

## GUEST EDITORIAL

### Teaching Old Dogs

Science progresses by challenging established wisdom, but scientists sometimes need reminding of their own principles. Consider 'what everybody knows': *as people grow older they suffer declines in sensory functions*. Add the dictum that *correlation does not prove causation*. Mix well and apply to some recurring and annoying scientific writing.

Hearing impairment constitutes the most prevalent chronic physical disability in the United States. As of 1991, the National Health Survey estimates that somewhat over 9 percent of the U.S. population has trouble hearing—a substantial increase from 1971 when the rate of impaired hearing was just under 7 percent. By 2015, a conservative projection places the national rate at 11 percent.

A major share of that increase will result from the aging of the U.S. population. The rates of impaired hearing by age in 1991 show a hefty correlation: less than 2 percent of persons under 18 years of age have trouble hearing compared to almost 30 percent of those 65 and older. When sample sizes permit analysis of ages past 65, the results show that the upward trend continues unabated. Furthermore, the same relationship between age and hearing loss appears regularly in data from other countries.

With this strong statistical backing, then, is it any wonder that occasionally scientific journals contain sentences like, *Age is the greatest cause of hearing impairment*? Even textbooks can be found with such a statement. Given the evidence and the inevitability of aging, is it not excusable? Or at least harmless? Neither. This misstatement is harmful, because carelessly speaking about hearing losses as "due to old age" misleads researchers and encourages poor clinical practices. Accepting hearing loss as inescapable encourages the public to ignore the efforts to prevent it and practitioners not to take measures to halt declines.

But the very evidence that encourages the misconception of age as a cause argues against that hypothesis. After all, as dramatic as a prevalence of 30 percent is, the obverse shows 70 percent do not have trouble hearing. For a researcher, it is also important to conceptualize the nature of the causal



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agent. What does Age look like? Is chronology a sufficient description of the aging process?

Alternatively, the Cumulative Insults hypothesis explains the correlation between hearing impairment and aging by the fact that the longer one lives, the more one is exposed to factors that can damage hearing. Traumas to the auditory system—such as, infections, ototoxic drugs, noise exposures—accrete. A minor insult may go

unnoticed, but, since CNS tissue does not regenerate, enough hair cells may be lost as the individual ages to reduce hearing ability significantly.

The Cumulative Insults hypothesis is optimistic as opposed to its competitor. It can benefit rehabilitation by directing attention: first, to preventing hearing loss and, second, to aggressively treating it when it occurs. It directs

researchers to identify ototoxins and to develop improved procedures for monitoring their effects. Moreover, ridding the notion of aging as a cause may lead researchers to challenge more vigorously the belief that human CNS tissue cannot be regenerated; hence, that damaged hearing cannot be repaired.

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