

AUD 816: Speech Perception
(line #: 82093)
Course syllabus: Spring, 2008

Time and place: Thursdays, 10:00 am – 12:00 pm, 3048 Dole

Instructor: Sarah Hargus Ferguson, Ph.D., CCC-A

Office: 3018 Dole

Laboratory: 4152 Haworth

Telephone: 785-864-1116

Lab Telephone: 785-864-0610

E-mail address: safergus@ku.edu

Instructor office hours: Thursdays 8:30-10:30 or by appointment

What this course is intended to help you do:

- Engrave the following into your brain: **No one has ever said, “You know, I just can’t hear pure tones like I used to!”**
- Recall the **acoustic characteristics** of speech that are important to speech understanding and how they are measured
- Understand **normal perception** of phonemes, words, and sentences
- Learn how **sensorineural hearing loss** and **aging** affect the perception of phonemes, words, and sentences
- Appreciate how **hearing aids** affect the spectral and temporal characteristics of the speech signal as well as speech understanding by hearing aid users

ASHA Certification Standards:

Students enrolled in this course will acquire knowledge and skills associated with the following ASHA standards for certification in Audiology:

B: 2, 3, 5, 6, 7, 10, 11, 12, 16, 17, 20. **C:** 1. **D:** 1, 2, 3, 6, 7, 9, 11, 12, 13, 16.

E: 2, 6, 11, 12, 13, 17.

What you’ll read:

- Journal articles and selected book chapters. All but one of the readings will be accessible online, either through the KU and KUMC libraries, through KU library e-reserves, or through Blackboard. A complete list of readings appears below. Each listing indicates where the item may be accessed.

How your grade will be determined:

- **Preparation and participation** in class discussions 40%
- **Research Paper** 30%
- Take-home **Final Exam** 30%

Preparation and participation:

- Readings will be assigned each week and are to be read before class. In addition, for each reading, students are required to write a **1-paragraph synopsis** and **three discussion generators**. You may create your own or use one or more of the following sentence stems:
 - What most struck me about this paper was...
 - A question I'd like to ask the author is...
 - The part of the paper that made the most sense to me was...
 - The part of the paper that was the most confusing to me was...
 - This article proves that...
 - The most important message of this paper is...
- Synopses and discussion generators must be submitted via email **prior to class time**. During class, students will be **called upon at random** to start discussion for a given paper by providing an oral summary and a discussion generator. Additional discussion generators will be elicited as needed, but **all students are expected to participate during every class meeting**.
- Participation **for each session** will be graded using the following **4-point scale**. Your participation grade will be your **average score** for the semester.
 0. Absent
 1. Tries to respond when called, but does not offer much. Demonstrates very infrequent involvement in discussion.
 2. Demonstrates adequate preparation. Offers straightforward information without elaboration. Demonstrates sporadic involvement in discussion.
 3. Demonstrates good preparation. Offers interpretation and analysis. Responds to other students constructively. Demonstrates consistent ongoing involvement.
 4. Demonstrates excellent preparation. Offers analysis and synthesis. Puts together pieces of the discussion to develop new approaches.

Research paper:

- Each student will write a **10-page** research paper exploring in depth either one of the course topics, or a speech perception topic not covered in this course. The paper will be submitted in a series of five steps which will be detailed in a separate document. The final version of the paper is due on **Friday, May 2**.

Exam:

- The **final exam** will consist of take-home essay questions. Questions will be **distributed in class on May 2**; responses will be **due May 12**.

Extra credit:

- **Three percentage points** will be added to the final grade for all students who complete one of the following extra credit assignments:
1. Participate in a **speech perception experiment** being carried out in the Speech Acoustics and Perception laboratory.
 - Details will be announced in class. Note that choosing not to participate in the experiment will not negatively affect your grade in class.
 2. Attend a **research lecture** relevant to speech perception and **write a 1-page summary** of the lecture.

OTHER IMPORTANT INFORMATION:**Blackboard:**

- Blackboard will be used extensively in this course. Students should **check the course site** frequently for any announcements. In addition, all email from the instructor to students will be sent through Blackboard. Please be sure to **check the email account associated with your Blackboard account**. See the instructor if you have any questions about or problems with Blackboard.

Students with disabilities:

- The staff of Services for Students with Disabilities (SSD), 135 Strong, 785-864-2620 (v/tty), coordinates accommodations and services for KU courses. If you have a disability for which you may request accommodation in KU classes and have not contacted them, please do as soon as possible. Please also see the instructor privately in regard to this course.

Academic dishonesty:

- Academic dishonesty is a serious ethical violation and will not be tolerated. Cheating on any exam or plagiarism on any written assignment will be rewarded with a **zero** grade on that exam/assignment.
- The College of Liberal Arts and Sciences Academic Misconduct policy may be found at <http://www.clas.ku.edu/faculty/policies/misconduct.pdf>. Note that for a grade change to be carried out (i.e., changing a grade to zero); **paperwork must be filed with the College**.

