. Perception & Psychophysics, 13, 253-260.Remez, R.E., Rubin, P.E., Pisoni, D.B. & Carrell, T.D. (1981). Speech perception without traditional speech cues. Science, 212, 947-950.
Shankweiler, D.P. and Studdert-Kennedy, M. (1967). Identification of consonants and vowels presented to left and right ears. Quarterly Journal of Experimental Psychology, 19, 59-63.
Stevens, K.N. (1972). The quantal nature of speech: Evidence from articulatory-acoustic data. In E.E. David & P.D. Denes (Eds.), Human Communication: A Unified View. New York: McGraw-Hill, pp. 51-66.
Stevens, K.N. & Blumstein, S. (1981). The search for invariant acoustic correlates of phonetic features. In Perspectives on the Study of Speech (P.D. Eimas & J.L. Miller, eds.), pp. 1-38. Hillsdale, NJ: Lawrence Erlbaum.
Studdert-Kennedy, M. (1986). Two cheers for direct realism. Journal of Phonetics, 14, 99-104.
Sumby, W.H. & Pollack, I. (1954). Visual contribution to speech intelligibility in noise. Journal of the Acoustical Society of America, 26, 212-215.
Turk, A.E. and Sawusch, J.R. (1996). The processing of duration and intensity cues to prominence. Journal of the Acoustical Society of America, 99, 3782-3789.
Verbrugge, R.R., Strange, W., Shankweiler, D.P., and Edman, T.R. (1976). What information enables a listener to map a talker's vowel space? Journal of the Acoustical Society of America, 60, 198-212.Warren, R.M. (1970). Perceptual restoration of missing speech sounds. Science, 167, 392-393.

GENERAL COURSE/UNIVERSITY INFORMATION FOR ALL STUDENTS

LINGUISTICS STUDENT ADVISING

For any questions regarding the undergraduate or graduate program in linguistics, the organization of your program, or the selection of courses, contact the appropriate advisor as follows:

Undergraduate Advisor	Dr Robert Murray	SS 824	lingadv@ucalgary.ca
Graduate Program Director	Dr Susanne Carroll	SS 830	linggrad@ucalgary.ca

FACULTY of ARTS PROGRAM ADVISING and STUDENT INFORMATION

The Faculty of Arts Program Information Centre (PIC) is the overall headquarters for undergraduate programs in the Faculty of Arts. The key objective of this office is to connect students with whatever academic assistance that they require. The PIC is located in the Social Sciences Building (SS 102), please contact them by phone at 403-220-3580, or email artsads@ucalgary.ca, or visit the website http://arts.ucalgary.ca/undergraduate.

For program planning and advice, contact the Student Success Centre (SSC). Degree advisors assist undergraduate students in planning their overall degree programs along with providing broad educational planning, learning support, assistance with academic difficulties, academic program guidance, writing support, success seminars and peer support. The SSC is on the 3rd Floor of the Taylor Family Digital Library, or you can contact them at 403-220-5881, by email success@ucalgary.ca, or visit their website http://www.ucalgary.ca/ssc/.

For registration issues, contact Enrolment Services who will also be able to help you with questions about fee payments, awards, financial aid, admissions questions, visiting and exchange students, open studies, transcripts, deferred exams. Enrolment Services are in the MacKimmie Library Block, Room 117, or you can contact them at 403-210-ROCK [7625] or visit their website http://www.ucalgary.ca/registrar/.

ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodation. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 403-220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. **You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.**

FREEDOM OF INFORMATION AND PRIVACY ACT (FOIP)

The Freedom of Information and Protection of Privacy Act was enacted by the Alberta Legislature on June 1, 1994. The Act is intended first of all to allow any person the right of access to the records in the custody and under the control of a public body although this right is subject to limited and specific exceptions. The Act also includes a strong right to privacy component, allowing individuals to control the manner in which a public body collects personal information, to control the use that a public body may make of the information, and to control the disclosure of that information by a public body. It also allows individuals the right of access to personal information about themselves held by a public body and the right to request corrections to that information.

For more information on FOIP, visit the website http://www.ucalgary.ca/legalservices/foip/, or contact Jo-Anne Munn Gafuik at 403-220-3602 or by email munngafu@ucalgary.ca

PLAGIARISM AND ACADEMIC MISCONDUCT

Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course, when, in fact, it is not. Most commonly plagiarism exists when:

1. the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test);
2. parts of the work are taken from another source without reference to the original author,;
3. the whole work (e.g. an essay) is copied from another source; and/or
4. a student submits or presents work in one course which has also been submitted in another course (although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved.

While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Students are often encouraged to work together in preparing homework assignments, but check with your instructor beforehand. However, unless noted otherwise in writing, students must write up their own answers for submission of the assignment. Failure to do so constitutes plagiarism.

Plagiarism is an extremely serious academic offence. Possible penalties for plagiarism include: failing the assignment, failing the course, disciplinary probation, suspension, or expulsion. Any student who voluntarily and consciously aids another student in the commission of plagiarism is also guilty of academic misconduct.

For more information on academic misconduct and related UofC regulations please consult the Student Misconduct web pages in the on-line University Calendar: http://www.ucalgary.ca/pubs/calendar/current/k.html.

EMERGENCY EVACUATION AND ASSEMBLY POINTS

The University of Calgary is committed to creating a safe and healthy living and learning environment. The health and safety of our employees, students and the general public are the highest priority of the University of Calgary's Emergency Management Program.

During times of emergency, Assembly Points have been identified across campus. These areas have been selected as they are large enough to hold a significant number of people and will provide an evacuated population access to washroom facilities and protection from the elements. Assembly points are also designed to establish a location for information updates:

- from the emergency responders to the evacuees; and
- from the evacuated population to the emergency responders.

Please familiarize yourself with the following:

Emergency Assembly Points**:** http://www.ucalgary.ca/emergencyplan/assemblypoints
Emergency Instructions**:** http://www.ucalgary.ca/emergencyplan/node/28

SAFEWALK INFORMATION

Twenty four hours a day and seven days a week, Safewalk volunteers walk people safely to their destination on campus. This service is free and available to students, staff and campus visitors. Requesting Safewalk volunteers to walk with you is easy:

- Call 403-220-5333 (24 hours a day/seven days a week, 365 days a year)
- Use the Help Phones (they are not just for emergencies)
- Approach an on-duty Safewalker and request a walk

For more information, contact the Safewalk main office at 403-220-4750, by email safewalk@ucalgary.ca or visit their website http://www.ucalgary.ca/security/safewalk.

STUDENT REPRESENTATIVE INFORMATION

The Students' Union and the Graduate Students' Association (GSA) in partnership with the University of Calgary offers students a key advocacy resource to assist in addressing concerns and issues they encounter at the University with the Student Ombuds Office.

Students in undergraduate programs, please contact the Student's Union in the MacEwan Student Centre, Room MSC 251, at 403-220-6551, by email arts1@su.ucalgary.ca, or visit their website http://www.su.ucalgary.ca/.

Students in a graduate program, please contact the GSA at 403-220-5997, by email ask@gsa.ucalgary.ca, or visit their website at: http://gsa.ucalgary.ca/. The GSA will be moving offices in 2013, please contact them for their current location.

The Student Ombuds Office offers a safe place for undergraduate and graduate students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems. Their office is in the Administration Building, Room A166, or you can contact them at 403-220-6420, by email ombuds@ucalgary.ca or visit their website http://www.ucalgary.ca/provost/students/ombuds.

Updated: December, 2012 (FP)