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The Deaf Education Context

The purpose of this chapter is to describe the context of deaf education in an effort to better understand how accountability reforms may affect students who are deaf or hard of hearing. One debated assumption about public primary and secondary education is that, as a whole, it is in great need of repair. Does this same assumption apply to the educational structures that serve students who are deaf or hard of hearing (Johnson, 2003b; Simms & Thumann, 2007; Steffan, 2004)? This chapter first discusses demographics of today's population of students who are deaf or hard of hearing—a diverse group with great variability in language use, educational experiences, and academic success. The chapter then briefly discusses educational placement and its relationship with how we evaluate potential effectiveness of accountability reforms. Students who are deaf or hard of hearing attend a variety of settings, for example, some attend schools for the deaf with specifically tailored instruction and cohorts of students who are deaf or hard of hearing, and some attend schools with very little Deaf-centered[1] pedagogy or student resources.

1. Designations of "Deaf" or "deaf" vary across individuals, groups, and contexts. In this volume, *Deaf* refers to contexts where the emphasis is on a cultural community or identify construct. Deaf communities and identities tend to include a signed language as primary means of communication (e.g., American Sign Language). If the original author refers to *Deaf* in his or her

Academic success depends largely on a student's ability to read; literacy development is a main area of concentration in the research literature on the effectiveness of instruction for students who are deaf or hard of hearing. This chapter therefore discusses several strands of research related to literacy development in deaf education. The chapter concludes with recommendations for how an understanding of the demographics of students who are deaf or hard of hearing the field might lead to advocacy efforts for this student population within accountability-based education reform.

Student Demographics

This first section discusses what we know about the prevalence of students who are deaf or hard of hearing in the United States as well as key characteristics of this diverse population. Three relevant themes to this discussion are that (a) students who are deaf or hard of hearing make up a low-incidence population; (b) many students who are deaf or hard of hearing have other disabilities; and (c) the growing use of cochlear implants may change the future linguistic and communication patterns among students who are deaf or hard of hearing.

For the purpose of this discussion of accountability reforms in public education, it is important to know how many students in the elementary and secondary grades (i.e., Kindergarten to Grade 12) have a hearing loss (Mitchell & Karchmer, 2005, 2006). The U.S. Department of Education estimates that a total of just over 72,000 deaf or hard of hearing students receive services under the Individuals With Disabilities Education Act (IDEA) nationwide (U.S. Office of Special Education Programs, 2004). This total does not count those deaf or hard of hearing students who are not eligible for IDEA. This number also does not include children for whom another disability is considered the *primary* disability. For example, if a child has both a learning disability and a hearing loss, but the learning disability is considered the primary disability, then that student would not be included in these totals for deaf or

discussion, I also adopt that descriptor. On the whole, the book uses "little-*d*" *deaf* because this form is the terminology used in education and policy circles. Furthermore, the collective term *deaf or hard of hearing* is used throughout the book to refer to individuals with a variety of characteristics, including different levels of hearing loss, use of amplification systems, and a range of communication systems.

hard of hearing students. Finally, these figures do not include many students who experience temporary hearing loss due to otitis media or other affecting conditions (Easterbrooks, 1999). The number of children in the United States who actually have a hearing loss will therefore be higher than the number who officially receive services in schools under IDEA. However, even if there are more than 72,000 students, the key point is that this group is still a very low-incidence population in the public schools (Blackorby & Knokey, 2006; Bowen & Ferrell, 2003; Mitchell, 2005). Through IDEA, U.S. public schools serve approximately 6 million students with disabilities; the estimated 72,000 students who are deaf or hard of hearing represent roughly 1% of the students with disabilities population.

Many students whose primary disability is categorized as deaf or hard of hearing also have other disabilities (Gallaudet Research Institute, 2008). Approximately 40% of students counted in the 2007–08 Gallaudet Annual Survey were listed as having an additional disability. In a national profile of students in the Special Education Elementary Longitudinal Study (also known as SEELS), about half of parents of students with hearing loss indicated that their child had an additional disability (Blackorby & Knokey, 2006). Additional disabilities include learning disabilities, speech impairment, cerebral palsy, mental retardation, emotional disturbance, and attention deficit disorder. As with the general population, the incidence of autism and autistic spectrum disorder is rising quickly among deaf and hard of hearing students (Vernon & Rhodes, 2009). A student who is deaf or hard of hearing with multiple disabilities will often face great challenges in attaining grade-level academic proficiency. Yet discussions of the implications of education reform on students with disabilities as a whole, including students who are deaf or hard of hearing, often do not take into account the significant challenges faced by students with multiple disabilities (Cawthon, 2007; see Guardino, 2008, for a summary and implications and Bruce, DiNatale, & Ford, 2008, for a discussion of needed professional development).

Before initiatives to identify children with hearing loss at an early age, diagnosis of students who are deaf or hard of hearing often came late into their language development years. As a result, many children had decreased exposure to language (either speech or sign language) during what is considered a sensitive period for language and cognitive development. The Universal Newborn Hearing Screening program, authorized by the Public Health

Service Act, Title III, Section 301, 42 U.S.C. 241, provides federal funds for states to screen infants for hearing loss before they leave the hospital (for a discussion of similar initiatives in other countries, see Storbeck & Calvert-Evans, 2008). In states with screening programs, children with potential hearing loss receive follow-up information and connections with resources within the community at the very earliest stages of language development.

