



## The Secondary School Experiences and Academic Performance of Students With Hearing Impairments

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### Introduction

With the passage of the Education for All Handicapped Children Act (P.L. 94-142) and the movement toward inclusion, educational options for students with hearing impairments<sup>1</sup> have expanded significantly in the last 30 years (Stinson and Antia 1999). Students with hearing impairments are increasingly attending typical schools and being educated in general education classrooms (Schildroth and Hotto 1996; Gallaudet Research Institute 2006). Other developments have changed the classroom experiences of students with hearing impairments in the last three decades as well. For example, technologies such as visual or text communication devices and speech-to-print software have brought new means through which students with hearing impairments can communicate and access educational content (Virvan 1992). However, researchers, educators, and advocates acknowledge that these developments have not sufficiently addressed the challenges these students face in school, such as difficulties with communication, classroom participation, and social integration (e.g., Johnson and Cohen 1994). Despite advances and efforts to improve the outcomes of students with hearing impairments, evidence suggests that these students continue to lag behind their general education peers in academic achievement (Traxler 2000; Antia, Jones, Reed, and Kreimeyer 2009). As a result, discussions about effective education for students with hearing impairments have turned toward instructional practices and the experiences of these students in the various types of classrooms and schools in which they are enrolled.

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<sup>1</sup> Although this population is commonly referred to as “deaf or hard-of-hearing students,” the term “students with hearing impairments” is used in this fact sheet to be consistent with the federal disability category specified in the Individuals with Disabilities Education Improvement Act of 2004. Included in this fact sheet are students who received special education services through an individualized education program (IEP) for a hearing impairment as their primary disability category. This fact sheet does not include students whose primary disability classification was “deaf-blind,” nor does it include students who had a hearing impairment but were classified as having a different primary disability. Students whose primary disability classification was hearing impairment may also have had secondary disabilities.

To support improved outcomes of students with hearing impairments, it is important to understand their direct experiences in the classroom. The classroom environment and activities are what students experience directly and are the mechanism through which educational interventions are most likely to produce desired improvements in student achievement. Yet there has been very little information nationally on the classroom experiences and academic performance of this population of students. For example, little is known nationally about the types of courses students with hearing impairments take, the instructional settings of those courses, the instructional practices they experience, or the accommodations and supports they are provided.

This fact sheet provides this critically needed information by describing the secondary school experiences and academic performance of students with hearing impairments in the United States.<sup>2</sup> The findings are based on data collected from school staff and from direct assessments of students' academic achievement as part of the National Longitudinal Transition Study-2 (NLTS2).<sup>3</sup> Mail surveys were conducted with staff in the schools attended by NLTS2 sample members in the spring

of the 2001–02 school year; students were 14 through 18 years old at the time. School staff members who were knowledgeable about the students' overall school programs and about their special education and vocational education courses were surveyed.<sup>4</sup> For NLTS2 sample members who were reported by school staff to be enrolled in at least one general education academic class, teachers of the first such class in each student's school week also were surveyed in the spring of the 2001–02 school year.<sup>5</sup> In addition, school staff were asked to provide information about the school.<sup>6</sup> Direct assessments of students' academic achievement were conducted in 2002 and 2004 using six subtests from the research edition of the *Woodcock-Johnson III Tests of Achievement* (Woodcock, McGrew, and Mather 2001). Information about students' level of hearing impairment was obtained from interviews or mail surveys of study members' parents, conducted in 2001.<sup>7</sup>

### **Students Included in the Fact Sheet**

The youth who are the subject of this fact sheet represent youth in the United States who were identified by their school district or school as having a hearing impairment as a primary disability and were 13 to 16 years old and receiving special

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<sup>2</sup> Much of the information presented in this fact sheet also is included in Wagner et al. (2003); Levine, Marder, and Wagner (2004); and Wagner, Newman, Cameto, and Levine (2006).

<sup>3</sup> The National Longitudinal Transition Study-2 (NLTS2), being conducted by SRI International for the U.S. Department of Education, has a nationally representative sample of more than 11,000 secondary school-aged youth with disabilities who were in at least seventh grade and receiving special education services in the 2000–01 school year. Approximately 1,000 youth with hearing impairments are included in the sample. This sample is designed to represent a total of 1,838,848 youth with disabilities and 22,001 youth with hearing impairments, according to federal child count figures (U.S. Department of Education 2002). See <http://www.nlts2.org> for more information about the study.

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<sup>4</sup> This survey is referred to in this fact sheet as the student's school program survey.

<sup>5</sup> This survey is referred to in this fact sheet as the general education teacher survey.

<sup>6</sup> This survey is referred to in this fact sheet as the school characteristics survey.

<sup>7</sup> For information about response rates and study methods, see Wagner, Newman, Cameto, Levine, and Marder (2003) for parent interviews/surveys and school data collection and Wagner, Newman, Cameto, and Levine (2006) for direct assessments.

education services in grade 7 or above as of December 1, 2000.<sup>8,9</sup>

Because there is a single federal hearing impairment category, sample data did not differentiate students in that category by level of impairment. Although some degree of hearing impairment is the shared characteristic of students who receive special education services in this category, the extent to which the impairment is associated with students' expressive and receptive language functioning may determine the extent to which it influences students in important domains of life, such as schooling. The degree of hearing impairment can be measured accurately through tests that determine the intensity level (in decibels) that students can detect at each of the range of frequencies. However, it was infeasible to include this type of audiometric testing of individual students in the large-scale data collection used for the NLTS2 nationally representative sample. Thus, the general degree of students' hearing impairment was determined through parent interviews. Although such reports are important and valuable, they cannot be equated with the results of formal evaluations conducted by trained audiologists. In addition, in understanding differences in the functioning of students with hearing impairments, it is important to account for their ability to maximize their hearing and communication through the use of hearing devices or medical advances.

<sup>8</sup> Despite efforts to ensure a study population that is representative of the full population of youth with hearing impairments, systematic differences may exist between those who participated in this study and those who did not. Consequently, the current results from this study may not be fully representative of the entire population of secondary students with hearing impairments in the United States.

<sup>9</sup> For more information about the characteristics of students with hearing impairments represented by NLTS2, as well as students in other disability categories, see Wagner et al. (2003).

Using parent responses to interview items about students' level of hearing with and without hearing devices, three categories of students' level of hearing impairment were created: "little or none," "some," and "substantial or profound."<sup>10</sup> For students whose parents reported they were prescribed and used a hearing aid or device (77 percent of students in the hearing impairment category),<sup>11</sup> the level of hearing impairment was categorized by parents' report of the student's hearing functioning with the device. For all other students (23 percent of students in the hearing impairment category),<sup>12</sup> the level of hearing impairment was categorized by parents' report of the student's level of hearing impairment without a hearing device.<sup>13</sup>

<sup>10</sup> Three questions from the parent interview were used to determine students' levels of hearing impairment. The first question addressed the level of hearing impairment without a hearing aid or hearing device. Parents then were asked whether a hearing aid or other kind of hearing device had been prescribed for the youth, and parents who indicated that the student had been prescribed a hearing aid or device were asked about the youth's level of hearing functioning with the hearing aid or hearing device.

