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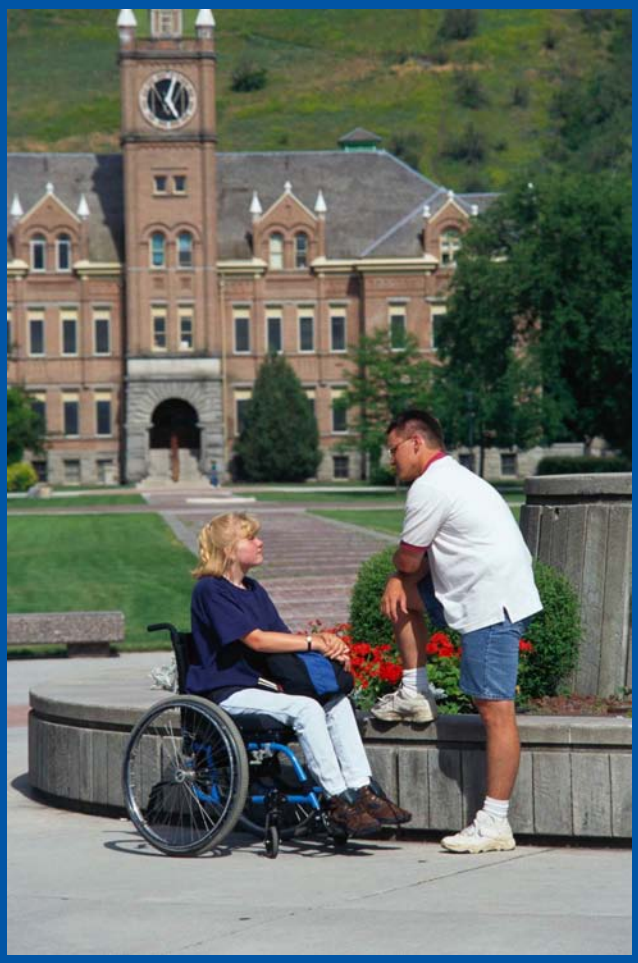
Secondary School Programs and Performance of Students With Disabilities

A Special Topic Report of Findings From the National Longitudinal Transition Study-2 (NLTS2)



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A Special Topic Report of Findings From the National Longitudinal Transition Study-2 (NLTS2)

November 2011

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Executive Summary

Since 1982, the U.S. Department of Education's National Center for Education Statistics (NCES) has periodically surveyed the status of curricula being implemented in America's high schools and the course-taking patterns of high school students, as identified from their transcripts. Data from the High School Transcript Study (HSTS), conducted in conjunction with the National Assessment of Educational Progress (NAEP), serve a valuable accountability function in that they can capture course-taking patterns at a time when major curriculum changes or educational policy initiatives are being implemented. Although for many years, this important data source did not provide information on students with disabilities, the most recent report from 2009 (Nord et al. 2011) takes a cursory look at this important population, providing information on credits earned overall and in core academic, other academic, or nonacademic courses; and average GPA. However, many questions remain unanswered about the school programs and performance of students with disabilities. For example, the extent to which students took their courses in general education or special education settings is unaddressed, as are the wide-ranging differences in the school programs of students who differ in the nature of the disability that qualifies them for special education services.

The National Longitudinal Transition Study-2 (NLTS2) provides a unique source of information on these and other important questions for students with disabilities. The study addresses questions about youth with disabilities by providing information over a 10-year period about a nationally representative sample of secondary school students with disabilities, including information that details for policymakers, educators, parents, and students a national picture of what courses students with disabilities took in high school, in what settings, and with what success in terms of credits and grades earned. This report describes course taking primarily through the lens of course credits earned. To progress toward graduation, students need not only to take a particular distribution of courses but also to meet the performance standards for those courses, resulting in earned credits. Specifically, this report addresses the following questions for students with disabilities who attended typical high schools:[1]

- How many credits did students with disabilities earn during high school and in what types of courses?
- What proportion of credits did students with disabilities earn in general and special education settings?
- What grades did they receive in their classes?
- How did the high school credit-earning and grade-performance experiences of students with disabilities compare with those of their peers in the general population?
- How did the high school credit-earning and grade-performance experiences differ for students who differed in disability category, demographic characteristics, grade levels, and school completion status?

This executive summary presents all findings related to these questions that are included in the full report for students with disabilities as a whole who had attended a typical high school at

[1] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

some point from 2001 through 2009. The full report also presents findings for students who differed in their primary disability category, demographic characteristics, grade levels, and school completion status when those differences were statistically significant at at least the $p < .01$ level.

Credits Earned by Secondary School Students with Disabilities

Drawing on the high school transcript data compiled as part of NLTS2 for students with disabilities nationally illuminates the overall pattern of credits earned by these students across academic, vocational, and other types of courses and provides a basis of comparison with the general population of high school students.

- Students with disabilities earned, on average, 22.7 credits during their time in high school.[2] Academic courses[3] accounted for an average of 12.7 credits, vocational courses accounted for an average of 4.5 credits, and other courses that were neither academic nor vocational, such as physical education and life skills, accounted for an average of 5.7 credits.
- Students with disabilities averaged fewer credits than did their peers in the general population (22.7 vs. 24.2).[4] Whereas the coursework of students in the general population was focused more heavily on academic courses, compared with that of students with disabilities (16.1 academic credits vs. 12.7), students with disabilities earned more vocational and nonacademic, nonvocational credits than did students in the general population (4.5 vs. 3.1 and 5.7 vs. 4.9, respectively).
- Similar to their general population peers, academic courses were part of the school programs of virtually all students with disabilities (99 percent) attending typical high schools. Academic credits accounted for 57 percent of the total credits they earned.
- Students with disabilities earned significantly more credits in English courses (4.0 credits, on average,) than in any other subject. They averaged 3.0 social studies credits, 2.9 mathematics credits, 2.3 science credits, and half a foreign language credit. The number of English credits earned by students with disabilities was similar to that of the general population, whereas the numbers of credits earned in all the other academic subjects were lower than those of students in the general population.
- Among the various kinds of mathematics courses taken by students with disabilities, more credits were earned in basic mathematics[5] (1.6) than in either mid-level mathematics (1.3) or advanced mathematics courses (0.1).

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[2] The analyses of credits earned are based only on complete transcripts, with the exception of the by-grade-level analyses. Transcripts for students who had completed their high school programs typically included 4 or more years of coursework. Transcripts for students who had not completed high school were considered to be complete if transcript information was available for all of the grading periods the students had been in high school. Partial transcripts (e.g., only 9th-grade transcript information was collected for a student who had continued his or her education beyond the 9th grade) were only included in the by-grade-level analyses.

[3] Academic courses include English, mathematics, science, social studies, and foreign languages.

[4] General population estimates are based on calculations using the restricted use dataset from the U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study. All general population estimates include students who have completed high school, as well as those who have not (i.e., both graduates and dropouts have been included).

[5] Basic mathematics courses include mathematics (undifferentiated); integrated, consumer, basic, general, remedial, fundamental, and "higher level" mathematics; and pre-algebra. Mid-level mathematics courses include

- Nearly all students with disabilities (96 percent) enrolled in some type of vocational course during high school, with those courses accounting for 20 percent of the total credits earned.
- The types of vocational courses taken by students with disabilities attending typical high schools and the average credits earned in them were: prevocational courses (e.g., career exploration), 0.5 credit; occupation-specific courses (e.g., agriculture, alternate business occupations), 3.4 credits; and work study or cooperative education (3.6 credits). The numbers of average vocational credits earned were similar for the general student population.
- Almost 100 percent) of students with disabilities were enrolled in at least one nonacademic, nonvocational[6] course during high school, which accounted for 25 percent of the total number of credits earned. More credits were in fine and performing arts,[7] physical education and health, and learning support courses (1.5 to 1.7 credits) than in life skills[8] or other nonacademic, nonvocational courses (0.6 and 0.7, respectively).
- Students with disabilities earned more credits in learning support courses and other, uncategorized courses (1.5 and 0.7, respectively) than did students in the general population (0.3 and 0.2). In contrast, students in the general population earned more credits in fine and performing arts and life skills courses (1.8 and 1.0, respectively) than students with disabilities (1.5 and 0.6).

Credits Earned in General and Special Education Settings

Efforts to improve student outcomes "have centered on increasing inclusion of students with disabilities in general education classrooms and, most recently, ensuring access to the general education curriculum" (McLaughlin and Tilstone 2000, p. 50). For most students with disabilities served under IDEA, both general education and special education settings are part of their instructional experience.

- On average, students with disabilities who attended typical high schools earned 16.7 credits in general education courses and 6.1 credits in special education courses (72 percent and 28 percent of their overall credits, respectively).
- More than one-quarter (27 percent) of secondary school students with disabilities spent all of their course time in general education courses and earned all their credits there, whereas 3 percent of students with disabilities earned all their credits in a special education setting.
- Overall, students with disabilities earned 66 percent of their academic credits, 84 percent of their vocational credits, and 81 percent of their nonacademic,

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algebra (I, II, and undifferentiated) and geometry. Advanced mathematics courses include advanced math (undifferentiated), algebra/trigonometry, trigonometry, trigonometry/geometry, pre-calculus, statistics/ probability, and calculus (all levels).

6 Nonacademic, nonvocational courses include courses in the fine and performing arts, physical education and health, learning support courses, life skills, and other, uncategorized courses.

7 Courses in fine and performing arts include drama, music, dance, art, and photography and film.

8 Courses in life skills include living skills, resource management, health and safety education, driver's education, community living, communication and social development instruction, and food and nutrition.

nonvocational credits in general education settings, compared with 34 percent, 17 percent, and 19 percent, respectively, earned in special education settings.

- On average, students earned 9.0 credits in general education academic courses and 3.9 credits in special education academic courses. They earned 3.7 credits in general education vocational courses, compared with 1.0 credit in special education vocational courses; and they earned 4.3 credits in general education nonacademic, nonvocational courses and 1.4 credits earned in such courses taken in special education settings.

Grade Performance

Students' overall grade point average (GPA) and rate of course failure are used to describe the grade performance of students with disabilities attending typical high schools. In interpreting the results, it is important to note that differences in grade performance are confounded by several other variables, including instructional setting and course type, variables that are distributed differently across disability categories. For example, students in the four disability categories that averaged higher GPAs also had earned larger proportions of their overall credits in special education than general education courses.

Key findings regarding students' grade performance include the following:

- On average, students with disabilities who received grades earned a 2.3 GPA on a 4-point scale, a lower GPA than that of the general student population (2.7).
- Approximately 6 percent of students with disabilities had GPAs of 3.35 or higher (mostly As and Bs), compared with 20 percent of students in the general population; 11 percent of students with disabilities had GPAs lower than 1.25 (mostly Ds), compared with 1 percent of general population peers.
- Twenty-eight percent of students with disabilities had GPAs between 2.75 and 4.0, whereas 45 percent had GPAs that were less than 2.25.
- Approximately 66 percent of students with disabilities had failed at least one course during their years in secondary school, thereby losing course credits, a significantly higher course failure rate than for the general student population (47 percent). Students with disabilities who had failed a course had failed seven courses, on average, compared with six courses among students in the general population who had failed a course.
- Students with disabilities received lower grades in their academic courses (2.1 GPA, on average) than in their vocational (2.4) or nonacademic, nonvocational courses (2.6); the average GPA for vocational courses also was lower than the GPA for nonacademic, nonvocational courses.
- Consistent with this, students with disabilities were more likely to fail an academic course than a vocational course or a nonacademic, nonvocational course (58 percent vs. 31 percent and 37 percent, respectively).
- Average GPAs of students with disabilities were lower in their general education courses than those earned in their special education courses (2.2 vs. 2.5), a pattern that was consistent across types of courses. Students also were more likely to have failed at least one course in a general education setting than in a special education setting (65 percent vs. 30 percent), again, a consistent pattern across course types.

1. The School Programs and Grade Performance of Students With Disabilities: Study Background and Methods

Since 1982, the U.S. Department of Education's National Center for Education Statistics (NCES) has periodically surveyed the status of curricula being implemented in America's high schools and the course-taking patterns of high school students, as identified from their transcripts. Data from the High School Transcript Study (HSTS), conducted in conjunction with the National Assessment of Educational Progress (NAEP), serve a valuable accountability function in that they can capture course-taking patterns at a time when major curriculum changes or educational policy initiatives are being implemented and reveal the relationships between high school course taking and performance in mathematics and science on the NAEP.

Although students' high school transcript data can be valuable information to collect, for many years, this important data source did not provide information on students with disabilities. The most recent transcript report from 2009 (Nord et al. 2011) takes a cursory look at this important population, providing information on credits earned overall and in core academic, other academic, or nonacademic courses and average GPA. However, many questions remain unanswered about the school programs and performance of students with disabilities. For example, the extent to which students took their courses in general education or special education settings is unaddressed, as are the wide-ranging differences in the school programs of students who differ in the nature of the disability that qualifies them for special education services.

The National Longitudinal Transition Study-2 (NLTS2) provides a unique source of information on these and other important questions for students with disabilities. The study addresses questions about youth with disabilities by providing information over a 10-year period about a nationally representative sample of secondary school students with disabilities, including information that details for policymakers, educators, parents, and students a national picture of what courses students with disabilities took in high school, in what settings, and with what success in terms of credits and grades earned. Early analyses from NLTS2 (Wagner, Newman, et al. 2003) that used course-taking information from a single semester provided a preliminary view of the kinds of academic, vocational, and other courses taken and the settings in which they were taken by students who differed in their primary disability category and selected demographic characteristics. Similarly, a preliminary look at academic performance was provided using parent-reported information on students' grades (Wagner, Marder, Blackorby, et al. 2003).

With the completion of the collection of student transcripts for NLTS2 sample members, it is now possible to take a more thorough look at course taking, course settings, and grade performance for students with disabilities over their entire high school career. This report describes course taking primarily through the lens of course credits earned. To progress toward graduation, students need not only to take a particular distribution of courses but also to meet the performance standards for those courses, resulting in earned credits. Specifically, this report addresses the following questions for students with disabilities who attended typical high schools:[9]

[9] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

- How many credits did students with disabilities earn during high school and in what types of courses?
- What proportion of credits did students with disabilities earn in general and special education settings?
- What grades did they receive in their classes?
- How did the high school credit-earning and grade-performance experiences of students with disabilities compare with those of their peers in the general population?[10]
- How did the high school credit-earning and grade-performance experiences differ for students who differed in disability category, demographic characteristics, grade levels, and school completion status?

This report addresses these questions by focusing on the high school side of the transition process; it describes the experiences of students with disabilities who had attended a typical high school at some point from 2001 through 2009.

Students attended high school for varying lengths of time; findings presented here describe the course credits accrued during the length of time an individual student attended a typical high school. Most students (80 percent) spent 4 years in high school, typically in grades 9 through 12. Less than 1 percent of students remained in high school beyond the traditional 12th grade (referred to in this report as "extended 13th grade"), resulting in additional years of transcript information.[11] Other students (19 percent) left high school prior to completion, resulting in fewer years of course taking.

Study Overview

NLTS2 is a 10-year-long study of the characteristics, experiences, and outcomes of a nationally representative sample of youth with disabilities who were 13 to 16 years old and receiving special education services in grade 7 or above on December 1, 2000. NLTS2 findings generalize to youth with disabilities nationally and to those in each of the 12 federal special education disability categories in use for students in the NLTS2 age range.[12] (Details of the NLTS2 design, sample, and analysis procedures are presented in the appendix)[13] The study was

[10] Credit-earning and grade-performance experiences are impacted by the extent to which students fail courses or fail to be promoted to the next grade level, but these issues, albeit important, are beyond the scope of the descriptive questions addressed by this report.

[11] The Individuals with Disabilities Education Act (IDEA) **allows students with disabilities to remain in public school transition programs through age 21** if they have transition needs and have not received a regular high school diploma. Students who continued their high school programs into extended 13th grade often remained in high school for longer than 1 additional school year; on average, students spent 1.57 school years in extended 13th grade. The majority of students with an extended high school program were students with mental retardation (31 percent), emotional disturbances (28 percent), or learning disabilities (21 percent). Students in the categories of other health impairment, autism, and multiple disabilities each accounted for 4 percent of this small group. Three percent of students who stayed in high school beyond 12th grade were students with orthopedic impairments, 1 percent were in each of the categories of hearing impairments, visual impairments, and deaf-blindness, and less than 1 percent were students with traumatic brain injuries. As among students with disabilities as a whole, almost two-thirds (63 percent) were male, and 59 percent were White. Eighty-five percent of students with extended high school programs did complete high school; 15 percent did not.

[12] The definitions of the 12 primary disability categories used here are specified by law and presented in table A-4 in the appendix.

[13] Additional information about NLTS2 is available at www.nlts2.org.

designed to collect data on sample members from multiple sources in five waves, beginning in 2001 and ending in 2009.[14]

The NLTS2 sample was constructed in two stages. The NLTS2 district sample was stratified to increase the precision of estimates, to ensure that low-frequency types of districts (e.g., large urban districts) were adequately represented in the sample, to improve comparisons with the findings of other research, and to make NLTS2 responsive to concerns voiced in policy debate (e.g., differential effects of federal policies in particular regions, districts of different sizes). Three stratifying variables were used: region, size (student enrollment), and community wealth. A stratified random sample of school districts was selected from the universe of approximately 12,000 that served students receiving special education in at least one grade from 7th through 12th grades. These districts were invited to participate in the study, with the intention of recruiting approximately 500 districts. For NLTS2 to be nationally representative of youth with disabilities who attended publicly supported schools, the 77 state-supported "special schools"—i.e., those that served primarily students with hearing impairments, vision impairments, and multiple disabilities—were invited to participate.

The goal was to select from these districts and special schools a target sample of about 12,000 students. Extensive efforts to obtain consent to participate from eligible districts and the known universe of special schools resulted in 501 school districts and 38 special schools agreeing to participate in NLTS2. Analyses of the NLTS2 district sample revealed that it closely resembled the universe of districts from which it was drawn on the sample's stratifying variables and on selected variables from the U.S. Department of Education's Office of Civil Rights database on the universe of school districts. Participating school districts and special schools provided rosters of students receiving special education services in the designated age range, from which the student sample was selected.

The roster of all students in the NLTS2 age range who were receiving special education services from each district and special school was stratified by primary disability category, as reported by the districts. Students then were selected randomly from each disability category. Sampling fractions were calculated that would produce enough students in each category so that, in the final study year, findings would generalize to most categories individually with an acceptable level of precision, accounting for attrition and for response rates to the parent/youth interview. A total of approximately 11,280 students were selected and eligible to participate in NLTS2.

Data Sources

High school transcripts were the primary data source for this report. Additionally, school district rosters were the source of the primary disability category under which each student received special education services. These two data sources are described briefly below and

[14] Wave 1 included parent interviews (2001), surveys of school staff (2002), and assessments of the academic abilities of students who were 16 to 18 years old in 2002. Wave 2 involved interviews with both parents and youth (2003), a mail survey of youth whose parents reported they were able to respond to questions but not by phone (2003), school staff surveys for youth still in high school (2004), and assessments of the academic abilities of youth who were 16 to 18 years old in 2004. Wave 3 (2005) repeated the telephone interviews and mail survey of youth, as did Waves 4 and 5 (2007 and 2009). High school transcripts were collected annually from 2002 through 2009, for youth who had left high school that school year.

discussed in greater detail in the appendix. In addition, the appendix includes a description of the overall response rates for the transcript data collection.

High School Transcripts

Transcript data collection spanned multiple NLTS2 study years. The first request to schools for transcript data was sent in 2002. From March 2002 to September 2009, eight waves of requests were sent to all NLTS2 schools and district offices. Each request contained a letter describing the study and a cover sheet to be returned with a student's transcript. The cover sheet requested that the registrar or other school or district staff member indicate the following information, if not already included on the transcript: student's enrollment or exit status, grade level, instructional setting of course (special or general education), course content, vocational courses, and absentee information.

A transcript that included information indicating that a student had graduated, completed his or her high school program, aged out, or dropped out and that included complete transcript information for all of the grading periods the student had been in high school was considered to be complete, and no further requests for that student's information were made. A transcript that did not indicate that the student had completed his or her program or did not include information for all appropriate grading periods was considered to be a partial transcript, and an updated transcript was requested in the following data collection period.

Complete transcripts were available for 83 percent of the approximately 7,500 students in typical high schools included in this report. The number of course-taking years included on completed transcripts varied. Of the students who are the focus of this report (students in typical high schools who received transcripts), 80 percent of the completed transcripts included 4 years of high school course-taking information, usually in grades 9 through 12. An additional 19 percent left high school before completing their programs (i.e., dropped out or were permanently expelled), and their completed transcripts usually included fewer than four years of course taking. Finally, less than 1 percent of students in typical high schools remained in school beyond the traditional 12th grade (extended 13th grade), resulting in additional years of course-taking information being included on their transcripts.

To provide a comprehensive description of course taking and grade performance across a student's time in high school, the analyses included in this report are based only on completed transcripts, with one exception: the by-grade-level analyses. When the disability-related and demographic characteristics of the subsample of students with complete transcripts were compared with those of the full sample of students included in this report, there were no significant differences between the two groups (analyses presented in appendix A).

To benefit from the full range of available transcript information, transcript data for the students not included in the overall analyses (the 17 percent of students with partial transcripts) were included in the by-grade-level analyses, if transcript information available for a specific grade level was complete. For example, if only 9th-grade transcript information had been collected for a student who had continued his education beyond the 9th grade, the transcript information would be included in the description of course taking and performance in the 9th grade but would not be included in other sections of the report focusing on the student's overall high school course taking. Partial transcripts represent 11 percent of the transcripts included in the 9th-grade analyses, 10 percent in the 10th-grade analyses, 7 percent in the 11th-grade

analyses, 2 percent in the 12th-grade analyses, 7 percent in the extended 13th-grade analyses, and 24 percent in the ungraded analyses.[15]

Transcript courses were coded using the Classification of Secondary School Courses (CSSC) codes used by the U.S. Department of Education, National Center for Education Statistics, High School Transcript Study (2000) and the special education course codes used in the National Longitudinal Transition Study (NLTS).

When reporting the average and total number of credits earned, both overall and by subject area, courses with zero credits (because of a failing course grade or it being a non-credit bearing course) were counted as zero credits. For calculating grade point average, all grades received from courses were included in the calculation, with grades of F counting as zero. See the appendix for further description of the transcript data collection, coding, and variable creation.

School and School District Student Rosters

Information about the primary disability category of the NLTS2 sample members who form the basis of this report came from rosters of students in the NLTS2 age range receiving special education services in the 2000–01 school year under the auspices of participating school districts and state-supported special schools.

