

larger than those of humans. Consequently, intensity discrimination thresholds (ΔI) were measured in the chinchilla using a positive reinforcement technique. Intensity discrimination thresholds were obtained at several different frequencies over a range of sensation levels. In general the intensity discrimination thresholds improved as the sensation level in-

creased. The smallest intensity discrimination thresholds obtained were approximately two to three times larger than those for humans. Furthermore, the effect of sensation level on intensity discrimination threshold was more pronounced in the chinchilla than in man. Results and their implications will be discussed.

TUESDAY AFTERNOON, 8 MAY 1984

YORK HALL, 1:40 TO 3:15 P.M.

Session X. Speech Communication V: Development and Disorders of Speech

Winifred Strange, Chairman

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Chairman's Introduction—1:40

Contributed Papers

1:45

X1. Features of infant vocalization at successive age levels. Rachel E. Stark, Jennifer L. Bond, Lynne E. Bernstein, and John M. Heinz (John F. Kennedy Institute 707 N. Broadway, Baltimore, MD 21205 and Johns Hopkins University, Baltimore, MD 21205)

It has been suggested that speech motor abilities in infants emerge within an invariant sequence of levels. The present study was designed to describe the articulatory-acoustic features of infant vocalization and thus, to identify those that may be characteristic of infant utterances at different age levels or developmental levels. The vocalizations of five infants were studied on a limited longitudinal basis. The age ranges of these infants were 2–10, 12–23, 26–36, 40–55, and 72–88 weeks, respectively. Forty to 50 vocalizations were selected randomly from each infant's output at the first and at the last recording session for a total of ten recordings. These vocalizations were analyzed acoustically by means of computer-assisted spectral analyses. Measurements of duration and frequency were made from the resulting displays, which also provided information to listeners as they judged voicing and vocalic and consonantal features. Analyses of these preliminary data suggest that three classes of features may provide useful indices of development of infant speech motor abilities: namely, (1) pitch contour; (2) vocalic features; and (3) consonantal features. The relative importance of each will be discussed. [Work supported by Bureau of Community Health Services, Maternal and Child Health.]

2:00

X2. A neuroethologic hypothesis of speech development. Harold R. Bauer (Speech and Hearing Science, 324 Derby, Ohio State University, 154 N. Oval Mall, Columbus, OH 43210)

The relation between phonetic contrast and individual differences in infants was noninvasively measured to operationally state a hypothesis of speech development. Four 13-month-old infants were recorded interacting with their mothers at home. Continuous f_0 and amplitude displays were used in analyses made by two observers from each 1-h, time coded session of all vocalizations. Acoustic-phonetic data were lumped into front, central, and back vocants and bilabial, apical, palatal, and velar closants to emphasize motor contrast. These seven categories of speech sounds were graphed by each minute in the Phonetic Record, and then multiplied within each minute sample to yield a Phonetic Product, as a production/contrast measure. Individual Phonetic Record and Phonetic Product populational differences in production and contrast were found in the temporal analyses that are hypothesized to be predictive of speech-language development. [Supported by NINCDS Grants NS 16763 and 5T32 NS 07147.]

2:15

X3. Developmental speech perception of three acoustic cues associated with place of articulation. J. E. Sussman (Department of Curriculum and Instruction, Louisiana State University, Baton Rouge, LA 70803) and A. E. Carney (Department of Speech and Hearing Science, University of Illinois, Champaign, IL 61820)

In this experiment, 30 children and 10 adults participated in three speech perception tasks: discrimination, labeling, and adaptation. Stimuli were four sets of synthetic CV syllables, varying along a bilabial-to-alveolar, place-of-articulation continuum. The primary acoustic cue in each continuum was the change in slope of the F_2 - F_3 transitions. The continua were constructed so that two had transition lengths of 45 ms, and two of 95 ms. Two continua contained a 5-ms burst, and two were burstless. The discrimination task was a change-no change procedure, in which subjects indicated whether a set of four stimuli remained the same or changed. Results indicated a complex developmental pattern. For discrimination, there was a progression in response strategy and sensitivity with increasing age. In contrast, labeling performance was similar for all subjects. Finally, only the adult subjects showed significant adaptation effects. Children's responses were essentially unchanged after adaptation. Further, transition length affected all three tasks, while the presence of a burst was nonsignificant. Results will be discussed with respect to implications for the study of children's speech perception.

2:30

X4. Acquisition of the English voicing contrast by Arabic children. Joann Fokes, Z. S. Bond, and Marcy Steinberg (School of Hearing and Speech Sciences, Ohio University, Athens, OH 45701)

Children are typically more proficient than adults in learning the phonetic detail of a second language. The purpose of this study was to investigate the acquisition of the English voicing contrast as cued by voice onset time in syllable-initial position comparing the performance of children whose native language is Arabic with that of American English speaking children and of adult speakers of Arabic learning English as a second language. Twelve children, 24 to 135 months in age, were recorded producing 11 minimal pairs differing in the voicing of the initial stop consonant, such as *pea/bee* and *cab/gab*. Voice onset time (VOT) was measured from spectrograms for labial, apical, and velar stops. Children were highly variable in their mastery of the voicing contrast; neither a child's age nor his experience with English could predict his phonetic proficiency.