The speaker, the listener, and articulatory control

John Kingston

April 12, 2010

1   Introduction

One might expect that a conversation would be a cooperative act, in which the speaker tries to be understood, while the listener tries to understand. Exactly this conception is embodied in the famous quote from Jakobson, Fant, & Halle (1952), "we speak to be heard in order to be understood" (p. 12). Yet in much current work, notably Lindblom (1990) but also many others, the interaction is instead conceived as a competition or even strugle between the speaker and listener, in which the speaker seeks to expend as little effort as possible while the listener demands the message be as distinct as possible. In these lectures, I will present a series of arguments for the cooperative as opposed to the competitive conception of conversation.

2   Day-by-day schedule

2.1   Day 1: Lindblom and allies

During the first day of the course, I will lay out Lindblom's (1990) Hyper- and Hypo-Speech (H&H) theory in some detail, as well as discussing related proposals, principally those developed in Kirchner's and Flemming's work (Kirchner, 1998, 2001, 2004; Flemming, 2004, 2005, 2006).

2.2   Day 2: Prosody and allophony

During the second day, I will review the evidence presented in a series of papers by Keating, Fougeron, Cho, and their colleagues (Fougeron & Keating, 1997; Keating, Cho, Fougeron, & Hsu, 1999; Cho & Keating, 2001; Keating, Cho, Fougeron, & Hsu, 2003; Cho, 2005, 2006, 2008; Cho & McQueen, 2005) demonstrating that the strength of articulations varies systematically as function of a segment's prosodic position, as well as work which shows that listeners use that variation as information about the segment's prosodic position (McQueen & Cho, 2003; Cho, McQueen, & Cox, 2007). I will also present the alternative conception of lenition that follows from these results, which treats it as conveying prosodic information, too (Kingston, 2008). I will also briefly discuss the difference between less effortful versus more efficient articulations.

2.3   Day 3: Automatic versus controlled articulations 1

On the third day, I will begin to compare alternative accounts of why articulations and their acoustic consequences covary systematically in speech. The "automatic" account asserts that speakers control relatively few articulations and the others covary because they are mechanically dependent on the controlled articulations (Hombert, Ohala, & Ewan, 1979), while the "controlled" account asserts that many more articulations are controlled and that they are controlled in order to produce arrays of acoustic properties that mutually enhance one another in perception (Kingston, 1991; Kingston & Diehl, 1994; Kingston, 2007; Kingston, Diehl, Kirk, & Castleman, 2008). The discussion will focus on the contrasts for voicing in obstruents and for height in vowels. This discussion will include a comparison of the gesturalist and auditorist theories of speech perception (Fowler,

1986; Diehl & Kluender, 1989; Fowler, 1990, 1991; Diehl, Walsh, & Kluender, 1991; Diehl, Lotto, & Holt, 2004), as differences in their conceptions of the objects of speech perception dovetail with differences between the automatic and controlled accounts of speakers' articulatory behavior.

2.4   Day 4: Automatic versus controlled articulations 2

The discussion begun on the third day will continue into and conclude on the fourth day.

2.5   Day 5: New experiments

The focus of the first four days of the course is a retrospective review of what has been said and accomplished concerning these issues up to now. On the last day, I will describe in detail new experiments designed to test the hypotheses arising out of this review. The purpose of this discussion is to show what needs to be done next and to elicit critical feedback from course participants.

3   Concluding remarks

If conversation is conceived as an information exchange between participants, then it's expected to be a cooperative rather than competitive act. Even if this conception is correct, a fundamental unanswered question remains: is the speaker aware of the success with which the information in the message is transmitted, or only aware of the moment-to-moment variation in information content? Quite different predictions follow if the speaker is a solipsist rather than an altruist.

References

Cho, T. (2005). Prosodic strengthening and featural enhancement: Evidence from acoustic and articulatory realizations of /a,i/ in english. *Journal of the Acoustical Society of America*, *117*, 3867-3878.

Cho, T. (2006). Manifestation of prosodic structure in articulation: Evidence from lip kinematics in english. In L. M. Goldstein, D. H. Whalen, & C. T. Best (Eds.), *Laboratory phonology 8* (p. 519-548). Berlin/New York: Mouton de Gruyter.

Cho, T. (2008). Prosodic strengthening in transboundary v-to-v lingual movement in american english. *Phonetica*, *65*, 45-61.