Data Source for Comparisons With Students in the General Population

Comparison data were taken from the U.S. Department of Education, National Center for Education Statistics (NCES), Education Longitudinal Study of 2002 (ELS:2002), High School Transcript study.[16] ELS:2002 includes a nationally representative sample of approximately 16,200 youth who were sophomores in high school in 2002. The first round of data collection occurred in spring 2002. In that round, eligible youth and their parents, teachers, principals, and librarians were surveyed. In 2004, the 2002 sophomore cohort was surveyed again, and a sample of seniors who were not high school sophomores in 2002 or in the United States at the time was added. In late 2004 and early 2005, about 6 months to 1 year after most students had graduated from high school, transcripts were collected from all these students' high schools. Thus, the time periods represented in NLTS2 and ELS:2002 differ (2002–2009 and 2002–2005, respectively), which may have contributed to differences between the populations represented in the two studies. Calculations were made from restricted use data obtained from the National Center for Education Statistics.

Students Included in the Report

The students with disabilities who are the focus of this report, students in typical high schools, represent only a subset of students with disabilities who received special education services in secondary school in 2000–01 (97 percent), not the entire population. The full

[15] Students in "ungraded" programs were those not assigned to a grade level. The higher percentage of partial transcripts in the ungraded analyses primarily was a result of ungraded transcripts missing program completion information.

[16] Young adults with disabilities are included in the general-population comparison sample because excluding them would require using self-reported disability data, which frequently are not an accurate indicator of disability, resulting in both over- and underestimations of disability. For example, NLTS2 findings indicate that less than two in five youth (37 percent) who were identified by their secondary school as having a disability consider themselves to have a disability by the time they are age 17 or older (Newman et al. 2011).

population to which the NLTS2 sample generalizes is a cohort of students who were 13 through 16 years old and received special education services in grade 7 or above in participating schools and school districts as of December 1, 2000. Weights for analyses reported in this document were calculated so that all students with disabilities who had transcript information generalize to all students with disabilities in the NLTS2 age range who attended typical schools. Weights were computed to adjust for various youth and school characteristics used as stratifying or poststratifying variables. (See the appendix for additional information related to sample weighting.)

Analysis Approaches

Analyses reported in this document involve simple descriptive statistics (e.g., percentages, means) and bivariate relationships (i.e., cross-tabulations). All statistics were weighted to be representative of a larger population of students (as discussed earlier). These analysis approaches excluded cases with missing values; no imputation of missing values was conducted.

Rather than test for differences between all independent subgroups (e.g., students in different disability categories) simultaneously (e.g., using a $k \times 2$ chi-square test of homogeneity of distribution, where k is the number of disability groups), the statistical significance of differences between selected pairs of independent subgroups was tested. This approach was followed because the intent was to identify significant differences between specific groups (e.g., students with visual impairments received significantly higher GPAs than students with learning disabilities) rather than to identify a more general "disability effect" (e.g., the observed distribution across disability categories differs significantly from what would be expected from the marginal distributions) for the variable of interest.[17]

The test statistic used to compare Bernoulli-distributed responses (i.e., responses that can be allocated into one of two categories and coded as 0 or 1) for two independent subgroups is analogous to a chi-square test for equality of distribution (Conover 1999) and approximately follows a chi-square distribution with one degree of freedom. However, because a chi-square distribution with one degree of freedom is the same as an F distribution with one degree of freedom in the numerator and infinite degrees of freedom in the denominator (Johnson and Kotz 1995), this statistic can be considered the same as following an F distribution under the null hypothesis; it also can be considered "chi-squared."[18]

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[17] All standard errors in this report were calculated using formula-based estimates rather than estimates based on replicate weights. (See Appendix A for description of estimating standard errors.) As a 10-year longitudinal study, NLTS2 has used this formula-based procedure to calculate standard errors throughout the duration of the study, rather than use currently available procedures. This decision to maintain consistency in analytical approaches was based on the need to support comparisons of findings across NLTS2 reports. To examine possible differences between approaches, replicate weights were created for chapter 3 of this report. Findings using the replicate weights were then compared with the findings using formula-based estimates. Of the 544 possible comparisons in the chapter, five differences (< 1%) were noted, supporting the decision to maintain the use of formula-based estimates.

[18] In the case of unweighted data, two percentages are usually compared by using nonparametric statistics, such as the Fisher exact test. In the case of NLTS2, the data were weighted, and the usual nonparametric tests would yield significance levels that are too small (Heeringa, West, and Berglund 2010) because the NLTS2 effective sample size is less than the nominal sample size. Instead, to test for the equality between the mean values of the responses to a single survey item in two disjoint subpopulations, we began by computing a ratio where the numerator was the difference of the sample means for those subpopulations. (In the case of Bernoulli variables,

Tests also were conducted to examine differences within the group of students with disabilities as a whole (for example, the average number of credits earned in academic courses by students with disabilities compared with the number earned in vocational courses), using an analogous one-sample statistic based on difference scores.[19] The test statistic follows a chi-square distribution with one degree of freedom for sample sizes of 30 or larger and, for reasons similar to those cited above, is considered to roughly follow an *F* (1, infinity) distribution under the null hypothesis.

Technical Notes

Readers should remember the following issues when interpreting the findings in this report:

- **Purpose of the report.** The purpose of this report is descriptive; as a nonexperimental study, NLTS2 does not provide data that can be used to address causal questions. The descriptions provided in this document concern the course taking and grade performance of students with disabilities. The report does not attempt to explain why students varied in their high school course taking and performance or why experiences differ for students in different subgroups (e.g., disability categories). In addition, the data cannot be used to determine if certain course-taking patterns resulted in better educational outcomes for students.
- **Subgroups reported.** In each chapter, the descriptive findings are reported for the full sample of students; those findings are heavily influenced by information provided by students with learning disabilities, who constitute 63 percent of the weighted sample. Students with mental retardation, emotional disturbances, other health impairments, and speech/language impairments constitute 12 percent, 12 percent, 5 percent, and 4 percent of the weighted sample, respectively. The other seven categories together make up less than 6 percent of the weighted sample. Findings then are reported separately for students

each mean was a weighted percentage.) The denominator for the ratio was the estimated standard error of the numerator, where the standard errors were adjusted to take into account clustering, stratification, and unequal weights. The adjustment to the variances was determined in a design effect study that compared traditionally calculated variances with those calculated using 32 balanced repeated replicate weights. Sample sizes (and consequently degrees of freedom) for Student *t* types of ratios were typically reasonably large (i.e., never fewer than 30 in each group), so the ratio follows, by the Central Limit Theorem, an approximately normal distribution. For a two-tailed test, the test statistic is the square of the ratio, which then follows an approximate chi-square distribution with one degree of freedom. Because a chi-square distribution with one degree of freedom is the same as an *F* distribution with one degree of freedom in the numerator and an infinite number of degrees in the denominator, the test statistic approximately follows an *F* (1, infinity) distribution. Since the application of adjustments from the design effect study tended to slightly overestimate the standard errors from balanced repeated replicates, the use of infinite degrees of freedom, rather than 31 degrees of freedom, nevertheless resulted in actual *p* values that were slightly lower than nominal *p* values.

[19] Testing for the significance of differences in transcript variables for the same individuals involves calculating a difference score for each student and then testing whether the weighted mean value for that difference score is statistically significantly different from zero. For example, the difference score might be the difference between the student GPA in special and general education classes, or the difference between the number of credits in math and English. A test statistic analogous to a one-sample *t* test is calculated, where the numerator is the weighted mean value for the difference value across students, and the denominator is the estimated standard error of the numerator (taking into account the sampling design). Because the ratio approaches a normal distribution by the Central Limit Theorem, the square of this test statistic approximately follows a chi-square distribution with one degree of freedom, that is, an *F* (1, infinity) distribution.

in each federal special education disability category. Comparisons also were made between groups of students who differed with respect to grade level, gender, race/ethnicity, household income, and high school–leaving status. These bivariate analyses should not be interpreted as implying that a factor on which subgroups are differentiated (e.g., disability category) has a causal relationship with the differences reported. The complex interactions and relationships among subgroups relative to the other variables included in this report (e.g., average number of credits earned) have not been explored.

- **Findings weighted.** NLTS2 was designed to provide a national picture of the characteristics, experiences, and achievements of students with disabilities in the NLTS2 age range as they transition to young adulthood. Therefore, all the statistics presented in this report are weighted estimates of the national population of students who received special education in the NLTS2 age group who attend typical schools and of each disability category individually.
- **Standard errors.** For each mean and percentage in this report, a standard error is presented that indicates the precision of the estimate. For example, for a variable with a weighted estimated value of 50 percent and a standard error of 2.00, the value for the total population, if it had been measured, would, with 95 percent confidence, lie between 46 percent and 54 percent (i.e., within plus or minus 1.96 × 2, or 3.92 percentage points of 50 percent). Thus, smaller standard errors allow for greater confidence to be placed in the estimate, whereas larger ones require caution.
- **Small samples.** Although NLTS2 data are weighted to represent the population, the size of standard errors is influenced heavily by the actual number of students in a given group (e.g., a disability category). In fact, findings are not reported separately for groups that do not include at least 30 sample members because groups with very small samples have comparatively large standard errors. For example, because there are relatively few students in the extended 13th grade, estimates for that group have relatively large standard errors. Therefore, readers should be cautious in interpreting results for that group and others with small sample sizes and large standard errors.
- **General population comparisons.** Readers should note that students with disabilities represented in this report differ from students in the general population (e.g., gender distribution, proportion living in poverty) (Wagner, Marder, Levine, et al. 2003) in ways that may account for some of the differences in course taking, academic performance, and other factors presented here. Additionally, the difference in the time periods in which data were collected for NLTS2 (2002–09) and ELS:2002 (2002–05) could have contributed to differences between the populations represented in the two studies.
- **Significant differences.** A large number of statistical analyses were conducted and are presented in this report. Because no explicit adjustments were made for multiple comparisons, the likelihood of finding at least one statistically significant difference when no difference exists in the population is substantially larger than the type I error for each individual analysis. To partially compensate for the number of analyses that were conducted, we have used a relatively conservative p value of $< .01$ in identifying significant differences. The text mentions only differences reaching at least that level of significance. The large number of comparisons made in this report will results in some apparently significant differences, even at this level, being false positives (i.e., Type I

errors). Readers also are cautioned that the meaningfulness of differences reported here cannot be inferred from their statistical significance.

Organization of the Report

This report is organized to provide information collected from high school transcripts on the credit-earning and grade-performance experiences of students with disabilities as a group in typical high schools. Overall, students with disabilities spent various lengths of time in high school. The majority completed their high school programs, and their transcripts usually included 4 or more years of course taking. Others (approximately 22 percent) did not complete high school (i.e., they had dropped out or had been permanently expelled),[20] which frequently resulted in their having fewer than 4 years of course taking. Because the overall intent of NLTS2 is to describe the experiences of the population of students with disabilities as a whole, including both those who eventually completed their high school programs and those who did not, each chapter of this report begins by presenting the experiences of students with disabilities as a group, independent of their high school completion status. The final portion of each section in the chapters then distinguishes the credit-earning experiences of students with disabilities by high school completion status, presenting data separately for those who did and did not complete high school.

Chapter 2 describes the course credit–earning pattern of students with disabilities and compares their credit-earning experiences with those of their peers in the general population. This chapter describes the average number of credits earned in academic, vocational, and nonacademic, nonvocational courses. Chapter 3 considers the instructional settings in which students with disabilities took their courses, examining the proportion of credits earned in general and special education settings, overall and by course type. Chapter 4 addresses grade performance, examining both the grade point average and course failure experiences of students with disabilities in typical high schools. This chapter compares the grade performance of students with disabilities and their peers in the general population, and examines how grade performance of students with disabilities varied by course type and instructional setting. The appendix provides details of the NLTS2 design, sample, measures, and analysis approaches.

[20] This dropout rate is lower than the 28 percent rate specified in an earlier NLTS2 Wave 2 report (Wagner et al. 2005). Although dropout rates were calculated in the same way for both the 2005 report and the current report, the dropout rate for the 2005 report was based on parent and youth report, whereas the dropout rate included in this report is based on data from high school transcripts. In addition, at the time of the 2005 report most NLTS2 sample members still were in high school. The 2005 report focused on the small subset who had recently left high school (within 2 years), and the dropout rate was reported for this subset. In contrast, the current report includes the full NLTS2 sample with transcript information from typical high schools, and the dropout rate reported here is based on the full NLTS2 sample.

2. Credits Earned by Secondary School Students With Disabilities

The U.S. Department of Education has as one of its goals to "ensure that all students are on track to graduate from high school on-time and ready for college and careers," with "on time" defined as high school freshmen graduating within 4 years (U.S. Department of Education 2010). Course credits[21] are the metric by which high schools measure the progress of their students toward graduation. Thus, understanding the number of credits earned as a whole and at each high school grade level is an important perspective on students' high school experience. Understanding the distribution of those credits across the various course content areas further enriches this perspective by signaling the breadth of content to which students are exposed during their high school careers

This chapter examines the credits earned by high school students with disabilities by drawing on the high school transcript data compiled as part of NLTS2 for students with disabilities nationally who attended typical high schools at some time from 2001 to 2009. Findings reported here address the following questions for students with disabilities in typical high schools:[22]

- How many credits did high school students with disabilities earn and how were they distributed among academic, vocational, and other types of courses?
- How did the pattern of credits earned by students with disabilities compare with that of students in the general population?
- What were the similarities and differences in the patterns of credits earned by students who differed in primary disability category, demographic characteristics, grade level, and high school completion status?

The chapter begins with an overview of the credit-earning experiences of students with disabilities in high school and then focuses separately on experiences in academic, vocational, and nonacademic, nonvocational courses. As noted in chapter 1, NLTS2 intends to describe the experiences of the population of students with disabilities as a whole, including both those who eventually completed their high school programs and those who did not. Each section of this chapter begins with an examination of credit-earning patterns by students with disabilities as a whole and then continues with a focus on students who differed in disability category, grade level, and selected demographic characteristics. Each section then distinguishes the credit-earning experiences of students with disabilities by high school completion status, presenting data separately for those who did and did not complete high school.

In computing the average number of credits earned, courses with zero credits (because of a failing course grade or a non-credit bearing course) were counted as zero credits. The text mentions only differences reaching at least the $p < .01$ level of significance.

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[21] Credits typically are expressed as Carnegie units. A Carnegie unit is a standard of measurement used for secondary education that represents the completion of a course that meets for one period a day of at least 40 minutes for one academic year. In NLTS2, the number of credits, in Carnegie units, usually were indicated on transcripts. The courses that did not have Carnegie units assigned were converted to the Carnegie standard unit of one period per day per academic year.

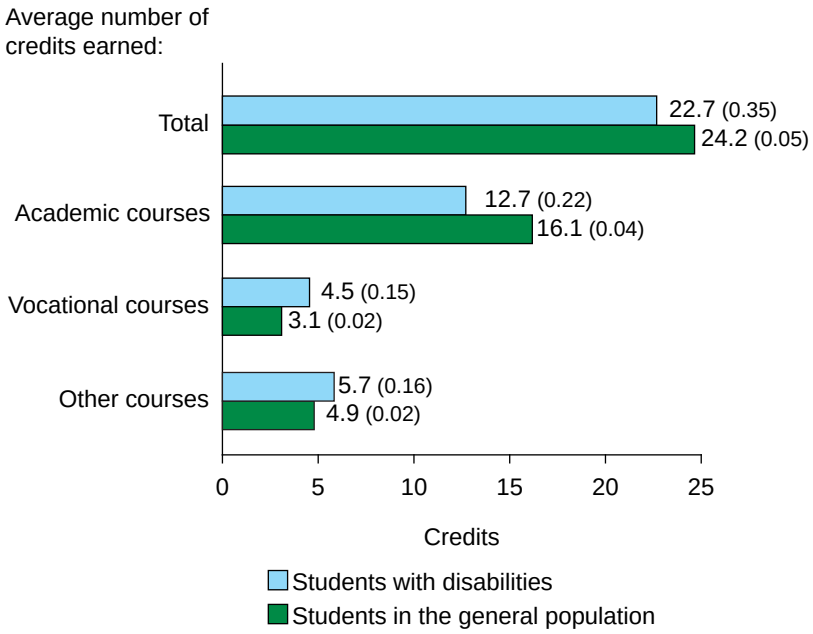
[22] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

An Overview of Credits Earned in Academic, Vocational, and Nonacademic, Nonvocational Types of Courses

This section describes the overall pattern of credits earned by secondary school students with disabilities attending typical high schools, including total credits earned and their distribution among academic, vocational, and nonacademic, nonvocational courses. The distribution of credits earned across these subject areas may reflect the graduation requirements of a student's state and district of residence; the abilities, preferences, and goals of students themselves; and/or other factors.

High school students with disabilities earned, on average, 22.7 credits[23] during their time in high school[24] (figure 1). Academic courses[25] accounted for an average of 12.7 credits, more than

Figure 1. Average number of credits earned by students with disabilities and students in the general population



NOTE: Standard errors are in parentheses. Numbers are weighted population estimates based on samples that ranged across types of courses from approximately 6,080 to 6,110 for students in NLTS2 and include 14,800 students in ELS:2002.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009; U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study.

[23] Credits are expressed as Carnegie units. A Carnegie unit represents the completion of a course that meets for one period a day for at least 40 minutes for 1 academic year. The number of credits, in Carnegie units, usually was indicated on transcripts. For the courses that did not have Carnegie units assigned were converted to the Carnegie standard unit of one period per day per academic year.

[24] The analyses included in this chapter are based only on complete transcripts, with the exception of the by-grade-level analyses. Transcripts for students who had completed their high school programs typically included 4 or more years of coursework. Transcripts for students who had not completed high school were considered to be complete if transcript information was available for all of the grading periods the students had been in high school prior to leaving. For example, if a student had dropped out of high school after 9th grade, the student's one year of 9th-grade transcript data would be included here. Partial transcripts (e.g., only 9th-grade transcript information was collected for a student who had continued his or her education beyond the 9th grade) were not included in the analyses in this chapter, other than the by-grade-level analyses.

[25] Academic courses include English, mathematics, science, social studies, and foreign languages.

half of the total credits earned in high school. In contrast, vocational courses accounted for an average of 4.8 credits, and other courses that were neither academic nor vocational, such as physical education and life skills, accounted for an average of 5.7 credits.

Students with disabilities earned fewer overall credits, on average, than did their peers in the general population (22.7 vs. 24.2).[26] The coursework of students in the general population was focused more heavily on academic courses, compared with that of students with disabilities. Students in the general population accrued, on average, 3.4 more academic credits during their time in high school than did students with disabilities (16.1 vs. 12.7). In contrast, students with disabilities earned more vocational and nonacademic, nonvocational credits than did students in the general population (4.5 vs. 3.1 and 5.7 vs. 4.9, respectively).

Disability Differences in Credits Earned in Academic, Vocational, and Nonacademic, Nonvocational Courses

Total credits accrued during high school ranged from 17.8 credits for students with emotional disturbances to 28.5 credits for students with autism (table 1). Students with emotional disturbances earned fewer credits than students in all other disability categories. Their lower rate of credit earning parallels their lower rate of high school completion compared with their peers in other disability categories (National Longitudinal Transition Study-2 2005). Students with other health impairments averaged fewer credits (22.0) than students with speech/language impairments, hearing impairments, orthopedic impairments, autism, multiple disabilities, or deaf-blindness (25.3 to 28.5).

Students with autism earned more credits (28.5) than students with learning disabilities, speech/language impairments, visual impairments, mental retardation, or traumatic brain injuries (22.8 to 24.5). Students with orthopedic impairments (26.0 credits) or hearing impairments (25.6 credits) also accrued more credits than students with learning disabilities (23.0 credits).

Accrued academic course credits ranged from 10.6 for students with mental retardation to 15.4 for students with hearing impairments. Students with speech/language impairments, hearing impairments, visual impairments, or orthopedic impairments earned more academic credits (14.8, 15.4, 15.2, and 14.6, respectively) than students with mental retardation, emotional disturbance, other health impairment traumatic brain injury, and multiple disabilities (10.5 to 12.6). Students with speech/language impairments, hearing impairments, or visual impairments also earned more academic credits than students with learning disabilities (13.2). In addition, students with autism accrued more academic credits (13.3) than students with mental retardation or emotional disturbances (10.6 and 10.5). However, students with autism earned fewer academic credits than students with hearing impairments (15.4). Students with learning disabilities or other health impairments (12.6) also earned more academic credits (13.2) than students with mental retardation or emotional disturbances (10.6 and 10.5), and students with learning disabilities earned more academic credits than students with multiple disabilities (13.2 vs. 11.4).

[26] General population estimates are based on calculations using the restricted use dataset from the U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study. All general population estimates include students who have completed high school, as well as those who have not (i.e., both graduates and dropouts have been included).

Table 1. Average number of credits earned, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Average number of credits earned:												
Total	23.0	24.2	23.8	17.8	25.6	24.5	26.0	22.0	28.5	22.8	25.3	25.7
	(0.47)	(0.46)	(0.71)	(0.75)	(0.68)	(0.92)	(0.81)	(0.58)	(1.23)	(1.03)	(1.04)	(1.31)
Academic courses	13.2	14.8	10.6	10.5	15.4	15.2	14.6	12.6	13.3	12.2	11.4	13.2
	(0.30)	(0.34)	(0.37)	(0.47)	(0.50)	(0.68)	(0.47)	(0.36)	(0.62)	(0.75)	(0.59)	(0.94)
Vocational courses	4.5	4.1	6.0	3.3	4.5	3.3	4.4	4.2	5.6	4.5	6.1	4.2
	(0.20)	(0.20)	(0.32)	(0.23)	(0.30)	(0.33)	(0.29)	(0.25)	(0.90)	(0.53)	(0.50)	(0.51)
Nonacademic, nonvocational courses	5.4	5.5	7.6	4.2	5.8	6.1	7.3	5.5	9.9	6.3	8.2	8.6
	(0.19)	(0.19)	(0.43)	(0.24)	(0.27)	(0.41)	(0.41)	(0.26)	(0.74)	(0.57)	(0.72)	(1.23)

NOTE: Standard errors are in parentheses. Numbers are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 6,080 to 6,110 students .

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Credits earned for vocational coursework ranged from 3.3 for students with emotional disturbances or visual impairments to 6.1 for students with multiple disabilities. Students with multiple disabilities or mental retardation averaged more vocational credits (6.1 and 6.0, respectively) than students with learning disabilities, emotional disturbances, speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, other health impairments, or deaf-blindness (3.3 to 4.5). In contrast, students with emotional disturbances or visual impairments averaged fewer vocational credits (3.3 for both groups) than students with learning disabilities or hearing impairments (4.5 for each disability category), and students with emotional disturbances earned fewer vocational credits than students with orthopedic impairments (4.4).