Early identification of hearing loss has led to a greater emphasis on amplification and oral communication options for students who are deaf or hard of hearing (Vohr, 2003; Yoshinaga-Itano & Gravel, 2001). In the past few years, a growing number of children with the most significant hearing losses have undergone cochlear implant surgery (Belzner & Seal, 2009; Niparko & Blankenhorn, 2003). In a person with functioning hearing, the inner ear acts to convert sounds into electric impulses that are then sent to the brain (U.S. Food and Drug Administration, 2004). Although the cochlear implant does not create normal hearing, it can give auditory input to the brain to help process speech and other sounds (Barker & Tomblin, 2004). According to the Gallaudet Research Institute 2007–08 Annual Survey, approximately 14% of children attending schools or programs for deaf or hard of hearing students had a cochlear implant (Gallaudet Research Institute, 2008). Cochlear implants have been on the rise steadily over the last decade: cochlear implant use among children has grown by approximately 1% per year between 1999 and 2007. Although implantation trends may shift in the future, use of cochlear implants among students who are deaf or hard of hearing is currently experiencing a steady increase.

Cochlear implants have potentially far-reaching implications for the Deaf community (Christiansen & Leigh, 2002; Marschark & Spencer, 2006; Moores, 2006; Simms & Thumann, 2007). Proponents of cochlear implants view the procedure as medically safe and an effective means of giving deaf children access to the sounds of speech (Geers, 2002). Research has provided some evidence for increased speech and language outcomes when implantation is followed by consistent, intensive speech therapy (Blamey, Sarant, Paatsch, Barry, Bow, Wales et al., 2001; Geers & Brenner, 2004; Moog, 2002; Tomblin, Spencer, Flock, Tyler, & Gantz, 1999). Yet those who object to cochlear implants note the severity of brain surgery on those very young children within the population who cannot give informed consent (Lane, 1999;

Moores, 2006). Not all children who have an implant follow predicted trajectories of speech and language development (Duchesne, Sutton, & Bergeron, 2009) and often need to use sign language for effective communication (Moores, 2009; Nussbaum, La Porta, & Hinger, 2003). Furthermore, the level of speech therapy required is potentially intrusive and expensive given the possibly limited gain.

The above three demographic characteristics of students who are deaf or hard of hearing have implications for how we investigate the impact of accountability reforms on this population. First, low-incidence populations are often aggregated into summaries of student outcomes across multiple groups, so outcomes for those with characteristics or educational needs very different from those of students who are deaf or hard of hearing are often combined. Nevertheless, being a part of the larger "students with disabilities" umbrella may be beneficial when gaining access to resources such as those through the Americans With Disabilities Act of 1990. However, aggregation of low-incidence populations can also mask some of the unique characteristics of each subgroup, resulting in muddied waters for not only addressing educational needs but also implementing educational reform. As we will discuss further in Chapter 4, it is very difficult to determine the status of students who are deaf or hard of hearing under the current accountability system.

The second demographic characteristic is the presence of multiple disabilities. Additional disabilities add to the complexity of language, communication, and instruction for students with hearing loss. For example, a Deaf student who also has a learning disability may require additional support beyond a sign language interpreter to experience academic success. Most summaries of students who are deaf or hard of hearing rely on information from students who have a *primary* designation for hearing loss. Yet up to half of these students are likely to have a second disability. Summaries of academic performance based only on the primary disability reduce our understanding of how students who are deaf or hard of hearing fare under educational reform. Inversely, some students with hearing loss have other primary disabilities and, thus, may not be recognized as a member of the deaf or hard of hearing subgroup. Most performance summaries of students who are deaf or hard of hearing do not include students with hearing loss as a secondary disability. The goal of accountability reform is to make measures of student

achievement more transparent. For students who are deaf or hard of hearing, it is necessary to include both groups—students with primary *and* secondary hearing loss designations—to meet that goal.

Third, the use of cochlear implants with children, discussed above, brings with it some evidence for improved speech and language in particular circumstances, but it also brings its own set of controversies and concerns. Evidence of improvements must be further verified, and concerns, not only for safety and health reasons but also for financial reasons, need to be addressed.

In summary, heterogeneity in the deaf and hard of hearing population has always been a challenge for the field. When making recommendations about changes for instructional strategies in deaf education or best practices in teacher preparation, the characteristics of students in the research base is critical to making predictions about the effectiveness of changes for this diverse group (Antia, Jones, Reed, & Kreimeyer, 2009; Johnson, Liddell, & Erting, 1989). Educational policy that supports a "one size fits all" approach to instruction and assessment risks misapplying strategies designed with "typical" students in mind. This risk of misapplication is particularly true for students who are deaf or hard of hearing. In Chapters 4 and 5, we will investigate ways that assessment and accountability approaches oversimplify the learning process for students who are deaf or hard of hearing with multiple disabilities.

