Identifying Minimal Hearing Loss and Managing Its Effects on Literacy Learning

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Abstract

Minimal hearing loss is an often undiagnosed condition that has a negative impact on literacy acquisition. Minimal hearing loss affects a substantial percentage of students, particularly those who struggle with literacy. Research has demonstrated that between 50% and 80% of children with learning disabilities do not pass their hearing screenings. Such a high hearing screening referral rate highlights the importance of understanding the effects of minimal hearing loss in schools and working collaboratively with other educational professionals to manage minimal hearing loss. In this article, we present action steps that educational professionals can follow to identify students with minimal hearing loss and develop educational plans for students these students.

Keywords

Elementary, Secondary, Hearing Loss/Deafness, Specific Learning Disabilities, Reading/Literacy, Professional Collaboration
Introduction

“I have trouble hearing my teacher sometimes.” -Nick (pseudonym), a first grader, when asked what he thinks is the hardest thing about learning to read. No one had previously suspected hearing loss as a factor in his literacy struggles.

It is well established that students who have moderate to profound hearing loss may experience difficulty in learning how to read and write and can benefit from modifications to the classroom environment and curriculum (e.g., Moeller, Tomblin, Yoshinaga-Itano, Connor, & Jerger, 2007). Minimal hearing loss, however, often goes undiagnosed, and its negative impact on literacy acquisition is less widely known (McCormick Richburg & Hill, 2014). Figure 1 illustrates the different degrees of hearing loss (Clark, 1981). Minimal hearing loss encompasses the “slight” and “mild” hearing loss categories. Students with hearing loss in these ranges are able to hear environmental sounds and participate in conversations but may have difficulty with some specific speech sounds and soft speech. Minimal hearing loss can make listening in classrooms particularly difficult, where background noise is a persistent problem (Knecht, Nelson, Whitelaw, & Feth, 2002).

![Figure 1. Degrees of Hearing Loss (Clark, 1981)](image-url)
In this article, we discuss minimal hearing loss and its effects on literacy learning, demonstrate how minimal hearing loss affects a large portion of school-age children who struggle with literacy, and propose an action plan for identifying and managing educational issues related to minimal hearing loss in schools. Box 1 displays probing questions to guide your reading.

**Box 1. Probing Questions for Teachers and Educational Professionals**

1. Think about students who struggle with literacy. How does knowing the prevalence of undiagnosed minimal hearing loss affect the way you think about struggling readers and writers?
2. If you suspect a student might have minimal hearing loss, what can you do as an educator or parent to best support his or her literacy acquisition?
3. What challenges might you encounter in ensuring all your students have had recent hearing screenings or in making modifications to alleviate classroom noise?

**Minimal Hearing Loss and Its Effects on Literacy Learning**

Children with minimal hearing loss are a heterogeneous group. The term “minimal hearing loss” encompasses several diagnostic categories (Bess & Gravel, 2006):

(a) permanent mild bilateral pure-tone averages (500, 1000, 2000 Hz between 20 and 40 dB HL), or

(b) permanent unilateral hearing loss (normal hearing in one ear; pure-tone average greater than 20 dB HL in affected ear), or
(c) unilateral or bilateral permanent high-frequency hearing loss (air conduction thresholds greater than 25 dB HL at two or more frequencies above 2000 Hz), or
(d) permanent or temporary conductive hearing loss due to fluid in the ears (e.g., because of an ear infection).

Additionally, minimal hearing loss is not rare in school-age children. Estimates of the prevalence of minimal hearing loss range from approximately 10 to 40% of students. Using the above criteria (a – c), Bess, Dodd-Murphy, and Parker (1998; 2006) reported that 10.97% of 3rd grade students in an urban Tennessee school district exhibited minimal hearing loss. Likewise, Niskar et al. (1998) reported that 14.9% of school-age children exhibited hearing loss. The majority of hearing loss in Niskar et al. was unilateral and/or slight in severity; however, the authors did not report the prevalence of specifically minimal hearing loss. When a threshold of 15 dB HL was used, Flexer (1989) reported that as many as 43% of students in a rural Ohio school district presented minimal hearing loss on any given day. In Denmark, Teasdale and Sorensen (2007) reported that 20% of adults had exhibited minimal hearing loss.