Credits earned in nonacademic, nonvocational courses (e.g., physical education or fine arts) ranged from 4.2 credits for students with emotional disturbances to 9.9 credits for students with autism. Students with emotional disturbances earned fewer nonacademic, nonvocational credits, on average, than students in all other disability categories. Conversely, students with autism earned more nonacademic, nonvocational credits than students in the 11 other disability categories. Students with mental retardation or multiple disabilities also accrued more nonacademic, nonvocational credits (7.6 and 8.2, respectively) than students with learning disabilities (5.4), speech/language impairments, hearing impairments, or other health impairments (5.5, 5.8, and 5.5, respectively). In addition, students with orthopedic impairments averaged more nonacademic, nonvocational credits (7.3) than students with learning disabilities, speech/language impairments, other health impairments, or hearing impairments.

Grade-Level Differences in Credits Earned in Academic, Vocational, and Nonacademic, Nonvocational Courses

The total number of credits earned did not differ significantly across grade levels, with the exception of students in programs not assigned a grade level (table 2).[27] On average, students earned 6.1 credits in 9th and 10th grades and 6.3 credits in 11th and 12th grades; those who remained in high school beyond the 12th grade earned an average of 6.2 credits in the extended 13th grade.[28] Students in ungraded programs averaged 1.8 credits per school year, significantly fewer credits than students in 9th through 12th grades.

Table 2. Average number of credits earned by students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded[1]
Average number of credits earned:						
Total	6.1 (0.08)	6.1 (0.10)	6.3 (0.13)	6.3 (0.13)	6.2 (1.45)	1.8 (0.34)
Academic courses	3.6 (0.06)	3.7 (0.07)	3.5 (0.08)	3.0 (0.08)	2.7 (0.76)	‡
Vocational courses	0.8 (0.03)	1.0 (0.04)	1.5 (0.07)	1.9 (0.08)	1.7 (0.56)	‡
Nonacademic, nonvocational courses	1.7 (0.04)	1.5 (0.05)	1.4 (0.06)	1.5 (0.08)	2.0 (0.72)	‡

‡ Responses for items with fewer than 30 respondents are not reported.

[1] Number of credits per school year.

NOTE: Standard errors are in parentheses. Analyses for each grade level include all students with data for that grade level. Numbers are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 6,080 to 6,010 9th-graders, 6,700 to 6,780 10th-graders, 6,130 to 6,220 11th-graders, 5,460 to 5,500 12th-graders, 90 to 100 13th-graders, and 30 ungraded students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Other than in ungraded programs, students' coursework was focused more heavily on academic courses than on other subjects. Credits earned in academic courses in grades 9 through 13 ranged from 2.7 to 3.7, whereas from 0.8 to 1.9 credits were earned in vocational courses and from 1.4 to 2.0 credits were accrued in nonacademic, nonvocational courses.

Despite this strong academic emphasis in course taking across grade levels, the focus on academic courses declined in students' later high school years. For example, students earned 3.6, 3.7, and 3.5 academic credits in 9th, 10th, and 11th grades, respectively, significantly more than the 3.0 academic credits earned in 12th grade. In contrast, students earned more vocational

[27] As indicated in footnote 2, only students with complete transcript information for the years they had been in high school were included in the analyses for this chapter, with the exception of the by-grade-level analyses. To benefit from the full range of available transcript information, transcript data for the students not included in the overall analyses were included in the by-grade-level analyses. To be included in the by-grade-level analyses, a transcript needed to be complete for the grade for which it provided information.

[28] The Individuals with Disabilities Education Act (IDEA) allows students with disabilities to remain in public school transition programs through age 21 if they have transition needs and have not received a regular high school diploma. Students who continued their high school programs beyond 12th grade often remained in high school for longer than 1 additional school year; on average, students spent 1.57 school years in extended 13th grade. The credits reported here reflect the total credits earned while in an extended-13th-grade program.

credits across their high school years, increasing from 0.8 in 9th grade to 1.0 in 10th grade, 1.5 in 11th grade, and 1.9 in 12th grade. Students in extended 13th grade earned 2.7 academic credits and 1.7 vocational credits.

Credits earned in nonacademic, nonvocational courses ranged from 1.4 in 11th grade to 2.0 in extended 13th grade.

Demographic Differences in Credits Earned in Academic, Vocational, and Nonacademic, Nonvocational Courses

Earned credits differed to some extent by gender, race/ethnicity, and household income (table 3). Although the total number of credits earned overall and in academic courses did not differ significantly by gender, males earned more vocational course credits, on average, than females (4.8 vs. 3.9). In contrast, females spent more time than males in nonacademic, nonvocational courses, averaging 6.4 credits in those courses, compared with 5.3 credits earned by males. White students earned more vocational credits (4.9) than either African American or Hispanic students (4.0 and 3.9, respectively). Students from households with incomes of $25,000 or less earned fewer total credits in high school (20.7), on average, than students from households with incomes of $25,001 to $50,000 (23.9) or more than $50,000 (24.2). Students in the lowest income group also earned fewer academic credits—11.5, compared with 13.1 and 13.7 earned by students in the middle and highest income groups.

Table 3. Average number of credits earned by students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Average number of credits earned:								
Total	22.5 (0.44)	23.0 (0.61)	23.5 (0.42)	21.0 (0.90)	21.9 (1.00)	20.7 (0.69)	23.9 (0.67)	24.2 (0.63)
Academic courses	12.6 (0.27)	12.9 (0.37)	12.9 (0.26)	12.0 (0.56)	13.0 (0.63)	11.5 (0.40)	13.1 (0.41)	13.7 (0.41)
Vocational courses	4.8 (0.19)	3.9 (0.23)	4.9 (0.19)	4.0 (0.34)	3.9 (0.39)	4.3 (0.27)	5.0 (0.28)	4.7 (0.29)
Nonacademic, nonvocational courses	5.3 (0.19)	6.4 (0.28)	5.9 (0.20)	5.3 (0.35)	5.2 (0.49)	5.2 (0.30)	6.0 (0.31)	5.9 (0.30)

NOTE: Standard errors are in parentheses. Numbers for each of the three demographic analyses are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 6,080 to 6,110 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Differences in Credits Earned in Academic, Vocational, and Nonacademic, Nonvocational Courses, by High School Completion Status

This section focuses on high school completers and noncompleters to illuminate the amount of education they acquired before leaving high school, as indicated by the number of credits earned. Not surprisingly, students who completed their high school programs generally spent more years in high school than noncompleters and, thus, earned more credits (table 4). On

average, completers earned more than twice as many credits as noncompleters (25.8 vs. 11.8). This pattern was apparent across the various types of courses. High school completers earned more credits than noncompleters from academic courses (14.4 vs. 6.9), vocational courses (5.2 vs. 2.1), and nonacademic, nonvocational courses (6.4 vs. 3.0).

Table 4. Average number of credits earned by students with disabilities, by high school completion status

	Completers	Non-completers
Average number of credits earned:		
Total	25.8 (0.29)	11.8 (0.62)
Academic courses	14.4 (0.20)	6.9 (0.39)
Vocational courses	5.2 (0.17)	2.1 (0.18)
Nonacademic, nonvocational courses	6.4 (0.18)	3.0 (0.21)

NOTE: Standard errors are in parentheses. Numbers are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 6,080 to 6,110 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Academic Course Taking

As noted above, academic courses accounted for more than half of the total credits earned by students with disabilities. This section provides further detail on the academic courses students with disabilities took, including how credits were distributed across the subject areas of English, mathematics, science, social studies, and foreign language; how their academic course taking compared with that of students in the general population; and how academic course taking differed for students with different primary disabilities, demographic characteristics, grade levels, and school completion status. There were three types of math courses, as presented in Table 5. For the three types of math courses, if a student had earned any credits in the overall math category and had not taken any credits in a subset type of class (e.g., had six math credits but no advanced math credits), the number of credits for that subset was set to zero, to more accurately reflect the denominator when computing the average number of credits earned in the subset math course.

Academic courses were part of the school programs of virtually all students with disabilities (99 percent) attending typical high schools (table 5) and accounted for more than half (57 percent) of the course credits they earned. The percentage enrolled in any academic courses did not differ significantly between students with disabilities and students in the general population; however, the percentage of total high school credits earned in academic courses differed significantly, with students in the general population earning more academic credits than students with disabilities (66 percent vs. 57 percent).[29]

[29] General population estimates are based on calculations using the restricted use dataset from the U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High

Table 5. Academic course taking by students with disabilities and students in the general population

	Students with disabilities in grades 9 through 12	Students in the general population in grades 9 through 12
Percentage enrolled in any academic courses	99.1 (0.37)	99.9 (0.03)
Percentage of total high school credits earned in academic courses	56.5 (0.56)	66.4 (0.01)
Average number of credits earned in:		
English	4.0 (0.07)	4.1 (0.01)
Mathematics	2.9 (0.05)	3.4 (0.01)
Basic	1.6 (0.06)	0.5 (0.01)
Mid-level	1.3 (0.06)	2.0 (0.01)
Advanced	0.1 (0.01)	0.9 (0.01)
Science	2.3 (0.05)	3.0 (0.01)
Social studies	3.0 (0.06)	3.8 (0.01)
Foreign language	0.5 (0.07)	1.8 (0.01)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,710 to 6,010 students in NLTS2 and included 14,800 students in ELS:2002.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009; U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study.

The number of credits earned by students with disabilities varied by academic subject. Students with disabilities earned significantly more credits, on average, in English courses (4.0 credits) than in any other subject. An average of 3.0 credits were earned by students with disabilities in social studies courses, significantly more than the 2.3 credits earned in science courses and the 0.5 credit earned in foreign language courses. Course credits earned in mathematics (2.9, on average) also significantly exceeded those earned in science, and credits earned in both mathematics and science exceeded those earned in foreign language courses. Among the various kinds of mathematics courses taken by students with disabilities, credits earned in basic mathematics[30] (1.6) exceeded the average of those earned in both mid-level

School Transcript Study. All general population estimates include students who have completed high school, as well as those who have not (i.e., both graduates and dropouts have been included).

[30] Basic mathematics courses include mathematics (undifferentiated); integrated, consumer, basic, general, remedial, fundamental, and "higher level" mathematics; and pre-algebra. Mid-level mathematics courses include

mathematics (1.3) and advanced mathematics courses (0.1), and the average number of credits earned in mid-level mathematics exceeded the average number earned in advanced mathematics.

Comparing the credits earned by students with disabilities in specific academic subjects with those of students in the general population, the average number of credits earned in English courses did not differ. For all the other major academic subjects, students with disabilities earned fewer credits on average, than students in the general population: students with disabilities earned 2.9 credits in mathematics, 2.3 in science, 3.0 in social studies, and 0.5 in foreign language, compared with 3.4 credits in mathematics, 3.0 in science, 3.8 in social studies, and 1.8 in foreign language for students in the general population.

Disability Differences in Academic Course Taking

The predominance of academic course taking in the school programs of students with disabilities as a whole also is apparent across disability categories (table 6). The percentage of students with disabilities taking any academic courses ranged from 93 percent of students with multiple disabilities and 95 percent of students with mental retardation to virtually all students with learning disabilities, speech/language impairments, other health impairments, or traumatic brain injuries (percentages round to 100). Students with mental retardation were less likely to enroll in any academic course than students with emotional disturbances, hearing impairments, orthopedic impairments, or autism. There were no other significant differences in the percentage of students enrolled in any academic courses by disability category.

The average percentage of all credits earned that came from enrollment in academic classes ranged from 48 percent for students with mental retardation and 49 percent for students with autism or multiple disabilities to 60 percent, 61 percent, and 62 percent for students with hearing impairments, speech/language impairments, or visual impairments, respectively. Students with speech/language impairments, hearing impairments, or visual impairments also earned a higher percentage of credits in academic subjects than students with traumatic brain injuries (53 percent), and students with speech/language impairments or visual impairments earned a higher percentage of credits in academics than students with learning disabilities or deaf-blindness (57 percent and 53 percent, respectively). The percentage of credits earned in academics also was higher for students with speech/language impairments (61 percent) than for students with orthopedic impairments or other health impairments (57 percent and 58 percent, respectively).

Within each disability category, more credits were earned in English classes than in any other subject area; however, the average number of credits earned in English classes varied by disability category. Students with emotional disturbances averaged fewer credits in English (3.3) than students with learning disabilities (4.1), speech/language impairments (4.3), hearing impairments (4.7), visual impairments (4.4), orthopedic impairments (4.7), autism (4.4), or deaf-blindness (4.4). Students with other health impairments averaged fewer credits (3.9) than students with speech/language impairments or with hearing impairments or orthopedic impairments. In addition, students with orthopedic impairments earned more credits in English (4.7) than students with learning disabilities (4.1) or mental retardation (3.9), and

algebra (I, II, and undifferentiated) and geometry. Advanced mathematics courses include advanced math (undifferentiated), algebra/trigonometry, trigonometry, trigonometry/geometry, pre-calculus, statistics/probability, and calculus (all levels).

Table 6. Academic course taking, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Percentage enrolled in any academic courses	99.9 (0.16)	99.7 (0.34)	94.6 (1.47)	99.3 (0.61)	99.4 (0.64)	98.9 (1.22)	99.2 (0.69)	99.8 (0.29)	99.1 (0.89)	99.9 (0.35)	93.1 (2.40)	97.0 (2.73)
Percentage of credits earned in academic courses	57.3 (0.71)	61.0 (0.80)	48.3 (1.18)	59.1 (1.13)	60.4 (1.13)	61.9 (1.53)	57.0 (1.15)	57.6 (0.89)	49.0 (1.99)	53.1 (2.26)	49.1 (1.84)	52.7 (3.01)
Average number of credits earned in:												
English	4.1 (0.10)	4.3 (0.10)	3.9 (0.13)	3.3 (0.17)	4.7 (0.18)	4.4 (0.20)	4.7 (0.16)	3.9 (0.12)	4.4 (0.23)	3.9 (0.25)	4.0 (0.20)	4.4 (0.36)
Mathematics	3.0 (0.07)	3.3 (0.08)	2.9 (0.10)	2.4 (0.10)	3.4 (0.12)	3.3 (0.15)	3.3 (0.12)	2.9 (0.09)	3.2 (0.17)	2.8 (0.18)	2.9 (0.16)	3.1 (0.23)
Basic	1.6 (0.08)	1.3 (0.08)	2.5 (0.11)	1.3 (0.09)	1.7 (0.13)	1.2 (0.18)	2.0 (0.14)	1.5 (0.10)	2.1 (0.19)	1.8 (0.19)	2.7 (0.16)	2.1 (0.30)
Mid-level	1.4 (0.08)	1.8 (0.09)	0.5 (0.06)	1.2 (0.10)	1.6 (0.13)	1.9 (0.17)	1.4 (0.11)	1.4 (0.10)	1.1 (0.14)	1.1 (0.18)	0.4 (0.11)	1.1 (0.21)
Advanced	0.1 (0.02)	0.3 (0.04)	#	0.1 (0.02)	0.2 (0.05)	0.3 (0.07)	0.1 (0.04)	0.1 (0.02)	0.2 (0.05)	0.1 (0.04)	#	0.2 (0.07)
Science	2.4 (0.07)	2.8 (0.08)	1.9 (0.09)	2.0 (0.12)	2.9 (0.13)	2.8 (0.14)	2.6 (0.10)	2.5 (0.09)	2.3 (0.14)	2.3 (0.19)	2.0 (0.14)	2.5 (0.23)
Social studies	3.2 (0.09)	3.4 (0.09)	2.4 (0.11)	2.5 (0.12)	3.5 (0.14)	3.4 (0.18)	3.4 (0.14)	2.9 (0.11)	2.8 (0.18)	2.7 (0.20)	2.7 (0.18)	2.8 (0.25)
Foreign language	0.6 (0.05)	1.0 (0.08)	0.1 (0.03)	0.4 (0.06)	1.0 (0.11)	1.4 (0.17)	0.7 (0.09)	0.5 (0.07)	0.6 (0.11)	0.4 (0.11)	0.3 (0.09)	0.6 (0.15)

Rounds to zero.

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,710 to 6,010 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

students with hearing impairments or speech/language impairments earned more English credits than students with mental retardation.

On average, 2.4 to 3.4 credits were earned in mathematics courses across disability categories. Similar to their rank relative to others in earning English credits, students in the category of emotional disturbance averaged significantly fewer credits in mathematics (2.4) than students with disabilities in every other category except traumatic brain injury and multiple disabilities (2.9 to 3.4). Students with mental retardation or other health impairments earned fewer mathematics credits (2.9 for both groups) than students with speech/language impairments, hearing impairments, or orthopedic impairments (3.3 to 3.4); students with other health impairments (2.9) also earned fewer mathematics credits than students with visual impairments (3.3). Fewer mathematics credits were earned by students with traumatic brain injuries or learning disabilities than by students with hearing impairments (2.8 and 3.0, respectively, vs. 3.4), and students with learning disabilities also earned fewer credits in mathematics than students with speech/language impairments (3.0 vs. 3.3).

The average number of credits earned in basic mathematics courses ranged from 1.2 to 2.7. Students with speech/language impairments, emotional disturbances, visual impairments, or other health impairments averaged significantly fewer credits (1.2 to 1.5) than students with mental retardation, orthopedic impairments, autism, or multiple disabilities (2.0 to 2.7). Similarly, students with learning disabilities, hearing impairments, orthopedic impairments, or traumatic brain injuries earned fewer credits in basic mathematics (1.6 to 2.0) than students with mental retardation or multiple disabilities (2.5 and 2.7, respectively). Students with learning disabilities also earned fewer basic mathematics credits (1.6) than students with autism (2.1).

Credits earned in mid-level mathematics courses, on average, ranged from 0.4 to 1.9. Students with mental retardation or multiple disabilities averaged fewer credits in mid-level mathematics courses (0.5 and 0.4, respectively) than students in any other disability category (1.1 to 1.9). In addition, on average, students with learning disabilities, emotional disturbances, orthopedic impairments, autism, traumatic brain injuries, or deaf-blindness earned fewer credits in mid-level mathematics (1.1 to 1.4) than students with speech/language impairments or visual impairments (1.8 and 1.9, respectively). Fewer mid-level mathematics credits were also earned by students with other health impairments (1.4), compared with students with visual impairments (1.9). In addition, students with autism or emotional disturbances earned fewer of these mathematics credits (1.1 and 1.2, respectively) than students with hearing impairments (1.6).

Fewer differences between disability categories were noted regarding credits earned in advanced mathematics courses, which ranged from 0.0 to 0.3. Students in the mental retardation and multiple disabilities categories had an average of 0.0 credit in advanced mathematics courses, compared with 0.1 to 0.3 credit for students with speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, or autism. Fewer credits in advanced mathematics were earned by students with learning disabilities, emotional disturbances, other health impairments, or traumatic brain injuries (0.1 for each group) than by students with speech/language impairments (0.3). Additionally, students with emotional disturbances and students with other health impairments earned fewer credits in advanced mathematics courses than students with visual impairments (0.3).

The average number of credits earned in science ranged from 1.9 to 2.9 across disability categories. From 1.9 to 2.0 credits were earned in science, on average, by students with emotional disturbances, mental retardation, or multiple disabilities, significantly fewer than the science credits earned by students with speech/language impairments, hearing impairments, visual impairments, or orthopedic impairments (2.6 to 2.9). Students with mental retardation or emotional disturbances also earned fewer science credits, on average, than students with learning disabilities or other health impairments (2.4 and 2.5, respectively). Students with learning disabilities, other health impairments, or autism earned fewer credits in science (2.3 to 2.5) than students with speech/language impairments or hearing impairments (2.8 and 2.9, respectively). Students with autism also earned fewer credits in science courses than students with visual impairments (2.3 vs. 2.8).

Credits earned in social studies, on average, ranged from 2.4 to 3.5, with students with mental retardation or emotional disturbances again earning fewer credits (2.4 and 2.5, respectively) than students in several other categories: learning disabilities, speech/language impairment, hearing impairment, visual impairment, and orthopedic impairment (3.2 to 3.5). Students with mental retardation also earned fewer social studies credits than students with other health impairments (2.4 vs. 2.9). Additionally, students with other health impairments, autism,

traumatic brain injuries, or multiple disabilities earned fewer social studies credits (2.7 to 2.9), on average, than students with speech/language impairments, hearing impairments, or orthopedic impairments (3.4 to 3.5), and students with traumatic brain injuries or multiple disabilities (2.7 for both groups) also earned fewer credits in social studies courses than students with visual impairments (3.4).

The average number of credits earned in foreign language ranged from 0.1 credit to 1.4 credits. Students with mental retardation earned fewer credits in foreign language courses (0.1) than students in any other disability category (0.3 to 1.4). Fewer foreign language credits were earned by students with learning disabilities, emotional disturbances, other health impairments, autism, traumatic brain injuries, or multiple disabilities (0.3 to 0.6) than by students with speech/language impairments, hearing impairments, or visual impairments (1.0 to 1.4). Students with multiple disabilities or emotional disturbances earned fewer credits in foreign language courses than students with orthopedic impairments (0.3 and 0.4, respectively, vs. 0.7), who in turn earned fewer foreign language credits than students with speech/language impairments or visual impairments (1.0 and 1.4). In addition, students with deaf-blindness earned fewer credits in foreign language courses (0.6) than students with visual impairments (1.4).

Grade-Level Differences in Academic Course Taking

There were no significant differences across grade levels in the percentage of students who had taken one or more academic courses as part of their high school programs. However, differences were apparent in the percentage of total credits earned that were in academic courses (table 7). Twelfth-grade students averaged a smaller proportion of their credits from academic classes (49 percent) than students in 9th through 11th grades (57 percent to 61 percent). The percentage of total credits that came from academic classes also was smaller for 11th-graders (57 percent) than for 9th- or 10th-graders (60 percent and 61 percent).

Across 9th through 12th grades, the average number of credits earned in English by students with disabilities did not differ significantly; however, there were significant differences in credits earned in mathematics by grade level. Students with disabilities in 9th and 10th grades earned more credits in mathematics, on average, (0.9 for both groups) than students in 11th and 12th grades (0.8 and 0.6, respectively), and students in 11th grade earned more credits in mathematics courses than students in 12th grade. In basic-level mathematics courses, 9th-grade students with disabilities earned more credits (0.6), on average, than students in 10th and 11th grades (0.5 for both groups). Students with disabilities in 10th grade averaged more credits in mid-level mathematics courses (0.5) than students in 9th, 11th, and 12th grades (0.3 to 0.4), and students in 9th grade earned more credits in mid-level mathematics courses (0.4) than students in 12th grade (0.3). For advanced mathematics courses, students with disabilities in 12th grade earned more credits (0.1), on average, than students in 9th through 11th grades, as well as students in extended 13th grade (0.0).

