

A QUIETER SCHOOL: AN ENRICHED LEARNING ENVIRONMENT

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It is common knowledge to anyone administering a school that lunchrooms, gymnasias, and schoolyards are noisy and, in some cases, actions have been taken to lower the decibel levels in these facilities. However, are administrators aware of the noises to which children are exposed within their classrooms - from the hallways, nearby classes, heating and ventilation systems, adjacent highways, overhead jets, holes cut in walls for electrical wiring or sprinklers, appliances, or over crowdedness? Even if aware, have they done enough to quiet these classrooms? The aim of this article is to alert school administrators to the effects of noise on children's cognition, reading skills, and learning ability and to suggest ways they can participate in the growing worldwide effort to lessen the din - not only in the school but in children's homes and wherever else children are exposed to noises. Noises are not only hazardous to our children's mental abilities but to their overall well-being as well.

Noise and Hearing

That loud sounds may be harmful to hearing has been accepted for many years but do we realize the number of people suffering actual hearing loss from noise is huge (Bronzaft, 2002)? Of the over 28 million people suffering from hearing loss in the United States, it has been estimated that approximately ten million of these people suffered damage to their hearing because of exposure to noises, primarily in the occupational setting. However, with the introduction of headsets, video arcades, stereo systems and outdoor recreational vehicles, loud noises are not simply confined to the occupational environment. Many people, including children and adults, are now being exposed to very loud sounds in their homes and recreational settings, making them more vulnerable to potential hearing loss. Children attend movies that are too loud, play their video games with loud audio attachments, often walk around with headsets set at high levels, and in too many schools eat in lunchrooms and play in gymnasias that are far too loud. Even at very young ages, children are playing with toys that have been measured at levels exceeding 120 decibels.

Noises Don't Have to Be Loud

Noise has been frequently associated with loud sounds but sounds need not be loud to be disturbing, intrusive, and bothersome. Rather noise should be defined as unwanted, uncontrollable or unpredictable sounds that intrude upon our activities. Noisy neighbors can make it difficult for a child to read, do homework or fall asleep. Several children whispering in the classroom can make it especially difficult for the teacher to transmit information to those children who are listening. A passing elevated train or an overhead jet can bring classroom teaching to a halt.

Impact of Noises on Children's Mental Development

Thirty years ago, Cohen, Glass and Singer (1973) found that children who lived on the lower floors of an apartment complex, which exposed them to nearby traffic noise, had poorer reading scores than

children living in the same complex but on higher floors. In their study conducted over twenty years ago, Wachs and Gruen (1982) found that noise in the home impaired a child's cognitive and language development. Noise in schools can also impede the learning process. Bronzaft and McCarthy (1975) examined the reading scores of children attending classes facing a noisy elevated train structure and compared their scores with children attending classes on the quiet side of the building. They found that by the 6th grade, children on the noisy side of the building were nearly a year behind the students on the quiet side. Children exposed to the noisy trains complained that the noise made it difficult for them to think and their teachers complained that they came home more exhausted after teaching in these noisy classrooms. Several years later, after noise-absorbing materials were installed by the Board of Education in the ceilings of the classes facing the tracks and the Transit Authority installed resilient-rubber pads on the adjacent tracks, lowering the noise levels in the classrooms significantly, the reading scores of the students on both sides of the building were examined and now both sets of children were now reading at the same level (Bronzaft, 1981). When something is done to lessen the noise in classrooms, students do better! Bronzaft (2002) provides a more extensive review of the studies that have found that noise interferes with learning.

By contrast, in interviews of older high academic achievers, all members of Phi Beta Kappa, Bronzaft (1996) found that they tended to be reared in homes that respected quiet. These academic achievers remembered that their parents provided them with quiet places to study, read, and think; that television and radios were not blasting in the background, as so often is the case today, when the family sat down for dinner; and that their parents did not generally discipline them by shouting or screaming but used soft, firm voices and disapproving looks. In homes where parents and children share quieter times, there are also more opportunities for parents and children to talk, e.g. at dinner time, children can discuss their work at school or ask for parental advice on numerous matters. One could conclude that the quiet in the households of these high academic achievers contributed to their academic success, as well as to the professional and personal success most of them attained in later life.

Quiet learning environments are a benefit to all students, but most important to students with a hearing disability. These students need a signal to noise ratio on the order of 20 decibels (the teacher must be 20 decibels louder than the background noise). Students in general need at least a 10 decibel signal to noise ratio. By contrast, a survey of actual classroom conditions in schools indicated a Speech to Noise ratio range from +5 decibels to -7 decibels.

