



Enhancing communication for older patients with impaired hearing through environmental design

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The Problem and Solutions

The listening environment can have a negative impact on speech understanding in older adulthood. Those include listening environments involving home, church, health care facilities, clinics, auditoriums, and the many other environments that possess natural or man-made barriers that can impede an older adult's ability to understand the speech of others. In a medical clinic, it is especially important that older patients are able to understand what physicians and nurses are saying to them!

Here are some examples of environments that can cause older adults with impaired hearing problems understanding the speech of others and some ways to assist them:

Problem Environments

Clinics, Meeting Rooms, Church Sanctuaries, Homes and Other Frequented Environments. Meeting rooms, medical clinics, nursing home all-purpose rooms, church sanctuaries, homes, auditoriums, bank lobbies, and many other environments in which older adults find themselves are generally not conducive to hearing and understanding speech. They either resemble reverberation chambers (too many almost subliminal echoes), or on the other hand, anechoic environments (environments in which sound has difficulty traveling to the listener because it is absorbed or blocked).

Numerous environments are constructed on those same principles. They are either square or rectangular in shape, with hard floors (tile, concrete, marble, or wood), sheetrock, concrete block, or brick walls, "acoustic" tile ceilings which are sound reflective, uncovered windows, glass covered pictures, and others. Further, most church sanctuaries have hard wooden pews, vaulted ceilings, stained glass windows, hard reflective walls, hard floors (except

for perhaps a strip of carpeting down the center aisle), all of which are sound reflective/reverberant surfaces.

The reflective surfaces described above cause speech and other sounds to reflect, or "bounce" from one surface to another, setting up reverberant echoes that distort sound, particularly complex sounds such as those of speech, and can play havoc with an impaired peripheral and central auditory system by distorting the sounds listeners are attempting to interpret. Persons with normally functioning auditory systems may not notice those distortions. However, persons with an aging peripheral and central auditory decline may have significant difficulty interpreting what is being said to them because of distortions resulting from the listening environment.

Homes

Typical home environments interact with sound in a manner that is the opposite of that found in the reverberant environments of churches and typical meeting or service environments. Homes are designed for comfort and are generally furnished in such a way that there are few, if any, reverberant characteristics. They become essentially anechoic chambers. That is, they do not give sound the "life" that is needed to travel well.

One may surmise, then, that if too much reverberation, or too many echoes, in a listening environment are bad for speech understanding, then a typical non-reverberant home environment should enhance hearing. That is not the case. Many homes designed with the principle of comfort in mind restrict the movement of sound by absorbing it before it can travel, thereby deadening it. Soft carpeting, window drapes, soft chairs and sofas, wallpaper, and heavily textured ceilings all absorb sound, so a complex acoustic signal such as speech cannot travel far enough to be

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heard well from any distance. Further, since speech comprises an extremely complex set of acoustic signals, it cannot negotiate stair wells (up or down), travel through doorways, or move around corners to be received by the listener well enough to be understood.

In a typical home environment, speech will not travel well further than about 7 feet in a straight line. If a speaker is any further than that distance from the intended listener, then it is important that the speaker move to no less than 6 - 7 feet from the listener.

Meeting Rooms, Clinics, Church Sanctuaries and Other Typical Listening Environments

As stated earlier, many environments in which older adults find themselves including meeting rooms, clinic rooms, restaurants, fellowship halls of churches, church sanctuaries, classrooms for continuing education, and others are essentially reverberation chambers.

The task is to reduce the reverberation/echoes to enhance the transmission and quality of distortion free speech so that it is more easily heard and understood.

The real task is to reduce the reverberation without removing the "life" of the room which supports the natural transmission of speech from the mouth of the speaker to the ears of the listeners. On the other hand, a good listening environment does not always mean adding carpet.

Here are some suggestions to consider and choose from. It is not intended that all of these are necessary to be added to change the listening environment. Choose one or two, and they should suffice if they are found to be the most appropriate:

1. Since most rooms in which meetings, classes are held or medical services provided are usually square or rectangular in their design, and thus are naturally reverberant resulting in echoes and distortion of speech, do whatever is necessary to do away with the square or

rectangular configuration.

2. Hang light attractively colored drapes to the sides of windows (not over the windows), the length being two to three inches above and about six to eight inches below the window. Or, if there are no windows, hang decorative light floor-to-ceiling drapes at a few strategic locations on the walls. Colors that blend or complement the existing colors of the room will add to the attractiveness of the environment and importantly will reduce echoes.
3. Muffle irrelevant noise. If there is a pop machine, ice maker or water cooler nearby in the hallway, make sure that it is either muffled, or quieted to the degree possible. If neither of those options are possible, have them moved to another location.
4. If there is an area that is used for food preparation attached to or near the meeting room, use heavy drapes to block off that area to quiet the noise of pots and pans, people talking and so on. If the finances are available, add a wall with a sliding door to block off that area.

Summary

In order to prevent the possibility of causing otherwise minor impairments of hearing to appear greater than they truly are, we must work in terms of supportive architecture, thereby preventing unnecessary impairments of hearing and speech understanding, vision, mobility, social competence, and mental competence.

The role of those who serve older adults who possess impaired hearing and/or central auditory function can expand to make sure that the design of the communicative environment enhances, rather than restricts communication. It is a tangible aspect of our services that provides almost immediate rewards on behalf of older patients in the social, medical, business, and personal aspects of their communicative lives.