There were a few significant differences in average number of credits earned in other subjects by grade level. Credits in science courses were higher for students with disabilities in 9th and 10th grades (0.8), compared with students in 11th and 12th grades (0.6 and 0.4, respectively), and students with disabilities in 11th grade earned more science credits than students in 12th grade. Earned credits in social studies courses were higher among 11th- and 12th-graders (0.9 for both groups), compared with 9th- and 10th-graders (0.7 and 0.8, respectively). Students with disabilities in 10th and 11th grades earned more credits in foreign

Table 7. Academic course taking by students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded
Percentage enrolled in any academic courses	98.1 (0.50)	97.9 (0.54)	97.6 (0.61)	96.7 (0.77)	86.2 (8.91)	‡
Percentage of total high school credits earned in academic courses	59.5 (0.67)	61.4 (0.70)	56.5 (0.83)	49.0 (0.90)	53.4 (6.95)	‡
Average number of credits earned in:						
English	1.2 (0.03)	1.1 (0.03)	1.1 (0.04)	1.2 (0.03)	1.3 (0.29)	‡
Mathematics	0.9 (0.02)	0.9 (0.02)	0.8 (0.02)	0.6 (0.03)	0.9 (0.31)	‡
Basic	0.6 (0.02)	0.5 (0.02)	0.5 (0.03)	0.6 (0.04)	1.0 (0.41)	‡
Mid-level	0.4 (0.02)	0.5 (0.02)	0.4 (0.03)	0.3 (0.03)	0.2 (0.15)	‡
Advanced	#	#	#	0.1 (0.02)	#	‡
Science	0.8 (0.02)	0.8 (0.02)	0.6 (0.03)	0.4 (0.02)	0.5 (0.20)	‡
Social studies	0.7 (0.02)	0.8 (0.02)	0.9 (0.03)	0.9 (0.03)	0.7 (0.32)	‡
Foreign language	0.1 (0.01)	0.2 (0.02)	0.2 (0.02)	0.1 (0.01)	0.2 (0.12)	‡

‡ Responses for items with fewer than 30 respondents are not reported.

Rounds to zero.

NOTE: Standard errors are in parentheses. Analyses for each grade level include all students with data for that grade level. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,040 to 7,230 9th-graders, 6,560 to 6,860 10th-graders, 4.660 to 5,570 11th-graders, 2,950 to 5,570 12th-graders, and 50 to 100 13th-graders.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

language courses (0.2) than students in 9th and 12th grades (0.1). There were no other significant differences in academic credits earned by grade level.

Demographic Differences in Academic Course Taking

A few significant differences were noted in the academic course taking of students with disabilities who had different demographic characteristics (table 8). There were no differences in the percentage of students with disabilities taking any academic courses by gender, race/ethnicity, or household income, but there was one significant difference in the average percentage of all credits earned that came from academic courses; Hispanic students with disabilities earned a higher percentage of their total credits from academic classes than White students with disabilities (61 percent vs. 56 percent).

Regarding specific types of academic courses, male and female students with disabilities did not differ significantly in credits earned in any type of academic course. There were differences, however, by race/ethnicity and household income. White and Hispanic students with disabilities earned more credits, on average, in advanced mathematics courses (0.1) than African American students (0.0). In addition, Hispanic students with disabilities earned more credits in foreign

Table 8. Academic course taking by students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Percentage enrolled in any academic courses	99.2 (0.43)	98.9 (0.69)	99.3 (0.39)	98.4 (1.14)	99.2 (1.09)	98.5 (0.86)	99.3 (0.66)	99.7 (0.41)
Percentage of total high school credits earned in academic courses	56.4 (0.70)	56.7 (0.91)	55.5 (0.63)	57.5 (1.56)	60.8 (1.48)	55.5 (1.12)	56.1 (0.99)	57.0 (0.96)
Average number of credits earned in:								
English	4.0 (0.09)	4.1 (0.13)	4.0 (0.09)	4.0 (0.19)	4.3 (0.21)	3.8 (0.14)	4.2 (0.14)	4.1 (0.13)
Mathematics	2.9 (0.07)	3.0 (0.09)	3.0 (0.06)	2.9 (0.14)	2.8 (0.14)	2.7 (0.10)	2.9 (0.10)	3.2 (0.10)
Basic	1.6 (0.07)	1.8 (0.10)	1.7 (0.07)	1.8 (0.14)	1.4 (0.15)	1.7 (0.10)	1.7 (0.11)	1.6 (0.10)
Mid-level	1.3 (0.07)	1.2 (0.09)	1.3 (0.07)	1.2 (0.13)	1.4 (0.16)	1.1 (0.09)	1.3 (0.11)	1.5 (0.11)
Advanced	0.1 (0.02)	0.1 (0.02)	0.1 (0.02)	#	0.1 (0.03)	#	0.1 (0.02)	0.2 (0.04)
Science	2.3 (0.06)	2.4 (0.09)	2.4 (0.06)	2.3 (0.13)	2.2 (0.12)	2.1 (0.09)	2.4 (0.10)	2.5 (0.10)
Social studies	3.0 (0.08)	3.0 (0.10)	3.1 (0.08)	2.7 (0.15)	3.0 (0.17)	2.7 (0.11)	3.2 (0.14)	3.3 (0.11)
Foreign language	0.5 (0.04)	0.6 (0.07)	0.5 (0.04)	0.4 (0.08)	0.9 (0.12)	0.4 (0.05)	0.5 (0.07)	0.7 (0.08)

Rounds to zero.

NOTE: Standard errors are in parentheses. Values for each of the three demographic analyses are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,710 to 6,010 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

language courses (0.9) than White or African American students with disabilities (0.5 and 0.4). Students with disabilities from households with incomes greater than $50,000 earned more credits than students from households with incomes of $25,000 or less in mathematics (3.2 vs. 2.7), science (2.5 vs. 2.1), social studies (3.3 vs. 2.7), and foreign language (0.7 vs. 0.4). Students from households with incomes of more than $50,000 also earned more credits in mid-level and advanced mathematics (1.5 and 0.2, respectively) than students from households with incomes of $25,000 or less (1.1 and 0.0, respectively, vs. 1.2). In addition, students with disabilities in households with incomes from $25,001 to $50,000 earned more credits in social studies courses (3.2) than students in households with incomes of $25,000 or less (2.7).

Differences in Academic Course Taking, by High School Completion Status

Students with disabilities who completed high school were as likely to enroll in academic courses as students who did not complete high school—99 percent of both groups had done so—and the proportion of their total credits from those academic courses did not differ significantly (56 percent and 58 percent, respectively) (table 9). However, there were notable differences in the average number of credits earned for several academic courses by students who had and had

Table 9. Academic course taking by students with disabilities, by high school completion status

	Completers	Non-completers
Percentage enrolled in any academic courses	99.3 (0.38)	98.6 (0.96)
Percentage of total high school credits earned in academic courses	56.2 (0.58)	57.9 (1.49)
Average number of credits earned in:		
English	4.5 (0.07)	2.3 (0.14)
Mathematics	3.3 (0.05)	1.7 (0.10)
Basic	1.8 (0.07)	1.2 (0.09)
Mid-level	1.4 (0.06)	0.6 (0.08)
Advanced	0.1 (0.02)	#
Science	2.6 (0.05)	1.4 (0.11)
Social studies	3.5 (0.06)	1.5 (0.10)
Foreign language	0.6 (0.04)	0.1 (0.04)

Rounds to zero.

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,710 to 6,010 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

not completed high school. Across all academic subjects, students with disabilities who had completed high school earned more credits than students who had not completed high school, likely reflecting completers having been in school longer than noncompleters. For example, high school completers had more than twice the average number of credits earned in English classes, compared with noncompleters (4.5 vs. 2.3), and the average number of mathematics credits earned overall and in each level of mathematics was higher among high school completers than among noncompleters. Students with disabilities who completed high school accrued an average of 2.6 credits in science courses, compared with an average of 1.4 credits earned by noncompleters, and completers earned an average of 3.5 social studies credits, compared with1.5 credits by noncompleters. Credits earned in foreign language courses were also higher for completers than for students who had not completed high school (0.6 vs. 0.1).

Vocational Course Taking

Vocational course enrollment included prevocational courses (e.g., career exploration), occupation-specific courses (e.g., agriculture, alternate business occupations), and work study or cooperative education. There were nine types of occupationally-specific courses, as presented in Table 10. For the nine types of occupationally-specific courses, if a student had earned any

credits in the overall occupationally specific category and had not taken any credits in a subset type of class (e.g., had earned four occupationally specific credits but no credits in business), the number of credits for that subset was set to zero, to more accurately reflect the denominator when computing the average number of credits earned in the subset occupationally specific course.

Nearly all students with disabilities (96 percent) enrolled in some type of vocational course during high school (table 10), with those courses accounting for 20 percent of the total high school credits earned. On average, 0.5 credit was earned for prevocational courses, 3.4 credits

Table 10. Vocational course taking by students with disabilities and students in the general population

	Students with disabilities in grades 9 through 12	Students in the general population in grades 9 through 12
Percentage enrolled in any vocational courses	95.6 (0.81)	93.5 (0.20)
Percentage of total high school credits earned in vocational courses	19.7 (0.55)	13.9 (0.01)
Average number of credits earned in:		
Prevocational courses	0.5 (0.07)	0.5 (0.01)
Occupation-specific courses	3.4 (0.12)	2.6 (0.02)
Agriculture	0.3 (0.05)	0.2 (0.01)
Business	0.6 (0.04)	0.6 (0.01)
Food services and hospitality	0.2 (0.04)	0.1 (0.01)
Health	0.1 (0.02)	0.1 (0.01)
Home economics	0.1 (0.02)	0.1 (0.01)
Marketing	0.1 (0.02)	0.1 (0.01)
Technology	0.9 (0.05)	0.8 (0.01)
Trade and industry	1.3 (0.09)	0.6 (0.02)
Other occupation-specific courses	0.2 (0.05)	0.1 (0.04)
Work study or cooperative education	3.6 (0.12)	0.1 (0.01)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from 5,150 to 6,180 students in NLTS2 and included 14,800 youth in ELS:2002.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009; U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study.

were earned in occupation-specific courses, and 3.6 credits were earned in work study or cooperative education. A breakdown of occupation-specific courses ranged from 0.1 credit for health, home economics, and marketing to 1.3 credits for trade and industry occupations.

Disability Differences in Vocational Course Taking

The percentage of students having ever enrolled in a vocational course ranged from 85 percent of students with traumatic brain injuries to 97 percent of students with learning disabilities (table 11); however, only the difference in enrollment between students with emotional disturbances and students with learning disabilities was significant (90 percent vs. 97 percent).

The percentage of total high school credits earned in vocational courses ranged from 14 percent for students with visual impairments to 25 percent for students with multiple disabilities. Students with mental retardation or multiple disabilities earned a higher percentage of credits in vocational courses (24 percent and 25 percent, respectively) than students with learning disabilities, emotional disturbances, speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, other health impairments, or autism (14 percent to 20 percent). Similarly, students with learning disabilities earned a higher percentage of high school credits in vocational courses (20 percent) than students with speech/language impairments (17 percent). In contrast, students with visual impairments earned a smaller proportion of high school credits in vocational courses (14 percent) than students with learning disabilities, traumatic brain injuries, or autism (19 percent to 21 percent).

Table 11. Vocational course taking, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Percentage enrolled in any vocational courses	96.9 (1.01)	96.2 (1.17)	94.1 (1.53)	90.2 (2.14)	96.2 (1.64)	92.2 (3.09)	94.8 (1.69)	95.4 (1.51)	93.1 (2.41)	84.7 (4.68)	92.0 (2.57)	93.6 (3.91)
Percentage of total high school credits earned in vocational courses	19.5 (0.78)	16.7 (0.76)	24.0 (1.03)	17.8 (1.05)	17.6 (1.03)	14.1 (1.19)	17.3 (0.97)	17.8 (0.90)	19.0 (1.43)	21.3 (1.98)	25.3 (1.84)	18.3 (2.70)
Average number of credits earned in:												
Prevocational courses	0.5 (0.09)	0.3 (0.06)	0.9 (0.15)	0.6 (0.12)	0.3 (0.09)	0.2 (0.10)	0.3 (0.07)	0.3 (0.08)	0.9 (0.86)	0.6 (0.24)	0.7 (0.19)	0.4 (0.16)
Occupation-specific courses	3.5 (0.17)	3.2 (0.18)	3.7 (0.23)	2.6 (0.20)	3.5 (0.25)	2.8 (0.28)	3.0 (0.23)	3.3 (0.21)	3.6 (0.38)	3.8 (0.43)	4.0 (0.44)	3.1 (0.48)
Work study or cooperative education	3.6 (0.17)	3.3 (0.18)	3.9 (0.24)	2.7 (0.21)	3.6 (0.26)	2.9 (0.29)	3.2 (0.24)	3.5 (0.21)	3.7 (0.38)	4.0 (0.45)	4.2 (0.45)	3.1 (0.48)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from 5,150 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Prevocational courses accounted for 0.2 to 0.9 credit across disability categories. Students with mental retardation, on average, had a significantly higher number of prevocational credits than students with speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, or other health impairments (0.9 vs. 0.2 to 0.3). The average number of credits earned in occupation-specific courses ranged from 2.6 for students with emotional disturbances to 4.0 for students with multiple disabilities. Students with emotional disturbances earned significantly fewer credits in occupation-specific courses than students with learning disabilities, multiple disabilities, mental retardation, or hearing impairments (2.6 vs. 3.5 to 4.0). Students with visual impairments also earned fewer credits in occupation-specific courses than students with mental retardation (2.8 vs. 3.7).

Credits earned for work study or cooperative education ranged from 2.7 for students with emotional disturbances to 4.2 for students with multiple disabilities. Students with emotional disturbances earned significantly fewer credits in such courses than students with learning disabilities, multiple disabilities, mental retardation, hearing impairments, or traumatic brain injuries (2.7 vs. 3.6 to 4.2). In contrast, students with mental retardation accrued more credits in work study or cooperative education than students with visual impairments (3.9 vs. 2.9).

Grade-Level Differences in Vocational Course Taking

Students with disabilities in 9th and 10th grades were less likely to have enrolled in vocational courses than students in 11th and 12th grades (table 12). Sixty-nine percent of students in both 9th and 10th grades had enrolled in one or more vocational courses, whereas 78 percent of students in 11th grade and 82 percent of students in 12th grade had done so. Students with disabilities in extended 13th grade and ungraded programs did not differ from students in 9th through 12th grades. Consistent with their lower enrollment rates for vocational courses, students in the lower grades accrued significantly smaller proportions of their total credits from vocational courses than students in upper grades (18 percent and 21 percent for 9th- and 10th-graders vs. 28 percent and 35 percent for 11th- and 12th-graders, respectively). For students in ungraded programs, vocational courses accounted for a smaller proportion of overall high school credits (14 percent) than for students in grades 11 and 12.

Across grade levels, students were similar in the average number of credits earned from prevocational, occupation-specific, or work study or cooperative education courses.

Table 12. Vocational course taking by students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded
Percentage enrolled in any vocational courses	69.2 (1.67)	68.8 (1.75)	78.4 (1.65)	81.8 (1.64)	79.5 (10.41)	76.3 (14.32)
Percentage of total high school credits earned in vocational courses	18.4 (0.66)	20.7 (0.73)	28.2 (0.88)	35.2 (1.05)	31.8 (6.68)	14.1 (4.57)
Average number of credits earned in:						
Prevocational courses	#	0.1 (0.02)	0.2 (0.03)	0.5 (0.06)	0.5 (0.31)	‡
Occupation-specific courses	1.0 (0.04)	1.0 (0.04)	1.4 (0.07)	1.4 (0.07)	1.5 (0.56)	‡
Work study or cooperative education	1.0 (0.04)	1.1 (0.05)	1.4 (0.07)	1.5 (0.07)	1.5 (0.57)	‡

Rounds to zero.

‡ Responses for items with fewer than 30 respondents are not reported.

NOTE: Standard errors are in parentheses. Analyses for each grade level include all students with data for that grade level. Values are weighted population estimates based on samples that ranged across variables from approximately 4,340 to 7,250 9th-graders, 4,270 to 6,860 10th-graders, 4.440 to 6,290 11th-graders, 4,300 to 5,570 12th-graders, 74 to 100 13th-graders, and 30 to 60 for students in ungraded programs.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Demographic Differences in Vocational Course Taking

Rates of enrollment and credits earned in vocational courses did not differ significantly by household income or race/ethnicity (table 13). However, males earned a higher proportion of their overall credits in vocational courses than females (21 percent vs. 17 percent).

Table 13. Vocational course taking by students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Percentage enrolled in any vocational courses	96.4 (0.92)	94.1 (1.53)	96.0 (0.95)	94.6 (2.02)	94.8 (2.64)	94.4 (1.64)	96.7 (1.40)	96.5 (1.34)
Percentage of total high school credits earned in vocational courses	21.0 (0.71)	16.8 (0.80)	20.7 (0.68)	18.7 (1.38)	17.6 (1.40)	20.1 (1.06)	20.4 (1.00)	19.6 (1.04)
Average number of credits earned in:								
Prevocational courses	0.6 (0.08)	0.5 (0.12)	0.7 (0.10)	0.3 (0.11)	0.3 (0.13)	0.4 (0.10)	0.6 (0.12)	0.5 (0.15)
Occupation- specific courses	3.7 (0.15)	2.9 (0.18)	3.7 (0.15)	3.0 (0.26)	3.2 (0.34)	3.3 (0.22)	3.7 (0.24)	3.7 (0.23)
Work study or cooperative education	3.8 (0.16)	3.0 (0.18)	3.8 (0.16)	3.2 (0.27)	3.3 (0.34)	3.4 (0.23)	3.9 (0.25)	3.7 (0.23)

NOTE: Standard errors are in parentheses. Values for each of the three demographic analyses are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,150 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Vocational Course Taking, by High School Completion Status

Students with disabilities who completed high school were more likely to have ever enrolled in vocational courses than students who did not complete high school (97 percent vs. 92 percent) (table 14). Furthermore, students with disabilities who had completed high school averaged more credits earned in vocational courses than students who did not complete high school, likely reflecting completers having been in school longer than noncompleters. Specifically, high school completers earned an average of 3.9 credits in occupation-specific courses, compared with 1.8 credits for noncompleters. In addition, credits earned were higher for completers than for noncompleters in work study or cooperative education courses (4.0 vs. 1.9).

Table 14. Vocational course taking by students with disabilities, by high school completion status

	Completers	Non-completers
Percentage enrolled in any vocational courses	96.7 (0.80)	91.8 (2.22)
Percentage of total high school credits earned in vocational courses	20.1 (0.59)	18.2 (1.40)
Average number of credits earned in:		
Prevocational courses	0.6 (0.08)	0.2 (0.06)
Occupation-specific courses	3.9 (0.14)	1.8 (0.16)
Work study or cooperative education	4.0 (0.14)	1.9 (0.17)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,150 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Nonacademic, Nonvocational Course Taking

Nearly all (99.7 percent) of students with disabilities were enrolled in at least one nonacademic, nonvocational[31] course during high school (table 15), which accounted for one-quarter (25 percent) of the total number of credits students earned in high school. The average number of credits earned across different types of nonacademic, nonvocational courses ranged from 0.6 to 1.7. Students with disabilities were more likely to earn credits in fine and performing arts,[32] physical education and health, and learning support courses (1.5 to 1.7) than in life skills[33] and other nonacademic, nonvocational courses (0.6 and 0.7, respectively).

[31] Nonacademic, nonvocational courses include courses in the fine and performing arts, physical education (PE) and health, learning support courses, life skills, and other, uncategorized courses.

[32] Courses in fine and performing arts include drama, music, dance, art, and photography and film.

[33] Courses in life skills include living skills, resource management, health and safety education, driver's education, community living, communication and social development instruction, and food and nutrition.

Table 15. Nonacademic, nonvocational course taking by students with disabilities and students in the general population

	Students with disabilities in grades 9 through 12	Students in the general population in grades 9 through 12
Percentage enrolled in any nonacademic, nonvocational courses	99.7 (0.22)	99.8 (0.04)
Percentage of total high school credits earned in nonacademic, nonvocational courses	25.1 (0.57)	20.7 (0.01)
Average credits earned in:		
Fine and performing arts courses	1.5 (0.07)	1.8 (0.02)
Physical education and health courses	1.7 (0.05)	1.6 (0.01)
Learning support courses	1.5 (0.09)	0.3 (0.01)
Life skills courses	0.6 (0.06)	1.0 (0.01)
Other nonacademic, nonvocational courses	0.7 (0.06)	0.2 (0.01)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,010 to 6,180 students in NLTS2 and includes 14,800 youth in ELS:2002.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Compared with high school students in the general population, students with disabilities earned a higher proportion of overall credits in nonacademic, nonvocational courses (25 percent vs. 21 percent).[34] Students with disabilities earned more credits in learning support courses and other, uncategorized courses (1.5 and 0.7, respectively) than did students in the general population (0.3 and 0.2, respectively). In contrast, students in the general population earned more credits in fine and performing arts and life skills courses (1.8 and 1.0, respectively) than students with disabilities (1.5 and 0.6, respectively).