Finally, accountability reform (as are all large-scale reforms) is applied on top of, and not instead of, the local educational context. In deaf education, cochlear implants and the controversy surrounding their use is part of the local context of how parents, teachers, and students approach education. The use of a medical procedure to change the impact of a disability may not apply only to children who are deaf. Its potential interpretation as an agenda for eradicating a culture and way of life is, however, unique to the Deaf community. One argument in favor of cochlear implants is that implants may help children who have profound hearing loss be more fully mainstreamed into regular education classrooms by improving speech and subsequent academic achievement. When accountability reforms measure the effectiveness of schools from a single perspective, with English as the primary mechanism for demonstrating language and academic proficiency, it is possible that the reforms become a way to gather evidence for or against cochlear implantation. In a sense, this strategy may be a case of using the end goal of English proficiency to promote the success of cochlear implants. This unintended

consequence of accountability reform may have significant impact on how it is implemented in the Deaf community.

Educational Setting

Student demographics are but one area where there is diversity within deaf education. Educational setting is also more varied for students who are deaf or hard of hearing than for students in regular education (Marschark, Lang, & Albertini, 2002). The history behind education for deaf students includes initiatives at the federal level. The Education of the Deaf Act, most recently amended in 2008, provides funding for the education of deaf students in elementary, secondary, and postsecondary settings. Gallaudet University (originally Gallaudet College, founded in 1864) and the National Institute of the Deaf at Rochester Institute of Technology are both funded through this legislation. As part of its charge, Gallaudet also hosts the Kendall Demonstration School and the Model Secondary School for the Deaf. Collectively, these federally funded institutions serve as centers of educational research, resources for teacher preparation, and advocacy for parents and teachers across the country.

Depending on the setting, a student who is deaf or hard of hearing may be enrolled either with deaf or hard of hearing peers in a regional program that combines separate and integrated instruction or as a single student integrated into a regular education classroom (Blackorby & Knokey, 2006). These are common, but not mutually exclusive, designations. For example, some schools for the deaf may offer instructional support services in district programs or regular educational settings. The overlap in categories can make an educational setting difficult to characterize from site to site. Another useful designation is the percentage of time students who are deaf or hard of hearing spend with hearing peers. In the 2007–08 Gallaudet Annual Survey, with a sample skewed largely toward students at schools for the deaf, only a quarter of students spent more than 25 hours per week with hearing peers. Half spent no more than 5 hours per week in an integrated format. By looking at both time spent with hearing peers and the location designation, researchers and policymakers can gain a better understanding of the characteristics of each educational setting for students who are deaf or hard of hearing (Mitchell & Karchmer, 2006).

Along with the diverse settings is variability in the roles of educational professionals who work with students who are deaf or hard of hearing. For example, students may be served by a teacher of the deaf, a special educator, or by a regular education teacher with an educational interpreter. Teachers of the deaf are professionals who have been trained in professional programs that focus on deaf education. A special education teacher, in contrast, receives preparation that applies to the broad spectrum of students with disabilities. It is possible that a special education teacher will not have specific training in the language and communication strategies to use with students who are deaf or hard of hearing. Regular education teachers are the most common type of educator of students who are deaf or hard of hearing (Muller, 2005a). Their professional preparation includes little to no formal training in pedagogy for students with disabilities, students who are English Language Learners, or students who are deaf or hard of hearing. When a regular education teacher has students who use sign language, an educational interpreter translates the teacher's spoken language for the student. Each kind of teacher training lends to a particular emphasis and skill set used by teachers of students who are deaf or hard of hearing. Educational settings employ teachers with different preparation and certification and, thus, draw on different strengths and resources. As we will discuss in Chapter 6, teachers in different professional roles experience teacher-quality components of accountability reform in different ways.

Educational placement for students who are deaf or hard of hearing has changed significantly in the last 30 years. Much of this change is due to larger inclusion movements and implementation of IDEA (Stinson & Antia, 1999). IDEA stipulates that students must be taught in the "least restrictive environment" (LRE) possible. Depending on how LRE and the needs of the student are interpreted, IDEA can result in a push toward regular education settings and away from separate settings such as schools for the deaf. Figure 1.1 shows the results of demographic surveys conducted through the Gallaudet Research Institute (GRI) in each of the last three decades (Gallaudet Research Institute, 2008; Karchmer, Allen, & Brown, 1988). These surveys divide student placement into three categories: (a) schools for the deaf, (b) programs for deaf students in general education settings, and (c) regular education classrooms. As time has passed, the Annual Survey has become more representative of schools for the deaf than other settings; the overall population of

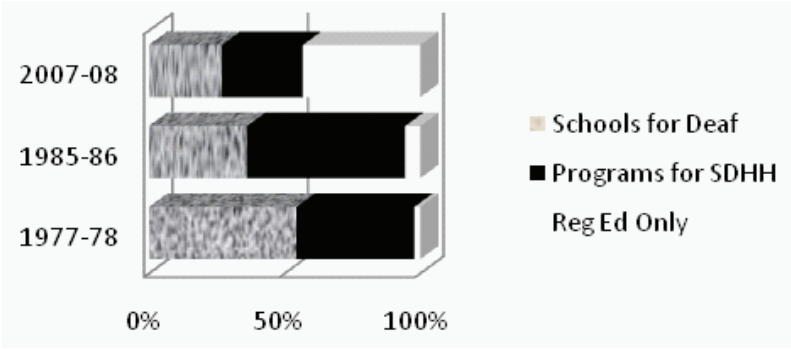

Figure 1.1. Educational placement trends for deaf and hard of hearing students. Data from *Deaf Students and Their Schools: The Changing Demographics* by T. Karchmer, M. Allen, & S. Brown, 1988, Washington, DC: Gallaudet Research Institute, and *Regional and National Summary Report of Data From the 2007–08 Annual Survey of Deaf and Hard of Hearing Children and Youth* by Gallaudet Research Institute, 2008, Washington, DC: Author.

students who are deaf or hard of hearing has a greater proportion of students in regular education settings than is reported below (Mitchell, 2004).