<sup>11</sup> Of the 77 percent of students with hearing impairments whose parent reported that the student used a hearing device, 22 percent were in the "little or none" impairment category, 39 percent were in the "some" impairment category, and 39 percent were in the "substantial or profound" impairment category.

<sup>12</sup> This includes students who were not prescribed a hearing device, those who were prescribed an aid or device but did not have or use one, and those whose parents indicated that the student was prescribed a device but did not provide information on their level of hearing impairment with it. Among the 23 percent of students with hearing impairments who were categorized by parents' report of the student's level of impairment without a hearing device, 23 percent were in the "little or none" impairment category, 25 percent were in the "some" impairment category, and 52 percent were in the "substantial or profound" impairment category.

<sup>13</sup> For a small percentage of youth in the hearing impairment category whose parents participated in the Wave 1 interview (less than 3 percent), information about the youth's level of hearing impairment (with or without a hearing device) was not provided. These students are not included in any of the analyses conducted for this report.

The resulting parent-reported levels of hearing impairment consisted of 22 percent of students with “little or none,” 36 percent with “some,” and 42 percent of students with “substantial or profound” hearing impairment. These are the categories used throughout the fact sheet to examine the secondary school experiences of students with different levels of hearing impairment.

### **Organization of the Fact Sheet**

The findings in this fact sheet are reported for the overall group of students with hearing impairments and by the three levels of parent-reported hearing impairment described above. The fact sheet is organized to provide information on the secondary school experiences and performance of students with hearing impairments in several key areas, beginning with a snapshot of the courses taken in a given semester. Next, the educational settings in which instruction occurred are described. The fact sheet then presents findings on students’ experiences in general education academic courses and their experiences in nonvocational special education courses, including the degree of teachers’ modification of the curriculum, instructional groupings, students’ participation in the classroom, and teachers’ perceptions of and expectations for student performance. Findings related to the accommodations, supports, and services provided to students with hearing impairments are presented next. The fact sheet concludes with findings on the academic achievement of students with hearing impairments.

### **Students’ Course Taking**

Survey data provided information about the courses in which students with hearing impairments were enrolled in a given semester, giving a picture of course

taking among this population.<sup>14</sup> On average, academic courses accounted for 61 percent of the courses taken by students with hearing impairments in a semester, vocational courses accounted for 13 percent, and other nonacademic courses, such as fine arts and physical education, accounted for 26 percent of students’ course taking (table 1). There were no significant differences between students with different levels of parent-reported hearing impairment in the average percentage of courses that were academic, vocational, or other nonacademic.<sup>15</sup>

Virtually all students with hearing impairments took at least one academic class in a given semester (table 2), particularly language arts and mathematics, which were taken by 99 percent and 97 percent, respectively. Large majorities also enrolled in a social studies or history course (89 percent) and in a science course (87 percent). More than a quarter (27 percent) of students with hearing impairments were enrolled in a foreign language course. The percentage enrolled in at least one academic course or enrolled in specific types of academic courses such as mathematics or language arts did not differ significantly for students with different levels of parent-reported hearing impairment.

Students with hearing impairments also were enrolled in nonacademic courses, including vocational and other nonacademic subjects. Overall, 61 percent of students

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<sup>14</sup> School staff were asked to indicate the types of courses in which students were enrolled at the time of data collection. Information about exact course titles, credits, and other information was not obtained.

<sup>15</sup> Statistical comparisons are based on *F* tests (ANOVA, student’s *t* test). No special adjustments were made to account for multiple comparisons. To partially compensate for the number of analyses that were conducted, only differences at the *p* value of <.01 were reported as significant. Given the number of comparisons made in this fact sheet, readers are cautioned to consider the possibility of false positives in interpreting the data.

Table 1. Average percentage of courses students with hearing impairments took in a semester that were academic, vocational, or other nonacademic, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Average percentage of courses that were				
Academic	61	66	62	59
Vocational education	13	8	14	14
Other nonacademic	26	26	25	27

NOTE: Percentages are population estimates based on a weighted sample of approximately 470 youth. Percentages may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

Table 2. Academic courses students with hearing impairments took in a semester, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Percentage who took				
At least one academic course	100 <sup>1</sup>	100 <sup>1</sup>	100	100 <sup>1</sup>
Language arts	99	98	100 <sup>1</sup>	99
Mathematics	97	95	96	99
Social studies/history	89	85	94	86
Science	87	92	86	87
Foreign language	27	23	34	23

<sup>1</sup> Rounds to 100.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 450 to 470 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

with hearing impairments were enrolled in at least one vocational education course in a given semester (table 3). Almost one-third of students with hearing impairments (31 percent) were enrolled in at least one prevocational education course, and 55 percent were enrolled in at least one occupationally specific vocational education course. About 90 percent of students with hearing impairments were enrolled in at least one nonvocational nonacademic course, with 75 percent of students with hearing impairments taking physical education, 54 percent enrolled in fine arts courses (e.g., art, music, drama), 33 percent enrolled in study skills courses, and 25 percent taking a life skills or social skills course in a given semester.

There was a significant difference in the percentage of students taking vocational education courses by parent-reported level of hearing impairment. Students with “substantial or profound”

hearing impairment were significantly more likely than students with “little or none” to be enrolled in at least one vocational course (72 percent vs. 43 percent,  $p < .01$ ). Enrollment in other nonacademic nonvocational courses such as physical education or fine arts did not vary significantly by level of hearing impairment.

### Educational Settings

Underlying IDEA is the principle that students should receive their education in the least restrictive environment. For many students with disabilities, the least restrictive environment is a general education classroom in a typical school; for others, it is a special education setting such as a self-contained classroom or a school serving only students with disabilities. The types of schools and classrooms in which students with hearing impairments are placed provide the backdrop for understanding their experiences in secondary school.

Table 3. Nonacademic courses students with hearing impairments took in a semester, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Percentage who took				
At least one vocational education course	61	43	61	72
Prevocational education	31	15	38	34
Occupationally specific vocational education	55	36	58	63
At least one other nonacademic course	90	90	87	92
Physical education	75	69	79	76
Fine arts (e.g., art, music, drama)	54	52	58	51
Study skills	33	29	27	41
Life skills, social skills	25	23	19	33

NOTE: Percentages are population estimates based on a weighted sample of approximately 470 youth.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student’s school program survey, 2002.

### School Placement

Residential schools for the deaf have a long history in the United States; however, in recent years, students with hearing impairments increasingly began attending typical schools—those that serve a wide variety of students (Schildroth and Hotto 1996). By the mid-1980s, 68 percent of students with hearing impairments were attending typical schools (Wagner, Newman, and Cameto 2004). NLTS2 data indicate that more than three-fourths (76 percent) of students with hearing impairments were enrolled in typical schools serving a wide variety of students (table 4). Instruction for 19 percent of students with hearing impairments took place in schools serving only students with disabilities such as schools for the deaf, and 4 percent attended other types of school (e.g., charter, magnet, alternative, hospital, home schools).