Disability Differences in Nonacademic, Nonvocational Course Taking

The percentage of students with disabilities enrolled in any nonacademic, nonvocational courses during high school ranged from 99 percent to 100 percent across disability categories (table 16), with no significant differences between them. However, students with mental retardation, orthopedic impairments, autism, traumatic brain injuries, or multiple disabilities earner a higher proportion of their credits from nonacademic, nonvocational courses (27 percent to 34 percent) than students with speech/language impairments (23 percent). Similarly, the

[34] General population estimates are based on calculations using the restricted use dataset from the U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study. All general population estimates include students who have completed high school, as well as those who have not (i.e. both graduates and dropouts have been included).

percentages of total credits that were earned in nonacademic, nonvocational courses were higher for students with mental retardation, orthopedic impairments, autism, or multiple disabilities

Table 16. Nonacademic, nonvocational course taking, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Percentage enrolled in any nonacademic, nonvocational courses	99.8 (0.24)	99.8 (0.27)	99.5 (0.47)	98.8 (0.80)	99.9 (0.21)	100.0 (0.00)	99.5 (0.56)	100.0 (0.00)	99.8 (0.46)	100.0 (0.00)	99.9 (0.29)	100.0 (0.00)
Percent age of total high school credits earned in nonacademic, nonvocational courses	23.9 (0.71)	22.8 (0.67)	31.6 (1.40)	24.9 (1.14)	23.0 (0.95)	25.8 (1.69)	27.1 (1.04)	25.2 (0.89)	33.7 (1.96)	28.9 (2.10)	30.5 (2.07)	32.0 (3.72)
Average credits earned in:												
Fine and performing arts courses	1.6 (0.11)	1.7 (0.12)	1.2 (0.10)	1.0 (0.10)	1.6 (0.15)	2.2 (0.29)	2.0 (0.18)	1.7 (0.13)	2.2 (0.23)	1.5 (0.20)	1.5 (0.17)	1.9 (0.39)
Physical education and health courses	1.7 (0.07)	1.7 (0.08)	1.9 (0.11)	1.4 (0.09)	1.8 (0.11)	1.4 (0.13)	1.6 (0.11)	1.6 (0.08)	2.3 (0.22)	1.8 (0.18)	1.9 (0.16)	1.9 (0.24)
Learning support courses	1.2 (0.07)	1.4 (0.09)	3.5 (0.32)	1.2 (0.11)	1.5 (0.14)	1.2 (0.18)	2.0 (0.22)	1.4 (0.13)	4.0 (0.53)	1.8 (0.31)	3.5 (0.53)	3.0 (0.88)
Life skills courses	0.5 (0.06)	0.6 (0.07)	1.6 (0.17)	0.4 (0.07)	0.8 (0.15)	0.4 (0.12)	1.1 (0.17)	0.5 (0.08)	1.3 (0.26)	0.6 (0.17)	1.7 (0.26)	0.9 (0.27)
Other nonacademic, nonvocational courses	0.8 (0.08)	0.4 (0.06)	0.7 (0.13)	0.5 (0.07)	0.7 (0.13)	0.9 (0.22)	1.4 (0.17)	0.8 (0.10)	1.1 (0.25)	0.9 (0.21)	1.1 (0.34)	1.4 (0.47)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,010 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

(27 percent to 34 percent) than for students with learning disabilities or hearing impairments (24 percent and 23 percent, respectively). Students with mental retardation or autism also accrued higher percentages of their total credits in nonacademic, nonvocational courses (32 percent and 34 percent, respectively) than students with emotional disturbances, visual impairments, or other health impairments (25 percent to 26 percent). Students with autism also earned a larger percentage of credits in nonacademic, nonvocational courses than students with orthopedic impairments (34 percent vs. 27 percent).

Some differences across disability categories were noted for several nonacademic, nonvocational subject areas. For courses in fine and performing arts, students with emotional disturbances or mental retardation averaged the fewest credits earned (1.0 and 1.2, respectively), which were significantly lower than the credits earned by students with learning disabilities,

speech/language impairments, visual impairments, orthopedic impairments, other health impairments, or autism (1.6 to 2.2). Students with emotional disturbances also earned significantly fewer credits in fine and performing arts (1.0) than students with multiple disabilities (1.5). A similar course-taking pattern was observed for physical education (PE) and health courses.[35] Students with emotional disturbances accrued fewer credits in PE and health (1.4) than students with learning disabilities, speech/language impairments, hearing impairments, mental retardation, autism, or multiple disabilities (1.4 to 2.3). In contrast, students with autism earned more credits in PE and health (2.3), on average, than students with speech/language impairments, visual impairments, orthopedic impairments, or other health impairments.

Differences across disability categories were similar in terms of credits accrued in learning support[36] and life skills courses. On average, students with mental retardation, autism, or multiple disabilities earned more credits in learning support courses (3.5 to 4.0) than students with learning disabilities, speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, other health impairments, emotional disturbances, or traumatic brain injuries (1.2 to 2.0). In addition, students with orthopedic impairments accrued more credits in learning support courses (2.0) than students with learning disabilities, speech/language impairments, or visual impairments (1.2 to 1.4).

Similar to differences in credits earned in learning support courses, students with mental retardation, autism, or multiple disabilities earned more credits in life skills courses (1.3 to 1.7) than students with learning disabilities, speech/language impairments, visual impairments, other health impairments, or emotional disturbances (0.4 to 0.6. Students with mental retardation or multiple disabilities also accrued more credits than students with hearing impairments or traumatic brain injuries (0.8 and 0.6, respectively). In addition, students with orthopedic impairments earned more credits in life skills courses (1.1) than students with learning disabilities, emotional disturbances, or visual impairments (0.4 to 0.5), and students with hearing impairments earned more credits than students with emotional disturbances (0.8 vs. 0.4). Students with orthopedic impairments also earned more credits in other, uncategorized[37] courses (1.4) than students with learning disabilities, speech/language impairments, mental retardation, emotional disturbances, or other health impairments (0.4 to 0.8). In contrast, students with speech/language impairments earned fewer credits in other, uncategorized courses than students with learning disabilities or other health impairments (0.4 vs. 0.8).

Grade-Level Differences in Nonacademic, Nonvocational Course Taking

Differences in patterns of taking nonacademic, nonvocational courses were found across grade levels (table 17). Ninth-grade students with disabilities were more likely to have taken one or more nonacademic, nonvocational courses (98 percent) than students in 10th, 11th, or 12th grade (85 percent to 94 percent), and 10th-graders were more likely to be enrolled in such courses (94 percent) than students in grade 11 or 12 (86 percent and 85 percent, respectively). Also, the percentage of total credits earned in nonacademic, nonvocational courses was higher for students with disabilities in 9th grade than students in 11th grade (29 percent vs. 26 percent).

[35] Physical education and health courses include physical education, health, and adapted physical education.

[36] Courses in learning support include study skills, test preparation, learning strategies, special resources, self-contained classroom, and homebound instruction.

[37] Other courses include transition, homeroom, independent study, and college planning.

For fine and performing arts courses, 12th-grade students with disabilities earned significantly more credits (0.6 on average) than students in 9th grade (0.4 on average). Students in the 12th grade also had earned more life skills credits on average (0.4) than those in grades 9, 10, and 11 (0.1, 0.1, 0.2).

Table 17. Nonacademic, nonvocational course taking by students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded
Percentage enrolled in any nonacademic, nonvocational courses	98.1 (0.49)	93.6 (0.93)	85.8 (1.40)	84.5 (1.54)	84.4 (9.37)	[1]
Percentage of total high school credits earned in nonacademic, nonvocational courses	29.2 (0.68)	26.9 (0.71)	25.8 (0.79)	27.5 (0.87)	32.1 (7.53)	47.7 (12.31)
Average credits earned in:						
Fine and performing arts courses	0.4 (0.02)	0.5 (0.02)	0.5 (0.03)	0.6 (0.04)	0.6 (0.22)	‡
Physical education and health courses	0.6 (0.02)	0.5 (0.02)	0.5 (0.03)	0.5 (0.03)	0.6 (0.31)	‡
Learning support courses	0.5 (0.03)	0.5 (0.03)	0.5 (0.04)	0.5 (0.06)	1.2 (0.58)	‡
Life skills courses	0.1 (0.01)	0.1 (0.02)	0.2 (0.03)	0.4 (0.04)	0.2 (0.22)	‡
Other nonacademic, nonvocational courses	0.3 (0.02)	0.2 (0.02)	0.2 (0.02)	0.2 (0.03)	0.1 (0.23)	‡

‡ Responses for items with fewer than 30 respondents are not reported.

[1] Fewer than three respondents in the cell for those not enrolled in any nonacademic, nonvocational courses.

NOTE: Standard errors are in parentheses. Analyses for each grade level include all students with data for that grade level. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,740 to 7,250 9th-graders, 6,110 to 6,860 10th-graders, 5,140 to 6,290 11th-graders, 4,510 to 5,570 12th-graders, 70 to 80 13th-graders, and 40 to 60 students in ungraded programs.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Demographic Differences in Nonacademic, Nonvocational Course Taking

Table 18 shows the percentage and average number of credits accrued in nonacademic, nonvocational courses for students who differed in gender, race/ethnicity, and household income. Although there were no significant differences by students' race/ethnicity, some differences were noted by gender and household income. On average, the percentage of total credits earned in nonacademic, nonvocational courses was higher for females than males (28 percent vs. 24 percent). Females also earned more credits in fine and performing arts and learning support courses (1.9 and 2.0, respectively), on average, than males (1.3 for both courses). However, males averaged more credits earned in PE and health than females (1.8 vs. 1.4). Differences related to household income were significant for both fine and performing arts courses and PE and health courses. Students with household incomes of less than $25,000 had fewer fine and performing arts credits, on average, than students from households with incomes above $50,000 per year (1.2 vs. 1.8) and accrued fewer credits in PE and health courses than students from households with income from $25,001 to $50,000 (1.5 vs. 1.9).

Table 18. Nonacademic, nonvocational course taking by students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Percentage enrolled in any nonacademic, nonvocational courses	99.5 (0.33)	100.0 (0.04)	99.6 (0.30)	99.9 (0.33)	99.7 (0.67)	99.4 (0.54)	99.9 (0.21)	99.8 (0.33)
Percentage of total high school credits earned in nonacademic, and nonvocational courses	23.7 (0.69)	28.0 (0.99)	24.9 (0.64)	25.8 (1.46)	22.9 (1.72)	26.2 (1.24)	24.5 (0.97	24.4 (0.98)
Average number of credits earned in:								
Fine and performing arts courses	1.3 (0.08)	1.9 (0.13)	1.6 (0.09)	1.4 (0.16)	1.3 (0.18)	1.2 (0.11)	1.5 (0.13)	1.8 (0.15)
Physical education and health courses	1.8 (0.07)	1.4 (0.08)	1.7 (0.06)	1.7 (0.12)	1.6 (0.16)	1.5 (0.09)	1.9 (0.11	1.7 (0.09)
Learning support courses	1.3 (0.11)	2.0 (0.18)	1.6 (0.12)	1.5 (0.19)	1.3 (0.27)	1.6 (0.19)	1.6 (0.18)	1.4 (0.17)
Life skills courses	0.6 (0.07)	0.7 (0.09)	0.7 (0.07)	0.6 (0.15)	0.5 (0.13)	0.7 (0.12)	0.6 (0.11)	0.6 (0.09)
Other nonacademic, nonvocational courses	0.7 (0.07)	0.8 (0.11)	0.8 (0.08)	0.6 (0.11)	0.7 (0.18)	0.7 (0.10)	0.8 (0.15)	0.8 (0.11)

NOTE: Standard errors are in parentheses. Values for each of the three demographic analyses are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,010 to 6,080 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Differences in Nonacademic, Nonvocational Course Taking, by High School Completion Status

Overall, students who did and did not complete high school were similar in their likelihood of having taken any nonacademic, nonvocational courses and in the percentage of total accrued credits that were earned in nonacademic, nonvocational courses (table 19). Differences were noted, however, in the average number of credits earned in various types of nonacademic, nonvocational courses. Students with disabilities who completed high school earned more credits in every specific kind of nonacademic, nonvocational course (0.7 to 1.9 across types of courses) than noncompleters (0.3 to 1.0), which, in part, may reflect the fact that completers had been in school longer than noncompleters, completers took a wider variety of courses than noncompleters, noncompleters had failed more classes, and/or other factors.

Table 19. Nonacademic, nonvocational course taking by students with disabilities, by high school completion status

	Completers	Non-completers
Percentage enrolled in any nonacademic, nonvocational courses	100.0 (0.09)	98.8 (0.90)
Percentage of total high school credits earned in nonacademic, nonvocational courses	24.8 (0.60)	26.2 (1.49)
Average number of credits earned in:		
Fine and performing arts courses	1.8 (0.09)	0.6 (0.07)
Physical education and health courses	1.9 (0.06)	1.0 (0.08)
Learning support courses	1.7 (0.12)	0.9 (0.11)
Life skills courses	0.7 (0.07)	0.3 (0.06)
Other nonacademic, nonvocational courses	0.8 (0.07)	0.5 (0.09)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,110 to 6,080 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

This chapter has focused on credits earned by students with disabilities who attended typical high schools. Chapter 3 will consider the instructional settings in which credits were earned.

3. Instructional Settings

Efforts to improve student outcomes "have centered on increasing inclusion of students with disabilities in general education classrooms and, most recently, ensuring access to the general education curriculum" (McLaughlin and Tilstone 2000, p. 50). Hence, the maximum appropriate integration of students with disabilities with the general student population is the specific intent of the "least restrictive environment" (LRE) provision of the Individuals with Disabilities Education Act of 2004, which seeks to ensure that

> (i) To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are nondisabled; and (ii) Special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only if the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. §300.114

In addition, research on the school experiences associated with including students with disabilities in general education classrooms has identified benefits for both students with disabilities and students without disabilities (Causton-Theoharis and Malmgren 2005; Cole 2006; Frattura and Capper 2006; Katz and Mirenda 2002; Salend and Duhaney 1999).

A comprehensive examination of the types of classrooms in which students with disabilities received credits is possible by drawing on the high school transcript data compiled as part of NLTS2 for students with disabilities nationally who attended typical high schools[38] at some time from 2001 to 2009. This chapter addresses the following questions for these students:

- To what extent did students with disabilities in secondary schools earn credits in general education and special education settings?
- How did instructional settings differ by course type?
- How did the proportion of credits earned in general education and special education settings differ for students who differed in primary disability category, grade level, and high school completion status?

As noted in chapter 1, NLTS2 intends to describe the experiences of the population of students with disabilities as a whole, including both those who eventually completed their high school programs and those who did not. This chapter begins with an examination of the proportion of credits earned in general education and special education settings by students with disabilities as a whole, a distribution that may reflect students' abilities and preferences, the extent to which districts and schools offer courses in particular settings, and/or other factors. The discussion continues with a focus on the settings experienced by students who differed in disability category and grade level. It then distinguishes the experiences of students with disabilities by high school completion status, presenting data separately for those who did and did not complete high school. The text mentions only differences reaching at least the $p < .01$ level of significance.

[38] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

Credits Earned in General and Special Education Settings, by Type of Course

NLTS2 transcript data include a code for whether each course reported on the transcript was taken in a general education or a special education setting as well as the credits earned from the course. From these data, a percentage of credits earned in the two settings was computed, as reported in table 20.

On average, students with disabilities who attended typical high schools earned 16.7 credits in general education courses and 6.1 credits in special education courses,[39] resulting in 72 percent and 28 percent of their overall credits having been earned in general education and special education settings, respectively. More than one-quarter (27 percent) of secondary school students with disabilities spent all of their instruction time in general education courses and earned all their credits there. In contrast, 3 percent of students with disabilities earned all their credits in a special education setting and none in a general education setting. Similarly, more students with disabilities had earned more than half of their credits in a general education setting (77 percent[40]) than had earned that proportion of credits in a special education setting (23 percent).

Table 20. Credits earned in general and special education settings by students with disabilities

	General education	Special education
Average number of credits earned	16.7 (0.38)	6.1 (0.30)
Average percentage of credits earned	72.2 (1.16)	27.8 (1.16)
Percentage earning the following proportion of credits:		
None to 25 percent	9.0 (1.14)	57.6 (1.97)
More than 25 percent to 50 percent	13.7 (1.37)	19.1 (1.57)
More than 50 percent to 75 percent	20.3 (1.60)	14.6 (1.41)
More than 75 percent to 99.9 percent	29.6 (1.82)	6.0 (0.95)
100 percent	27.4 (1.78)	2.7 (0.65)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 6,050 to 6,100 students.

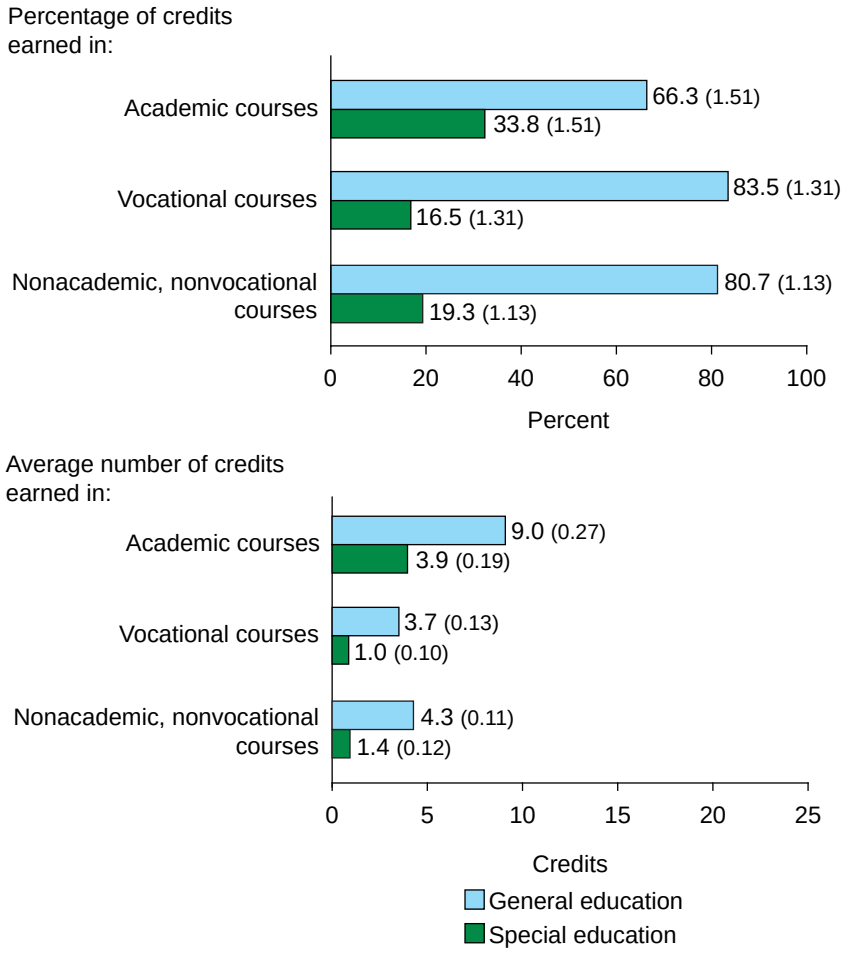
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

[39] The analyses included in this chapter are based only on complete transcripts, with the exception of the by-grade-level analyses. Transcripts for students who had completed their high school programs typically included 4 or more years of coursework. Transcripts for students who had not completed high school were considered to be complete if transcript information was available for all of the grading periods the students had been in high school prior to leaving. For example, if a student had dropped out of high school after 9th grade, the student's one year of 9th-grade transcript data would be included here. Partial transcripts (e.g., only 9th-grade transcript information was collected for a student who had continued his or her education beyond the 9th grade) were not included in the analyses in this chapter, other than the by-grade-level analyses.

[40] Combined percentages of students who had earned >50 percent to 75 percent, >75 percent to 99.9 percent, and 100 percent.

Overall, students with disabilities were more likely to take courses in general education settings than in special education settings, across course types (figure 2). Students earned 66 percent of their academic credits, 84 percent of their vocational credits, and 81 percent of their nonacademic, nonvocational credits in general education settings, compared with 34 percent, 17 percent, and 19 percent, respectively, earned in special education settings.

Figure 2. Academic, vocational, and nonacademic, nonvocational credits earned by students with disabilities, by instructional setting



NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 5,900 to 5,980 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

On average, students earned 9.0 credits in academic courses taken in general education settings, compared with 3.9 credits in special education academic courses. They earned 3.7 credits in general education vocational courses, compared with 1.0 credit in special education vocational courses; and they earned 4.3 credits in nonacademic, nonvocational courses taken in general education settings, compared with 1.4 credits earned in special education settings.

Across specific types of academic, vocational, and nonacademic, nonvocational courses, students also were more likely to have taken courses in general education rather than special

education settings, with one exception. Placement did not differ significantly in prevocational courses (table 21). The proportion of credits earned in academic courses taken in general education settings ranged from 61 percent for English to 97 percent for foreign language courses. The proportion of credits earned in academic courses taken in special education settings thus ranged from 3 percent for foreign language courses to 39 percent for English courses. The proportion of vocational credits earned in general education settings ranged from 55 percent for prevocational courses to 91 percent for occupation-specific courses and for work study or cooperative education courses. In comparison, 45 percent of prevocational credits were earned in special education settings (not significantly different from the proportion in general education settings), and approximately 9 percent of the other types of vocational course credits were earned in special education settings. Finally, nonacademic, nonvocational courses followed a similar trend. The proportion of credits in nonacademic, nonvocational courses accrued in general education settings ranged from 64 percent for life skills courses to 93 percent for physical education and health courses. The proportion of credits in nonacademic, nonvocational courses

Table 21. Percentage of credits earned in course content areas by students with disabilities enrolled in those types of courses, by instructional setting

	General education	Special education
Percentage of credits earned by students who had earned credits in:		
Academic courses		
English	61.1 (1.72)	38.9 (1.72)
Mathematics	63.1 (0.90)	36.9 (0.9)
Science	74.8 (1.68)	25.3 (1.68)
Social studies	72.2 (1.68)	27.8 (1.68)
Foreign language	97.2 (1.22)	2.8 (1.21)
Vocational courses		
Prevocational courses	54.7 (4.55)	45.3 (4.55)
Occupation-specific courses	91.3 (1.06)	8.7 (1.06)
Work study or cooperative education	90.5 (1.10)	9.6 (1.10)
Nonacademic, nonvocational courses		
Physical education and health courses	93.3 (0.99)	6.7 (0.99)
Learning support courses	81.7 (1.53)	18.4 (1.53)
Life skills courses	63.8 (2.89)	36.2 (2.89)

NOTE: Standard errors are in parentheses. NLTS2 percentages are weighted population estimates derived from analyses in which the total sample ranged across types of courses from approximately 1,020 to 5,980 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

earned in special education settings thus ranged from 7 percent for physical education courses to 36 percent for life skills courses.

Disability Differences in Credits Earned in General and Special Education Settings

Students in 8 of the 12 disability categories—those with learning disabilities, speech/language impairments, emotional disturbances, hearing impairments, visual impairments, orthopedic impairments, other health impairments, or traumatic brain injuries—earned higher proportions of overall course credits in general education settings than in special education settings (table 22). Youth in three of the remaining four disability categories—those with autism, multiple disabilities, or deaf-blindness—were about equally likely to earn credits in special education and general education settings, with no significant differences between the average proportion of overall credits earned in general education and special education courses. In contrast to their peers in other disability categories, students with mental retardation were significantly more likely to earn credits in special education settings than in general education settings (55 percent vs. 45 percent).