Cho, T., & Keating, P. (2001). Articulatory and acoustic studies of domain-initial strengthening in Korean. *Journal of Phonetics*, *29*, 155-190.

Cho, T., & McQueen, J. M. (2005). Prosodic influences on consonant production in dutch: Effects of prosodic boundaries, phrasal accent and lexical stress. *Journal of Phonetics*, *33*, 121-157.

Cho, T., McQueen, J. M., & Cox, E. (2007). Prosodically driven phonetic detail in speech processing: The case of domain-initial strengthening in english. *Journal of Phonetics*, *35*, 210-243.

Diehl, R. L., & Kluender, K. R. (1989). On the objects of speech perception. *Ecological Psychology*, *1*, 121-144.

Diehl, R. L., Lotto, A. J., & Holt, L. L. (2004). Speech perception. *Annual Review of Psychology*, *55*, 149-179.

Diehl, R. L., Walsh, M. A., & Kluender, K. R. (1991). On the interpretability of speech/nonspeech comparisons: A reply to Fowler. *Journal of the Acoustical Society of America*, *89*, 2905-2909.

Flemming, E. (2004). Contrast and perceptual distinctiveness. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically based phonology* (p. 232-276). Cambridge: Cambridge University Press.

Flemming, E. (2005). *A phonetically-based model of phonological vowel reduction.*

Flemming, E. (2006). *The role of distinctiveness constraints in phonology.*

Fougeron, C., & Keating, P. (1997). Articulatory strengthening at edges of prosodic domain. *Journal of the Acoustical Society of America*, *106*, 3728-3740.

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. A. (1990). Sound-producing sources as the objects of perception: Rate normalization and nonspeech perception. *Journal of the Acoustical Society of America*, *88*, 1236-1249.

Fowler, C. A. (1991). Auditory perception is not special: We see the world, we feel the world, we hear the world. *Journal of the Acoustical Society of America*, *89*, 2910-2915.

Hombert, J.-M., Ohala, J. J., & Ewan, W. G. (1979). Phonetic explanations for the development of tones. *Language*, *55*, 37-58.

Jakobson, R., Fant, G., & Halle, M. (1952). *Preliminaries to speech analysis.* Cambridge: MIT Press.

Keating, P., Cho, T., Fougeron, C., & Hsu, C.-S. (1999). Domain intitial articulatory strengthening in four languages. *UCLA Working Papers in Phonetics*, *97*, 139-156.

Keating, P., Cho, T., Fougeron, C., & Hsu, C.-S. (2003). Domain-initial strengthening in four languages. In *Papers in laboratory phonology 6: Phonetic interpretation* (p. 145-163). Cambridge: Cambridge University Press.

Kingston, J. (1991). Integrating articulations in the perception of vowel height. *Phonetica*, *48*, 149-179.

Kingston, J. (2007). Segmental influences on f0: Automatic or controlled? In C. Gussenhoven & T. Riad (Eds.), *Tones and tunes.*

Kingston, J. (2008). Lenition. In *Proceedings of 3rd conference on laboratory approaches to spanish phonology* (p. 1-31). Somerville: Cascadilla Press.

Kingston, J., & Diehl, R. L. (1994). Phonetic knowledge. *Language*, *70*, 419-454.

Kingston, J., Diehl, R. L., Kirk, C. J., & Castleman, W. A. (2008). On the internal perceptual structure of distinctive features: The [voice] contrast. *Journal of Phonetics*, *36*(1), 28-54.

Kirchner, R. (1998). *An effort-based approach to consonant lenition.* Phd dissertation, University of California, Los Angeles.

Kirchner, R. (2001). Phonological contrast and articulatory effort. In L. Lombardi (Ed.), *Segmental phonology in optimality theory: constraints and representations* (p. 79-117). Cambridge: Cambridge University Press.

Kirchner, R. (2004). Consonant lenition. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically based phonology* (p. 313-345). Cambridge: Cambridge University Press.

Lindblom, B. (1990). Explaining phonetic variation: A sketch of the h&h theory. In W. J. Hardcastle & A. Marchal (Eds.), *Speech production and speech modeling* (p. 403-439). Dordrecht: Kluwer.

McQueen, J. M., & Cho, T. (2003). The use of domain-initial strengthening in segmentation of continuous English speech. In *Proceedings of the 15th international congress of phonetic sciences* (p. 2993-2996). Barcelona.