

# School Safety Alert



*Are all school cafeterias created equal? NO. Although quiet cafeterias may be too much to ask for, certainly less noisy and more pleasant school cafeterias are achievable.*

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## Kids + Cafeteria = NOISE!

Cafeterias are often synonymous with noise. If you do an Internet word search on "cafeteria noise" or "noisy or loud cafeteria" you would find over 200 entries. A search on "quiet cafeteria" turns up about 40. Dictionaries often use noisy cafeterias as an example of the use of the adjective noisy. Those who study the ability to understand speech in noise often use what is called "cafeteria noise" as the noise source. It is a recording of many people talking at the same time.

This is especially true of the school cafeteria. Parent Teacher Associations (PTA's) and others call acoustical consultants looking for answers to this problem. Some cafeterias exceed the OSHA noise level of 85 dBA and causing cafeterias to begin accumulating noise dose. When visiting and measuring noise at one school, a frustrated teacher screamed into the microphone on the sound level meter (paraphrased) "It sure is loud in here isn't it?"

So what is the primary underlying phenomenon? Research has shown that signal to noise ratio (S/N) is the number one factor contributing to changes in voice levels used by adults. S/N is simply the difference in sound level between the signal (what someone wants to hear) and the background noise (what is interfering with someone hearing the signal). The S/N in a cafeteria is the difference in sound level of the person talking to the noise of everyone else talking measured at the listener's ear. When the S/N is poor, someone cannot be heard over the "cafeteria noise", the response is often to raise one's voice. This makes sense, after all S/N is also the primary factor affecting speech intelligibility (the ability to understand speech) in this setting. It has been thought that adults will all then raise their voices to some maximum sustainable voice level, until listening conditions improve again.

Why are some restaurants quiet and school cafeterias noisy? For starters, classroom acoustics

research has shown that children have a much greater difficulty understanding teachers and each other in noise and reverberation than adults do. Reverberation is the time rate of sound decay in a room. It is the liveliness or 'echoey' (made up word) character that is found especially in large rooms with mostly hard surfaces such as the typical large gym. In addition, the number of children in a cafeteria and seating densities are much greater than in adult cafeterias and restaurants. Quiet restaurants and adult cafeterias also have full acoustical ceilings, carpet, and padded furniture. Most school cafeterias have no more than a basic acoustical ceiling with mediocre sound absorption properties. Less absorption, more people talking, greater seating densities, and greater inherent difficulty understanding speech all mean much louder cafeterias.

What can be done about it? There has been anecdotal evidence that adults respond to improved S/N by lowering their voices, even if conditions are still not ideal. If this is true, and if it is also true for children, it could mean that, even a small improvement in S/N would result in children also lowering their voices, and therefore lower noise levels.

How can the S/N be improved? S/N can be improved by reducing the number of children talking (quiet periods, reading time etc.), reducing the number of children, adding sound absorption, or having a lower seating density. Many of these and other ideas can be implemented in designing better school cafeterias in initial construction. For instance, the use of more absorptive and full acoustical ceilings, and the addition of absorptive wall treatments. Reduction of seating densities. Reducing the number of kids talking may involve having outdoor play areas, or spreading lunch service over a larger period. With existing schools, often answers are limited to looking at adding sound absorption.