Table 22. Percentage of credits earned in general and special education settings, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Average percentage of overall earned credits in:												
General education settings	77.0 (1.43)	86.3 (1.42)	45.0 (2.22)	67.2 (2.40)	77.5 (2.45)	85.4 (2.82)	68.8 (2.55)	78.9 (1.83)	53.6 (3.61)	64.9 (4.15)	46.9 (3.27)	57.0 (5.65)
Special education settings	23.0 (1.43)	13.7 (1.42)	55.1 (2.22)	32.8 (2.40)	22.5 (2.45)	14.6 (2.82)	31.2 (2.55)	21.1 (1.83)	46.4 (3.61)	35.1 (4.15)	53.2 (3.27)	43.0 (5.65)
Average percentage of credits earned by students enrolled in type of courses, by setting:												
Academic courses												
General education setting	70.9 (2.00)	82.9 (1.92)	34.1 (2.60)	63.7 (2.92)	73.8 (3.10)	86.2 (3.27)	66.9 (3.08)	73.9 (2.46)	48.5 (4.29)	57.1 (5.20)	38.1 (4.01)	52.6 (6.67)
Special education setting	29.1 (2.00)	17.1 (1.92)	66.0 (2.60)	36.3 (2.92)	26.3 (3.10)	13.8 (3.27)	33.1 (3.08)	26.1 (2.46)	51.5 (4.29)	42.9 (5.20)	61.9 (4.01)	47.5 (6.67)
Vocational courses												
General education setting	88.0 (1.62)	92.7 (1.36)	58.3 (2.83)	79.7 (2.82)	87.3 (2.46)	90.3 (3.02)	78.7 (2.81)	87.9 (1.90)	64.2 (4.25)	79.4 (4.32)	63.5 (4.24)	63.2 (7.23)
Special education setting	12.0 (1.62)	7.3 (1.36)	41.7 (2.83)	20.3 (2.82)	12.8 (2.46)	9.7 (3.02)	21.3 (2.81)	12.1 (1.90)	35.8 (4.25)	20.6 (4.32)	36.5 (4.24)	36.8 (7.23)
Nonacademic, nonvocational courses												
General education setting	85.7 (1.34)	90.4 (1.17)	59.4 (2.47)	72.2 (2.48)	81.6 (2.25)	84.0 (3.16)	66.7 (2.63)	84.8 (1.75)	57.8 (3.67)	70.6 (4.19)	58.6 (3.69)	63.5 (6.08)
Special education setting	14.4 (1.34)	9.6 (1.17)	40.6 (2.47)	27.8 (2.48)	18.4 (2.25)	16.0 (3.16)	33.3 (2.63)	15.2 (1.75)	42.2 (3.67)	29.4 (4.19)	41.4 (3.69)	36.5 (6.08)

NOTE: Standard errors are in parentheses. NLTS2 percentages are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,560 to 6,100 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

The percentage of overall credits earned in general education settings differed by disability category.[41] Students with learning disabilities, speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, or other health impairments (69 percent to 86 percent) earned larger proportions of their overall credits in general education courses than did students with mental retardation, multiple disabilities, autism, deaf-blindness, or traumatic brain injuries (45 percent to 65 percent). Students with emotional disturbances or orthopedic impairments (67 percent and 69 percent, respectively) also accrued more overall credits from courses in general education settings than students with mental retardation, multiple disabilities, or autism. In addition, students with traumatic brain injuries (65 percent) earned a significantly larger proportion of their overall credits from general education courses than students with mental retardation or multiple disabilities.

Students with learning disabilities, speech/language impairments, hearing impairments, visual impairments, or other health impairments (77 percent to 86 percent) earned larger proportions of their overall credits from general education courses than students with emotional disturbances (67 percent). Students with speech/language impairments or visual impairments (86 percent and 85 percent, respectively) accrued more overall credits in general education settings than students with learning disabilities or orthopedic impairments (77 percent and 69 percent, respectively). Students with other health impairments (79 percent) earned more overall credits in general education settings than students with orthopedic impairments (69 percent). Finally, students with speech/language impairments (86 percent) earned a larger proportion of overall credits in a general education setting than students with hearing impairments or other health impairments (78 percent and 79 percent, respectively).

The proportion of academic credits accrued in general education settings also differed by disability category. Students with learning disabilities, emotional disturbances, speech/language impairments, hearing impairments, visual impairments, orthopedic impairments, or other health impairments (64 percent to 86 percent) earned larger proportions of their academic credits in general education settings than students with mental retardation, multiple disabilities, or autism (34 percent to 49 percent). In addition, students with traumatic brain injuries (57 percent) earned a larger proportion of their academic credits in general education settings than students with mental retardation (34 percent) or multiple disabilities (38 percent). Students with autism or deaf-blindness (49 percent and 53 percent, respectively) also accrued larger proportions of academic credits in general education settings than students with mental retardation.

Students with speech/language impairments, hearing impairments, visual impairments, or other health impairments (74 percent to 86 percent) averaged larger proportions of academic credits in general education settings than did students with traumatic brain injuries or deaf-blindness (57 percent and 53 percent, respectively).

Students with speech/language impairments (83 percent) or visual impairments (86 percent) earned larger proportions of academic credits in general education settings than did students in several disability categories, including learning disability, emotional disturbance, orthopedic impairment, and other health impairment (66 percent to 74 percent).

[41] Proportion of credits earned in special education settings is the inverse of proportion earned in general education settings. Therefore, the remaining sections of this chapter will focus on describing differences in the proportion of credits earned in general education settings only.

A similar pattern was observed in terms of vocational courses taken in general education settings. Students in several disability categories, including learning disability, emotional disturbance, speech/language impairment, hearing impairment, visual impairment, orthopedic impairment, and other health impairment (79 percent to 93 percent) earned larger proportions of their vocational courses in general education settings than did students with mental retardation, multiple disabilities, or autism (58 percent to 64 percent). The percentage of vocational credits accrued in general education settings by students with traumatic brain injuries (79 percent) was significantly larger than the percentages earned by students with mental retardation or multiple disabilities (58 percent and 64 percent, respectively).

Students with learning disabilities, speech/language impairments, hearing impairments, visual impairments, or other health impairments (87 percent to 93 percent) averaged larger proportions of their vocational credits in general education settings than students with deaf-blindness (63 percent). Students with speech/language impairments (93 percent) or visual impairments (90 percent) earned larger percentages of vocational credits in general education settings than students with emotional disturbances, orthopedic impairments, or traumatic brain injuries (79 percent to 80 percent).

The pattern of by-disability differences in the proportion of nonacademic, nonvocational courses taken in general education settings was similar to patterns for academic and vocational courses taken in general education. Students with learning disabilities, emotional disturbances, speech/language impairments, hearing impairments, visual impairments, or other health impairments (72 percent to 90 percent) earned larger proportions of their nonacademic, nonvocational course credits in general education settings than did students with mental retardation, multiple disabilities, or autism (58 percent to 59 percent).

Students with learning disabilities, speech/language impairments, hearing impairments, visual impairments, or other health impairments (82 percent to 90 percent) averaged larger proportions of their nonacademic, nonvocational credits in general education settings than students with deaf-blindness (64 percent).

Students with speech/language impairments, learning disabilities, or visual impairments (84 percent to 90 percent) earned larger proportions of nonacademic, nonvocational credits in general education settings than students with emotional disturbances, traumatic brain injuries, or orthopedic impairments (67 percent to 72 percent). In addition, students with speech/language impairments averaged a larger percentage of nonacademic, nonvocational credits in general education settings than students with hearing impairments or other health impairments.

Grade-Level Differences in Credits Earned in General and Special Education Settings

The proportion of overall, academic, vocational, and nonacademic, nonvocational credits earned in general education settings as compared with special education settings did not differ significantly across grades 9 through 12[42] (table 23). Students in grades 9 through 12 consistently earned higher proportions of credits in general education than special education

[42] As indicated in footnote 2, only students with complete transcript information for the years they had been in high school were included in the analyses for this chapter, with the exception of the by-grade-level analyses. To benefit from the full range of available transcript information, transcript data for the students not included in the overall analyses were included in the by-grade-level analyses. To be included in the by-grade-level analyses, a transcript needed to be complete for the grade for which it provided information.

settings. For example, the proportion of overall credits that were earned in general education settings ranged from 70 percent to 75 percent for students in grades 9 through 12. In comparison, the proportion of overall accrued credits earned in special education settings ranged from 25 percent to 30 percent.

Table 23. Percentage of credits earned in general and special educations setting by students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded
Average percentage of overall earned credits in:						
General education settings	70.6 (1.19)	70.4 (1.25)	71.6 (1.34)	74.8 (1.40)	53.6 (11.11)	19.9 (7.31)
Special education settings	29.4 (1.19)	29.7 (1.25)	28.4 (1.34)	25.2 (1.40)	46.4 (11.11)	80.1 (7.31)
Average percentage of credits earned by students enrolled in type of courses, by setting:						
Academic courses						
General education setting	65.4 (1.54)	64.1 (1.64)	65.0 (1.72)	69.0 (1.82)	51.0 (13.33)	9.5 (6.35)
Special education setting	34.6 (1.54)	35.9 (1.64)	35.0 (1.72)	31.0 (1.82)	49.0 (13.33)	90.5 (6.35)
Vocational courses						
General education setting	85.3 (1.56)	85.0 (1.62)	82.2 (1.70)	80.6 (1.79)	66.3 (13.92)	11.9 (6.50)
Special education setting	14.7 (1.56)	15.0 (1.62)	17.9 (1.70)	19.4 (1.79)	33.7 (13.92)	88.1 (6.50)
Nonacademic, nonvocational courses						
General education setting	79.3 (1.24)	80.3 (1.31)	79.6 (1.57)	80.8 (1.64)	54.6 (13.44)	23.4 (7.50)
Special education setting	20.7 (1.24)	19.7 (1.31)	20.4 (1.57)	19.2 (1.64)	45.4 (13.44)	76.6 (7.50)

NOTE: Standard errors are in parentheses. Analyses for each grade level include all students with data for that grade level. Percentages are weighted population derived from analyses in which the total sample ranged across variables from approximately 4,300 to 6,000 9th-graders, 4,220 to 6,630 10th-graders, 4,370 to 6,050 11th-graders, 4,230 to 5,400 12th-graders, 70 to 90 13th-graders, and 90 to 120 ungraded students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

In contrast to students in grades 9 through 12, students in ungraded programs accrued a higher proportion of overall credits in special education settings than in regular education settings (80 percent vs. 20 percent), whereas students in an extended 13th grade[43] did not differ significantly in their overall balance of regular and special education settings.

Students in ungraded programs earned smaller proportions of overall credits (20 percent), academic credits (10 percent), vocational credits (12 percent), and nonacademic, nonvocational credits (23 percent) in general education settings than did students in grades 9 through 12 (70 percent to 75 percent of overall credits).

[43] Students who continued their high school programs beyond 12th grade often remained in high school for longer than 1 additional school year; on average, students spent 1.57 school years in extended 13th grade.

Demographic Differences in Credits Earned in General and Special Education Settings

The proportion of academic course credits earned in general education settings and special education settings differed significantly by race/ethnicity. White students with disabilities earned a higher proportion of academic credits in general education settings than African American students with disabilities (70 percent vs. 57 percent; table 24). The proportion of overall credits, vocational credits, and nonacademic, nonvocational credits earned in the two settings did not differ significantly by race/ethnicity.

Table 24. Percentage of credits earned in general and special education settings by students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Average percentage of overall earned credits in:								
General education settings	72.6 (1.44)	71.4 (1.96)	74.7 (1.35)	66.9 (2.86)	69.3 (3.60)	66.6 (2.24)	74.4 (2.23)	77.3 (2.00)
Special education settings	27.5 (1.44)	28.6 (1.96)	25.3 (1.35)	33.1 (2.86)	30.7 (3.60)	33.4 (2.24)	25.6 (2.23)	22.7 (2.00)
Average percentage of credits earned by students enrolled in type of courses, by setting:								
Academic courses								
General education setting	66.0 (1.90)	66.8 (3.79)	69.6 (1.78)	57.2 (3.79)	63.6 (4.47)	58.5 (2.86)	67.8 (2.99)	73.1 (2.58)
Special education setting	34.0 (1.90)	33.2 (2.45)	30.5 (2.19)	42.8 (3.79)	36.5 (4.47)	41.5 (2.86)	32.2 (2.99)	27.0 (2.58)
Vocational courses								
General education setting	85.5 (1.51)	79.2 (2.46)	84.9 (1.51)	79.2 (3.43)	83.5 (4.04)	81.3 (2.65)	86.6 (2.36)	85.4 (2.15)
Special education setting	14.5 (1.51)	20.8 (2.46)	15.1 (1.51)	20.8 (3.43)	16.5 (4.04)	18.7 (2.65)	13.4 (2.36)	14.6 (2.15)
Nonacademic, nonvocational courses								
General education setting	81.3 (1.39)	79.0 (1.92)	81.6 (1.35)	79.1 (2.59)	80.3 (3.58)	78.2 (2.27)	81.6 (2.16)	83.4 (1.90)
Special education setting	18.7 (1.39)	21.0 (1.92)	18.4 (1.35)	20.9 (2.59)	19.7 (3.58)	21.8 (2.27)	18.4 (2.16)	16.6 (1.90)

NOTE: Standard errors are in parentheses. Percentages for each of the three demographic analyses are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,560 to 6,100 students.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Significant differences also were apparent by household income. Students with disabilities from households with the highest income level (more than $50,000) earned a higher proportion of overall credits in general education settings than students with disabilities from households with the lowest income level ($25,000 or less; 77 percent vs. 67 percent). Similarly, students from the highest-income households also earned a higher percentage of academic credits in general education settings than did students from the lowest-income households (73 percent vs. 59 percent). The proportion of vocational credits and nonacademic, nonvocational credits earned in the two settings did not differ significantly by household income.

The proportion of credits earned in general and special education settings did not differ significantly by gender.

Differences in Credits Earned in General and Special Education Settings, by High School Completion Status

The proportion of overall, academic, vocational, and nonacademic, nonvocational credits earned in general education settings as compared with special education settings did not differ significantly by high school completion status (table 25).

Table 25. Percentage of credits earned in general and special education settings by students with disabilities, by high school completion status

	Completers	Non-completers
Average percentage of overall earned credits in:		
General education settings	73.6 (1.28)	67.0 (2.63)
Special education settings	26.4 (1.28)	33.0 (2.63)
Average percentage of credits earned by students enrolled in type of courses, by setting:		
Academic courses		
General education setting	68.1 (1.67)	59.4 (3.41)
Special education setting	31.9 (1.67)	40.6 (3.41)
Vocational courses		
General education setting	83.5 (1.44)	83.6 (3.09)
Special education setting	16.5 (1.44)	16.4 (3.09)
Nonacademic, nonvocational courses		
General education setting	81.0 (1.24)	79.5 (2.68)
Special education setting	19.0 (1.24)	20.5 (2.68)

NOTE: Standard errors are in parentheses. NLTS2 percentages are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,560 to 6,100 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

This chapter has considered the instructional settings of courses that students with disabilities took in typical high schools. Chapter 4 will focus on student performance in their coursework.

4. Grade Performance

Over the course of a school career, higher grade performance (e.g., grade point average and course passing rates) may help shape students' images of themselves as learners, increase their sense of belonging and self-efficacy, nurture academic aspirations, and determine their competence to perform academic tasks (Jones 2008; Kettler, Shiu, and Johnsen 2006). The decision by students with and without disabilities to persist in or leave school is affected by multiple interacting factors, such as family, peers, school, and neighborhood (Rumberger 2004; Wagner 1991). In addition to these factors, students' performance in their academic courses, rather than performance on general measures of achievement such as large-scale assessments, has been identified as the factor more directly related to graduation (Allensworth and Easton 2007; Ekstrom et al. 1986; Gwynne et al. 2009; Wagner et al. 1993; Willford 2009). In particular, research indicates that course failure in the freshman year and inadequate credit accumulation are highly predictive of failing to graduate from high school (Allensworth and Easton 2007). Students who perform well in school acquire the skills necessary to understand their environment and are able to self-regulate, establish goals, and set a course to achieve them (Cleary, Platten, and Nelson 2008). They have the basic skills that are desired by employers and that are the foundation for further education. Many poor school performers, on the other hand, may fail to acquire necessary skills, the lack of which presents serious obstacles to later efforts in the employment and/or postsecondary education arena (Bottoms and Timberlake 2007; Smith 2006).

School performance can be measured in many ways (e.g., standardized test scores, course grades, and receipt of failing grades). However, each measure captures only one aspect of what is a complex, multidimensional concept, and each has its substantive and methodological limitations. Here we examine two aspects of grade performance—grade point average and course failure—that have been associated with a range of school and post–high school outcomes (e.g., Allensworth and Easton 2007; Bottoms and Timberlake 2007; Wagner et al. 1993; Willford 2009). This chapter addresses the following questions for students with disabilities who attended typical high schools:[44]

- What were the grade performance (i.e. grade point averages and course failure) experiences of students with disabilities in secondary schools?
- How did the grade performance (i.e. grade point averages and course failure) of students with disabilities compare with that of their peers in the general population?
- How did grade performance (i.e. grade point averages and course failure) differ by course type and instructional setting?
- How did grade performance (i.e. grade point averages and course failure) differ for students who differed in primary disability category, grade level, and high school completion status?

As noted in chapter 1, NLTS2 intends to describe the experiences of the population of students with disabilities as a whole, including both those who eventually completed their high

[44] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

school programs and those who did not. This chapter begins with an examination of grade point average and course failure by students with disabilities as a whole, and then continues with a focus on students who differed in disability category and grade level. It then distinguishes the experiences of students with disabilities by high school completion status, presenting data separately for those who did and did not complete high school. The text mentions only differences reaching at least the $p < .01$ level of significance.

Overall Grade Point Average and Course Failure

On average, students with disabilities who received grades earned a 2.3 grade point average (GPA) on a 4-point scale (table 26). The grade averages of students with disabilities were lower than the grade averages of the general student population (2.7 GPA).[45]

Table 26. Grade point average and course failure rates of students with disabilities and students in the general population

	Students with disabilities	Students in the general population
Mean GPA in graded courses	2.3 (0.03)	2.7 (0.01)
Percentage of students whose mean GPA was:		
3.35 or higher	6.4 (0.96)	19.9 (0.57)
2.75 to < 3.35	22.0 (1.62)	27.9 (0.51)
2.25 to < 2.75	27.0 (1.73)	26.7 (0.49)
1.75 to < 2.25	21.2 (1.59)	18.8 (0.49)
1.25 to < 1.75	12.7 (1.30)	6.0 (0.30)
Less than 1.25	10.7 (1.20)	0.7 (0.12)
Percentage of students who had failed one or more graded courses	66.4 (1.86)	47.3 (0.41)
Mean number of failed courses of students who had failed a course	6.9 (0.36)	5.9 (0.08)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 3,680 to 6,180 youth with disabilities. General population comparison data are weighted population estimates based on samples that ranged from approximately 6,390 to 14,810 youth in ELS:2002.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009; U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study.

[45] General population estimates are based on calculations made using the restricted use data set from the U.S. Department of Education, National Center for Education Statistics, Education Longitudinal Study of 2002 (ELS:2002), High School Transcript Study. All general population estimates include students who have completed high school, as well as those who have not (i.e., both graduates and dropouts have been included).

GPAs are a good summary of students' general grade performance. However, the mean GPA masks the broad distribution of grades.[46] Approximately 6 percent of students with disabilities had GPAs of 3.35 or higher (mostly As and Bs), and 11 percent had GPAs lower than 1.25 (mostly Ds). Most students' GPAs were between these two ends of the grading spectrum; 22 percent earned GPAs of 2.75 to less than 3.35, 27 percent earned GPAs of 2.25 to less than 2.75, 21 percent earned GPAs of 1.75 to less than 2.25, and 13 percent earned GPAs of 1.25 to less than 1.75.

Differences in grade distribution between students with disabilities and students in the general population were most apparent at the two ends of the grading spectrum. Students in the general population were approximately three times as likely as students with disabilities to earn higher GPAs; 20 percent of students in the general population earned GPAs of 3.35 or above, compared with 6 percent of students with disabilities. In contrast, students with disabilities were more than 10 times as likely as their peers in the general population to earn GPAs below 1.25 (11 percent vs. 1 percent).

Another indicator of grade performance is having failed one or more courses, with a resulting loss of credits needed for graduation. Approximately two-thirds (66 percent) of students with disabilities had failed at least one course during their years in secondary school.[47] Those who had failed a course had failed seven courses, on average. The failure rate of students with disabilities was higher than that of their peers in the general population (66 percent vs. 47 percent), and among those who had failed a course, students with disabilities averaged more failed courses than students in the general population (seven courses vs. six courses).

Grade Performance, by Type of Course

As described in chapter 2, secondary students with disabilities were enrolled in a range of academic, vocational, and nonacademic, nonvocational courses such as performing arts or physical education. Students received lower grades in their academic courses (2.1 GPA, on average) than in their vocational (2.4) or nonacademic, nonvocational (2.6) courses (table 27). In addition, students were almost twice as likely to have failed an academic course as a vocational

[46] A data-driven approach, based on quartiles, was used to select the six GPA categories reported here and in table 26. After the distribution of GPA percentages of students with disabilities was divided into approximate quartiles, the resulting highest and lowest quartiles included a wide range of GPAs, i.e., GPAs of 2.75 or higher for the highest quartile, which represents approximate grades of B- to A+ and GPAs of 1.75 or lower for the lowest category, which represents approximate grades of C- to F. To help better distinguish grade performance within these two broad categories, the GPA spread in the highest and lowest quartiles then were divided approximately in half. For example, in the highest GPA quartile of 2.75 to 4.0, there is a 1.25 GPA-point-range between the two ends of the GPA spectrum. This 1.25 GPA range then was divided approximately in half (.6 and .65 points), resulting in the two highest GPA categories included in this report, i.e., 2.75 to less than 3.35 (.60 range) and 3.35 or higher (.65 range). A similar process was used to create the two lowest GPA categories.

[47] The analyses included in this chapter are based only on complete transcripts, with the exception of the by-grade-level analyses. Transcripts for students who had completed their high school programs typically included 4 or more years of coursework. Transcripts for students who had not completed high school were considered to be complete if transcript information was available for all of the grading periods the students had been in high school prior to leaving. For example, if a student had dropped out of high school after 9th grade, the student's one year of 9th-grade transcript data would be included here. Partial transcripts (e.g., only 9th-grade transcript information was collected for a student who had continued his or her education beyond the 9th grade) were not included in the analyses in this chapter, other than the by-grade-level analyses.

course (58 percent vs. 31 percent). They also were more likely to have failed an academic course than a nonacademic, nonvocational course (37 percent).

Table 27. Grade point average and course failure rates of students with disabilities, by course type

	Academic	Vocational	Nonacademic, nonvocational
Mean GPA in graded courses	2.1 (0.03)	2.4 (0.04)	2.6 (0.04)
Percentage of students who had failed one or more graded courses	57.9 (1.96)	31.1 (1.88)	37.4 (1.91)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Grades received in vocational courses were lower, on average, than those earned in nonacademic, nonvocational courses; however, the course failure rate did not differ significantly between these two types of courses.

Grade Performance, by Instructional Setting

On average, grades earned by students with disabilities in their general education courses were lower than those earned in their special education courses (table 28). Students received a mean GPA of 2.2 in courses taken in general education settings and a mean GPA of 2.5 in those taken in special education settings. This pattern was consistent across types of courses. Students earned lower GPAs, on average, in general education settings than in special education settings in academic (1.9 vs. 2.4), vocational (2.4 vs. 2.8), and nonacademic, nonvocational courses (2.5 vs. 2.7).

