THE ROLE OF SPEECH PERCEPTION IN PHONOLOGY pdf

1: Speech perception - Wikipedia

Recent research using the phenomenon of illusory vowels has raised our awareness of the extent to which speech perception is modulated by the listener's native-language phonological knowledge.

It has proven practical over a long history of research on language sound systems to rationalize phonological units and processes in terms of speech articulation. The Sanskrit grammarians, for example, focused on vocal anatomy and articulatory processes to the exclusion of descriptions of acoustic The Sanskrit grammarians, for example, focused on vocal anatomy and articulatory processes to the exclusion of descriptions of acoustic or auditory impressions produced by speech sounds Allen, Similarly, the 19th century linguists Bell , Sweet , Sievers , Passy , and Rousselot all focused primarily on speech articulation to explain sound change, describe similarities and differences across languages and in language teaching. In this paper, we consider the perceptual consequences of phonological contrast, a topic that has been of interest to both phonologists and speech perception researchers for some time. Drawing on perception data on Mandarin tone, we illustrate the impact of partial contrast on native and non-native Drawing on perception data on Mandarin tone, we illustrate the impact of partial contrast on native and non-native speech perception. Partial contrast results when an otherwise contrastive pair of elements is neutralized in some context. We conclude that perceptual distinctiveness is a function of phonological contrast and that partial contrast reduces perceptual distinctiveness for native listeners 1. Show Context Citation Context The Sanskrit grammarians, for example, focused on vocal anatomy and articulatory processes to the The Sanskrit grammarians, for example, focused on vocal anatomy and articulatory processes to the Surface Syllable Structure and Segment Sequencing. Formal and Functional Considerations by Elizabeth Hume " The focus of this paper is on metathesis, the process whereby in certain languages, under certain conditions, sounds appear to switch positions with one another. Thus, in a string of sounds where we would expect the linear ordering of two sounds to be Multiple feature occurrences, cross-linguistically attested as undesirable phonological configurations, may be resolved in at least two ways. One is by imposing a requirement that at most one feature of a given type may occur in a linguistic form. Another is by restricting the distribution, rather t Another is by restricting the distribution, rather than the number, of features within a linguistic form; that is, by imposing like distributions on multiple features. A fairly standard view: Keating , Cohn , also individual contributions in Burton-Roberts et al. But many issues have been raised recently: There are two distinct ways in which phonology and phonetics interact: English nonsense consonant-vowel-consonant syllables were presented at four different signal-to-noise ratios for recognition. Information theory methods are used to analyze the response data according to segment type and phonological feature, and are consistent with previous studies showing that the Information theory methods are used to analyze the response data according to segment type and phonological feature, and are consistent with previous studies showing that the consonantal contrast of voicing is more robust than place of articulation, word-initial consonants are more robust than word-final consonants, and that vowel height is more robust than vowel backing. Asymmetrical confusions are also analyzed, indicating a bias toward front vowels over back vowels. The results are interpreted as parts of phonetic explana-tions for synchronic and diachronic phonological patterns.

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2: Project MUSE - The Role of Speech Perception in Phonology (review)

The Role of Speech Perception in Phonology is a collection of authoritative articles on the role of speech perception in phonology by leading phonologists, phoneticians, and cognitive psychologists. Key Features.