In interpreting this graph, it is helpful to look at the relative proportion of students at each site within each year. The proportion of students who are deaf or hard of hearing in schools exclusively serving deaf students has declined whereas the proportion in regular education has increased significantly during this time frame. This transition happened in phases over the three decades. The most dramatic shift between 1977 and 1985 was the proportion of students moving from schools for the deaf to programs for students who are deaf or hard of hearing in regular education settings (trend confirmed in Holden-Pitt & Diaz, 1998). This shift reflects the move toward integration with hearing peers (Bello, 2007; Blackorby & Knokey, 2006). Yet even more striking is the significant jump in regular education placements in the 1990s and 2000s (Moores, 2004). Regular education placements more than tripled in the last decade. This shift is partly a result of reduction in the number of stand-alone schools or merging of program resources (Asmar, 2006; Blackorby & Knokey, 2006; Silverman, 2006). However, in spite of these long-term shifts, placement trends have stabilized over the last few years, particularly for students with severe or profound hearing losses (Blackorby & Knokey, 2006; Gallaudet Research Institute, 2001, 2005, 2008). Children of Deaf adults, those with significant hearing losses, and those with multiple disabilities are

more likely to enroll in schools for the deaf than students with more moderate losses or those who have hearing parents. Schools for the deaf may serve fewer students than in the past overall, but they still play a critical role in the education of students who are deaf or hard of hearing.

One area not evident in the overall graphs is the change in the age range of students served in the different educational settings. In the past, students at schools for the deaf would attend from their early elementary through high school years. More recent trends are for students to remain in a local elementary school at a regional program or in a regular education school for the elementary years. Students who are deaf or hard of hearing, particularly those who are Deaf, then shift to a school for the deaf in the secondary grades (Cawthon & the Online Research Lab, 2006; personal communication, Diana Poeppelmeyer, May 14, 2009). At schools for the deaf, this shift places a greater emphasis on the educational needs of secondary students. In the context of academic outcomes for accountability reform, the focus at schools for the deaf may therefore shift to academic content in upper grades and on high school completion (Lang, 2002).

Educational setting has implications for accountability in two ways: measurement and transparency. First, accountability explicitly measures student outcomes in public education. Depending on how the reform is structured, this measurement could focus on individual students, teachers, schools, districts, or states. The organizational unit (e.g., school or program) responsible for educating students therefore is relevant to the concept of measuring and "holding accountable" the education system for student achievement. In current accountability reforms, *schools* are the most local organizational unit evaluated for student progress. One challenge in the shifts in school enrollment for students who are deaf or hard of hearing is that it is difficult for schools to reliably measure how their students fare over time. This difficulty is particularly true if the demographic makeup of the study body changes (e.g., influx of secondary students at schools for the deaf) from year to year. Thus, accountability reform can be a tool for schools or programs to use in their own self-assessment, but it must take into consideration the fact that different student cohorts arrive each year. Chapter 5 will discuss in further detail how schools for the deaf, district programs for students who are deaf or hard of hearing, and regular education programs are differentially affected by the current structure of accountability reforms.

On the flip side of this discussion of educational setting and accountability reform is the level of transparency provided in the structure of the law. If the "unit of responsibility" is broad enough that student performance is calculated over a large group, we lose information about how smaller groups are served by that institution. It is easy to lose specific information about how low-incidence groups fare in large-scale reforms, and students who are deaf or hard of hearing in accountability reforms are no exception. The majority of students who are deaf or hard of hearing are in regular education programs that have only a handful of students with hearing loss in the school or district. In some cases, the deaf or hard of hearing "group" for a school is a single student. When report cards are given to schools, especially regular education schools that may serve only one or a few students who are deaf or hard of hearing, the group progress of students who are deaf or hard of hearing cannot be tracked. In other words, if a student who is deaf or hard of hearing is in a regular education school, it is unlikely that we would ever know how well that student performed on state assessments. A state could aggregate results for all individual students who are deaf or hard of hearing across the state, a recommendation I strongly support, but it is challenging to report this information from a single school or district without violating federal privacy laws and confidentiality of student information. The current focus on overall population summaries (e.g., all students with disabilities) thus limits what we know about the impact of changes made at the local level (e.g., instruction to students who are deaf or hard of hearing at a local program).

