of connecting beams, shear transfer occurs between the open edges of the core wall. The connecting beams are modeled as a continuum media with equivalent stiffness property. The results include warping effects and shearing deformations in the plane of the wall. Formulations for displacements and rotations at the top of the structure are given [cf. Ö. Sümer and G. Aşkar, Thin-Walled Struct. **14**, 193–208 (1992)]. Results are compared with those of open core walls without connecting beams. [Work supported by TÜBITAK.]

WEDNESDAY MORNING, 19 MAY 1993 BALLROOM, 8:00 TO 11:45 A.M.

Session 3aSP

Speech Communication: Applications in Speech Science

Donald G. Jamieson, Chair
Department of Communicative Disorders, Elborn College, University of Western Ontario, London, Ontario N6G 1H1, Canada

Contributed Papers

8:00

3aSP1. An actuarial approach to cochlear implant candidacy in deaf children. I: Development of test instruments. Orna Eran and Arthur Boothroyd (Grad. School, City Univ. of New York, 33 W. 42 St., New York, NY 10036)

Cochlear implants are being used extensively in the habilitation and rehabilitation of profoundly and totally deaf children. It is generally accepted that an implant can provide significant access to acoustic speech information to children who cannot obtain this information through more conventional devices. Appropriate decisions regarding implant candidacy can be difficult in this population, however, because many of the children who are potential implantees are too young to perform reliably on tests that measure speech perception capacity. The purpose of this presentation is to describe two tests of speech perception assessment that are used with young deaf children. THRIFT is a three-interval, forced-choice oddity procedure. The results depend on the adequacy of sensory data rather than on cognitive and linguistic status. IMSPAC is an imitative test for children as young as 3 years. In older subjects, scores obtained on IMSPAC correlate with those obtained on the THRIFT. The presentation will include data on applicability, reliability, validity, and efficiency of both tests. [Work supported by NIH Grant No. 2PO1DC00178.]

8:15

3aSP2. An actuarial approach to cochlear implant candidacy in deaf children. II: Comparison of implants and hearing aids. Arthur Boothroyd and Orna Eran (Grad. School, City Univ. of New York, 33 W. 42 St., New York, NY 10036)

The perception of speech pattern contrasts, via hearing aids, was measured in approximately 100 hearing-impaired children with a wide range of hearing losses. A regression function for performance on hearing loss were generated. Using identical tests, data were collected from approximately 60 profoundly deaf children who had been fitted with cochlear implants. Using the regression function obtained from the hearing aid users, the implantees' speech perception scores were converted to "equivalent hearing loss." The cumulative distribution of equivalent hearing loss was used to estimate the probability that a child with a given hearing loss would be expected to perform better with a hearing aid than with an implant. The data suggest that the hearing loss should be in excess of 105 dB before the odds in favor of superior performance with an implant are acceptably high. A factor analysis of the implantees data suggests four relatively independent factors that were labeled: perception, age, experience, and age-at-onset. [Work supported by NIH Grant No. 2PO1DC00178.]

8:30

3aSP3. Single- versus multichannel vibrotactile supplements to intonation and stress by normal-hearing and hearing-impaired adults. Lynne E. Bernstein, Edward T. Auer (Ctr. for Auditory and Speech Sci., Gallaudet Univ., 800 Florida Ave., N.E., Washington, DC 20002), David C. Coulter (Coulter Assoc., Fairfax, VA 22031), Paula E. Tucker (Gallaudet Univ., Washington, DC 20002), and Marilyn E. Demorest (Univ. of Maryland Baltimore County, Catonsville, MD 21228-5398)

The possible benefit of a wearable, single-channel versus eight-channel tactile aid for conveying voice fundamental frequency (F0) was estimated in three experiments. Severely or profoundly hearing-impaired (HI) and normal-hearing (NH) adults identified position of stressed words and rising versus falling intonation in sentences previously recorded for this purpose by Bernstein *et al.* [J. Acoust. Soc. Am. **85**, 397–405 (1989)]. In experiment 1, NH subjects performed the identification task in counter-balanced visual-alone (VA) and visual-tactile (VT) conditions. Both tactile configurations conveyed intonation but neither conveyed stress. In experiment 2, NH subjects performed the task tactile alone. Both stress and intonation were conveyed. In experiment 3, pre- and post-lingually HI subjects demonstrated effects of the aid for identification of intonation but not of stress. As in the previous study (Bernstein *et al.*, 1989), visual stress was highly accurate in all VA conditions and tactile information shown to be present in experiment 2 did not improve identification in VT conditions.

8:45

3aSP4. Automated derivation of phonemic spectral distribution in speech output of nonlinear hearing aids. Faye Erickson (Lexington Ctr., 30th Ave. and 75th St., Jackson Heights, NY 11347), Eddy Yeung, and Arthur Boothroyd (City Univ. of New York, New York, NY 10036)

Interactions occur between the temporal characteristics of nonlinear processing schemes and the temporal and spectral properties of speech. Uncertainties in the nature and extent of these interactions make it difficult to predict hearing aid performance with speech input. An option is empirical measurement, but the collection of spectral data on a sample of phonemic segments can be prohibitively time consuming. This paper describes progress toward the development of an automated process. Input is derived from digitized samples of connected speech in which the temporal locations of segments of interest are already known. Recordings of speech output are, themselves, digitized. Using a known onset marker, the segments of interest are automatically extracted, subjected to FFT transformation, and integrated over a moving 1/3-oct window. The intensities and frequencies of key spectral points from each spectrum are displayed on a graph of intensity versus frequency for