# Phonetic Errors in Dichotic Listening to Simultaneous and Time-Staggered CVs

Charles I. Berlin, Larry F. Hughes, Carl L. Thompson, et al.

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syllables which coincided in time of onset and offset. The purpose of the experiment was to compare the effect of varying the intensity of the stimuli in one channel when stimuli pairs were presented dichotically (one to each ear) with the effect that occurred when both stimuli were directed monotically to a single ear. We could thus compare the effect of attenuation of one of the two competing speech signals when the competition involved peripheral masking (the monotic condition) with the effect obtained when the locus of masking was exclusively central (the dichotic condition). In the monotic case, the decrement in identification performance was nearly asymptotic with 10 dB of attenuation, whereas in the dichotic case the decrement in performance with attenuation was much less steep, not having reached asymptote at 25 dB of attenuation. These results agree with findings in visual masking studies with respect to the relatively greater importance of intensity difference among stimuli in peripheral masking than in central masking. [This research was supported in part by NSF Grant No. GJ-9.]

**L6. Reaction-Time Measures of Ear Advantage in Dichotic Listening.** SALLY P. SPRINGER, *Hearing and Speech Sciences, Stanford University School of Medicine, Stanford, California 94305*.—Experiments employing a dichotic listening test to study hemispheric specialization for speech have typically used probability of recall as the response measure to assess ear asymmetry. Reaction-time (RT) measures can be shown to provide additional information about the underlying processes and to reveal asymmetries not found with the traditional paradigm. In the first experiment, subjects monitored a dichotic consonant–vowel (CV) tape for each occurrence of a designated syllable. Whenever that item occurred, subjects manually depressed a button. For right-ear responses, percent correct was higher and reaction times were shorter, with no significant interaction of ear and hand-used-to-respond for either response measure. A second study showed that manual and verbal RT responses to targets produced identical ear differences, suggesting that at least the terminal portion of the processing of each speech input takes place in the left hemisphere. That RT may be a more sensitive tool to study ear asymmetries is suggested by a third study in which manual RT responses were obtained to CV syllables in the presence of contralateral noise. Right-ear RT responses averaged 14 msec shorter than left-ear responses, although percent correct scores did not reveal any asymmetry.

**L7. Effects of Asynchrony on the Perception of Dichotically Presented Speech and Non-Speech.** ROBERT J. PORTER, JR., *Department of Psychology, LSU in New Orleans, and Kresge Hearing Research Laboratory of the South, Department of Otorhinolaryngology, LSU Medical Center, New Orleans, Louisiana 70122*.—Subjects were asked to identify both members of pairs of dichotically asynchronous (by 0 to 165 msec) stop consonant–vowel syllables or non-speech sounds derived from stop-vowels. For CV pairs, subjects tended to identify most accurately the temporally lagging syllables. As in previous studies [e.g., M. Studdert-Kennedy, D. Shankweiler, and S. Schulman, J. Acoust. Soc. Amer. 48, 599–602 (1970)], this lagging-syllable advantage ("lag effect") was found at asynchronies up to 120 msec with a maximum effect at 60 msec. Lagging-signal advantages for the non-speech, when observed, were small, variable, and tended to occur over a smaller range of asynchronies. These non-speech results appear to be consistent with findings in previous non-speech masking studies. The pattern of lag effects observed for the syllables, on the other hand, indicate that the processing of these signals is particularly sensitive to the conditions of dichotic asynchronous competition, perhaps because special perceptual processing is required for the perception of speech. [Work supported by NIH.]

**L8. The Effect of Varying Syllable Microstructure on Voiceless Preponderance in Dichotic Listening.** CHARLES I. BERLIN, LARRY F. HUGHES, CARL L. THOMPSON, JOHN K. CULLEN, JR., AND JOSEPH E. HANNAH, *Department of Otorhinolaryngology Louisiana State University Medical Center, Kresge Hearing Research Laboratory of the South, New Orleans, Louisiana 70119*.—Previous data [S. S. Lowe, J. K. Cullen, Jr., C. I. Berlin, C. L. Thompson, and M. E. Willett, J. Speech Hearing, Res. **13**, 812–822 (1970); C. I. Berlin, M. E. Willett, C. L. Thompson, J. K. Cullen, Jr., and S. S. Lowe, J. Acoust. Soc. Amer. **47**, 75–76 (1970)] show that when the onsets of the six English stops are aligned in dichotic CV pairs, voiceless CVs are more intelligible than voiced. This experiment reports the effect of maintaining onset alignments but changing voicing onset times (VOT) of the syllables. Thus, two types of voiceless CVs (+60 and +90 msec VOT) and two types of voiced CVs (−30 and 0 VOT) competed with each other in a dichotic paradigm. Changing VOT for the voiceless items had little effect on overall intelligibility. Using a 0-msec VOT voiced item, however, generated greater probability that the voiceless dichotic items would be perceived correctly. The relationship of this observation to the "lag effect" and suppression of one item by another will be discussed.

**L9. Phonetic Errors in Dichotic Listening to Simultaneous and Time-Staggered CVs.** CHARLES I. BERLIN, LARRY F. HUGHES, CARL L. THOMPSON, JOHN K. CULLEN, JR., AND SENA S. LOWE-BELL, *Department of Otorhinolaryngology, Louisiana State University Medical Center, Kresge Hearing Research Laboratory of the South, New Orleans, Louisiana 70119*.—These data represent further analyses of experiments previously reported [C. I. Berlin, C. L. Loovis, S. S. Lowe, J. K. Cullen, Jr., and C. L. Thompson, J. Acoust. Soc. Amer. **48**, 70–71 (1970)]. Analysis of the errors made by normal subjects reveal that at simultaneity unvoiced consonants are better perceived than voiced consonants, especially when the unvoiced compete with the voiced consonants. When two voiced consonants compete, the V–V competition yields intelligibility about as good as the U–U competition; however, when U and V compete, then the intelligibility of the unvoiced syllable goes up while the intelligibility of the voiced syllable drops. As time asynchronies are introduced, the intelligibility of the unvoiced consonants remains constant while the intelligibility of the voiced consonant in the competing pair increases until, by 90-msec temporal offset, intelligibility of both voiceless and voiced CVs are the same. A preliminary hypothesis on switching during analysis time will be presented.

**L10. Interference by Speech and Nonspeech Signals.** CHARLES SPEAKS, PATRICIA KUHL, TERRY TROOIEN, SUZANNE MARTH, ALAN RUBENS, AND BONNIE PODRAZA, *Speech Research Laboratory, University of Minnesota, Minneapolis, Minnesota 55455*.—Temporal-lobe patients provide a useful vehicle for exploring the "speech–nonspeech" dichotomy. Berlin *et al.* [J. Acoust. Soc. Amer. 52, 702–705 (1972)], for example, reported reduced intelligibility for the ear contralateral to the lesion when speech competed in the ipsilateral ear but only a slight reduction in intelligibility when noise competed. Our results on one patient were similar. We have also extended our observation to other competing signals: speech, backward speech, foreign language, voice babble, white noise, and a noise envelope. The message was synthetic-sentence identification (SSI). With SSI to the ear ipsilateral to the side of suspected lesion and *any* competing signal to the contralateral ear, SSI scores were high. With SSI to the contralateral ear and competing "speech" (normal, backward, or foreign language) to the ipsilateral ear, SSI scores were severely reduced. SSI scores were unaffected with noise (babble, white, or envelope) to the ipsilateral ear. All competing signals seemed clearly dichotomous as either "speech" or "nonspeech." Our interest is to