

## Critical Review: Can the use of amplification prevent the effects of auditory deprivation in adults with sensorineural hearing loss?

Jason Cheung

M.Cl.Sc (AUD) Candidate

University of Western Ontario, School of Communication Sciences and Disorders

This critical review examines the use of amplification in preventing the effects of auditory deprivation in adults with sensorineural hearing loss. Studies evaluated consist of (1) prospective clinical trials and (2) retrospective clinical trials. Overall, the research examined in this review does not provide substantial evidence for the use of amplification in preventing auditory deprivation. Results from these studies should be interpreted cautiously due to various limitations in their designs and methodologies.

### Introduction

Arlinger et al., (1998) define auditory deprivation as a systematic decrease in auditory performance associated with the reduction in acoustic information. (p. 10)

amsfh#

search (as listed to studies reported in English and including human subjects. Additional articles were obtained through the reference lists of acquired articles.

#### Selection Criteria

Retrospective and prospective studies that evaluate the effects of auditory deprivation on a variety of measures in adult subjects (with 6SS517) were included. Case series and single subject design studies were not



The testing regime included the following: (1) pure tone air conduction audiometry (2000/000 18, pure tone bone conduction audiometry (2000/000 18, tympanometry, acoustic reflex) threshold testing and a number of speech tests. In addition to (or recognition testing (conducted using a standard recording (with C=D #A 22 D0 (or list at B0 6 S7 re S+')) and tape S+ testing, a 60 dB speech in noise (S/N=5) (with recording and a nonsense syllable test (5S')) (with recording (were utilized). Tests (were conducted to analyze the scores across all tests.

The researchers found no significant changes from the initial test to retest in the air conduction thresholds and S+ scores between the ears of the three groups. The researchers did not find a significant difference in test-retest scores between the ears of the control and bilaterally deaf group across all speech tests. In the monaurally deaf group, the authors found significant differences (p<0.05) between test and retest

studies evaluate the effects of auditory deprivation on individuals (who were not a participant, although this may have been the result of ethical considerations. The study conducted by Purley is not independent and is designed to not include a control group or a hearing subjects. Interestingly, Purley's study also found a deprivation effect "or several ears of the naturally able group. So explanation, however, (as proposed "or this observation. Purley's study evaluate individuals over a sufficiently (i.e. 18 and 20) "in 12 years. For the 1, 2 study conducted by Silman et al., the study followed individuals to only one year post fitting and may not have been of sufficient length in order to reveal further auditory deprivation effects. Although the S;=5 test is not reveal any potential deprivation effects, it may have been more representative of real world performance "or those subjects (with hearing loss. Moreover, this result brings into debate the significance of the auditory deprivation effect on real world functioning in individuals (who are naturally able. Altogether, these two prospective studies provide suggestive evidence "or the existence of an auditory deprivation effect in the unaided ear of a naturally able individual.

#### Conclusion and Clinical Implications

Some of the studies evaluate in this critical review demonstrate a significant decrease in audiometric thresholds "or the unaided ear over time. It is likely that the auditory deprivation effect may not be only due to changes in the peripheral auditory system, but also in the central auditory system (Silman, 1998). Therefore, it is crucial to control "or factors such as age or cause of hearing loss (when conducting prospective research on auditory deprivation. Features such as data logging that are present in most digital hearing instruments to aid should be used in future studies as they provide an easier and more reliable method "or monitoring hearing aid usage. As discussed earlier, conventional speech testing may not be the most appropriate method "or measuring the effects of auditory deprivation. Researchers may wish to implement tests that measure the potential effects of auditory deprivation on other components of auditory functioning.

Although the studies evaluate in this review point to a possible auditory deprivation effect, the quality of evidence provided by these studies is