JADARA

Volume 6 | Number 2 Article 40

November 2019

Audiological Assessments of Hospitalized Schizophrenic Patients

Mary Doyle Rastatter
Chief, Speech Pathology and Audiology Section, Saint Elizabeth's Hospital

AUDIOLOGICAL ASSESSMENT OF HOSPITALIZED SCHIZOPHRENIC PATIENTS

By MARY DOYLE RASTATTER, Ed.D., Chief, Speech Pathology and Audiology Section, Saint Elizabeths Hospital

The audiologist is equipped with a strong and reliable armamentarium for testing the hearing of motivated and cooperative adults, who respond appropriately to verbal instructions and social reinforcement from the examiner. However, when for some reason conventional audiometric testing procedures fail to elicit a response or elicit inconsistent responses from a subject, the audiologist may question the appropriateness of his testing procedures (7,9). Since weak, inconsistent or absent response patterns may characterize the behavior of children, the metnally retarded and other "difficult to test" (10) populations, the audiologist has developed specialized procedures adapted for these particular groups.

A variety of procedures, which may be grouped into the category of play audiometry, has been developed for testing the hearing of young children. Methods of employing visual or tangible reinforcement have also been successfully applied with children. All these procedures are founded on the principle of operant conditioning (6,9); the child is taught to respond and to establish an association between the sound stimulus and the behavioral response (3,6).

Recently Lloyd (5), Spradlin (13), Spradlin and Lloyd (14), Lloyd, Spradlin and Reid (7,8), working with children having varying degrees of mental retardation demonstrated that, in most instances, reliable audiological assessment of this often difficult-to-test group is possible when the method is adapted to the population.

Individuals with functional, or non-organic hearing impairments may be considered to represent another difficult-to-test group. In this case, to gain valid measures of auditory sensitivity may require the use of procedures not dependent upon voluntary responses. Tests which disrupt the individual's monitoring system, and thereby interfere with his ability to use a referent loudness level to falsify physiological thresholds may also be applied. Here again, however, the audiologist has developed a battery of tests designed to cope with the special characteristics of this population (2).

When it is further considered that hearing may be evaluated in such difficult-to-test groups as bats (15,16), goldfish (17), turtles (11), the Mongolian Gerbil (4) and other lower animals, it seems that the audiologist should be prepared to test the auditory function of most individuals, whatever the clinical setting in which they are encountered (7). Yet, a review of the literature demonstrates that one type of patient, potentially qualifying as difficult-to-test, has been rather grossly neglected: the hospitalized psychotic individual, in particular, the schizophrenic patient.

Studies of auditory behavior in schizophrenia have generally focused on perceptual-discriminatory abilities, such as frequency and signal-to-noise discriminations, or associated peculiarities, such as auditory hallucinations. However, the audiologist functioning in a psychiatric hospital setting is confronted with the problem of assessing, not the select or peculiar features of the schizophrenic patient's auditory behavior, but the functional status of his hearing for purposes of communication.

With chronic schizophrenic patients obtaining even basic audiometric pure-tone and speech data may be an arduous or nearly impossible task, depending on the degree of psychopathology. Conventional presentation methods and test stimuli may prove fruitless. For some patients, responses can be elicited readily with speech stimuli while pure-tones, presented at maximum audiometric output levels, yield no suggestion of hearing. Initially responsive patients may unpredictably cease to respond. A patient capable of following soft levels of conversational speech may volunteer no measurable responses to audiometric test stimuli. Response modes may be no more than subtle but stimulus correlated eye-blinks. The audiometric testing environment itself may function to trigger a sequence of auditory hallucinations that cannot be disrupted by the loudest of test stimuli. Considering this kaleidoscope of potential behavior, it is not surprising that audiological studies of psychotic patients are so few. Perusal of the literature fails to uncover any methods adapted for use with psychotic patients and only a minimum of information about the audiological assessment of these patients in general.

In a recent article dealing with listening problems of mentally ill patients, Briskey, Jansen and Merklein (1) state:

> Medical audiology has lagged in exploring auditory behavior of individuals with mental disorders. Except for the well-known phenomenon of hysterical deafness, no more than a score of studies have appeared over the past 30 years that deal specifically with the hearing problems of the mentally or emotionally ill . . . (1, p. 379).

The present study was designed to investigate the basic applicability or appropriateness of certain standard audiometric evaluation procedures as applied in a psychiatric hospital setting. Both method and behavioral

variables were studied in terms of their relative importance in the audiological assessment of chronic hospitalized adult schizophrenic patients.