Table 28. Grade point average and course failure rates of students with disabilities, by instructional setting and course type

	Overall		Academic courses		Vocational courses		Nonacademic, nonvocational courses	
	General education	Special education	General education	Special education	General education	Special education	General education	Special education
Mean GPA in graded courses	2.2 (0.03)	2.5 (0.05)	1.9 (0.04)	2.4 (0.05)	2.4 (0.04)	2.8 (0.08)	2.5 (0.04)	2.7 (0.06)
Percentage of students who had failed one or more graded courses	65.4 (1.90)	29.7 (2.12)	56.4 (2.10)	29.0 (2.33)	30.5 (1.94)	15.2 (2.5)	36.5 (1.94)	17.9 (2.05)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Students also were more than twice as likely to have failed at least one course in a general education setting as in a special education setting (65 percent vs. 30 percent). Again, this pattern was consistent across course types. More than half (56 percent) of students in general education academic courses had failed at least one course, compared with 29 percent in special education academic courses. Similarly, failure rates in vocational and nonacademic, nonvocational courses were higher in general education settings, compared with special education settings (31 percent vs. 15 percent and 37 percent vs. 18 percent, respectively).

Disability Differences in Grade Performance

The mean GPAs in graded coursework varied across disability categories, ranging from 2.0 for students with emotional disturbances to 3.0 for students with autism (table 29). Students with autism, deaf-blindness, multiple disabilities, or mental retardation averaged higher GPAs than students in several other disability categories. It is important to note that differences in grade performance are confounded by several other variables, including instructional setting and course type. For example, as described earlier in this chapter, students received higher grades, on average, in special education courses than in general education courses. These confounding variables are distributed differently across disability categories. For example, students in the four disability categories that averaged higher GPAs also had earned larger proportions of their overall credits in special education than general education courses. This section explores the broad differences in grade performance between disability categories and does not examine the complex interactions and relationships among subgroups relative to other variables.

Students with autism received higher grades (3.0 GPA, on average) than students in all other disability categories (ranging from 2.0 to 2.9). Students with deaf-blindness, multiple disabilities, or mental retardation earned higher GPAs (2.9, 2.7, and 2.5, respectively) than students with learning disabilities (2.2) or other health impairments (2.2). Students with deaf-blindness or multiple disabilities also earned higher GPAs than students with speech/language impairments (2.4).

Table 29. Grade point average and course failure rates, by disability category

	Learning disability	Speech/ language impair-ment	Mental retar-dation	Emo-tional distur-bance	Hearing impair-ment	Visual impair-ment	Ortho-pedic impair-ment	Other health impair-ment	Autism	Trau-matic brain injury	Multiple disabili-ties	Deaf-blind-ness
Mean GPA in graded courses	2.2 (0.04)	2.4 (0.05)	2.5 (0.06)	2.0 (0.06)	2.6 (0.07)	2.7 (0.09)	2.7 (0.06)	2.2 (0.06)	3.0 (0.07)	2.5 (0.09)	2.7 (0.08)	2.9 (0.14)
Percentage of students who had failed one or more graded courses	69.1 (2.69)	62.7 (2.96)	50.8 (3.25)	77.1 (3.02)	47.2 (4.29)	43.4 (5.72)	50.1 (3.83)	70.3 (3.30)	27.0 (4.22)	55.1 (6.47)	44.3 (4.70)	40.8 (7.85)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Students in several disability categories who had not earned higher proportions of their overall credits in special education settings—those with visual impairments, orthopedic impairments, or hearing impairments—also received higher GPAs (2.7, 2.7, and 2.6, respectively) than students in several other disability categories, including students with learning

disabilities (2.2) or other health impairments (2.2). Students with visual impairments or orthopedic impairments also earned higher GPAs, on average, than students with speech/language impairments (2.4).

Conversely, students with emotional disturbances averaged lower GPAs (2.0) than students in 10 of the 11 other disability categories.

The pattern of variation in course failure across disability categories was similar to the differences described for GPAs. Students with autism, deaf-blindness, multiple disabilities, or mental retardation were less likely to have failed a course (27 percent, 41 percent, 44 percent, and 51 percent, respectively) than were students with learning disabilities (69 percent), speech/language impairments (63 percent), emotional disturbances (77 percent), or other health impairments (70 percent). Students with autism also were less likely to have failed a course than were students with mental retardation (51 percent), hearing impairments (47 percent), orthopedic impairments (50 percent), traumatic brain injuries (55 percent), or multiple disabilities (44 percent).

Students with visual impairments, hearing impairments, or orthopedic impairments were less likely to have received a failing grade (43 percent, 47 percent, and 50 percent, respectively) than were students with learning disabilities (69 percent), speech/language impairments (63 percent), emotional disturbances (77 percent), or other health impairments (70 percent).

Students with emotional disturbances were more likely to have failed a course (77 percent) than were students in all disability categories except other health impairments.

Grade-Level Differences in Grade Performance

Twelfth-grade students with disabilities earned higher GPAs (2.6, on average) than students in grades 9 (2.2), 10 (2.2), and 11 (2.4) (table 30).[48] Grades earned by students in the 11th grade also were higher than those received in grades 9 and 10. Similarly, students in the 12th grade were less likely than students in earlier grades to have failed a course. Twenty-seven percent of 12th-graders had failed a course, compared with 44 percent of 9th-graders, 43 percent of 10th-graders, and 39 percent of 11th-graders. A variety of factors may have contributed to the improved grade performance in the upper grades, including for example, an increase in electives as students completed required courses, or the elimination of poor performers from the student body as students dropped out in 9th or 10th grade.

[48] As indicated in footnote 3, only students with complete transcript information for the years they had been in high school were included in the analyses for this chapter, with the exception of the by-grade-level analyses. To benefit from the full range of available transcript information, transcript data for the students not included in the overall analyses were included in the by-grade-level analyses. To be included in the by-grade-level analyses, a transcript needed to be complete for the grade for which it provided information.

Table 30. Grade point average and course failure rates of students with disabilities, by grade level

	9th grade	10th grade	11th grade	12th grade	Extended 13th grade	Ungraded
Mean GPA in graded courses	2.2 (0.03)	2.2 (0.03)	2.4 (0.04)	2.6 (0.04)	2.6 (0.30)	2.1 (0.46)
Percentage of students who had failed one or more graded courses	43.7 (1.80)	42.5 (1.87)	38.8 (1.96)	26.8 (1.89)	22.4 (11.21)	10.0 (9.93)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

The grade performance of students with disabilities in extended 13th grade[49] did not differ significantly from that of their peers in earlier grades. The average GPA of students in ungraded programs (2.1) also did not differ significantly from those in the various grade levels. However, students in ungraded programs were less likely to have failed a course (10 percent) than were students in grades 9 (44 percent), 10 (43 percent), and 11 (39 percent).

Demographic Differences in Grade Performance

The mean GPAs earned by students with disabilities differed significantly by gender, with female students having earned a higher mean GPA than male students (2.4 vs. 2.2; table 31). There was no significant gender difference in the percentage of students who failed one or more graded courses. Variations in grade performance also were apparent by race/ethnicity differences. White students with disabilities earned a higher mean GPA than did African American students with disabilities (2.4 vs. 2.0). White students also were less likely to have failed one or more graded courses than were African American students (62 percent vs. 80 percent). The grade performance of Hispanic students with disabilities did not differ significantly from that of their White or African American peers.

Grade performance also differed by household income. Students from households with the highest income level (more than $50,000 per year) averaged a higher GPA (2.5 vs. 2.1) and had a lower likelihood of having received a failing grade (53 percent vs. 75 percent) than students from households with the lowest income level ($25,000 or less). In addition, students from the highest-income households were less likely to have failed a course than were students from households with annual incomes from $25,001 to $50,000 (53 percent vs. 69 percent).

[49] Students who continued their high school programs beyond 12th grade often remained in high school for longer than 1 additional school year; on average, students spent 1.57 school years in extended 13th grade.

Table 31. Grade point average and course failure rates of students with disabilities, by demographic characteristics

	Gender		Race/ethnicity			Household income		
	Male	Female	White	African American	Hispanic	$25,000 or less	$25,001 to $50,000	More than $50,000
Mean GPA in graded courses	2.2 (0.04)	2.4 (0.05)	2.4 (0.04)	2.0 (0.07)	2.3 (0.10)	2.1 (0.06)	2.3 (0.06)	2.5 (0.06)
Percentage of students who had failed one or more graded courses	68.9 (2.28)	61.2 (3.17)	62.4 (2.35)	80.0 (3.59)	63.7 (5.72)	74.5 (3.11)	69.3 (3.64)	52.9 (3.63)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Differences in Grade Performance, by High School Completion Status

Grades earned by students with disabilities differed significantly by high school completion status. Students who completed high school earned a higher mean GPA than did students who had not completed high school (2.5 vs. 1.5; table 32). Consistent with this difference, completers also were less likely to have failed one or more graded courses than were noncompleters (62 percent vs. 89 percent).

Table 32. Grade point average and course failure rates of students with disabilities, by high school completion status

	Completers	Non-completers
Mean GPA in graded courses	2.5 (0.03)	1.5 (0.07)
Percentage of students who had failed one or more graded courses	62.3 (2.18)	89.4 (2.50)

NOTE: Standard errors are in parentheses. Values are weighted population estimates derived from analyses in which the total sample ranged across variables from approximately 5,760 to 6,180 students.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

This chapter has focused on student's performance in their coursework. It is the final chapter in this report describing the course-taking and grade-performance experiences of students with disabilities.

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Appendix

NLTS2 Sampling, Data Collection, and Analysis Procedures

Appendix. NLTS2 Sampling, Data Collection, and Analysis Procedures

This appendix describes several aspects of the NLTS2 methodology relevant to the data reported here, including

- sampling local education agencies (LEAs) and students;
- data sources and response rates;
- weighting the data;
- estimation and use of standard errors;
- unweighted and weighted sample sizes;
- calculating statistical significance; and
- measurement and reporting issues.

NLTS2 Sample Overview

The full NLTS2 sample was constructed in two stages. A stratified random sample of 3,634 LEAs was selected from the universe of approximately 12,000 LEAs that serve students receiving special education in at least one grade from 7th through 12th grades. These LEAs and 77 state-supported special schools that served primarily students with hearing and vision impairments and multiple disabilities were invited to participate in the study, with the intention of recruiting 497 LEAs and as many special schools as possible from which to select the target sample of about 12,000 students. The target LEA sample was reached; 501 LEAs and 38 special schools agreed to participate and provided rosters of students receiving special education in the designated age range, from which the student sample was selected.

The roster of all students in the NLTS2 age range who were receiving special education from each LEA[50] and special school was stratified by disability category. Students then were selected randomly from each disability category. Sampling fractions were calculated that would produce enough students in each category so that, in the final study year, findings will generalize to most categories individually with an acceptable level of precision, accounting for attrition and for response rates to the parent/youth interview. A total of 11,276 students were selected and eligible to participate in NLTS2.

Details of the LEA and student samples are provided below.

The NLTS2 LEA Sample

Defining the Universe of LEAs

The NLTS2 sample includes only LEAs that have teachers, students, administrators, and operating schools—that is, "operating LEAs." It excludes such units as supervisory unions; Bureau of Indian Affairs schools; public and private agencies (e.g., correctional facilities); LEAs

[50] LEAs were instructed to include on the roster any student for whom they were administratively responsible, even if the student was not educated within the LEA (e.g., attended school sponsored by an education cooperative or was sent by the LEA to a private school). Despite these instructions, some LEAs may have underreported students served outside the LEA.

from U.S. territories; and LEAs with 10 or fewer students in the NLTS2 age range, which would be unlikely to have students with disabilities.

The public school universe data file maintained by Quality Education Data (Quality Education Data 1999) was used to construct the sampling frame because it had more recent information than the alternative list maintained by the National Center for Education Statistics. Correcting for errors and duplications resulted in a master list of 12,435 LEAs that met the selection criteria. These comprised the NLTS2 LEA sampling frame.

Stratification

The NLTS2 LEA sample was stratified to increase the precision of estimates, to ensure that low-frequency types of LEAs (e.g., large urban districts) were adequately represented in the sample, to improve comparisons with the findings of other research, and to make NLTS2 responsive to concerns voiced in policy debate (e.g., differential effects of federal policies in particular regions, LEAs of different sizes). Three stratifying variables were used: region, size (student enrollment), and community wealth. The three variables generate a 64-cell grid into which the universe of LEAs was arrayed.

Region. This variable captures essential political differences, as well as subtle differences in the organization of schools, the economic conditions under which they operate, and the character of public concerns. The regional classification variable selected has been used by the Department of Commerce, the Bureau of Economic Analysis, and the National Assessment of Educational Progress (categories are Northeast, Southeast, Midwest, and West).

Size (student enrollment). LEAs vary considerably in size, the most useful available measure of which is student enrollment. A host of organizational and contextual variables are associated with size that exert considerable potential influence over the operations and effects of special education and related programs. In addition, total enrollment serves as an initial proxy for the number of students receiving special education served by an LEA. The QED database provides enrollment data from which LEAs were sorted into four categories serving approximately equal numbers of students:

- very large (estimated[51] enrollment greater than 14,931 in grades 7 through 12);
- large (estimated enrollment from 4,661 to 14,930 in grades 7 through 12);
- medium (estimated enrollment from 1,622 to 4,660 in grades 7 through 12); and
- small (estimated enrollment from 11 to 1,621 in grades 7 through 12).

[51] Enrollment in grades 7 through 12 was estimated by dividing the total enrollment in all grade levels served by an LEA by the number of grade levels to estimate an enrollment per grade level. This was multiplied by 6 to estimate the enrollment in grades 7 through 12.

Community wealth. As a measure of district wealth, the Orshansky index (the proportion of the student population living below the federal definition of poverty, Employment Policies Institute 2002) is a well-accepted measure. The distribution of Orshansky index scores was organized into four categories of LEA/community wealth, each containing approximately 25 percent of the student population in grades 7 through 12:

- high (0 percent to 13 percent Orshansky);
- medium (14 percent to 24 percent Orshansky);
- low (25 percent to 43 percent Orshansky); and
- very low (more than 43 percent Orshansky).

LEA Sample Size

On the basis of an analysis of LEAs' estimated enrollment across LEA size and estimated sampling fractions for each disability category, 497 LEAs (and as many state-sponsored special schools as would participate) was considered sufficient to generate the student sample. Taking into account the rate at which LEAs were expected to refuse to participate, a sample of 3,635 LEAs was invited to participate, from which 497 participating LEAs might be recruited. A total of 501 LEAs actually provided students for the sample, 101 percent of the target number needed and 14 percent of those invited. Analyses of the region, size, and wealth of the LEA sample, both unweighted and weighted (using sampling weights to project to the universe of LEAs), confirmed that the weighted LEA sample closely resembled the LEA universe with respect to those variables.

In addition to matching the LEA sample to the universe of LEAs on variables used in sampling, it was important to ascertain whether the stratified random sampling approach resulted in skewed distributions on relevant variables not included in the stratification scheme. Several analyses were conducted.

First, three variables from the QED database were chosen to compare the "fit" between the first-stage sample and the population: the LEA's racial/ethnic distribution of students, the proportion who attended college, and the urban/rural status of the LEA. This analysis revealed that the sample of LEAs somewhat underrepresented African American students and college-bound students and overrepresented Hispanic students and LEAs in rural areas. Thus, in addition to accounting for stratification variables, LEA weights were calculated to achieve a distribution on the urbanicity and racial/ethnic distributions of students that matched the universe.

To determine whether the resulting weights, when applied to the participating NLTS2 LEAs, accurately represented the universe of LEAs serving the specified grade levels, data collected from the universe of LEAs by the U.S. Department of Education's Office of Civil Rights (OCR) and additional items from QED were compared for the weighted NLTS2 LEA sample and the universe. Finally, the NLTS2 participating LEAs and a sample of 1,000 LEAs that represented the universe of LEAs were surveyed to assess a variety of policies and practices known to vary among LEAs and to be relevant to secondary-school-age students with disabilities. Analyses of both the extant databases and the LEA survey data confirm that the weighted NLTS2 LEA sample accurately represents the universe of LEAs (Javitz and Wagner 2003).

The NLTS2 Student Sample

Determining the size of the NLTS2 student sample took into account the duration of the study, desired levels of precision, and assumptions regarding attrition and response rates. Analyses determined that approximately three students would need to be sampled for each student who would have a parent/youth interview in Wave 5 of NLTS2 data collection.

The NLTS2 sample design called for findings to be generalizable to students receiving special education as a whole and for the 12 special education disability categories currently in use and reported in this document. Standard errors were to be no more than 3.6 percent, except for the low-incidence categories of traumatic brain injury and deaf-blindness. Thus, by sampling 1,250 students per disability category (with the two exceptions noted), 402 students per category were expected to have a parent or youth interview in year 9 (Wave 5). Assuming a 50 percent sampling efficiency[52] (which is likely to be exceeded for most disability categories), 402 students would achieve a standard error of estimate of slightly less than 3.6 percent. All students with traumatic brain injury or with deaf-blindness in participating LEAs and special schools were selected. Students were disproportionately sampled by age to assure that there would be an adequate number of students who are age 24 or older at the conclusion of the study. Among the eligible students, 40.2 percent are 24 or older as of the final interview.

LEAs and special schools were contacted to obtain their agreement to participate in the study and request rosters of students receiving special education who were 13 to 16 years old on December 1, 2000, and in at least seventh grade.[53] Requests for rosters specified that they contain the names and addresses of students receiving special education under the jurisdiction of the LEA, the disability category of each student, and the students' birthdates or ages. Some LEAs would provide only identification numbers for students, along with the corresponding birthdates and disability categories. When students were sampled in these LEAs, identification numbers of selected students were provided to the LEA, along with materials to mail to their parents/guardians (without revealing their identity).

After estimating the number of students receiving special education in the NLTS2 age range, the appropriate fraction of students in each category was selected randomly from each LEA and special school. In cases in which more than one child in a family was included on a roster, only one was eligible to be selected.[54] LEAs and special schools were notified of the students selected, and contact information for their parents/guardians was requested.

Data Sources and Report Sample

The students with disabilities who are the focus of this report, students in typical high schools,[55] represent a subset of students with disabilities who received special education services

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[52] "50 percent sampling efficiency" means that a simple random sample of half the size as NLTS2 would have the same standard error as obtained in NLTS2 when the complex sampling design is taken into account. Sampling efficiency is the inverse of the DEFT, where DEFT is the square foot of DEFF (the design effect).

[53] Students who were designated as being in ungraded programs also were sampled if they met the age criteria.

[54] As part of the process of selecting the student sample, random numbers were generated and the sample universe file was sorted by these numbers. Sample members were selected beginning at the start of the file until the required number of students had been selected. If two students were selected from the same family, the first student on the list was chosen for the sample (i.e., the one with the smaller random number).

[55] Students who attended non-typical schools (e.g., schools serving only students with disabilities, hospital-based schools, home schools) are not included in these analyses.

in secondary school in 2000–01, not the entire population represented by the full NLTS2 sample. This report does not include students with disabilities who attended schools that served only students with disabilities.

High school transcripts were the primary data source for this report. In addition, information about the primary disability category of NLTS2 sample members came from rosters of students in the NLTS2 age range receiving special education services in the 2000–01 school year under the auspices of participating school districts and state-supported special schools. High school transcripts are described below.

High School Transcripts

Transcript data collection spanned multiple study years. The first request to schools for transcript data was sent in 2002. Between March 2002 and September 2009, eight waves of requests were sent to all NLTS2 schools and district offices attended by NLTS2 participants. Each request mailed to a school or district office contained a letter describing the study and a cover page to be returned with each student's transcript. The cover page requested that the registrar or other school or district staff member indicate the following information, if not already included on the transcript: enrollment or exit status, grade level, instructional setting of each course (special or general education), course content, vocational courses, and absentee information.

Received transcripts which indicated that the student had graduated, completed their high school program, aged out, or dropped out and that included complete transcript information for all of the grading periods the student had been in high school were considered to be complete transcripts and no further requests for that student's information were made. Other transcripts were considered to be partial transcripts and an updated transcript was requested at a later date.

If returned forms indicated that the student had moved to another school, transcript request material was sent to the new school, using school contact information provided by parents and youth during interviews and mail surveys and/or information provided by the prior school. At the close of transcript data collection processing in 2009, requests had been made for 11,270 students' transcripts; 9,500 records with at least partial transcript information were returned (84 percent response rate).

Of the 9,500 students with transcript-related responses, course-taking information was available for approximately 8,200 students. The remaining 1,300 students who did not have course-level data that could be coded included 570 students with non-coursework transcript-related information, such as absentee or school status information, and 870 students who were in programs where they did not receive a transcript.

As indicated earlier, this report focuses on students with disabilities in typical high schools. Of the approximately 8,200 students with course-taking information, approximately 7,500 attended typical high schools that served a range of students.

Transcript Completion Status and By-Grade-Level Analyses

To provide a comprehensive description of course taking and grade performance across a student's time in high school, the analyses included in this report are based only on completed transcripts of students in typical high schools, with one exception: the by-grade-level analyses.

Complete transcripts were available for approximately 6,180 students, 83 percent of the approximately 7,500 students included in this report. The number of course-taking years included on completed transcripts varied. Of the students who are the focus of this report (students in typical high schools who received transcripts), 80 percent of the completed transcripts included 4 years of high school course-taking information, usually in grades 9 through 12. An additional 19 percent left high school before completing their programs (dropped out or were permanently expelled), and their completed transcripts usually included fewer than 4 years of course taking. Finally, less than 1 percent of high school students in typical high schools remained in school beyond the traditional 12th grade (extended 13th grade), resulting in additional years of course-taking information being included on their transcripts.[56]

As presented in tables A-1 and A-2, there were no significant differences between the two groups, when the disability-related and demographic characteristics of the subsample of students with complete transcripts were compared with those of the full sample of students included in this report.

To benefit from the full range of available transcript information, transcript data for the students not included in the overall analyses (the 17 percent of students with partial transcripts) were included in the by-grade-level analyses, if transcript information available for a specific grade level was complete. For example, if only 9th-grade transcript information had been collected for a student who had continued his education beyond the 9th grade, the transcript information would be included in the description of course taking and performance in the 9th grade but would not be included in other sections of the report focusing on the student's overall high school course taking. Partial transcripts represent 11 percent of the transcripts included in the 9th-grade analyses, 10 percent in the 10th-grade analyses, 7 percent in the 11th-grade analyses, 2 percent in the 12th-grade analyses, 7 percent in the extended 13th-grade analyses, and 24 percent in the ungraded analyses.