Academic Outcomes for Students Who Are Deaf or Hard of Hearing

Accountability reform focuses almost exclusively on student performance on standardized assessments as a measure of successful education (Chapter 4 discusses testing issues in greater detail). One of the underlying challenges in deaf education is the history of poor performance on large-scale standardized tests. Test performance on these tests is, on average, lower for deaf students than for hearing students, although performance relative to hearing peers varies by domain (Brasel & Quigley, 1977; Harris & Bamford, 2001; Mutua & Elhoweris, 2002; Ronnberg, 2003; Traxler, 2000). For example, on one older standardized assessment study, deaf adolescents performed at a

fourth-grade level on reading comprehension but at a seventh-grade level on mathematics (Holt, Traxler, & Allen, 1992). Discrepancies between hearing and deaf student groups were also larger for reading comprehension than for mathematics: deaf students' mean reading scores varied from two to six grades below the mean for hearing students, with the gap increasing with advancing grade. The mathematics component fared better: the mean for young deaf students was only one grade below grade level and stayed within three grades levels throughout the cross-sectional sample. While there is a great deal of variability in student achievement in math and reading (e.g., Ansell & Pagliaro, 2006; Antia et al. 2009), these average trends have remained relatively stable into recent years (Qi & Mitchell, 2007).

The focus of accountability reform is on reducing the achievement gap between student groups. Although teachers indicate that state assessments can provide useful information about student progress at the local level (Luckner & Bowen, 2006), there is very little data available on the proficiency rates of students who are deaf or hard of hearing on state standardized assessments used for accountability (see Antia et al., 2009, for data on subsamples from Arizona and Colorado). There are two summaries available that look at student scores across individual schools or states: (a) studies by Cawthon and colleagues and (b) by the National Center on Low-Incidence Disabilities (2006). I have looked at the No Child Left Behind (NCLB) report cards for schools for the deaf for three years (Cawthon, 2004, 2007, 2008). On the whole, the achievement levels for students who are deaf or hard of hearing were no lower than for other groups of students with disabilities. In terms of proficiency on state standardized assessments, students who are deaf or hard of hearing scored mostly in the lower quartile (25% of students at the school being proficient at grade level). Perhaps surprisingly, there was *not* a consistent trend of higher scores in math than in reading. Yet there were several examples of high percentages of deaf and hard of hearing students meeting proficiency guidelines in the 2005–06 school year, particularly in Kansas, Maryland, South Carolina, and Texas. Several of these states had demonstrated similar levels of student achievement in previous years, strengthening the stability of this finding (Cawthon, 2004).

The National Center on Low-Incidence Disabilities (NCLID) has gathered available information from state departments of education for several low-incidence disability groups, including students who are deaf or hard of

hearing (NCLID, 2007).). These summaries are for all public education students in the state, not just those who attend the publicly funded school for the deaf. The research is challenging because accountability reform does not require states to disaggregate their student achievement data by disability type. Those states that do are also sometimes reluctant to share this information with others (NCLID, 2007). Results combined scores across two to four states, depending on the grade and test subject. These averages therefore represent the percentage of students who meet state proficiency standards, but the way those standards are defined certainly varies for students in that group.

The Grade 4 and Grade 8 NCLID results for three groups—students who are deaf or hard of hearing, all students with disabilities, and students without disabilities—are shown in Table 1.1. For 2006 assessments, proficiency rates ranged from a low of 14.7% (Grade 4 English Language Arts, based on 185 students) to a high of 38.9% (Grade 4 Reading, based on 249 students). On the whole, science proficiency rates were lower than those for the other core academic areas (science was not assessed in every grade). This range of proficiency rates is a relatively small spread of scores considering assessments were for several grades (Grades 2–8) and subjects (ELA, Reading, Math, and Science). This spread is smaller than what was found when looking only at test scores for students at schools for the deaf, indicating that state disaggregations of scores may be more reliable estimates of student proficiency.

It is in this context that accountability reforms, with an emphasis on student performance on state achievement tests, come into play. The stakes are high; schools where few students meet annual benchmarks will face consequences and restrictions in how they spend their federal funds. For any school serving a traditionally underperforming (and at times, underserved) population, it can be frustrating to be measured against the state's overall goals without consideration for how far students need to improve to reach them. This situation is further complicated for students who are deaf or hard of hearing by the unique educational needs they often have, ones more challenging to overcome than those of students without disabilities. Research in deaf education focuses a great deal on issues surrounding literacy development and cultural factors. The remainder of this chapter therefore explores some of the potential challenges that students who are deaf or hard of hearing face in attaining grade-level proficiency in reading, a gateway skill to overall academic achievement.

Table 1.1. Grade 4 and Grade 8 State Assessments, 2006

	Subject							
	ELA		Reading		Math		Science	
Student Group	Number Assessed	Percentage Proficient	Number Assessed	Percentage Proficient	Number Assessed	Percentage Proficient	Number Assessed	Percentage Proficient
Grade 4								
Without Disabilities	113,369	53.0%	25,726	30.4%	163,901	55.5%	N/A	N/A
All Disabilities	20,733	19.9%	249	38.9%	46,574	16.9%	N/A	N/A
Deaf or Hard of Hearing	185	14.7%	88	53.2%	436	34.9%	N/A	N/A
Grade 8								
Without Disabilities	125,631	65.0%	NA	N/A	179,050	46.7%	116,183	45.5%
All Disabilities	21,318	25.0%	28,679	24.5%	50,095	13.5%	15,855	11.6%
Deaf or Hard of Hearing	177	27.1%	312	35.0%	491	22.6%	191	12.7%