Seminar in Speech Perception: Topics	
1/18/08	• Speech acoustics
1/25/08	• Normal perception: Vowels
2/1/08	• Normal perception: Consonants
2/8/08	• Normal perception: Speech in noise
2/15/08	• Speech perception in infants and children
2/22/08	• Clinical assessment of speech perception
2/29/08	• Listeners with hearing loss: Psychoacoustic function
3/7/08	• Listeners with hearing loss: Phoneme perception
3/14/08	• Listeners with hearing loss: Speech in noise
3/21/08	SPRING BREAK (no class)
3/28/08	• Aging and speech perception: Auditory factors
4/4/08	• Aging and speech perception – Cognitive factors
4/11/08	• Speech acoustics after hearing aid processing
4/18/08	• Speech perception with hearing aids
4/25/08	• AU.D. RESEARCH DAY (see you there!)
5/2/08	• Talker and linguistic factors affecting speech perception

Reading list for AUD 816: Speech Perception

1/18 – Speech acoustics

Raphael, L.J. (2005). Acoustic cues to the perception of segmental phonemes. In D.B. Pisoni & R.E. Remez, (Eds.), *The Handbook of Speech Perception* (pp. 182-206). Oxford: Blackwell. **Copies will be distributed in class.**

Rosen, S. (1992). Temporal information in speech: Acoustic, auditory and linguistic aspects. *Philosophical Transactions: Biological Sciences*, 336, 367-373. **KU and KUMC libraries.**

1/25 – Normal perception: Vowels

Hillenbrand, J., & Nearey, T. (1999). Identification of resynthesized /hVd/ utterances: Effects of formant contour. *Journal of the Acoustical Society of America*, 105, 3509-3523. **KU and KUMC libraries.**

Jenkins, J.J., Strange, W., & Trent, S. (1999). Context-independent dynamic information for the perception of coarticulated vowels. *Journal of the Acoustical Society of America*, 106, 438-448. **KU and KUMC libraries.**

Kewley-Port, D., Burkle, T. Z., & Lee, J. H. (2007). Contribution of consonant versus vowel information to sentence intelligibility for young normal-hearing and elderly hearing-impaired listeners. *Journal of the Acoustical Society of America*, 122, 2365-2375. **KU and KUMC libraries.**

Kewley-Port, D., & Zheng, Y. (1999). Vowel formant discrimination: Towards more ordinary listening conditions. *Journal of the Acoustical Society of America*, 106, 2945-2958. **KU and KUMC libraries.**

2/1 – Normal perception: Consonants

Freyman, R., & Nerbonne, G. (1989). The importance of consonant-vowel intensity ratio in the intelligibility of voiceless consonants. *Journal of Speech and Hearing Research*, 32, 524-535. **Blackboard.**

Jiang, J., Chen, M., & Alwan, A. (2006). On the perception of voicing in syllable-initial plosives in noise. *Journal of the Acoustical Society of America*, 119, 1092-1105. **KU and KUMC libraries.**

Miller, G., & Nicely, P. (1955). An analysis of perceptual confusions among some English consonants. *Journal of the Acoustical Society of America*, 27, 338-352. **Blackboard.**

Smits, R., ten Bosch, L., & Collier, R. (1996). Evaluation of various sets of acoustic cues for the perception of prevocalic stop consonants. I. Perception experiment. *Journal of the Acoustical Society of America*, 100, 3852-3864. **KU and KUMC libraries.**

2/8 – Normal perception: Speech in noise

Brungart, D. (2001). Informational and energetic masking effects in the perception of two simultaneous talkers. *Journal of the Acoustical Society of America*, 109, 1101-1109. **KU and KUMC libraries.**

Culling, J., Hodder, K., & Toh, C. (2003). Effects of reverberation on perceptual segregation of competing voices. *Journal of the Acoustical Society of America*, 114, 2871-2876. **KU and KUMC libraries.**

Freyman, R., Balakrishnan, U., & Helfer, K. (2001). Spatial release from informational masking in speech recognition. *Journal of the Acoustical Society of America*, 109, 2112-2122. **KU and KUMC libraries.**

Van Engen, K. J., & Bradlow, A. R. (2007). Sentence recognition in native- and foreign-language multi-talker background noise. *Journal of the Acoustical Society of America*, 121, 519-526. **KU and KUMC libraries.**

2/15 – Speech perception in infants and children

Hicks, C., & Ohde, R. (2005). Developmental role of static, dynamic, and contextual cues in speech perception. *Journal of Speech, Language, and Hearing Research*, 48, 960-974. **KU and KUMC libraries..**