After a review of the literature, the relevant behavioral variables selected for consideration were: diagnostic subtype (Schizophrenic reaction, Paranoid and Catatonic); a subject's ability to sustain attention (as measured by subtests from the Wechsler Memory Scale); and the response mode required (verbal and non-verbal). Audiometric method variables included: the approach to threshold (ascending or descending); auditory stimuli (pure-tone and speech); and instructions (standard and modified). In the interpretation of the results of this study, it should be remembered that the audiometric method variables were those subject to the audiologist's control. Thus, findings related to these variables should yield information of greater clinical importance when applied in the testing of chronic schizophrenics. The behavioral variables, on the other hand, were either intrinsic to the subject (Schizophrenia and attention) or at his discretion (response mode), and independent of the audiologist's manipulation.

The first step was to determine the reliability of auditory threshold measurements in the schizophrenic subjects when obtained by different assessment methods. The second step was to examine the relationship (gap) between the pure-tone threshold average of 500, 1,000 and 2,000 Hz (PTA) and the speech reception threshold (SRT) for the experimental subjects, to see if it compared to the clinically close relationship of 0 ± 5 dB which is expected in the audiometric testing of normals. This step permitted a judgment regarding the validity of the pure-tone results since the subject could not obtain an optimum SRT without hearing the speech but could exaggerate his pure-tone sensitivity with erratic responses.

Forty-eight subjects representing two groups of experimental subjects and a normal group, each with N = 16, were used. One experimental group was comprised of patients diagnosed as Schizophrenic reaction, Paranoid type; the other of Schizophrenic reaction, Catatonic type. Experimental subjects were selected on the basis of age, diagnosis, medication, length of hospitalization, audiometric test sophistication, verbal comprehension and absence of otorhinolaryngological problems. Control subjects met the same criteria where applicable.

Testing was conducted under controlled conditions in an Industrial Acoustics Company audiometric testing suite using a Beltone 15-C Clinical Audiometer for pure-tone stimuli and a Grason-Stadler 162 Speech Audiometer for live-voice speech presentations. Each subject received twelve tests in the initial battery and six retests.

The design of the present study utilized the suggestions of Rodnick and Garmezy (12) for enhancing the performance of schizophrenic subjects in experimental studies dealing with both schizophrenics and normals. A set of instructions was oriented for schizophrenic patients and was simple and repetitious in structure. Motor alternatives for responses were allowed, a practice session provided and, where possible, the materials colorful. The

experimental groups were homogenous with regard to sex, diagnostic subtype, verbal comprehension, and the other subject selection criteria.

The findings of the investigation showed that the schizophrenic subjects were reliable in their test-retest reliability as compared to the normal subjects. As mentioned earlier, the variables subject to the audiologist's control were those involving method: ascending or descending approach to threshold; pure-tone or speech stimuli; and standard or modified instructions. Applying the findings of this study using the clinically acceptable response range of ± 5 dB, it was found that all of these method variables were significantly relevant to the audiometric testing of schizophrenic patients. A descending approach for pure-tone tests exerted a significant influence on the pure-tone average for the Catatonics. Speech stimuli yielded significantly lower thresholds for Paranoids and Catatonics though only for the Catatonic group when using clinical criteria. Modified instructions also proved a significant variable, particularly for the Catatonic group.

When clinical and behavioral observations are combined, three findings seem important. First, the descending approach to threshold, whether used with pure-tone or speech tests, proved to be a much more efficient audiometric method. During tests utilizing ascending approaches there were greater periods of silence when patients would begin to hallucinate, become disinterested and inattentive to the task. To regain attention, this would require changing the intensity range as much as 60 dB, for example, before returning to determination of a threshold at 10 dB.

Second, speech appeared to be the more interesting and useful stimulus for the experimental subjects even though the means by which the SRT's were obtained did not prove statistically significant in producing better scores.

Third, beginning the tests with speech stimuli rather than beginning with pure-tones may be a more efficient method of testing chronic schizophrenic patients. It is certainly recommended that with difficult-to-test patients or more disturbed psychotic patients speech stimuli will provide more useful test material than pure-tones.

This study has examined the applicability of some fundamental audiological methods with a population that has been largely neglected with respect to its behavior during auditory testing and evaluation procedures. Although the field of Psychiatric Audiology is at present only in its ontogeny it is evident that infinite possibilities for research with the psychiatric population exist. Furthermore, since the accurate evaluation of hearing impairment may in some instances be a critical step in patient rehabilitation, it seems imperative that greater attention be devoted to this population.

Tangible reinforcement audiometry modified to meet the needs of the preoccupied, inattentive psychotic patient may offer a means for making pure-tone testing more interesting and valid. Signal-to-noise discrimination, the listening task required when masking is used, seems to pose particular

problems in audiometric assessment of psychotic patients. Yet some means is needed to obtain differential diagnostic information when the patient cannot manage the more complex listening task.