Reading as the Crux of the Matter

Reading skills are a critical component of compulsory education for all students because they serve as an access point for learning in many other domains. Literacy development is certainly the largest area of research in deaf education (Luckner & Cooke, 2010; Luckner & Handley, 2008). One reason for the focus on literacy is the long-standing difficulty education programs have had in teaching students who are deaf or hard of hearing how to read (Schimmel, Edwards, & Prickett, 1999; Truax, Fan, & Whitesell, 2004). It is proposed that many students who are deaf or hard of hearing do not become proficient readers because of delayed exposure to a fluent first-language base (Loeterman, Paul, & Donahue, 2002; Trezek & Wang, 2006). Strategies to improve literacy outcomes stem from a range of theories on literacy acquisition, including questions about the necessity of a phonological code as a precursor to decoding text (Nielsen & Luetke-Stahlman, 2002; Paul, 1994; Wang, Trezek, Luckner, & Paul, 2008, with response from Allen et al., 2009, and rejoinder from Paul, Wang, Trezek, & Luckner, 2009). Related aspects of literacy development, including content literacy and strategies used with students who are English Language Learners, are also a part of the discussion of how to improve literacy outcomes for students who are deaf or hard of hearing. Taken together, these elements form a foundation for discussion of what needs to be considered for an overall accountability reform when it measures academic progress and constructs initiatives to close the achievement gap (for a discussion of whether reading challenges are about reading or other factors, see Marschark et al., 2009).

There has been considerable debate over the best approach to literacy instruction for students who are deaf or hard of hearing. This debate has traditionally included discussions of phonologically based approaches to reading versus emphasis on visual reading cues, contextual evidence, and whole language approaches (Paul, 1997; Wang et al., 2008). This contrast is sometimes classified as a tension between "bottom-up" and "top-down" theories of the reading process. The bottom-up theories tend to be based on decoding English sounds and using the phonics to build reading skills (e.g., Nielsen & Luetke-Stahlman, 2002; Trezek & Wang, 2006; Wilbur, 2000). For example, in a bottom-up approach, a student might learn how to connect the pronunciation of the letter *b* with the printed letter at the start of the

word *bus*. In contrast, the top-down theories focus on holistic strategies such as using natural sources of print to foster emergent reading skills, developing a world-knowledge base through native language (usually American Sign Language), and recognizing whole words (e.g., Ewoldt, 1990; Goldin-Meadow & Mayberry, 2001; Kuntze, 1998). For example, in a top-down approach, students might begin with telling a story about their dog, then work from that story to connections about the dog in pictures and then in words. The top-down approach relies less on knowing the phonological components of written English and more on access to print through other means.

Although the discussion about the emphasis on phonology continues, many researchers and practitioners now include both bottom-up and top-down elements in their recommendations for literacy instruction for students who are deaf or hard of hearing (Evans, 2004; Maxwell, 1986; Moores & Miller, 2001; Schirmer, 2000). The discussion is particularly relevant for those students who are deaf or hard of hearing with severe to profound hearing loss who have limited access to spoken language (Paul, 1997). Depending on the individual student's linguistic repertoire, different strategies may prove to be effective in bringing him up to grade level in reading. For example, reading instruction for beginning readers may target word recognition and vocabulary development because it is essential for later comprehension and reading fluency (e.g., Barker, 2003; Loeterman et. al, 2002; Luckner & Muir, 2002). Early reading instruction may therefore focus on a bottom-up approach to gaining the building blocks for reading. Reading instruction for older students might focus more on tying ideas to daily experiences or understanding the motivation behind the author's intentions, reflecting a top-down approach. Best practice recommendations for combined approaches are still in the beginning stages. The heterogeneity within the population of students who are deaf or hard of hearing as well as variation in educational setting and instructional staff members make it difficult to generalize findings beyond single studies. Empirical findings on the effectiveness of specific reading instruction strategies with students who are deaf or hard of hearing, with sufficient sample sizes to draw causal connections, are only now emerging in the research literature.

It can be difficult for students who are deaf or hard of hearing without grade-level literacy skills to learn other content areas such as science, social studies, etc., placing them at risk for academic and social failure (Howell &

Luckner, 2003). Although literacy is often taught as a separate part of the academic curriculum, some programs are looking at ways to integrate literacy instruction into other academic domains. These strategies, known as content literacy skills, are strategies that good readers use to tailor their learning to the academic context. For example, the reading comprehension strategies and vocabulary one may use when studying a chronological time line in a history course are different from those used when preparing for a chemistry experiment. In a history course, teachers might emphasize either concurrent events or the linear sequence of events using the time line as a conceptual anchor. In chemistry, teachers might first address the structure and layout of a science textbook to help the student feel confident about her ability to navigate it for content (Howell & Luckner, 2003). Text elements such as the headings, diagrams, and captions as well as content features such as structuring a logical argument help the student approach the course with less trepidation. (Researchers also tapped into mental imagery techniques to help the student learn new content-specific vocabulary, as found in Schirmer, Bailey, & Lockman, 2004). Finally, the student is taught how to summarize important information in long stretches of text. Using this approach, secondary students might gain needed skills not only in general literacy but also in academic course work. This research demonstrates the importance of using multiple strategies to improve student learning as well as ways to leverage both content and literacy skill development. Students who are deaf or hard of hearing with content literacy skills will be better prepared to succeed on measures of student proficiency as accountability reforms move from core content areas of math and reading into applied content areas of science and social studies.

