

The search was limited to articles originally written in the English Language that were published after year the 2000 to reflect present research.

Some articles were retrieved by reviewing the references of relevant articles to gather general knowledge on the issue. No limits were set on the date of publication of these articles. These articles were not specifically reviewed.

Selection Criteria

Only the studies that specifically dealt with measuring speech recognition ability in background noise with binaural and monaural amplification by older adults with symmetric sensorineural hearing impairment were included in the investigation. However, there was no restriction on the demographics of the subjects and outcome measures.

Data Collection

The above selection strategy generated a total of three journal articles. There were three repeated measure within-subject design.

Due to the nature of audiological research, blinding and randomization were not accomplished for any of the three articles reviewed.

Results

Articles:

Listeners Who Prefer Monaural to Binaural Hearing Aids

Carter et al. (2001) examined four different individuals with hearing impairment from Veterans Affairs Medical Center, Mountain Home, Tennessee. Participants' ages ranged from 52 to 79 years of age. All subjects had a mild to moderately severe symmetrical hearing loss with excellent word recognition scores (WRS) in a quiet environment bilaterally. WRS for right and left ears were not significantly different in quiet. Thus, subjects were similar in terms of audiometric configuration and word recognition performance in quiet. In addition, all subjects were initially fitted with in-the-ear (ITE) type hearing instruments binaurally. All four subjects were not satisfied with their aided hearing, particularly in a noise environment. The experience of the hearing aid usage ranged from 5 months to 9 months among the four subjects. They also reported on the use of monaural amplification: three of them wore in the right ear and one either in the right or the left ear, but not in both ears.

The subjects were examined for the free-recall condition and the directed-recall condition of the dichotic digit test. The free-recall condition requires a listener to reproduce all numbers that were heard through each ear, thereby testing cognitive processing such as memory. The directed-recall condition requires a listener to recall from only one ear, thereby testing central auditory processing ability. Therefore, there could be four patterns of response: both free-recall and directed-recall normal, free-recall worse than directed-recall, directed-recall worse than free-recall and both free and directed-recall abnormal. The latter two indicate a central processing deficit and either or both of these patterns were observed by all four subjects in addition to a poor left ear performance. The left ear deficit cannot be explained by the differences between right and left ears in the audiometry and word recognition score in quiet. These results indicated that all four participants had a central auditory processing deficit.

The second part of the study was done to investigate the relationship between the central auditory deficit and the performance in speech recognition in background noise with monaural amplification, both right and left and unaided as a control, and with binaural amplification.

In order to generate a simulated noisy environment, a computer program was developed to generate a simulated noisy environment (Carter et al., 2001).

than with a left ear monaurally aided, or binaurally aided. This finding further supports the idea of binaural interference, when signals presented in the right ear would interfere with the left ear processing (Carter et al., 2001; original source, Chmiel et al., 1997). There were some additional interesting findings. For example, subject three, who indicated that he would prefer to wear a hearing instrument either in the right or the left ear, but not both, achieved a higher a word recognition score for the binaural condition when NAL-R & Directional Microphone amplification strategy was used. Only with the FM system was the binaural condition higher than with both monaural conditions and the word recognition score was similar to that obtained in quiet. Moreover, aided left ear score was

disproportion. Each had a mild to severe symmetrical sensorineural hearing loss bilaterally. Twenty one subjects had less than one year of experience with binaural amplification and the remaining subjects' experience ranged from 14 to 32 months. Speech recognition ability in quiet was tested using AB open-set monosyllabic words list in the Hebrew language. The scores of the subjects ranged from 60% to 100% bilaterally. Mean scores for the right and left ears were 89.2% and 87.8%, respectively. Subjects wore various styles of hearing instruments. There were 15 subjects with in-the-canal (ITC), 5 subjects with in-the-ear (ITE) and 8 subjects with behind-the-ear (BTE) hearing instruments. However, all hearing instruments came from one manufacturer. This can act as a confounding variable since hearing instruments' performance is not necessarily identical across hearing aid manufacturers. In addition, a limitation lies in the fact that all subjects were Hebrew speakers. This may restrict the study's application to a native English speaking population