Kuhl, P. (2000). A new view of language acquisition. *Proceedings of the National Academy of Science*, 97, 11850-11857. **KU and KUMC libraries..**

Werker, J., & Tees, R. (2005). Speech perception as a window for understanding plasticity and commitment in language systems of the brain. *Developmental Psychobiology*, 46, 233-251. **KU & KUMC libraries.**

Wightman, F., Kistler, D., & Brungart, D. (2006). Informational masking of speech in children: auditory-visual integration. *Journal of the Acoustical Society of America*, 119, 3940-3949. **KU and KUMC libraries..**

2/22 – Clinical assessment of speech perception

Hood, J., & Poole, J. (1980). Influence of the speaker and other factors affecting speech intelligibility. *Audiology*, 19, 434-455. **E-reserves.**

Killion, M., & Gudmundsen, G. (2005). Fitting hearing aids using clinical prefitting speech measures: An evidence-based review. *Journal of the American Academy of Audiology*, 16, 439-447. **E-reserves.**

Pavlovic, C. V., Studebaker, G. A., & Sherbecoe, R. L. (1986). An articulation index based procedure for predicting the speech recognition performance of hearing-impaired individuals. *Journal of the Acoustical Society of America*, 80, 50-57. **Blackboard.**

Wilson, R. H., Burks, C. A., & Weakley, D. G. (2005). Word recognition in multitalker babble measured with two psychophysical methods. *Journal of the American Academy of Audiology*, 16, 622-630. **E-reserves.**

You may also wish to re-read this chapter from your Diagnostic Audiology textbook:

Thibodeau, L. (2000). Speech audiometry. In R. Roeser, M. Valente & H. Hosford-Dunn (Eds.), *Audiology: Diagnosis* (pp. 281-309). New York: Thieme Medical Publishers, Inc.

2/29: Listeners with hearing loss: Psychoacoustic function

Moore, B.C.J. (1996). Perceptual consequences of cochlear hearing loss and their implications for the design of hearing aids. *Ear and Hearing*, 17, 133-160. **KU and KUMC libraries.**

Moore, B.C.J. (2004). Dead regions in the cochlea: Conceptual foundations, diagnosis, and clinical applications. *Ear and Hearing*, 25, 98-116. **KU and KUMC libraries.**

3/7 – Listeners with hearing loss: Phoneme perception

Boothroyd, A., Mulhearn, B., Gong, J., & Ostroff, J. (1996). Effects of spectral smearing on phoneme and word recognition. *Journal of the Acoustical Society of America*, 100, 1807-1818. **Blackboard.**

Coughlin, M., Kewley-Port, D., & Humes, L. (1998). The relation between identification and discrimination of vowels in young and elderly listeners. *Journal of the Acoustical Society of America*, 104, 3597-3607. **KU and KUMC libraries.**

Dubno, J., & Ahlstrom, J. (1995). Masked thresholds and consonant recognition in low-pass maskers for hearing-impaired and normal-hearing listeners. *Journal of the Acoustical Society of America*, 97, 2430-2441. **Blackboard.**

Liu, C., & Kewley-Port, D. (2007). Factors affecting vowel formant discrimination by hearing-impaired listeners. *Journal of the Acoustical Society of America*, 122, 2855-2864. **KU and KUMC libraries.**

3/14 – Listeners with hearing loss: Speech in noise

Arbogast, T., Mason, C., & Kidd, G. (2005). The effect of spatial separation on informational masking of speech in normal-hearing and hearing-impaired listeners. *Journal of the Acoustical Society of America*, 117, 2169-2180. **KU and KUMC libraries.**

Hornsby, B., & Ricketts, T. (2003). The effects of hearing loss on the contribution of high- and low- frequency speech information to speech understanding. *Journal of the Acoustical Society of America*, 113, 1706-1717. **KU and KUMC libraries.**

Mackersie, C., Prida, T., & Stiles, D. (2001). The role of sequential stream segregation and frequency selectivity in the perception of simultaneous sentences by listeners with sensorineural hearing loss. *Journal of Speech, Language, and Hearing Research*, 44, 19-28. **KU and KUMC libraries.**

Summers, V., & Molis, M. (2004). Speech recognition in fluctuating and continuous maskers: Effects of hearing loss and presentation level. *Journal of Speech, Language, and Hearing Research*, 47, 245-256. **KU and KUMC libraries.**

3/28 – Aging and speech perception: Auditory factors

Hargus, S., & Gordon-Salant, S. (1995). Accuracy of Speech Intelligibility Index predictions for noise-masked young listeners with normal hearing and

for elderly listeners with hearing impairment. *Journal of Speech and Hearing Research*, 38, 234-243. **Blackboard.**