Literacy and academic characteristics of students who are deaf or hard of hearing depend not only on degree of hearing loss but also on language use and access to culturally relevant academic experiences (Simms & Thumann, 2007). When thinking about the diversity of students who are deaf or hard of hearing and educational models to serve their needs, it can be helpful to look at parallels with other students who do not have spoken English as a first language. Some students who are deaf or hard of hearing share similarities not only with other students with disabilities but also with English Language Learners. For example, students who use American Sign Language as their first language may learn English as a second language. Some experiences of students who are deaf or hard of hearing can be similar to those of hearing

students who come from a non-English speaking background and come to school with little to no English. The sensory access to English is different (visual vs. auditory), but the existence of a primary language base and different culture from that of the majority of the student body can be a common ground. Some researchers propose literacy development strategies for deaf students that are similar to those used with English Language Learners (Spaulding, Carolino, & Amen, 2004). Although not designated as special education students, English Language Learners require extra assistance as they simultaneously learn a new language and participate in the curriculum (Cummins, 1984). Two instructional strategies in deaf education reflect aspects of an English Language Learner framework applied to students who are deaf or hard of hearing: culturally relevant literacy and bilingual education.

There are multiple cultural elements at play for students in public education who are deaf or hard of hearing, including the roles of Deaf culture, sign language, and minority culture within American society (Van Cleve & Crouch, 1989; for an extensive discussion of status of Deaf Studies from multiple frameworks, see recent work by Hauser, O'Hearn, McKee, Steider, & Thew, 2010; Holocomb, 2010; Marschark & Humphries, 2010; Myers & Fernandes, 2009; Paul & Moores, 2010). Depending on the language contexts of their family and social contexts, students may also be bi- or trilingual (Gerner de Garcia, 1995, 2004). Qualls-Mitchell (2002) emphasizes the need to look at culturally relevant literacy curriculum for students who are deaf or hard of hearing. Qualls-Mitchell's research explores ways to use culturally relevant topics to engage students in reading activities. One of her key points is the need to build a culturally relevant vocabulary. In this approach, showing words along with images throughout the process is a foundational part of reading instruction for emerging readers. For Deaf students whose heritage is from the majority culture in the local community, connections may need to be made between American Sign Language and the hearing world. For students who are both Deaf and from a minority background, which will vary depending on the local context, a culturally relevant curriculum requires focusing on concepts and meaning that are relevant to all three cultures (Deaf, minority culture, and majority culture). The goal is to create a stimulating classroom environment that reflects the interests and diversity of the students.

If successful literacy is grounded in a student's language use, then the complexities of multilingual realities are important to address in reading devel-

opment. Culturally relevant literacy approaches for students who are deaf or hard of hearing draw on student experiences in ways that integrate their linguistic and cultural background into the literacy acquisition process. When a bi- or tricultural approach is in place, literacy instruction can build on the child's ability to describe one's own experience. Yet most literacy curricula are taught from the perspective of the dominant, English-speaking, hearing culture (Simms & Thumann, 2007). Furthermore, accountability reforms in the United States emphasize English literacy development from the earliest grades to the detriment of multilingual approaches that may require additional time before English literacy is at grade level. When assessment focuses only on English literacy development, and not on literacy development in a broader sense, students from diverse language backgrounds are labeled as "non-proficient" readers at a time when they are still developing their English language skills.

Bilingual[2] education, reemerging in earnest about 30 years ago, is seen by some as a potentially fruitful model to use in educating deaf and hard of hearing students in a way that honors both the dominant English culture and the Deaf culture (e.g., Cangiano, 1992; Cline, 1997; LaSasso & Metzger, 1998; Laurence, 1991; Moores, 2008b; Wilbur, 2000; Zaitseva, Pursglove, & Gregory, 1999; for critiques, see also Mayer & Akamatsu, 1999; Stuckless, 1991). For students who are deaf or hard of hearing, the bilingual model combines American Sign Language and English in instruction. This strategy is, in part, a response to the perceived limitations of an oral-only or total communication (English with supplementary signs) environment. American Sign Language may be a more suitable first language for many students with hearing loss because it is communicated through the eyes, hands, and face. There is also emerging evidence of the strengths of bilingualism, including its effects in the areas of executive function and cognitive flexibility (Bialystok, Craik, & Ryan, 2006; Kushalnagar, Hannay, & Hernandez, 2010). Although the increase in cochlear implants may reduce the sole use of American Sign Language in instruction, American Sign Language will still play a role in the lives of students who are deaf or hard of hearing. Many hope that students who receive instruction in *both* American Sign Language and English will

2. Although I will primarily be discussing the bilingual education movement, many classrooms couple bilingual with bicultural emphases (Bi-Bi classrooms). Issues of culture are certainly important in discussing language development in deaf and hard of hearing children. The literature base, however, pertains almost exclusively to bilingual issues.

achieve higher levels of reading proficiency, and thus academic success, than those using only one mode of communication and instruction (Power, Hyde, & Leigh, 2008). The goal of the bilingual-bicultural movement reflects a "desire of many Deaf parents and parents of deaf children to have their children educated in an environment that supports and values both hearing and deaf culture and language" (Saunders, 1997, p. 62).