There were some significant differences in the percentages of students enrolled in different types of schools by parent-reported level of hearing impairment. About 87 percent of students with “some” hearing impairment and 90 percent of students with “little or none” were enrolled in a

typical school, compared with 60 percent of students with “substantial or profound” hearing impairment ( $p < .001$  for both comparisons). In addition, 37 percent of students with “substantial or profound” hearing impairment attended a school serving only students with disabilities, compared with 9 percent of students with “some” hearing impairment and 4 percent of students with “little or none” ( $p < .001$  for both comparisons). Enrollment in other types of schools did not differ significantly by parent-reported level of hearing impairment.

### Instructional Setting

For this fact sheet, classes that included only students with disabilities are considered to be special education classes, while classes that included students in the general population along with those with disabilities are considered to be general education classes. Courses in either setting could have a variety of instructional staff, including general or special education teachers and aides or specialists. For example, in general education academic courses, 85 percent of students with hearing impairments had a general education teacher as the only teacher

Table 4. Type of school students with hearing impairments attended, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Overall	Level of hearing impairment		
		Little or none	Some	Substantial or profound
		Percent		
Percentage who attended a				
Typical school	76	90	87	60
School serving only students with disabilities	19	4	9	37
Charter, magnet, alternative, hospital, or home school	4	6	4	4

NOTE: Percentages are population estimates based on a weighted sample of approximately 590 youth. Percentages may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), school characteristics survey, 2002.

in the class, and 15 percent had both general and special education teachers present.

The degree to which students with hearing impairments experienced their education in a general education classroom along with students without disabilities or in a special education classroom with other students with disabilities varied. Overall, 21 percent of students with hearing impairments took all their courses in a special education setting (table 5). Among the 21 percent of students who took all their courses in a special education setting, 84 percent attended a school serving only students with disabilities. More than one third (35 percent) of students with hearing impairments took all their courses in a general education setting. More than three-fourths (78 percent) of students with hearing impairments had at least one course in a general education setting in a given semester, and 64 percent had at least one course in a special education setting.

Two-thirds (67 percent) of the almost 100 percent of students with hearing impairments who took an academic course in a given semester had at least one such course in a general education classroom, and 53 percent had at least one such course in a special education classroom. Among the 61 percent of students with hearing impairments who were enrolled in a vocational education course, 61 percent took at least one of these courses in a general education setting, and 44 percent took at least one such course in a special education setting. For the 90 percent of students with hearing impairments enrolled in other nonvocational nonacademic courses, 73 percent took at least one in a general education classroom, and 48 percent took at least one in a special education setting, a significant difference ( $p < .001$ ).

There were some significant differences in course taking in general or special education settings for students with

Table 5. Instructional settings of courses taken in a semester by students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment							
	Overall		Little or none		Some		Substantial or profound	
	Special education	General education	Special education	General education	Special education	General education	Special education	General education
	Percent							
Percentage with all courses taken in setting	21	35	9	37	13	47	37	22
Percentage with at least one course taken in setting	64	78	62	90	52	87	77	61
Percentage with at least one of the following types of courses taken in setting: <sup>1</sup>								
Academic	53	67	58	75	37	80	67	49
Vocational education	44	61	33	69	33	77	57	45
Other nonacademic	48	73	34	86	42	83	61	57

<sup>1</sup> Includes only students with hearing impairments taking the kind of course specified.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 330 to 470 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.



different levels of parent-reported hearing impairment. Students with “some” hearing impairment were more likely than those with “substantial or profound” hearing impairment to have all their courses in a general education setting (47 percent vs. 22 percent,  $p < .01$ ), and students with “substantial or profound” hearing impairment were more likely to have all their courses in a special education setting than students with “little or none” or “some” impairment (37 percent vs. 9 percent and 13 percent, respectively,  $p < .001$  for the comparison with students with “little or none” and  $p < .01$  for the other comparison). Similarly, students with “little or none” and those with “some” hearing impairment were more likely to be taking at least one course in a general education setting than students with “substantial or profound” hearing impairment (90 percent and 87 percent vs. 61 percent,  $p < .01$  for the comparison with students with “little or none” and  $p < .001$  for the other comparison). In addition, students with “substantial or profound” hearing impairment were more likely to be taking at least one course in a special education setting relative to students with “some” hearing impairment (77 percent vs. 52 percent,  $p < .01$ ).

Several significant differences were found in instructional settings for academic courses by level of parent-reported hearing impairment. Students with “substantial or profound” hearing impairment were more likely than those with “some” hearing impairment to be taking at least one academic course in a special education setting (67 percent vs. 37 percent,  $p < .001$ ). Students with “little or none” and those with “some” hearing impairment were more likely to be taking at least one academic course in a general education setting than students with “substantial or

profound” hearing impairment (75 percent and 80 percent vs. 49 percent,  $p < .01$  for the comparison with students with “little or none” and  $p < .001$  for the other comparison).

In addition, there were some significant differences in the instructional settings for nonacademic courses for students with different levels of parent-reported hearing impairment. Among those enrolled in vocational education courses, a significantly higher percentage of students with “some” hearing impairment were enrolled in at least one vocational course in a general education setting compared with those with “substantial or profound” hearing impairment (77 percent vs. 45 percent,  $p < .01$ ). In addition, students with “some” hearing impairment and those with “little or none” were more likely than those with “substantial or profound” hearing impairment to take at least one nonvocational nonacademic course in a general education setting, among those enrolled in such courses (83 percent and 86 percent vs. 57 percent,  $p < .01$  for both comparisons).

### **Experiences in General Education Academic Courses**

Discussion about the nature of the least restrictive environment provision of IDEA has advanced beyond consideration of where students are educated to an emphasis on how they are educated. IDEA intends that students with disabilities not just be included in general education settings but that they also have access to challenging curricula. As indicated earlier, two-thirds (67 percent) of secondary school students with hearing impairments were enrolled in at least one general education academic course. The experiences of these students in general education academic courses, as reported by

Table 6. Extent of curriculum modification for students with hearing impairments in general education academic classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students had a				
Curriculum with no modifications	47	47	46	47
Curriculum with some modifications	49	52	50	46
Curriculum with substantial modifications	4	‡	4	5
Specialized curriculum	1	0	‡	‡

‡ Responses for cells that do not meet reporting standards are not reported.

NOTE: Percentages are population estimates based on a weighted sample of approximately 190 youth. Percentages may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

their teachers of the first such course during the week,<sup>16</sup> are described here.<sup>17</sup>

### **Access to the General Education Curriculum**

Teachers of general education academic courses were asked to indicate the extent to which they made modifications to the general education curriculum for students with hearing impairments. For 47 percent of students with hearing impairments enrolled in general education academic courses, teachers reported making no modifications

<sup>16</sup> For most students with hearing impairments (85 percent), their first general academic course of the week was taught by a single general education teacher who responded to the general education teacher survey. For the 15 percent of students with hearing impairments whose first such course of the week was taught by both general and special education teachers, the respondent could have been a special education teacher or general education teacher.