Souza, P. E., & Boike, K. T. (2006). Combining temporal-envelope cues across channels: effects of age and hearing loss. *Journal of Speech, Language, and Hearing Research*, 49, 138-149. **KU and KUMC libraries.**

Strouse, A., Ashmead, D., Ohde, R., & Grantham, D. (1998). Temporal processing in the aging auditory system. *Journal of the Acoustical Society of America*, 104, 2385-2399. **KU and KUMC libraries.**

Tremblay, K., Piskosz, M., & Souza, P. (2003). Effects of age and age-related hearing loss on the neural representation of speech cues. *Clinical Neurophysiology*, 114, 1332-1343. **KU and KUMC libraries.**

4/4 – Aging and speech perception : Cognitive factors

Gordon-Salant, S., & Fitzgibbons, P. (2004). Effects of stimulus and noise rate variability on speech perception by younger and older adults. *Journal of the Acoustical Society of America*, 115, 1808-1817. **KU and KUMC libraries.**

Murphy, D. R., Daneman, M., & Schneider, B. A. (2006). Why do older adults have difficulty following conversations? *Psychology and Aging*, 21, 49-61. **KU and KUMC libraries.**

Schneider, B. A., Daneman, M., & Murphy, D. R. (2005). Speech comprehension difficulties in older adults: cognitive slowing or age-related changes in hearing? *Psychology and Aging*, 20, 261-271. **KU and KUMC libraries.**

Sommers, M., Tye-Murray, N., & Spehar, B. (2005). Auditory-visual speech perception and auditory-visual enhancement in normal-hearing younger and older adults. *Ear and Hearing*, 26, 263-275. **KU & KUMC libraries.**

4/11 – Speech acoustics after hearing aid processing

Fabry, D.A., & Van Tasell, D.J. (1990). Evaluation of an articulation-index based model for predicting the effects of adaptive frequency response hearing aids. *Journal of Speech and Hearing Research*, 33, 676-689. **Blackboard.**

Henning, R. W., & Bentler, R. A. (2005). Compression-dependent differences in hearing aid gain between speech and nonspeech input signals. *Ear and Hearing*, 26, 409-422. **KU and KUMC libraries.**

Jenstad, L., & Souza, P.E. (2005). Quantifying the effect of compression hearing aid release time on speech acoustics and intelligibility. *Journal of Speech, Language, and Hearing Research*, 48, 651-667. **KU and KUMC libraries.**

Miller, R.L., Calhoun, B.M., & Young, E.D. (1999). Contrast enhancement improves the representation of /ε/-like vowels in the hearing-impaired auditory nerve. *Journal of the Acoustical Society of America*, 106, 2693-2708. **KU and KUMC libraries.**

4/18 – Speech perception with hearing aids

Gatehouse, S., Naylor, G., & Elberling, C. (2003). Benefits from hearing aids in relation to the interaction between the user and the environment. *International Journal of Audiology*, 42 (Suppl 1), S77-S85. Available online at KUMC only. **E-reserves.**

Humes, L. (2001). Issues in evaluating the effectiveness of hearing aids in the elderly: What to measure and when. *Seminars in Hearing*, 22, 303-315. Available online at KUMC only. **E-reserves.**

Peters, R., Moore, B., & Baer, T. (1998). Speech reception thresholds in noise with and without spectral and temporal dips for hearing-impaired and normally hearing people. *Journal of the Acoustical Society of America*, 103, 577-587. **KU and KUMC libraries.**

Preminger, J., Carpenter, R., & Ziegler, C. (2005). A clinical perspective on cochlear dead regions: Intelligibility of speech and subjective hearing aid benefit. *Journal of the American Academy of Audiology*, 16, 600-613. **E-reserves.**

5/2 – Talker and linguistic factors affecting speech perception

Dirks, D., Takayanagi, S., Moshfegh, A., Noffsinger, P. D., & Fausti, S. A. (2001). Examination of the Neighborhood Activation Theory in normal and hearing-impaired listeners. *Ear and Hearing*, 22, 1-13. **KU and KUMC libraries.**

Evans, B. G., & Iverson, P. (2007). Plasticity in vowel perception and production: A study of accent change in young adults. *Journal of the Acoustical Society of America*, 121, 3814-3826. **KU and KUMC libraries.**

Ferguson, S. H., & Kewley-Port, D. (2007). Talker differences in clear and conversational speech: Acoustic characteristics of vowels. *Journal of Speech, Language and Hearing Research*, 50, 1241-1255. **KU and KUMC libraries.**

Jongman, A., Wang, Y., & Kim, B. H. (2003). Contributions of semantic and facial information to perception of nonsibilant fricatives. *Journal of Speech, Language, and Hearing Research*, 46, 1367-1377. **KU and KUMC libraries.**