Despite Knowledge of Noise Impacts, Remedies Lag Behind

Despite the information provided by the many studies that have confirmed the adverse impact of noise on classroom learning (Federal Interagency Committee on Aviation Noise, 2000), too many of our nation's children are still attending schools situated near noisy highways and elevated trains and within the paths of roaring overhead jets. Although there are funding programs to abate intrusive aircraft noises at schools, those parents and school administrators who are aware of such funds have to put up a good fight before these funds are received, if at all.

Additionally the Federal Aviation Administration (FAA) has decided that qualifying schools must lie within a determined noise contour. This stringent standard has disqualified schools from receiving funding even though they are still exposed to unseemly aircraft intrusions. In their recent study of aircraft noise impacts at several schools near International Newark Airport in New Jersey lying outside the FAA accepted noise contour, Chen and Charuk (2001) found: "Noise during aircraft fly-overs can impact school instructional areas even if the school is not within the DNL 65dBA contour line." Aircraft noise is very likely interfering with learning in these schools.

Many of the most disruptive noise sources are not external to the school, such as jets overhead, but

internal. Heat pumps, air-conditioners, and air-handling systems are major classroom noise sources, sometimes located only feet from students. A host of classroom appliances may distract students and make hearing the teacher difficult, including computers, printers, and projectors. Finally, poor acoustical design unnecessarily creates poor learning environments. Open school plans, poor choices for walls, ceiling, and floor materials and inappropriate location of noisy equipment all lead to impoverished learning environments. Good acoustical design seeks to minimize noise while enhancing the sound transmission between the teacher and students.

Promoting a Quieter School Environment

Designing a Quieter School

Educators should be more actively involved in the design of school buildings and familiarize themselves with design features that emphasize quiet. Several resources are available: [Classroom Acoustics I and II](#) and "[Classroom Design for Good Hearing](#)" by Ewart A. Wetherill provide an excellent overview of good acoustical design and its importance. It is critical to realize that classrooms are either quiet or noisy by design. New standards just adopted by the [American National Standards Institute](#) provide important guidance for school administrators considering school construction or renovation.

Abating Noises from Outside the School

With so many schools located near noisy highways, railroads, and airports, principals need to become advocates for lessening the noises from these outside sources. For example, they should inquire as to whether their schools are entitled to city, state or federal funds for noise abatement if these schools are situated too close to a highway or airport. They should be aware of projects to widen highways or expand airports and inform the authorities of the potential impacts on their schools. Twenty years ago, when the principal of P. S. 98 in New York City learned that the Transit Authority was installing noise abatement materials in subway stations, he attended public hearings to urge the transit agency to consider installing abatement materials on the tracks adjacent to his school. He also garnered the support of parents and public officials in his undertaking. As a result, P.S. 98 was the test site for the installation of a new rail fastener to lessen noise on elevated train tracks.

Fostering Quiet in School

Not only should schools design for quiet, they should teach the value of quiet. The League for the Hard of Hearing's Stop the Noise program and their viewer-friendly website (www.lhh.org/noise) with educational materials that can be printed for distribution should be very helpful to teach children the positive effects of quiet in their lives and the hazards of noise. The children's book, Listen to the Raindrops, that I have written with illustrator Steven Parton to teach young children about the beauty of good sounds and the dangers of noise is highlighted on the League site. This book can serve as a teaching aid in the classroom and the school library.

So many of the noises that intrude upon us stem from a lack of respect for the rights of others to quiet. By teaching our children to respect others, they will come to understand that they cannot turn up their home stereos loudly or run through a school hallway shouting or speak loudly in a classroom. Should students lower their voices, then teachers may have less need to shout or use loud whistles and bullhorns to control their students. This does not mean that students can never raise their voices at school games as

they root for the home team; there are indeed times when being somewhat louder is tolerable.

Principals and teachers should also examine ways that they can lessen the noise in the school. Teachers have often complained about the piercing sounds of fire drills and principals could investigate whether these sounds could be softened and still serve their primary goal to alert students to danger. Principals can indeed set the tone that a quieter classroom benefits both the teacher and the student.

A Final Word Parents, educators, and caring citizens must join together in abating the noises that are engulfing our children. Then all of us will reap the benefits of a quieter, saner and healthier environment.