<sup>17</sup> General education courses in which students with disabilities receive instruction along with students without disabilities are typically not available at schools serving only students with disabilities; therefore, students attending schools serving only students with disabilities, as well as students who attended typical schools but were not enrolled in any general education academic courses, are not included in these analyses.

to the curriculum, and for nearly half of the students (49 percent), teachers reported making “some” modifications (table 6). Teachers reported making “substantial” modifications to the general education curriculum for 4 percent and providing a “specialized curriculum” to about 1 percent of students with hearing impairments. Students with different levels of hearing impairment did not differ significantly in the extent to which teachers modified the general education curriculum.

### **Instructional Groupings in General Education Academic Classes**

When asked about the type of instructional groupings used in general education academic classes, teachers of these courses indicated that 69 percent of students with hearing impairments “often” participated in whole-class instruction (table 7). In addition, they reported that about a quarter (24 percent) of students with hearing impairments “often” participated in small-group instruction, a quarter (25 percent) “often” received individual

Table 7. Instructional groupings of students with hearing impairments in general education academic classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Whole class	Overall students with hearing impairment	Level of hearing impairment		
			Little or none	Some	Substantial or profound
			Percent		
Students received					
Whole-class instruction					
Never or rarely	0	0	0	0	0
Sometimes	31	31	31	36	25
Often	69	69	69	64	75
Small-group instruction					
Never or rarely	18	17	16	17	16
Sometimes	62	59	53	66	55
Often	19	24	31	17	29
Individual instruction from classroom teacher					
Never or rarely	22	18	28	13	17
Sometimes	61	58	49	60	61
Often	17	25	23	27	22
Individual instruction from another adult					
Never or rarely	75	57	65	55	54
Sometimes	20	24	24	27	21
Often	5	19	12	18	26

NOTE: Percentages are population estimates based on weighted samples that range from approximately 180 to 190 youth across variables. Percentages for each variable may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

instruction from the classroom teacher, and 19 percent “often” received individual instruction from another adult, such as an aide or volunteer in the classroom. The frequency with which these types of instructional groupings were used did not differ significantly between individual students with hearing impairments and the class as a whole, with one exception: The percentage of students with hearing impairments who “often” received individual instruction from another adult was significantly greater than the percentage of students whose whole class “often”

received such instruction (19 percent vs. 5 percent,  $p < .001$ ).<sup>18</sup> The frequency with which students participated in different types of instructional groupings did not differ significantly for students with different levels of hearing impairment.

<sup>18</sup> The comparisons made in this section should not be construed as between students with and without disabilities. Rather, teachers reported on the classroom experiences of specific students with hearing impairments and compared them with those of the students in the class as a whole, including all students with hearing impairments or other disabilities and students without disabilities in the class.

Table 8. Classroom participation of students with hearing impairments in general education academic classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Whole class	Overall students with hearing impairment	Level of hearing impairment		
			Little or none	Some	Substantial or profound
Percent					
<b>Students</b>					
Responded orally to questions					
Never or rarely	4	18	15	20	17
Sometimes	19	41	32	36	55
Often	78	41	53	44	28
Presented to class or group					
Never or rarely	32	42	41	42	44
Sometimes	56	47	46	46	48
Often	12	11	13	12	8
Worked with a peer or group					
Never or rarely	3	8	8	10	4
Sometimes	53	51	46	50	55
Often	43	42	46	40	41
Took part in group discussions					
Rarely	—	20	16	28	11
Sometimes	—	26	24	20	36
Usually	—	26	27	23	31
Almost always	—	27	33	30	19

— Findings on the participation of the class as a whole are not available.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 180 to 190 youth across variables. Percentages for each variable may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

### ***Classroom Participation in General Education Academic Classes***

Regarding participation in the classroom, teachers of general education courses reported that 41 percent of students with hearing impairments “often” responded orally to questions, which was significantly fewer than the 78 percent of the class as a whole who “often” responded orally to questions ( $p < .001$ )<sup>19</sup> (table 8).

About 11 percent of students with hearing impairments “often” presented to the class or a group, and 42 percent “often” worked with a peer or group, frequencies that were not significantly different than those for the whole class. Over half of students with hearing impairments (53 percent) “usually” or “almost always” took part in group discussions. Students with different levels of hearing impairment did not differ significantly in their participation in these classroom activities.

<sup>19</sup> The frequency with which students with hearing impairments responded orally to questions may reflect a preference for responding with sign language and not an indicator of their level of participation in the classroom.

Table 9. Teachers of students with hearing impairments ever used sign language or other manual communication method in general education academic classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment		
	Overall	Little or none	Substantial or profound
		Percent	
Teachers ever used sign language or other manual communication method to teach the class	14	14	16

NOTE: Percentages are population estimates based on a weighted sample of approximately 190 youth.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

### **Communication Methods of Teachers of General Education Academic Classes**

How students with hearing impairments interact with their teachers is another aspect of their experience in general education academic courses. The teachers of 14 percent of students with hearing impairments reported that they had ever used sign language or other manual communication method in the students' general education academic classes (table 9).<sup>20</sup> No significant differences by level of hearing impairment were found.

### **Supports Provided to the Teachers of General Education Academic Classes**

Teachers of general education academic courses were asked to indicate the types of supports they were provided when students with hearing impairments were enrolled in their class. For two-thirds (67 percent) of students with hearing impairments enrolled

in general education academic courses, teachers were provided with information about the students' needs and abilities; half (50 percent) had teachers who were provided consultations by special education staff, 25 percent had teachers who were provided a teacher aide or instructional assistant, 15 percent had teachers who were provided in-service training on the needs of the student, 13 percent had teachers who were provided a co-team or co-teaching arrangement, 13 percent had teachers who were provided with special materials or equipment, and 9 percent had teachers who had a smaller student load or class size (table 10). The general education academic teachers of 14 percent of students with hearing impairments reported that supports were not needed, and the teachers of 9 percent indicated that none of these supports were provided. The supports and information provided to teachers did not differ significantly for students with different levels of hearing impairment.

<sup>20</sup> Teachers were asked if they had ever used sign language or other manual communication to teach the class. NLTS2 did not collect data on the frequency with which teachers used these communication methods in the class, nor on their proficiency in using them.

