

Procedures for Examining the Perceptual Capabilities for Processing Speech Sounds in Children under Two Years of Age*

Relatively little work on the perceptual capabilities of young infants has been done because of the difficulties encountered in obtaining the cooperation of the child. In the past year we have examined the feasibility of using two techniques that might prove useful.

- (1) For working with newborn and very young children we have looked into the possibility of using some facilities already available in the Pediatrics Department of the Johns Hopkins Hospital. This equipment has been set up by Dr. James Heriot for use in assessing auditory function in infants. As the system is designed now, the child is placed in a specially constructed crib which is sensitive to the frequency and intensity of his body movements. This activity is sampled 100 times per second, digitalized and recorded on magnetic tape for processing on a computer. Provisions have been made for presentation of auditory material in any sequence desired. The system is flexible enough to permit virtually any sort of experimental paradigm.

To check out the apparatus, we have run a newborn less than 24 hours old on a set of 48 stimuli consisting of either a

1000 cps tone, a synthetic /æ/ or a synthetic /ε/. Signals were presented over headphones at 80 dB SPL for 5 seconds with intervals varying from 10 to 30 seconds between stimuli. The primary purpose was to determine whether these stimuli would produce changes in the general activity as sensed by the accelerometers installed in the crib bedding. On 10 of the 48 presentations, changes in activity were noted by simple observation of the records for the five seconds preceding and during the stimulus. In seven cases, intensity of activity increased while in three cases it decreased. Presentation at a higher level probably would have produced changes in a greater number of cases.

One method that we plan to investigate for evaluating discrimination capabilities consists of presenting the same stimulus a number of times until no change in activity is noted. At that point, a different stimulus is presented and any change in the response measure recorded. Using this procedure one may be able to determine whether newborns and young infants perceive a difference between selected sounds such as a pure tone vs. a vowel or /da/ vs. /ta/.

- (2) To examine the perceptual capabilities of older children (between 1 and 2 years of age) techniques involving discrimination training may prove effective. In anticipation of this approach, we have built an electrically operated two lever discrimination apparatus. This machine permits operation of a wide variety of conditioning paradigms. It controls a tape recorder for presentation of stimuli and slide projector for presentation of reinforcement slides. A polygraph serves as an event recorder. One way in which it might be employed to determine whether a

child can perceive a difference between speech sounds (for instance /d/ and /t/) would be to attempt to train him to pull one lever following presentation of /d/ and the other lever for /t/. Appropriate control stimuli would be introduced to make sure that any lack of learning was not due to inattention or inability to perform on the apparatus.

Experience with a few children between one and two years of age has shown the necessity of breaking up the training phase into a series of steps. The first step consists of acquainting the child with the apparatus in a one lever-situation. During this stage no auditory stimuli are presented. The child simply learns that if the lever is pressed, a colorful slide appears on a screen in front of him. Our efforts to date have led to a considerable refining of the most workable procedures in this first stage. The kinds of slides most attractive at this age, the design of the chair and positioning of levers, the amount of time each session can last without fatiguing the child and other factors affecting a smoothly running experimental session have been worked out. In the next step we plan to introduce an auditory stimulus which will signal the operability of the lever for a short period and then finally in later steps introduce a second lever and another auditory stimulus.

Malcolm S. Preston
Juliet Phillips
Grace Yeni-Komshian

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