In terms of education, the term “minimal hearing loss” is a misnomer. Although the degree of hearing loss is slight or mild, research studies have shown that the effects of minimal hearing loss on students’ literacy learning can be enormous (Moeller et al., 2007). Children with minimal hearing loss perform lower than children with normal hearing across a range of language and literacy measures, including spoken and reading vocabulary and spelling (Bess et al., 1998; Wake, Hughes, Poulakis, Collins, & Rickards, 2004). Children with minimal hearing loss are also more likely to struggle academically (Yoshinaga-Itano, Johnson, Carpenter, & Brown, 2008). By 9th grade, almost half of children with minimal hearing loss have failed at least one grade (Bess et al.), and children in Denmark with minimal hearing loss were less likely to
continue to attend college preparatory high schools than children with normal hearing (Teasdale & Sorenson, 2007). It is important to note that in most of these studies the children with minimal hearing loss had not been previously identified, and were therefore not receiving medical management or education services related to their hearing loss. Finally, a substantial percentage of students who experience difficulty with literacy potentially have a minimal hearing loss that has been undiagnosed thus far in their schooling; estimates range from 50 to 80% (e.g., Flexer, 1989; Werfel & Hendricks, 2015; Yeates, 1995). The large number of students affected by minimal hearing loss underscores the importance of raising awareness about minimal hearing loss and its impact on literacy development.

**Action Plan for Educators**

There are a number of action steps that teachers and other education professionals can take to support students with minimal hearing loss (see Box 2).

**Box 2. Action Steps for Identifying and Managing Minimal Hearing Loss in Schools**

- Partner with your school’s audiologist, speech-language-pathologist, and/or teacher of the deaf to ensure students at your school receive regular hearing screenings, especially those students who struggle academically.
- If a student fails a hearing screening, communicate to parents the importance of following up with a full audiologic evaluation to determine whether the student has hearing loss. If the student is diagnosed with hearing loss, an IEP or 504 plan may be appropriate.
- Make changes to your classroom environment to alleviate background noise, and be prepared to provide extra literacy support for students with minimal hearing loss. Bonus: these changes benefit all students in the classroom, not just those with hearing loss.
- Team up with the other professionals at your school to develop and implement collaborative teaching plans for students with minimal hearing loss.
Action Step 1: Ensure Students, Especially Students who Struggle with Literacy, Receive Hearing Screenings

One of the most important first steps that education professionals can take to support children with minimal hearing loss is to ensure that their hearing loss is identified. It is important that hearing loss, including minimal hearing loss, is identified and a plan for managing the hearing loss and its academic effects is established. In many cases, classroom teachers may be one of the first professionals to notice that a student is struggling with literacy. Given the relation between minimal hearing loss and difficulty with literacy, teachers and educational professionals should consider whether minimal hearing loss contributes to students’ difficulty with literacy. Whenever a student struggles to learn in the classroom or appears inattentive, teachers should refer students to a school speech-language pathologist or audiologist for a hearing screening (ASHA, 1997).

Although teachers are not usually responsible for performing hearing screenings, they can work with the school audiologist or speech-language pathologist to ensure that students have had recent hearing screenings. A hearing screening is a quick preliminary test in which students’ hearing is checked to determine if further in-depth hearing testing is needed (ASHA, 1997). One of two results is possible from a hearing screening: pass or refer. Students who refer on the hearing screening need to follow up with a full hearing evaluation with a qualified audiologist. The audiologist can then make any referrals for additional medical evaluation and recommendations for hearing aids, if needed. For students who are diagnosed with minimal hearing loss after a full audiologic exam, particularly those who experience difficulty with literacy learning, developing a 504 plan or even an Individualized Education Program (IEP) is likely appropriate.
Action Step 2: Manage Minimal Hearing Loss in Schools

We suggest three main courses of action for managing minimal hearing loss in schools:

1) reducing the background noise in the classroom, 2) increasing the volume and clarity of the teacher’s voice, and 3) addressing the individual literacy needs for students with minimal hearing loss. The first way to improve the learning experience for students with minimal hearing loss is to reduce the background noise in the classroom and other teaching areas, such as speech-language therapy rooms, gymnasiums, and band rooms. Research has consistently shown that classroom noise is an almost universal problem; up to 97% of classrooms have background noise levels that are higher than the recommended level of 35 dBA (American Speech-Language-Hearing Association, 2005; Knecht et al., 2002). Background noise levels of this magnitude present a challenge to maintaining the desired signal (teacher’s voice) to noise (background noise) ratio of +15 dB (Nelson & Soli, 2000). Education professionals can take several steps to lessen noise in classrooms (see Box 3).

Box 3. Four Ways to Reduce Noise in Schools

1. Request that the school add acoustic tiles for better soundproofing.
2. Add felt to table and chair legs to lessen noise caused by moving them.
3. Add carpets, rugs, curtains, and cushions to absorb noise.
4. Use free apps to identify the noise level of classrooms.
5. Be aware of noise sources in the classroom and take steps to minimize.
   - turn off computers and projectors when not in use
   - replace noisy light fixtures
   - keep classroom doors and windows closed
   - turn off air conditioning and heating systems when not needed