Table 10. Instructional support and information provided to teachers of students with hearing impairments in general education academic classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students with teachers who were provided				
Information about student needs and abilities	67	66	69	65
Consultation services by special education staff	50	60	51	42
Teacher aides or instructional assistants	25	23	21	33
In-service training on needs of student	15	10	12	22
Co-teaching or team teaching	13	6	20	7
Special materials or equipment	13	8	10	19
Smaller student load or class size	9	9	15	‡
Other support	#	0	‡	‡
Students with teachers who indicated				
No support was needed	14	20	12	13
None of the above supports were provided	9	14	11	2

# Rounds to zero.

‡ Responses for cells that do not meet reporting standards are not reported.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 170 to 180 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

Table 11. General education academic teachers' perceptions of and expectations for students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students whose teachers reported				
Perceiving the appropriateness of student's placement as				
Not at all/not very appropriate <sup>1</sup>	4	10	4	0
Somewhat appropriate	20	18	20	21
Very appropriate	76	72	76	79
Expecting student to keep up with others in class				
	96	95	96	96
Perceiving student as keeping up with others in class				
	88	86	85	93

<sup>1</sup> Two response categories, "not very appropriate" and "not at all appropriate," were combined.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 160 to 190 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

### ***Perceptions and Expectations of Teachers of General Education Academic Classes***

For 76 percent of students with hearing impairments enrolled in general education academic classes, teachers reported that students' placement in the class was "very appropriate," 20 percent had teachers who believed that this placement was "somewhat appropriate," and 4 percent had teachers who felt that this placement was "not at all" or "not very" appropriate (table 11). The teachers of nearly all (96 percent) students with hearing impairments enrolled in general education academic courses reported that these students were expected to keep up with others in the class, and the teachers of 88 percent reported that these students did keep up with others. The difference in the percentages of students with hearing impairments who were expected to keep up and those who did keep up was not

significant. In addition, there were no differences in teachers' perceptions and expectations by parent-reported level of hearing impairment.

### **Experiences in Nonvocational Special Education Courses**

Although the emphasis of much special education legislation and policy is on increasing the access of students with disabilities to general education classrooms and curricula, 64 percent of students with hearing impairments were enrolled in at least one course in a special education classroom in a typical school or a school serving only students with disabilities where all classes are considered special education. Knowing what happens in these special education settings is an important aspect for understanding students' overall school experiences. For the 64 percent of students with hearing impairments who were

Table 12. Extent of curriculum modification for students with hearing impairments in nonvocational special education classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students had				
A curriculum with no modifications	8	9	9	7
A curriculum with some modifications	30	43	28	24
A curriculum with substantial modifications	19	16	16	23
A specialized or individualized curriculum	29	25	27	32
No curriculum	15	7	20	15

NOTE: Percentages are population estimates based on a weighted sample of approximately 360 youth. Percentages may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

enrolled in at least one nonvocational special education course (e.g., academic subjects taught in a special education classroom, life skills, study skills, basic skills), teachers of their first such course during the week were asked to provide information about the students' experiences. Teachers' responses are described here to provide a snapshot of these students' experiences in a special education setting.

### ***Curriculum in Nonvocational Special Education Classes***

The curriculum many students with hearing impairments experienced in nonvocational special education classes was one of the unique aspects of their program. Most students with hearing impairments who took nonvocational special education classes (92 percent) had a

grade-level curriculum with some degree of modification or specialization, or they had "no curriculum" at all (e.g., in a class that focused on homework help). Thirty percent of students with hearing impairments who were enrolled in nonvocational special education courses had a curriculum that was reported to have "some" modifications, and 29 percent had a specialized or individualized curriculum (table 12). These percentages were significantly different from the 8 percent of students with hearing impairments who had no modifications to their nonvocational special education classes ( $p < .001$  for both comparisons). No significant differences were found in the types of curricula used in nonvocational special education classes for students with different levels of parent-reported hearing impairment.



Table 13. Instructional groupings of students with hearing impairments in nonvocational special education classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students who received				
Whole-class instruction				
Rarely or never	23	19	24	23
Sometimes	40	46	41	36
Often	37	35	35	40
Small-group instruction				
Rarely or never	15	18	15	15
Sometimes	46	32	46	52
Often	39	51	39	34
Individual instruction from classroom teacher				
Rarely or never	8	13	6	6
Sometimes	53	47	51	57
Often	40	41	43	37
Individual instruction from another adult				
Rarely or never	52	45	53	55
Sometimes	31	27	28	35
Often	17	28	19	10

NOTE: Percentages are population estimates based on a weighted sample of approximately 360 youth. Percentages for each variable may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

### ***Instructional Groupings in Nonvocational Special Education Classes***

Students with hearing impairments in nonvocational special education settings were reported to experience a mix of instructional groupings (table 13). They “often” received individual instruction from the teacher (40 percent), small-group instruction (39 percent), and whole-class instruction (37 percent). These percentages were higher than individual instruction from an adult other than the classroom teacher (17 percent,  $p < .001$  for all comparisons).

The types of instructional groupings teachers used in nonvocational special education classes with students with hearing impairments did not differ by the level of parent-reported hearing impairment.

### ***Classroom Participation in Nonvocational Special Education Classes***

Students with hearing impairments participated in their nonvocational special education courses in a variety of ways. Sixty-seven percent of students with hearing impairments “often” worked

Table 14. Classroom participation of students with hearing impairments in nonvocational special education classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
<b>Students</b>				
Responded orally to questions				
Rarely or never	11	6	7	15
Sometimes	33	45	29	29
Often	57	50	64	55
Participated in class discussion				
Rarely or never	8	6	11	7
Sometimes	29	44	22	28
Often	62	50	67	65
Worked with a peer or group				
Rarely or never	13	7	12	16
Sometimes	52	61	53	47
Often	35	33	35	37
Presented to class or group				
Rarely or never	46	56	48	40
Sometimes	38	32	37	41
Often	16	12	15	18
Took quizzes or tests				
Rarely or never	10	10	8	11
Sometimes	41	28	46	45
Often	49	62	46	44
Worked independently				
Rarely or never	3	6	3	1
Sometimes	31	42	26	29
Often	67	52	71	70

NOTE: Percentages are population estimates based on a weighted sample of approximately 360 youth. Percentages for each variable may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

independently in their classes, 62 percent “often” participated in class discussions, 57 percent “often” responded to questions orally,<sup>21</sup> 49 percent “often” took quizzes or

tests, 35 percent “often” worked with peers or groups, and 16 percent “often” presented in front of a class or group in their special education class (table 14). There were no significant differences in these ways of participating in nonvocational special education classes by the level of parent-reported hearing impairment.

<sup>21</sup> The frequency with which students with hearing impairments responded orally to questions may reflect a preference for responding with sign language and not an indicator of their level of participation in the classroom.

Table 15. Communication methods used by teachers for students with hearing impairments in nonvocational special education classes, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students whose teachers used				
Voice communication only	34	64	42	13
Sign language only	19	9	10	30
Voice and sign language	48	27	48	57

NOTE: Percentages are population estimates based on a weighted sample of approximately 340 youth. Percentages may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

### **Teachers' Communication Methods in Nonvocational Special Education Classes**

Approximately 48 percent of students with hearing impairments had teachers who reported using a combination of voice and sign language or manual communication for instruction in nonvocational special education classes (table 15).<sup>22</sup> This percentage was significantly higher than the 19 percent of students with hearing impairments whose teachers used only sign language or manual communication in instruction in these classes ( $p < .001$ ). Students with “little or none” and those with “some” hearing impairment were more likely to have teachers who used voice communication only compared with students with “substantial or profound” hearing impairment (64 percent and 42 percent vs. 13 percent, respectively,  $p < .01$  for comparison with students with “some” hearing impairment and  $p < .001$  for the other comparison). There were no other

<sup>22</sup> Teachers were asked to indicate what communication methods were used to teach the class. NLTS2 did not collect data on the frequency with which teachers used these communication methods in the class, nor on their proficiency in using them.

significant differences in the communication methods used by teachers in nonvocational special education classrooms.

