Editorial
Special Issue on Auditory Deprivation

In this special issue of the Journal of the American Academy of Audiology, guest editor Shlomo Silman has assembled a series of invited papers by international experts on an important contemporary issue, the effects of impoverished sound input on speech understanding.

There is growing evidence that, when an ear is deprived of sufficient sound stimulation, the ability of the auditory system to process speech presented to that ear gradually declines. The phenomenon was first documented in 1984 by Silman and his colleagues, Stanley Gelfand and Carol Silverman. They followed, over a number of years, the W-22 scores of both the aided and unaided ears of veterans with bilateral symmetric sensorineural hearing losses who had been fitted monaurally and binaurally. Over the span of 4 to 5 years, there was no change in the average word recognition score of the monaurally and binaurally aided ears but a systematic decline in the average word recognition score of the unaided ear of the monaurally aided subject. Subsequently the phenomenon has been demonstrated in children with symmetric sensorineural losses, in adults with symmetric sensorineural losses, in adults with symmetric conductive losses, and in adults with asymmetric sensorineural losses. The phenomenon has been variously attributed to "deprivation," "acclimatization," and "inactivity."

Finally, Silverman and Silman found two cases in which individuals were fitted monaurally, followed for a number of years, then fitted binaurally. In both cases there was a decline in word recognition on the unaided but not the aided ear. Then, after binaural intervention, partial but not complete recovery of word recognition on the originally unaided ear.

Similar findings are reported in this issue by Ray Hurley. He presents nine cases in which speech recognition scores for both the aided and unaided ears of persons with bilateral sensorineural loss were measured systematically over periods ranging from 4.5 to 7.5 years after initial monaural amplification. In each case the "unaided ear effect" was striking and unmistakable. In each case, moreover, the originally unaided ear was ultimately aided. Results mirrored the original Silverman and Silman observation. After binaural fitting there was at least some recovery of speech recognition ability on the originally unaided ear. A further complication arose, however. In six of the nine cases the binaural fitting was successful. But three of the nine rejected the binaural arrangement and opted for the original monaural configuration. After a brief trial period these three individuals indicated that one hearing aid was preferred over two. Such a result is not inconsistent with the "binaural interference" phenomenon described by Jerger, Silman, Lew, and Chmiel in the March 1993 issue of the Journal.

Using both behavioral and electrophysiologic techniques, these investigators showed cases of elderly individuals in which binaural stimulation produced a poorer response than stimulation of just one ear. The phenomenon could be demonstrated both with and without amplification and using both evoked potentials and behavioral measures of speech understanding. The authors speculated that the
“binaural interference” phenomenon may represent a late stage of the monaural deprivation effect, in which the decline on the deprived ear is so severe that input to that ear actually interferes with the processing of speech signals through the relatively less deprived ear.

These observations on the effects of auditory deprivation may have profound implications for the use of amplification by all persons with sensorineural hearing loss, but especially for elderly persons suffering from presbyacusis. The growing body of converging evidence of deprivation effects and binaural interference suggests that, at the first sign of sensitivity loss, the elderly individual probably should be fitted immediately with binaural amplification. It may very well be that only such intervention can effectively counter the potentially serious deprivation effects resulting from lack of normal auditory stimulation. The evidence seems to point to the conclusion that to fit an elderly person monaurally is to invite speech processing deficits, which eventually may become permanent and perhaps lead to a situation in which binaural interference subsequently prevents the successful use of binaural amplification.

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Editor-in-Chief

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