Basics[edit] The process of perceiving speech begins at the level of the sound signal and the process of audition. For a complete description of the process of audition see Hearing. After processing the initial auditory signal, speech sounds are further processed to extract acoustic cues and phonetic information. This speech information can then be used for higher-level language processes, such as word recognition. Acoustic cues[edit] Figure 1: Spectrograms of syllables "dee" top , "dah" middle , and "doo" bottom showing how the onset formant transitions that define perceptually the consonant [d] differ depending on the identity of the following vowel. Formants are highlighted by red dotted lines; transitions are the bending beginnings of the formant trajectories. The speech sound signal contains a number of acoustic cues that are used in speech perception. The cues differentiate speech sounds belonging to different phonetic categories. For example, one of the most studied cues in speech is voice onset time or VOT. VOT is a primary cue signaling the difference between voiced and voiceless plosives, such as "b" and "p". Other cues differentiate sounds that are produced at different places of articulation or manners of articulation. The speech system must also combine these cues to determine the category of a specific speech sound. This is often thought of in terms of abstract representations of phonemes. These representations can then be combined for use in word recognition and other language processes. It is not easy to identify what acoustic cues listeners are sensitive to when perceiving a particular speech sound: At first glance, the solution to the problem of how we perceive speech seems deceptively simple. If one could identify stretches of the acoustic waveform that correspond to units of perception, then the path from sound to meaning would be clear. However, this correspondence or mapping has proven extremely difficult to find, even after some forty-five years of research on the problem. However, there are two significant obstacles: One acoustic aspect of the speech signal may cue different linguistically relevant dimensions. Speech segmentation Figure 2: A spectrogram of the phrase "I owe you". There are no clearly distinguishable boundaries between speech sounds. Although listeners perceive speech as a stream of discrete units[citation needed] phonemes , syllables , and words , this linearity is difficult to see in the physical speech signal see Figure 2 for an example. Speech sounds do not strictly follow one another, rather, they overlap. This influence can even be exerted at a distance of two or more segments and across syllable- and word-boundaries. It is difficult to delimit a stretch of speech signal as belonging to a single perceptual unit. Lack of invariance[edit] The research and application of speech perception must deal with several problems which result from what has been termed the lack of invariance. Reliable constant relations between a phoneme of a language and its acoustic manifestation in speech are difficult to find. There are several reasons for this: Context-induced variation[edit] Phonetic environment affects the acoustic properties of speech sounds. Many phonemic contrasts are constituted by temporal characteristics short vs. Variation due to different speaker identity[edit] The resulting acoustic structure of concrete speech productions depends on the physical and psychological properties of individual speakers. Men, women, and children generally produce voices having different pitch. Because speakers have vocal tracts of different sizes due to sex and age especially the resonant frequencies formants , which are important for recognition of speech sounds, will vary in their absolute values across individuals [8] see Figure 3 for an illustration of this. Research shows that infants at the age of 7. The mismatch between male, female, and child values is apparent. In the right panel formant distances in Bark rather than absolute values are plotted using the normalization procedure proposed by Syrdal and Gopal in It has been proposed that this is achieved by means of the perceptual normalization process in which listeners filter out the noise i. This may be accomplished by considering the ratios of formants rather than their absolute values. Similarly, listeners are believed to adjust the perception of duration to the current tempo of the speech they are listening to â€” this has been referred to as speech rate normalization. Whether or not normalization actually takes place and what is its exact nature is a matter of theoretical controversy see theories below. Perceptual constancy is a phenomenon not specific to speech

perception only; it exists in other types of perception too. Categorical perception Figure 4: Example identification red and discrimination blue functions Categorical perception is involved in processes of perceptual differentiation. People perceive speech sounds categorically, that is to say, they are more likely to notice the differences between categories phonemes than within categories. The perceptual space between categories is therefore warped, the centers of categories or "prototypes" working like a sieve [14] or like magnets [15] for incoming speech sounds. In an artificial continuum between a voiceless and a voiced bilabial plosive , each new step differs from the preceding one in the amount of VOT. The first sound is a pre-voiced [b], i. Then, increasing the VOT, it reaches zero, i. Such a continuum was used in an experiment by Lisker and Abramson in The conclusion to make from both the identification and the discrimination test is that listeners will have different sensitivity to the same relative increase in VOT depending on whether or not the boundary between categories was crossed. Similar perceptual adjustment is attested for other acoustic cues as well. Top-down influences[edit] In a classic experiment, Richard M. Warren replaced one phoneme of a word with a cough-like sound. Perceptually, his subjects restored the missing speech sound without any difficulty and could not accurately identify which phoneme had been disturbed [17] , a phenomenon known as the phonemic restoration effect. Therefore, the process of speech perception is not necessarily uni-directional. Another basic experiment compared recognition of naturally spoken words within a phrase versus the same words in isolation, finding that perception accuracy usually drops in the latter condition. When put into different sentences that each naturally led to one interpretation, listeners tended to judge ambiguous words according to the meaning of the whole sentence [18] [19]. That is, higher-level language processes connected with morphology , syntax , or semantics may interact with basic speech perception processes to aid in recognition of speech sounds. It may be the case that it is not necessary and maybe even not possible for a listener to recognize phonemes before recognizing higher units, like words for example. After obtaining at least a fundamental piece of information about phonemic structure of the perceived entity from the acoustic signal, listeners can compensate for missing or noise-masked phonemes using their knowledge of the spoken language. Compensatory mechanisms might even operate at the sentence level such as in learned songs, phrases and verses, an effect backed-up by neural coding patterns consistent with the missed continuous speech fragments [20] , despite the lack of all relevant bottom-up sensory input. Acquired brain disabilities[edit] The first ever hypothesis of speech perception was used with patients who acquired an auditory comprehension deficit, also known as receptive aphasia. Since then there have been many disabilities that have been classified, which resulted in a true definition of "speech perception". It consists of many different language and grammatical functions, such as: In the early years, they were more interested in the acoustics of speech. In recent years, there has been a model developed to create a sense of how speech perception works; this model is known as the dual stream model. This model has drastically changed from how psychologists look at perception. The first section of the dual stream model is the ventral pathway. This pathway incorporates middle temporal gyrus, inferior temporal sulcus and perhaps the inferior temporal gyrus. The ventral pathway shows phonological representations to the lexical or conceptual representations, which is the meaning of the words. The second section of the dual stream model is the dorsal pathway. This pathway includes the sylvian parietotemporal, inferior frontal gyrus, anterior insula, and premotor cortex. Its primary function is to take the sensory or phonological stimuli and transfer it into an articulatory-motor representation formation of speech. There are three distinctive dimensions to phonetics: Patients who suffer from this condition typically have lesions on their left inferior frontal cortex. These patients are described with having severe syntactical deficits, which means that they have extreme difficulty in forming sentences correctly. Expressive aphasic patients suffer from more regular rule governed principles in forming sentences, which is closely related to Alzheimer patients. For instance instead of saying the red ball bounced, both of these patients would say bounced ball the red. This is just one example of what a person might say; there are of course many possibilities. The patients suffer from lesions or damage located in the left temporoparietal lobe. Receptive Aphasic patients mostly suffer from lexical-semantic difficulties, but also have difficulties in comprehension tasks. Though they have difficulty saying things or describing things, these people showed that they could do well in online comprehension tasks. The effects could be difficulty in walking, communicating,