### **Accommodations, Supports, and Services**

Students with hearing impairments can receive a variety of accommodations, supports, and related services as part of their education programs. These supports include modifications to learning within the classroom, as well as various types of learning supports and technology aids. Among secondary school students with hearing impairments as a whole, 93 percent were provided some type of accommodation or support (table 16).

#### **Modifications to Accommodate Learning**

Providing modifications to accommodate learning is one type of support for students with disabilities. Providing additional time for taking tests or completing assignments was a frequently reported form of accommodation; 61 percent of students with hearing impairments were given more time to take tests, and 37 percent were given

Table 16. Types of accommodations and modifications provided for students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students were provided				
Any type of accommodations or supports <sup>1</sup>	93	85	95	96
More time in taking tests	61	68	56	62
Additional time to complete assignments	37	42	33	39
Test read to student	26	22	32	20
Slower paced instruction	26	13	22	36
Modified tests	25	24	18	32
Modifications to physical aspects of the classroom	19	6	25	21
Alternative tests or assessments	19	16	17	23
Shorter or different assignments	19	22	17	18
Modified grading standards	17	12	17	19

<sup>1</sup> Support includes provision of any of the accommodations and other learning assistance listed here and in tables 17 and 18. Students may have been provided more than one type of accommodation or support.

NOTE: Percentages are population estimates based on a weighted sample of approximately 460 youth.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

additional time to complete assignments (table 16). Twenty-six percent of students with hearing impairments had tests read to them or received slower-paced instruction, and 25 percent were given modified tests. Modifications to physical aspects of the classroom, alternative tests or assessments, or shorter or different assignments were provided to 19 percent of students. Modified grading standards were implemented for 17 percent of students with hearing impairments. Students with different parent-reported levels of hearing impairment generally did not differ in accommodations, supports, and services provided. One exception was that students with “substantial or profound” hearing impairment were more likely to be provided slower-paced

instruction than students with “little or none” (36 percent vs. 13 percent,  $p < .01$ ).

### **Learning Supports**

Other types of supports or assistance intended to enhance classroom participation and learning were provided to 73 percent of students with hearing impairments (table 17). Monitoring of progress by special education teachers was provided for 43 percent of students with hearing impairments, and 34 percent were provided help from a reader or interpreter. More frequent feedback was provided to 27 percent of students with hearing impairments, and 25 percent were provided learning strategies or study skills assistance. Eighteen percent were tutored by an adult,

Table 17. Types of learning supports provided for students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students were provided				
At least one type of learning support	73	70	81	83
Monitoring of progress by special education teacher	43	44	50	35
Reader or interpreter	34	19	30	45
More frequent feedback	27	14	28	34
Learning strategies/study skills assistance	25	17	27	28
Tutoring by an adult	18	9	19	23
Self-advocacy training	17	11	13	24
Teacher aide, instructional assistant, or other personal aide	14	12	12	17
Peer tutor	12	10	14	12

NOTE: Percentages are population estimates based on weighted samples that range from approximately 460 to 480 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

17 percent were provided self-advocacy training, and 14 percent were provided with a teacher's aide, instructional assistant, or other personal aide. Finally, 12 percent of students with hearing impairments participated in peer tutoring as a form of learning support. Students with "substantial or profound" parent-reported hearing impairment were more likely to be provided with the services of a reader or interpreter than those with "little or none" (45 percent vs. 19 percent,  $p < .01$ ). There were no other significant differences in the learning supports provided to students with different levels of parent-reported hearing impairment.

### **Technology Aids**

Technology aids were provided to 39 percent of students with hearing impairments (table 18). Nearly 1 in 5 (19 percent) of all students with hearing impairments were provided the use of a calculator in the classroom when other students were not permitted to use one. Communication aids (e.g., Touch Talker, manual printing board) supported 8 percent of students with hearing impairments. Computers also provided additional aid to students with hearing impairments: 5 percent were allowed to use computer software designed for students with disabilities, and 4 percent were allowed to use computers for activities when other students were not permitted to use one. Two percent of students with hearing impairments were

Table 18. Types of technology aids provided for students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Percent		
Students were provided				
At least one type of technology aid	39	35	39	41
Use of calculator when not allowed for other students (e.g., during tests)	19	22	18	18
Communication aids (e.g., Touch Talker, manual printing board)	8	‡	8	12
Computer software for disabilities	5	7	2	6
Use of computer when not allowed other students (e.g., use of spell checker when other students do not use one)	4	4	2	7
Books on tape	2	7	2	0
Computer hardware adapted for student's unique needs (e.g., alternative keyboards, switch interface)	1	‡	1	1

‡ Responses for cells that do not meet reporting standards are not reported.

NOTE: Percentages are population estimates based on weighted samples that range from approximately 460 to 480 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

provided books on tape, and 1 percent were provided computer hardware adapted for students with special needs. Communication aids were significantly more prevalent among students with “substantial or profound” parent-reported hearing impairment than among students with “little or none” (12 percent vs. less than 1 percent,  $p < .01$ ). Otherwise, no significant differences in technology aids were reported across the different levels of hearing impairment.

### **Related Services**

In addition to the accommodations and supports provided in their classes, 88 percent of secondary students with

hearing impairments were supported by a variety of related services (table 19). Seven in 10 of all secondary students with hearing impairments (70 percent) were provided audiology services, and nearly 6 in 10 students (59 percent) were provided speech or language therapy or other forms of communication services (e.g., instruction in sign/manual communication or lip reading, augmentative communication). Assistive technology services or devices supported 44 percent of students with hearing impairments. Thirty-six percent of students with hearing impairments were provided with case management. Mental health services were provided to 18 percent of students with hearing

Table 19. Types of related services provided for students with hearing impairments, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Substantial or profound	
		Percent		
Students were provided				
At least one type of related service	88	76	90	93
Audiology	70	55	71	77
Speech services or communication services				
Speech or language therapy	59	50	52	72
Communication services (e.g., instruction in sign/manual communication or lip reading, augmentative communication)	59	29	56	77
Assistive technology services/devices	44	32	38	55
Service coordination/case management	36	28	39	38
Behavior/personal counseling				
Mental health services, personal/group counseling, psychiatric care	18	13	18	19
Behavioral intervention	11	8	8	17
Social work services	10	8	8	15
Special transportation because of a disability	16	14	13	21
Health services (e.g., administering medication, oxygen)	13	4	9	20
Therapeutic services				
Occupational therapy	5	3	3	9
Physical therapy	4	0	3	8
Adaptive physical education	4	8	3	3

NOTE: Percentages are population estimates based on weighted samples that range from approximately 390 to 480 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 student's school program survey, 2002.

impairments, 11 percent were provided behavioral interventions, and 10 percent were provided social work services. Special transportation was given to 16 percent of students with hearing impairments, and 13 percent were provided with health services. Occupational therapy was provided to 5 percent of students, and physical therapy and adaptive physical education each were provided to 4 percent of students with hearing impairments. There were no significant differences in the provision of related services to students with different levels of parent-reported hearing impairment with one exception. In the case of communication services, 77 percent of students with “substantial or profound” hearing impairment were provided with these services, compared with 29 percent of students with “little or none” ( $p < .001$ ).

