

Dichotic Delayed Auditory Feedback in Normals and Stutterers*

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In the present study, Delayed Auditory Feedback (DAF) speech was used in a dichotic condition. Fifteen normals and fifteen stutterers between the age range of 16 to 25 years were taken for the study. All the thirty subjects underwent a pre-experimental condition, where they read a 'one minute' passage in English under Normal Auditory Feedback (NAF) condition to both the ears at 95 dB SPL. The time taken to read the passage, articulatory disturbances and fluency changes were noted down for normals and stutterers. After a rest period of 45 seconds, they were exposed to the II, III and IV experimental conditions.

In the II experimental condition, DAF speech was given to both the ears simultaneously at 95 dB SPL. In the III experimental condition, DAF speech was given to right ear and NAF speech to left ear simultaneously at 95 dB SPL. In the IV experimental condition, DAF speech was given to the left ear and NAF speech was given to the right ear simultaneously at 95 dB SPL. The time delays used in II, III and IV conditions were approximately 0.1 sec, 0.2 sec. and 0.3 sec. The time taken to read the other 'one minute' passages were noted down. Other speech changes were

noted down by the investigator by listening to the tapes.

Repetitions, hesitations, prolongations, substitutions, additions and omissions of sounds, syllables, words or phrases were considered as speech errors in normals. In stutterers, uniform and easy prolongations were taken as changes towards fluency. So, repetitions, hesitations, substitutions, additions and omissions of sounds, syllables, words or phrases were considered as speech errors.

An Ahuja tape recorder with an extra replay head, which had an extra motor, formed the DAF unit. An Ahuja microphone picked up NAF speech fed it to an Arphi amplifier and to one or both earphones of TDH-39. An Ampex microphone collected DAF speech, fed it to the tape recorder and the speech was replayed after 0.1 sec., 0.2 sec. or 0.3 sec. delays to an Arphi amplifier. The DAF speech was fed back to one or both the TDH-39 earphones.

Non parametric statistics were applied to analyze the data.

Conclusions

The following conclusions were made from the results :

- (1) DAF could be used as a dichotic listening task to evaluate cerebral dominance. The delay to right ear

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with NAF to left ear produced significantly greater number of speech errors than delay to left ear with NAF to right ear, showing a clear concept of dominance in normals.

- (2) In stutterers, there was no significant difference in speech errors between ${}^R\text{DAF}-{}^L\text{NAF}$ and ${}^L\text{DAF}-{}^R\text{NAF}$ conditions. Even though stutterers had more speech errors under ${}^R\text{DAF}-{}^L\text{NAF}$ than ${}^L\text{DAF}-{}^R\text{NAF}$ condition, the magnitude of difference was not significant. The lack of a clear-cut dominance in stutterers was thus supported.
- (3) Normals showed a significant increase in speech errors under DAF. In stutterers, there was a general reduction in stuttering.
- (4) Monaural DAF (${}^R\text{DAF}-{}^L\text{NAF}$) was as effective as binaural DAF (${}^R\text{DAF}-{}^L\text{DAF}$) at certain time delays.
- (5) ${}^L\text{DAF}-{}^R\text{NAF}$ condition seemed to be the least disturbing condition.
- (6) Mild stutterers behaved like normals under DAF and the severe stutterers showed a decrease in stuttering under DAF.
- (7) An optimal delay of 0.2 sec. under ${}^R\text{DAF}-{}^L\text{NAF}$ condition was found to cause maximum speech disruption in

normals. In stutterers, an optimal delay for fluency could not be found.

- (8) In the time taken to read the 'one minute' passages, normals and stutterers behaved similarly. Both took longer time to read under DAF conditions than under NAF.

Recommendations for Further Research

- (1) Stutterers should be classified on the basis of severity and the effect of DAF on each group should be noted.
- (2) The DAF equipment needs more precision and calibration.
- (3) Intensity levels could be varied with different time delays. Other types of speech disturbances and emotional disturbances under DAF could be studied.
- (4) As normals and stutterers were found to have misarticulations under DAF, cases with misarticulations should be put on DAF to see its effect.
- (5) The effect of masking noise, anaesthesia of the oral cavity and DAF could be tried on normals and stutterers.
- (6) DAF with variable time delays could be devised. The point at which the first speech disturbance occurs under each time delay could be noted.