A second way to improve the learning experience for students with minimal hearing loss is to increase the clarity of the teacher’s voice. We recommend two ways of increasing the clarity
of the teacher’s voice. First, children diagnosed with minimal hearing loss should sit as close to the teacher as possible. Proximity to the teacher can provide increased volume as well as increased ability to use visual cues to understand the teacher’s speech. Note that closest to the teacher is not always the front of the classroom (Goldberg & McCormick Richburg, 2004). Instead, students with minimal hearing loss should be seated closest to the place from which the teacher generally addresses the class. Teachers should remain mindful of the distance between them and students with hearing loss (no more than approximately 10 feet) and face the student when speaking (Crandell & Smaldino, 2000). We caution education professionals against using preferential seating as the only method of increasing the volume of the teacher’s voice (Flexer, Wray, & Ireland, 1989). Second, preferential seating should be accompanied by using a frequency modulation (FM) or classroom amplification system, such as Redcat or Topcat (Flexer, 1997). The teacher wears a microphone and his or her voice is amplified through either a receiver that the student wears or speakers in the classroom. In this way, the teacher’s voice is amplified even as the teacher or students move around the classroom. The student can wear an individual FM system throughout the school day, as he/she moves from room to room. Sound-field FM or classroom amplification systems are a good option as well, because all children in the classroom receive benefit from the amplified signal of the teacher’s voice. Newer sound-field FM or classroom amplification systems also have capabilities such as additional microphones for student use, allowing children with minimal hearing loss access not only to the teacher’s voice, but to classmates’ as well. Optimally, children with minimal hearing loss will be provided preferential seating and an FM/classroom amplification system. Additionally, education professionals should work with students with minimal hearing loss to learn how to advocate for themselves in terms of classroom placement and teacher use of their FM systems.
A third way to improve the learning experience for students with minimal hearing loss is to individualize literacy instruction. When a student has been diagnosed with minimal hearing loss, education professionals can work to provide tailored instruction, including spending extra time on small-group or one-on-one literacy intervention. We encourage educational professionals to be prepared to provide additional scaffolding for skills like phonological awareness, sounding out words, and spelling. For a description of a phonological awareness intervention that is effective for children with hearing loss, see Werfel and Schuele (2014). All of these skills require students to manipulate speech sounds, which is much more difficult to do when a student has minimal hearing loss.

**Action Step 3: Talk to Parents about the Importance of Managing Minimal Hearing Loss**

Because minimal hearing loss does not always affect a student’s ability to fully participate in conversations, parents often do not realize that hearing loss might be a contributing factor to their child’s literacy struggles. It is important, therefore, that education professionals convey to parents the importance of following-up with a full audiologic examination after their child refers on a hearing screening. If a full audiologic evaluation indicates that a child has hearing loss, education professionals can also convey to parents the importance of managing their child’s hearing loss. Parent training, including discussion of how accommodations at school (such as reducing background noise) can carry-over to the home, is an essential component of managing minimal hearing loss in students.

**Action Step 4: Foster Interprofessional Collaboration**

To ensure the success of students with minimal hearing loss, interprofessional collaboration is essential. Many students with minimal hearing loss may require 504 plans or IEPs. Classroom teachers, audiologists, speech-language pathologists, teachers of the deaf,
reading specialists, special educators, pediatricians, otolaryngologists, parents, and students should all play vital roles on the education team. Each of these groups of professionals has specialized training and experience, and by combining experience, they can create a plan for addressing minimal hearing loss in the classroom in ways that are not possible when each group operates independently. Many teachers already meet with other professionals in the school to plan lessons together, and some school districts specifically set time aside for interprofessional development and collaborative planning. Classroom teachers might consider meeting with speech-language pathologists, reading specialists, or special educators during these times to discuss ways in which they can come together to meet the needs of students with minimal hearing loss.

**Closing Thoughts**

Minimal hearing loss can affect almost half of students on any given day, yet most minimal hearing loss goes undiagnosed and unmanaged. Minimal hearing loss has negative consequences on students’ literacy acquisition, and classroom-teachers can play a vital role in the identification and management of minimal hearing loss in students. There are a number of resources available online that educators can use to inform parents about minimal hearing loss (see Box 4). When teachers, parents, and other educational professionals work together, proper management of minimal hearing loss can help alleviate the literacy difficulties experienced by many students who struggle to learn to read and write.
Box 4. Additional Resources for Understanding and Managing Minimal Hearing Loss

- More information about minimal hearing loss from the American Speech-Language-Hearing Association:
  http://www.asha.org/aud/articles/hearlosschild.htm


- Information for teachers or parents to share with other educational professionals about educational accommodations for students with minimal hearing loss:

- A book with a series of detailed lesson plans and materials aimed at improving phonological awareness in preschool and early elementary school:

- Results of a parent survey on services for school-age children with hearing loss:

- A video on the professional team working with children with hearing loss:
  https://www.boystownhospital.org/knowledgeCenter/Videos/Pages/Meet-Your-Early-Intervention-Team.aspx
References