### **The Academic Achievement of Students With Hearing Impairments**

This fact sheet also presents descriptive findings from the research edition of the *Woodcock-Johnson III Tests of Achievement* (WJ III), including overall assessment scores and scores on the following six assessment subtests: passage comprehension, synonyms and antonyms, mathematics calculation, applied problems, social studies, and science.

An assessment of academic achievement was attempted for each NLTS2 sample member for whom a telephone interview or mail questionnaire had been completed by a parent and parental consent for the assessment had been provided. Youth were eligible for an assessment during the data collection wave in which they were 16 through 18 years old. This age range was selected to limit the variability in performance that could be attributed to differences in the ages of the youth participating and to correspond to the

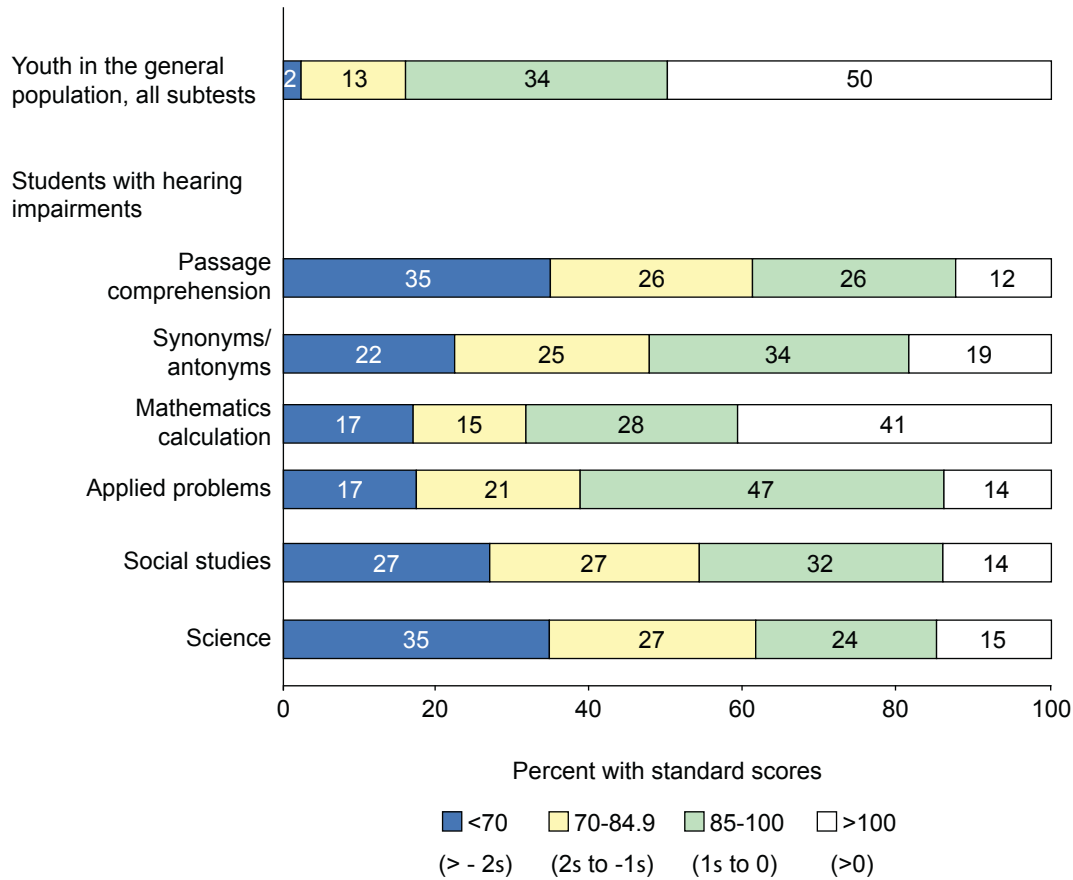
study’s every-2-year data collection cycle. The study design linked the timing of assessments with school data collection (conducted in 2002 and 2004) because most direct assessments occurred at school. The oldest two single-year age cohorts of youth (i.e., those ages 15 or 16 when sampled) reached the eligible age range in 2002; the youngest two cohorts (those ages 13 or 14 when sampled) reached the eligible age range in 2004. Data are combined across the two waves of data collection and reported here for all youth for whom an assessment was completed in either wave. Students were allowed to use any accommodations that were specified in their IEP and related to testing (e.g., use of an interpreter, additional time).<sup>23</sup>

Scores on the WJ III subtests suggest that many students with hearing impairments did not fare as well on these academic assessments as peers in the general population (figure 1). Direct assessment scores are reported as standard scores, which have a mean of 100 and a standard deviation of 15. In the general population of youth in the test norming sample, the distribution of test scores on each subtest is equally divided above and below the mean (i.e., 50 percent score at the mean of 100 or above and 50 percent scored below) (Woodcock and Johnson 1989). In comparison, the majority of secondary students with hearing impairments scored below the mean across subtests. Compared with the 50 percent of youth in the general population who scored 100 or below, 87 percent of secondary school students with hearing impairments had standard scores in that range on the passage comprehension subtest, 86 percent on the science and social studies subtests, 85 percent on the applied problems subtest,

<sup>23</sup> See Wagner, Newman, Cameto, and Levine (2006) for more information about accommodations provided and other details on the administration of the direct assessments.



Figure 1. Performance of students with hearing impairments compared with youth in the general population on Woodcock-Johnson III subtests



NOTE: Percentages are population estimates based on weighted samples that range from approximately 540 to 550 youth across variables. Percentages for subtests may not sum to 100 because of rounding. Youth in the general population refers to the Woodcock-Johnson norming sample.

SOURCE: Woodcock-Johnson, Tests of Cognitive Ability: Standard and Supplemental Batteries, Norm Tables, 1989; U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), student assessments, 2002 and 2004.

81 percent on the synonyms/antonyms subtest, and 60 percent on the mathematics calculation subtest ( $p < .01$  for calculation subtest,  $p < .001$  for all other comparisons with the general population).