or functioning. Speech agnosia[edit] Pure word deafness, or speech agnosia, is an impairment in which a person maintains the ability to hear, produce speech, and even read speech, yet they are unable to understand or properly perceive speech. These patients seem to have all of the skills necessary in order to properly process speech, yet they appear to have no experience associated with speech stimuli. Phonagnosia[edit] is associated with the inability to recognize any familiar voices. In these cases, speech stimuli can be heard and even understood but the association of the speech to a certain voice is lost. This can be due to "abnormal processing of complex vocal properties timbre, articulation, and prosodyâ€”elements that distinguish an individual voice". Then after they completed the first part of the experiment, the experimenters taught the aphasic patients to speech read, which is the ability to read lips. The experimenters then conducted the same test and found that the people still had more of an advantage of audio only over visual only, but they also found that the subjects did better in audio-visual than audio alone. The patients also did improve their place of articulation and their manner of articulation. This all means that aphasic patients might benefit from learning how to speech read lip reading. Since there is no cure for it, the patient will probably end up having to have surgery done to relieve some of the symptoms. When a patient has this procedure done, they are most likely going to receive a deep brain stimulation, so it will keep the brain stimulated even though the disease tries to disable it. A study was performed to test if surgery helps the patients discover their symptoms post surgery than pre-surgery. They found that the symptoms were still present but the patients were more aware of their difficulties than before they had surgery.

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3: Phonological awareness - Wikipedia

The Role of Speech Perception in Phonology (review) Hope C. Dawson Language, Volume 82, Number 1, March , pp. (Review) Published by Linguistic Society of America.

Edited by William J. Hardcastle and John Laver. Palgrave Macmillan Press, , pp. The Role of Perceptual Contrast. Evolution and Current Practice. Edited by Valerie Becker Makkai. Edited by John A. Edited by Gina Garding and Mimu Tsujimura. Hinskens, Frans, and Jeroen van de Weijer. Mouton de Gruyter, The Emergence of Distinctive Features. Ohio State University dissertation, Oxford University Press, Peperkamp, Sharon, Katrin Skoruppa, and emmanual Dupoux. Cascadilla Press, , pp. Pisoni, and Steven D. Psycholinguistic and Computational Perspectives. Evidence from Modern Standard Arabic. Edited by David Pisoni and Robert Remez. Conceptual and Empirical Knowledge. Word Frequency, Lenition, and Contrast. Edited by Joan L. Bybee and Paul Hopper. John Benjamins Publishing Company, Edited by Jaques Durand and Bernard Laks. Dumay, Nicolas, Uli H. Frauenfelder, and Alain Content. Size of Attentional Focus in French. Frauenfelder, and Ruth Kearns. McMurray, Bob, Michael K. Tannenhaus, and Richard N. Cascadilla Proceedings Project, , pp Evidence for Lexical Competition. Feedback is Never Necessary. Implications for Research and Theory. Edited by Morton Ann Gemsbacher. The Groundwork of Cognition. Cambridge University Press, Human Perception and Performance 21 Perrier, and Jean-Pierre Orliaguet. Human Perception and Performance 27, no. This is one of over 2, courses on OCW. Find materials for this course in the pages linked along the left. No enrollment or registration. Freely browse and use OCW materials at your own pace. Knowledge is your reward. Use OCW to guide your own life-long learning, or to teach others. Download files for later. Send to friends and colleagues. Modify, remix, and reuse just remember to cite OCW as the source.

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The Role of Speech Perception in Phonology (review) The Role of Speech Perception in Phonology (review) Dawson, Hope C. LANGUAGE, VOLUME 82, NUMBER 1, () classes of phonological models that can capture language-specific auditory/perceptual generalizations' (xvi).

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