The concern for educators, however, is not so much that deaf students learn to *speak* English, but that they learn how to *read and write*. As Musselman (2000) points out, "arguments favoring one communication mode over another frequently hinge on its purported ability to facilitate literacy. Notions of reading, therefore, are central to current conceptualizations of deafness and deaf education" (p. 9). One driving assumption in the bilingual education model is that, although American Sign Language and English are distinct in many ways, American Sign Language is a robust language that can provide top-down reading comprehension skills for reading English. Although the syntax and lexical entries of American Sign Language are not directly transferable to English text, making inferences and connecting world knowledge very well may be. Bilingual education thus tries to leverage the strengths of the cultural knowledge accessible through visual language to improve comprehension of concepts presented in print.

Highlighting parallels between students who are deaf or hard of hearing and those who are English Language Learners is again useful in the context of bilingual education. The first application is on a structural level: both English Language Learners and students who are deaf or hard of hearing have programs dedicated to instructional strategies that meet their linguistic and academic needs. Programs and approaches that focus on cultural relevance and bilingual-bicultural education have the potential to bring elements of Deaf culture into the dialogue about education, both inside and outside of schools for the deaf. The second parallel is within the stated goal of accountability policy. One of the main priorities of NCLB is to close the achievement gap for students with disabilities and for ethnic minorities. Students who are deaf or hard of hearing and English Language Learners have historically poor educational outcomes, at least on measures of student achievement used in United States accountability reforms (Cawthon, 2004, 2007). Furthermore, NCLB also articulates the need to develop quality, language-rich programs for students who are English Language Learners and to, where possible, de-

velop the first languages of students to be used as a basis for later English language development. Applied to students who are deaf or hard of hearing with a language/literacy delay, NCLB could be seen as a way to advocate for access to comprehensive language environments, including those with American Sign Language (Siegel, 2002). Therefore, from a large-scale and from a local (classroom-based) perspective, parallels between these two fields are important in this discussion about the impact of accountability reform on students who are deaf or hard of hearing.

Conclusion and Recommendations

Although students who are deaf or hard of hearing make up only a very small proportion of the overall student body, their unique linguistic, educational, and cultural characteristics make them an important case to study when investigating the impact of large-scale reforms on heterogeneous, low-incidence populations. The demographics of students who are deaf or hard of hearing highlight challenges related to primary and secondary categorizations of disability as well as the difficulty in understanding how reforms affect students with multiple disabilities. One recommendation mentioned in this chapter was to advocate for a summary of accountability measures specifically for students who are deaf or hard of hearing. This summary may have to occur at the state or national level and may be limited to common factors across states such as high school completion (the pending Common Core Content Standards Initiative may eventually provide a more broad basis for comparison across states). When looking at the effects of accountability reforms for students who are deaf or hard of hearing and who have multiple disabilities, it is important to know whether hearing loss is noted as a primary or secondary disability. An important effort would be to try and designate information in terms of (a) only students who are deaf or hard of hearing, (b) only students who are deaf or hard of hearing as a primary disability, and (c) only students who are deaf or hard of hearing as a secondary disability. This framing of data will give a more accurate picture of how students who are deaf or hard of hearing fare on measures of academic success with consideration for the heterogeneity of the student population.

Part of the complexity of looking at the effectiveness of instructional strategies for students with hearing loss is the diversity in approaches to literacy

development. From the perspective of accountability reform, education for students who are deaf or hard of hearing may need to be strengthened in particular areas to raise academic outcomes. Although the purpose of large-scale reforms is not necessarily to prescribe specific instructional strategies, reforms can use accountability measures to motivate schools to use certain programs. For example, NCLB includes language supporting "evidenced-based" teaching for students learning to read. One recommendation that arises from this discussion is for the field to create an "evidence-based" database of instructional strategies for students who are deaf or hard of hearing. This database could be similar to that of the What Works Clearinghouse, formed at the national level by the U.S. Department of Education, but would be established and reviewed by professionals with the deaf education and research community. This database would need to include details such as (a) primary or secondary disability categories, (b) age range or literacy skill targeted with the instructional strategy, and (c) a description of the generalizability of findings to other students who are deaf or hard of hearing. An emerging research base related to literacy programs for students who are deaf or hard of hearing may support the details of accountability reform.

There are, however, additional strands of literacy development research that are relevant to the discussion of how to improve educational outcomes for students who are deaf or hard of hearing. Targeted learning strategies such as content literacy or test-taking skills are also important components of raising student proficiency on measures of achievement used in accountability frameworks. Culturally relevant or bilingual literacy approaches could be encouraged in a more flexible model of accountability that measures outcomes in these areas. One recommendation for advocates of students who are deaf or hard of hearing is to align, where possible, with advocates for students who are English Language Learners (August & Hakuta, 1997). For example, immigrant English Language Learners are exempt from English testing for the first three years that they are in the United States; a similar approach for students who are deaf or hard of hearing may allow for the needed time to develop English language skills before participating in English-based assessments. Accountability reform purports to raise achievement for all students; whether it can fulfill this promise depends on the ability of reforms to be responsive to the needs of a diverse student population.