Approximately 2 percent of youth in the general population had standard scores that were more than two standard deviations below the mean—i.e., less than 70—a standard score range classified by WJ III as being “very low” (Woodcock and Mather 1990). Across the subtests, between 17 percent and 35 percent of students with hearing impairments had scores in this

range: 35 percent of students with hearing impairments had “very low” scores on the passage comprehension and science subtests, 27 percent on the social studies subtest, 22 percent on the synonyms/antonyms subtest, and 17 percent on the mathematics calculation and applied problems subtests ( $p < .001$  for all comparisons with the general population).

Despite 17 percent to 35 percent of students with hearing impairments scoring “very low” on these subtests, some students with hearing impairments performed

well. Across subtests, from 12 percent to 41 percent of students with hearing impairments scored above 100—the mean of the general population of youth.

Students with hearing impairments were more likely to score above the mean on the mathematics calculation subtest than on all other subtests, with 41 percent scoring above 100 on the mathematics calculation subtest compared with 12 percent on the passage comprehension, 14 percent on the applied problem solving, 14 percent on the social studies, 15 percent on the science, and 19 percent on the synonyms/antonyms subtests ( $p < .001$  for all comparisons with the mathematics subtest).

Students with hearing impairments received the highest overall mean standard score on the mathematics calculation subtest (table 20). They exhibited stronger mathematics calculation skills (mean standard score of 92) than science knowledge (mean standard score of 76) passage comprehension (mean standard score of 76), social studies knowledge (mean standard score of 81), applied problem

solving (mean standard score of 84), and synonyms/antonyms skills (mean standard score of 84,  $p < .001$  for all comparisons). Their applied problem solving skills and ability to use synonyms and antonyms (mean standard score of 84 on both subtests) were stronger than their science knowledge or passage comprehension (mean standard score of 76 on both subtests,  $p < .001$  for all comparisons).

Academic achievement differed for students with different levels of parent-reported hearing impairment categories. Students with “some” parent-reported hearing impairment scored higher on the synonyms/antonyms subtest than those with “substantial or profound” hearing impairment or those with “little or none” (mean standard scores of 91 vs. 80 and 79, respectively,  $p < .01$  for both comparisons). In addition, those with “some” hearing impairment scored higher on the social studies subtest than students with “little or none” (mean standard scores of 86 vs. 72,  $p < .01$ ).

Table 20. Performance of students with hearing impairments on the Woodcock-Johnson III research version subtests, by parent-reported level of hearing impairment (aided for those who used a hearing device)

	Level of hearing impairment			
	Overall	Little or none	Some	Substantial or profound
		Mean standard score		
Passage comprehension	76	69	82	74
Synonyms and antonyms	84	79	91	80
Mathematics calculation	92	86	96	91
Applied problems	84	82	86	82
Social studies	81	72	86	80
Science	76	71	81	72

NOTE: Percentages are population estimates based on weighted samples that range from approximately 540 to 550 youth across variables.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 1 general education teacher survey, 2002.

## Summing Up

This fact sheet provides a national picture of the secondary school experiences and academic performance of students with hearing impairments who received special education services at the time they were initially sampled for this study. In addition to findings for the overall group of secondary students with hearing impairments, this fact sheet provides findings by parent-reported levels of hearing impairment.

Findings from NLTS2 reveal that secondary students with hearing impairments took a range of courses in a given semester: On average 61 percent of their courses were academic, 13 percent were vocational education, and 26 percent were other nonacademic courses. Their courses took place in a variety of school and classroom settings. More than three-fourths (76 percent) of students with hearing impairments attended a typical school with a wide variety of students, whereas nearly a fifth (19 percent) attended a school serving only students with disabilities, and 4 percent attended another type of school. At the classroom level, 78 percent of students with hearing impairments were enrolled in at least one course in a general education setting, and 64 percent were enrolled in at least one course in a special education setting.

The fact sheet provides important information about the experiences of students with hearing impairments in general education academic courses, an educational context experienced by 67 percent of students with hearing impairments in a given semester. The general education curriculum was used without modification for 47 percent of students with hearing impairments enrolled in these courses, whereas some degree of modification was made to the general education curriculum for

54 percent. The experiences of students with hearing impairments in general education academic courses, such as their participation in different types of instructional groupings and their interactions in the classroom, generally did not differ from those of the whole class; however, there were two exceptions. Compared with their classmates in general education academic courses, students with hearing impairments were more likely to receive individual instruction often from an adult who was not the teacher, and they were not as likely to respond orally to questions often.

The fact sheet also provides information about the experiences of students with hearing impairments in nonvocational special education courses. Among the 64 percent of students with hearing impairments enrolled in at least one such course, 92 percent had a curriculum with some degree of modification or specialization or no curriculum at all. Students with hearing impairments experienced a mix of instructional groupings in their nonvocational special education courses such as individual instruction, small-group formats, and whole-class instruction. In terms of students' participation in class activities in nonvocational special education classes, students with hearing impairments were less likely to make presentations to the class than participate in other types of activities.

Most students with hearing impairments (93 percent) were provided some type of accommodation, support, or service from their schools. Additional time for taking tests was provided to a majority of students with hearing impairments (61 percent). In addition, the majority of students with hearing impairments were provided with audiology services (70 percent), speech or language therapy (59 percent), or communication services (59 percent).

With regard to academic achievement, a gap existed between the academic achievement of student's with hearing impairments and their peers in the general population in reading, mathematics, science, and social studies. Higher percentages of student's with hearing impairments scored below the mean across subtests compared with the general population.

The analysis of findings by parent-reported level of hearing impairment revealed several significant differences in the secondary school experiences and academic performance for students with different levels of hearing impairment. Students with "substantial or profound" hearing impairment were more likely to attend a school serving only students with disabilities than students with "some" hearing impairment or those with "little or none." Students with "substantial or profound" hearing impairment also were more likely to be enrolled in a vocational course than students with "little or none." In addition, students with "some" hearing impairment or "little or none" were more likely to be enrolled in general education courses than students with "substantial or profound" hearing impairment.

Students' experiences in general education academic courses (e.g., instructional groupings, participation in particular classroom activities, teachers' use of sign language, and teachers' expectations) did not differ significantly by level of hearing impairment. Similarly, there were no significant differences in instructional groupings, participation in classroom activities, or other aspects of instruction in nonvocational special education courses by level of hearing impairment.

Comparisons of students with different levels of parent-reported hearing impairment indicated significantly higher provision

of some accommodations and services, including slower paced instruction, the use of a reader or interpreter, and the receipt of communication aids and communication services for students with "substantial or profound" hearing impairment compared with students with "some" hearing impairment or those with "little or none."

In addition, academic achievement differed by parent-reported levels of hearing impairment, with students with "some" hearing impairment having a higher mean standard score on the synonyms and antonyms subtest than those with "substantial or profound" hearing impairment or those with "little or none." Those with "some" hearing impairment performed better on the social studies subtest than those with "little or none."

This is the fifth in a series of NLTS2 fact sheets on the experiences and outcomes of youth in a specific disability category. Previous briefs focused on students with attention-deficit/hyperactivity disorder (ADHD), learning disabilities, autism, and mental retardation. These and other products from NLTS2 are available at <http://www.nlts2.org>.

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