The present study has dealt only with schizophrenic patients. Regardless of the psychiatric diagnosis, the chronic hospitalized mentally ill patient should be recognized as a potentially difficult-to-test individual for whom audiometric evaluation procedures have not been adequately developed and are seriously needed.

BIBLIOGRAPHY

1. Briskey, R. J., Jansen, R. and Merklein, R. A. Listening problems of the mentally disturbed. *J. Aud. Res.* 6:379-383. 1966.
2. Chaiklin, J. B. and Ventry, I. Functional Loss. Ch. 3, pp. 76-125. J. Jerger (ed.) Modern Developments in Audiology. Academic Press. N.Y.
3. Donnelly, K. G. A vibro-tactile method of conditioning young children for hearing tests. L. L. Lloyd and D. R. Frisina (ed.) The Audiological Assessment of the Mentally Retarded: Proceedings of a National Conference. Parsons, Kansas: Speech and Hearing Dept., Parsons St. Hosp. and Tr. Center. 1965.
4. Finck, A. and Sofouglu, M. Auditory sensitivity of the Mongolian Gerbil (Meriones unguiculatus). J. Aud. Res. 6:313-320. 1966.
5. Lloyd, L. L. A Comparison of Selected Auditory Measures on Normal Hearing Mentally Retarded Children. Parsons Demonstration Project No. 46. Parsons, Kansas: Parsons St. Hosp. and Tr. Center. 1965.
6. Lloyd, L. L. Behavioral audiometry viewed as an operant procedure. *J. Speech Hearing Dis.* 31:128-136. 1966.
7. Lloyd, L. L., Spradlin, J. E. and Reid, N. J. Operant Conditioning Audiometry with Low-Level Retardates: A Progress Report. Parsons Demonstration Project No. 57. Parsons, Kansas: Parsons St. Hosp. and Tr. Center. 1966.
8. Lloyd, L. L., Spradlin, J. E. and Reid, M. J. Tangible Reinforcement Operant Conditioning Audiometry (TROCA) with Low-Level Retardates: A Progress Report. Paper presented at the National Convention of the American Speech and Hearing Association, Washington, D.C. 1966.
9. Lloyd, L. L., Spradlin, J. E. and Reid, M. J. The Application of TROCA (Tangible Reinforcement Operant Conditioning Audiometry) to the Testing of Infants. Parsons Demonstration Project No. 62. Parsons, Kansas: Parsons St. Hosp. and Tr. Center. 1966.
10. Meyerson, L. Pathways to the future in the audiological assessment of the mentally retarded. L. L. Lloyd and D. R. Frisina (ed.). The Audiological Assessment of the Mentally Retarded: Proceedings of a National Conference. Parsons, Kansas: Speech and Hearing Dept., Parsons St. Hosp. and Tr. Center.

11. Patterson, W. C. and Gulick, W. L. A method for measuring auditory thresholds in the turtle. *J. Aud. Res.* 6:219-228. 1966.
12. Rodnick, E. H. and Garmezy, N. An experimental approach to the study of motivation in schizophrenia. M. R. Jones (ed.) Nebraska Symposium on Motivation. Univ. of Nebraska Press. Lincoln, Nebraska. 1957. pp. 109-184.
13. Spradlin, J. E. Operant principles applied to audiometry with severely retarded children. L. L. Lloyd and D. R. Frisina (ed.). The Audiological Assessment of the Mentally Retarded: Proceedings of a National Conference. Parsons, Kansas: Speech and Hearing Dept., Parsons St. Hosp. and Tr. Center. 1965.
14. Spradlin, J. E. and Lloyd, L. L. Operant conditioning audiometry (OCA) with low-level retardates: a preliminary report. L. L. Lloyd and D. R. Frisina (ed.). The Audiological Assessment of the Mentally Retarded: Proceedings of a National Conference. Parsons, Kansas: Speech and Hearing Dept., Parsons St. Hosp. and Tr. Center. 1965.
15. Vernon, J. A., Dalland, J. I. and Wever, E. G. Further studies of hearing in the bat, Moytis Lucifugus, by means of cochlear potentials. *J. Aud. Res.* 6:153-164. 1966.
16. Vernon, J. and Peterson, E. Hearing in the vampire bat, Desmodus Rotundus, Murinus, as shown by cochlear potentials. *J. Aud. Res.* 6:181-188. 1966.
17. Weiss, B. A. Auditory sensitivity in the goldfish (Carassius Auratus). *J. Aud. Res.* 6:321-336. 1966.