[56] The Individuals with Disabilities Education Act (IDEA) allows students with disabilities to remain in public school transition programs through age 21 if they have transition needs and have not received a regular high school diploma. The majority of these students with an extended high school program were students with mental retardation (31 percent), emotional disturbances (28 percent), or learning disabilities (21 percent). Students in the categories of other health impairment, autism, and multiple disabilities each accounted for 4 percent of this small group. Three percent of students who stayed in high school beyond 12th grade were students with orthopedic impairments, 1 percent were in each of the categories of hearing impairments, visual impairments, and deaf-blindness, and less than 1 percent were students with traumatic brain injuries. As among students with disabilities as a whole, almost two-thirds (63 percent) were male, and 59 percent were White. Eighty-five percent of students with extended high school programs did complete high school; 15 percent did not.

Table A-1. Disability-related characteristics of students with disabilities included in this report, overall and by complete transcripts

	All Transcripts	Complete Transcripts
	Percent	
Primary disability category		
Learning disability	62.6 (1.73)	64.6 (1.88)
Speech/language impairment	4.0 (0.70)	4.0 (0.77)
Mental retardation	12.2 (1.73)	11.4 (1.25)
Emotional disturbance	11.0 (1.12)	10.7 (1.18)
Hearing impairment	1.1 (0.37)	1.1 (0.41)
Visual impairment	0.4 (0.23)	0.4 (0.26)
Orthopedic impairment	1.2 (0.38)	1.2 (0.41)
Other health impairment	4.6 (0.75)	4.7 (0.79)
Autism	0.7 (0.29)	0.7 (0.31)
Traumatic brain injury	0.3 (0.19)	0.3 (0.20)
Multiple disabilities	1.8 (0.47)	1.7 (0.49)
Deaf-blindness	0.1 (0.11)	0.1 (0.14)
Functional cognitive skills mean scale score	13.8 (0.09)	13.8 (0.10)
Youth's general health was excellent	39.8 (1.77)	41.0 (1.92)
Mean age disability first identified	5.8 (0.13)	5.8 (0..14)
Mean age special education services in school first received	7.4 (0.12)	7.4 (0.13)
N	7,460	6,180

NOTE: Standard errors are in parentheses.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Table A-2 Demographic characteristics of students with disabilities included in this report, overall and by complete transcripts

	All Transcripts	Complete Transcripts
	Percent	
Gender		
Male	68.1 (1.68)	69.0 (1.83)
Female	31.9 (1.68)	31.0 (1.83)
Race/ethnicity		
White	62.6 (1.74)	64.3 (1.89)
African-American	20.0 (1.44)	19.2 (1.56)
Hispanic	14.3 (1.26)	13.3 (1.34)
Household income		
<25,000	37.3 (1.86)	35.9 (2.05)
25,001-50,000	30.3 (1.79)	30.0 (1.96)
50,000+	32.4 (1.83)	34.1 (2.03)
School leaving status		
Completer	77.6 (1.61)	77.7 (1.64)
Noncompleter	22.4 (1.61)	22.3 (1.64)
N	7460	6180

NOTE: Standard errors are in parentheses.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), transcript data collection, 2002 through 2009.

Coding Transcript Data

High school transcripts vary widely in their content and format. To ensure consistency and quality, a coding scheme and guidelines were developed to consistently capture information included on transcripts, such as diploma type, grading periods, course type, grades, absentee information, and placement status. All transcript coders participated in a 2-day training session focused on providing information about NLTS2 and instructions on coding each aspect of a transcript. After transcript coders were familiar with the course coding scheme and guidelines, coders practiced coding transcripts as a group and then individually. Coders' responses on the practice transcripts were compared with the answers developed by an experienced coder. Transcript coders were permitted to begin coding transcripts when their coding error rates were 3 percent or less on the practice transcripts. This transcript coding training process was similar to that used in the Education Longitudinal Study of 2002 (Bozick et al. 2006).

Transcripts received from each state were assigned to a single transcript coder because transcript contents frequently were similar state- and/or district-wide. Transcript coders thoroughly reviewed transcripts and all related materials (e.g., Transcript Cover Sheet and additional notes from schools, such as indicators of special education or vocational courses), before abstracting/coding transcript data. A computer-based data entry system was created to assist with data entry accuracy and efficiency. The following transcript information was coded and entered:

School-level information:

- type of term (e.g., semester, quarter); and
- school name and school ID.

Student-level Information:

- enrollment status;
- attendance;
- attendance year;
- type of diploma or equivalency certification received (e.g., regular, special education; GED); and
- academic school year.

Course-level information:

- course code (course name is pre-entered in data entry system and was automatically entered after a course code was identified and entered);
- credits earned;
- grade level;
- term(s) course offered;
- grade earned; and
- type of grading system (e.g., letter, percentage); and
- course placement (e.g., general, special education, honors).

Each transcript coder was assigned to a supervisor, who was available to answer questions about the appropriateness of the course codes selected, oversee the coding process, and sporadically review and verify the successful completion of transcript coding and provide feedback. Duplicate data entry was conducted on 998 of the 8,200 coded transcripts (12 percent) to help train and monitor the reliability of members of the coding team. The supervisor randomly selected coded transcripts and completed duplicated entry. If the supervisor identified coding discrepancies, the correct code was entered in the computer-based data system and the coder participated in additional training. In addition, transcript coders and supervisors met as a team, at least weekly about coding issues as they were identified, to help to the supervisor would inform the team of transcript coders about issues that arose to ensure coding consistency.

Coding course titles. Course codes were based on the Classification of Secondary School Courses (CSSC) codes used by the U.S. Department of Education, National Center for Education Statistics, High School Transcript Study (2000). In addition, these course codes were expanded with additional course codes used in U.S. Department of Education, National Longitudinal Transition Study (NLTS) (1987) for special education courses not included on the CSSC, for example the CSSC includes a single code for “handicap specific support services,” which

includes speech therapy, mobility training, auditory or visual training, whereas NLTS included codes specific to each of the support services.

Course credits were coded based on Carnegie units. A Carnegie unit is a standard of measurement that represents the completion of a course that meets for one period a day of at least 40 minutes for 1 academic year. The number of credits, in Carnegie units, usually was indicated on the transcript. For courses that did not have Carnegie units assigned, credits were converted to the Carnegie standard unit, based on the scale the school used and on the duration and intensity of the course.

Readers should note that this report focuses on credits earned by secondary students with disabilities. In computing average number of credits earned, courses with zero credits (because of a failing course grade or a non-credit bearing course) were counted as zero credits. For two subsets of courses—the three types of math courses and the nine types of occupationally-specific courses—if a student had earned any credits in the overall math or the overall occupationally specific category and had not taken any credits in a subset type of class (e.g., advanced math or home economics), credits were zero-filled to more accurately reflect the denominator when computing the average number of credits earned in the subset math or occupationally specific course."

Coding grade point average. Schools and school districts varied in the grading schemes used to report student grades on transcripts. To create a consistent, across-school grade point average (GPA), all grades were converted to a 4-point scale (0 to 4.0). Letter and percentage grades were converted to 4-point scales based on categories used by the College Board. For transcripts with letter grades, the following conversion was used: A+ or A = 4.0, A- = 3.7, B+ = 3.3, B= 3.0, B- = 2.7, C+ = 2.3, C = 2.0, C- = 1.7, D+ = 1.3, D = 1.0, and F = 0. Grades reported in percentages were also converted to a 0 to 4 scale, for example, 95 to 100 percent= 4.0, 90 = 3.5, 85 = 3.0, 80 = 2.5, 75 = 2.0, 70 = 1.5, 65 = 1.0, and 0 to 64 = 0 (includes courses receiving 60 to 64 percentage grades and did not have credits associated with the course). Percentage grades of 60 to 64 were coded as 1 if credits were earned for the course.

A weighted grade point was calculated for each graded course by multiplying the awarded grade point by the number of course hours for that course. To calculate the overall weighted grade point average, the sum of all weighted grade points was divided by the sum of all hours in graded courses. To calculate weighted grade point averages in a type of course and/or course placement, the sum of all weighted grade points in that course type and/or placement were divided by the sum of all hours in that course type and/or placement.

Weighting the Transcript Data

The percentages and means reported in the data tables throughout this report are estimates of the true values for the population of students with disabilities in the NLTS2 age range. The response for each sample member is weighted to represent the number of students in his or her disability category in the kind of LEA (i.e., region, size, and wealth) from which he or she was selected.). Responses also are weighted to represent the best estimate of the number of students with disabilities by racial/ethnic category (non-Hispanic White, non-Hispanic Black, non-Hispanic other, and Hispanic).

Table A-3 illustrates the concept of sample weighting and its effect on percentages or means that are calculated for students with disabilities as a group. In this example, 10 students are included in a sample, 1 from each of 10 disability groups, and each has a hypothetical value

regarding whether that youth took a math course (1 for yes, 0 for no). Six students took a math course. Summing the hypothetical values for the 10 students results in an average of 60 percent for the full group. However, this would not accurately represent the national population of students with disabilities because many more students are classified as having a learning disability than as having orthopedic or other health impairments, for example. Therefore, in calculating a population estimate, weights in the example are applied that correspond to the proportion of students in the population who are from each disability category (actual NLTS2 weights account for disability category and several aspects of the districts from which students were chosen). The sample weights for this example appear in column C. Using these weights, the weighted population estimate is 88 percent. The percentages in all NLTS2 tables are similarly weighted population estimates, whereas the sample sizes are the actual numbers of cases on which the weighted estimates are based (similar to the 10 cases in column A in table A-3).

Table A-3. Example of weighted percentage calculation

Disability category	A Number in sample	B Took a math class	C Example weight for category	D Weighted value for category
Total	10	6	10.0	8.8
Learning disability	1	1	5.0	5.0
Speech/language impairment	1	1	1.9	1.9
Mental retardation	1	1	1.0	1.0
Emotional disturbance	1	0	.8	0
Hearing impairment	1	1	.2	.2
Visual impairment	1	1	.1	.1
Orthopedic impairment	1	0	.1	0
Other health impairment	1	1	.6	.6
Autism	1	0	.2	0
Multiple disabilities	1	0	.1	0
	Unweighted sample percentage = 60 percent (Column B total divided by Column A total)		Weighted population estimate = 88 percent (Column D total divided by Column C total)	

The students with course-taking data were weighted to represent the universe of students, using the following methodology:

- Let i=1, 2, 3, …, 64 index the NLTS2 LEA strata. Let N(i) denote the number of LEAs in the i-th strata. Let M(i) denote the prespecified sample size of LEAs or state schools in the i-th strata. Within each stratum, all N(i) LEAs were assigned a uniformly distributed random number and were sorted on the basis of that random number in increasing order. The first M(i) of those LEAs were selected for the sample in the i-th stratum; consequently the LEA sample in each stratum was drawn with equal probabilities and without replacement. Let P(i, j) denote the probability of selection of the j-th LEA within the i-th stratum. Then P(i, j) = M(i) / N(i). The j-th selected LEA in the i-th stratum was assigned an initial weight of W(i, j) = 1/P(i, j) = N(i) / M(i).
- Let Q(i) denote the number of respondent LEAs in the i-th stratum. Let R(i) denote the response rate in the i-th stratum. Then R(i) = Q(i)/M(i). The adjusted weight for the j-th selected LEA in the i-th stratum, denoted W*(i, j), was set to 0 if the j-th selected LEA in the i-th stratum was a non-respondent and to W*(i, j) = W(i, j)/R(i) = N(i)/Q(i) if the

j-th selected LEA was a respondent. Note that all respondent LEAs in the i-th stratum have the same adjusted weight.

- When rosters were obtained from each respondent LEA, they were separated by disability category and student age groups (13 to 15.99, and 16 to 17.99). Samples were independently selected and weighted for each disability and age category, using the same methodology (with the exception of deaf-blind as discussed later). Without loss of generality, therefore, the steps described below are restricted to the selection and weighting of students with learning disabilities in the older age category.
- Let (i, j, k) denote the k-th older students with learning disabilities in the i-th LEA in the j-th LEA stratum. Let Ns(i, j) denote the number of older students with learning disabilities in the (i, j)-th LEA. Let V(i) denote the predetermined sampling fraction for older students with learning disabilities in the i-th stratum. A uniformly generated random number, denoted U(i, j, k) was generated for each older student with learning disabilities in the (i, j)-th LEA roster. The (i, j, k)-th older student with learning disabilities was selected for the study without replacement if U(i, j, k) < V(i). Let Ws(i, j, k) denote the initial weight for the (i, j, k)-th older student with learning disabilities. Then Ws(i, j, k) = W*(i, j) / V(i), where W*(i j) is the weight assigned to the (i,j)-th LEA. Since W*(i, j) is a constant for all LEAs in the i-th stratum, note that Ws(i, j, k) is constant for all older students with learning disabilities in the i-th stratum.
- Let Ms(i, j) be the number of sampled older students with learning disabilities in the (i, j)-th LEA and let Ms(i) be the total number of selected older students with learning disabilities in the i-th stratum. Let Qs(i, j) be the number of responding older students with learning disabilities in the (i, j)-th LEA and let Qs(i) be the total number of responding older LD students in the i-th stratum. Let Rs(i) denote response rate among the older students with learning disabilities in the i-th stratum among selected students. Then Rs(i) = Qs(i) / Ms(i). The adjusted weight for the (i, j, k)-th older student with learning disabilities, denoted Ws*(i, j, k) is defined to be 0 if the student is a non-respondent and Ws*(i, j, k) = Ws(i, j, k) / R(i) otherwise. Note that Ws*(i, j, k) is a constant for all responding older students with learning disabilities in the i-th stratum.
- Data from Department of Education reports, the Common Core, the rosters of the respondent LEAs and the student weights were combined to estimate the following: (1) total number of students in each disability category by age category (for example, the total number of older students with learning disabilities in the universe), (2) the total number of students by disability and race/ethnicity (coded non-hispanic white, non-Hispanic Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska native), and (3) the total number of students by disability and LEA strata. Deming's raking algorithm was used to adjust the Ws*(i, j, k) weights so that the sum of the adjusted weights in these subgroups (for example, older students with learning disabilities in the universe) approximated their known or estimated national totals.
- Analysis of NLTS2 data after the first wave revealed that survey respondents to the later waves differed from the Wave I respondents with respect to the distribution of their household incomes, whether the parents had volunteered at the school, and whether the student had been held back one or more grade levels. The Wave I weights and parental survey responses were used to estimate, by disability and age category, the national number of students in each household income category, each parental volunteering

category, and each student advancement category (i.e., whether the student had ever been held back). To reduce nonresponse bias in these later waves, the Deming raking algorithm was extended to modify weights so that their totals also approximate these estimated national totals. (These additional raking variables also were used in the weighting of the transcript data, although they had less effect on transcript weights than interview weights.)

- Recruitment was attempted with all students with deaf-blindness who appeared on the rosters of the responding LEAs and these students were subject to the same weighting approach as described above (excluding the Deming raking). A few students in the hearing impairment disability category and in the visually impaired disability category with sufficiently severe hearing and vision problems to be classified as deaf-blind were identified. These students were retained in their original disability/age categories for purposes of developing weights for students in those categories, but were classified as deaf-blind for purposes of analysis. The sum of the weights for all students with deaf-blindness (i.e., those originally found in the deaf-blind category and those who were later reclassified as deaf-blind) was equal to 3,196. Due to the small number of students who qualified for the deaf-blind category, SRI and the Department of Education agreed that the weights for all of these students would be set to a constant, such that the sum of those weights was equal to 3,196.

Estimating Standard Errors

Each estimate reported in the data tables is accompanied by a standard error. A standard error acknowledges that any population estimate that is calculated from a sample will only approximate the true value for the population. The true population value will fall within the range demarcated by the estimate, plus or minus 1.96 times the standard error, 95 percent of the time. For example, if the estimate for the average number of earned credits is 22.7 credits, with a standard error of 0.35, one can be 95 percent confident that the true current postsecondary enrollment rate for the population is between 22.0 credits and 23.4 credits.

Because the NLTS2 sample is both stratified and clustered, calculating standard errors by formula is not straightforward. Standard errors for means and proportions can, however, be estimated by using pseudoreplication, a procedure that is widely used by the U.S. Census Bureau and other federal agencies involved in fielding complex surveys. To that end, a set of weights was developed for each of 32 balanced half-replicate subsamples. Each half-replicate involved selecting half of the total set of LEAs that provided contact information, using a partial factorial balanced design (resulting in about half of the LEAs being selected within each stratum) and then weighting that half to represent the entire universe. The half-replicates could be used to estimate the variance of a sample mean by (1) calculating the mean of the variable of interest on the full sample and each half-sample, using the appropriate weights; (2) calculating the squares of the deviations of the half-sample estimate from the full-sample estimate; and (3) adding the squared deviations and dividing by (n-1), where n is the number of half-replicates. Since there were 32 replicates, the variance estimates would have 31 degrees of freedom.

Because the method of using replicate weights is computationally intensive and was not easily implemented in the Statistical Analysis System (SAS) during the first years of NLTS2, we sought a simpler formula-based procedure. We selected a variety of categorical and continuous Wave 1 variables and calculated their standard errors using replicate weights. We compared

those standard error estimates with those obtained using a formula appropriate for an independent and identically distributed sample with unequal weights. (Under the latter assumptions, the effective sample size can be approximated as

$$N_{eff} = N\left(E^2[W] \Big/ E^2[W] + V[W] \right)$$

where N_{eff} is the effective sample size, $E^2[W]$ is the square of the arithmetic average of the weights, and *V[W]* is the variance of the weights. For a variable *X*, the standard error of estimate can typically be approximated by $\sqrt{V[X]/N_{eff}}$, where *V[X]* is the weighted variance of *X*.) As expected, due to the complex sampling design in NLTS2, the use of the formula given above was not fully adequate. However, we found that if we multiplied these formula-based standard errors by 1.25, this yielded estimates that slightly exceeded the variance estimates via pseudo-replication for approximately 90 percent of the categorical and 90 percent of the continuous variables that were examined. Therefore we modified our formula by including a design factor of 1.25, which accounts for the stratified and clustered nature of the sample.

All standard errors in this report were calculated using formula-based estimates rather than estimates based on the replicate weights. Since our formula based estimates tend to be slightly larger than the variances using pseudo-replicates, and the cutoff values for *t*-statistics based on infinite degrees of freedom rather than 31 degrees of freedom are similar, we calculated our p-values based on infinite degrees of freedom.

As a 10-year longitudinal study, NLTS2 has continued to use this formula-based procedure to calculate standard errors rather than use currently available procedures. This decision to maintain consistency in analytical approaches was based on the need to support comparisons of findings across NLTS2 reports. For example, initial placement and course taking information was reported in earlier NLTS2 reports. Changing the analytic approach would call into question the longitudinal look at such variables. To examine possible differences between the approaches, replicate weights were created for chapter 3 of this report. Findings using the replicate weights then were compared with the findings using formula-based estimates. Of the 544 possible comparisons in the chapter, five differences (< 1%) were noted: five differences that were reported at the $p < .01$ level dropped to $p < .05$ and no new significant differences were identified.

Determining Statistical Significance

The following formula was used to determine the statistical significance of the differences between independent groups.

$$F = \frac{(P_1 - P_2)^2}{SE_1^{\,2} + SE_2^{\,2}}$$

For example, this formula could be used to determine whether the difference in the percentages of students who report a particular view among students with learning disabilities and among those with hearing impairments is greater than would be expected to occur by chance. In this formula, P_1 and SE_1 are the first percentage and its standard error and P_2 and SE_2 are the second percentage and its standard error. The squared difference between the two percentages of interest is divided by the sum of the two squared standard errors.

If the product of a calculation is larger than 3.84 (i.e., 1.96^2), the difference is significant at the .05 level—that is, it would occur by chance fewer than 5 times in 100. If the result of the calculation is at least 6.63, the significance level is .01; products of 10.8 or greater are significant at the .001 level (Owen 1962, pp. 12, 51).

A large number of statistical analyses were conducted and are presented in this report. Since no explicit adjustments were made for multiple comparisons, the likelihood of finding at least one statistically significant difference when no difference exists in the population is substantially larger than the type I error for each individual analysis. This may be particularly true when many of the variables on which the groups are being compared are measures of the same or similar constructs, as is the case in this report. To partially compensate for the number of analyses that were conducted, we used a relatively conservative *p* value of .01. The text mentions only differences that reach a level of significance of at least $p < .01$. If no level of significance is reported, the group differences described do not attain the $p < .01$ level. Readers also are cautioned that the meaningfulness of differences reported here cannot be inferred from their statistical significance.

Measurement and Reporting Issues

The chapters in this report provide information on specific variables included in analyses. However, several general points about NLTS2 measures that are used repeatedly in analyses should be clear to readers as they consider the findings reported here.

Categorizing students by primary disability. Information about the nature of students' disabilities came from rosters of all students in the NLTS2 age range receiving special education services in the 2000–01 school year under the auspices of participating LEAs and state-supported special schools. In analyses in this report, each student is assigned to a disability category on the basis of the primary disability designated by the student's school or district. Although there were federal guidelines in the Individuals with Disabilities Education Act Amendments of 1997 related to making category assignments (table A-4), criteria and methods for assigning students to categories vary from state to state and even between districts within states, with the potential for substantial variation in the nature and severity of disabilities included in the categories (see, for example, MacMillan and Siperstein 2002). Therefore, NLTS2 data should not be interpreted as describing students who truly had a particular disability, but rather as describing students who were categorized as having that primary disability.

Table A-4. Definitions of the Individuals with Disabilities Education Act Amendments of 1997 disability categories

Autism. A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because the child has a serious emotional disturbance as defined below.

Deafness. A hearing impairment so severe that the child cannot understand what is being said even with a hearing aid.

Deaf-blindness. A combination of hearing and visual impairments causing such severe communication, developmental, and educational problems that the child cannot be accommodated in either a program specifically for the deaf or a program specifically for the blind.

Emotional disturbance.[1] A condition exhibiting one or more of the following characteristics, displayed over a long period of time and to a marked degree that adversely affects a child's educational performance:

- An inability to learn that cannot be explained by intellectual, sensory, or health factors
- An inability to build or maintain satisfactory interpersonal relationships with peers or teachers
- Inappropriate types of behavior or feelings under normal circumstances
- A general pervasive mood of unhappiness or depression
- A tendency to develop physical symptoms or fears associated with personal or school problems.

This term includes schizophrenia, but does not include students who are socially maladjusted, unless they have a serious emotional disturbance.

Hearing impairment. An impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but that is not included under the definition of deafness as listed above.

Mental retardation. Significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period that adversely affects a child's educational performance.

Multiple disabilities. A combination of impairments (such as mental retardation-blindness, or mental retardation-physical disabilities) that causes such severe educational problems that the child cannot be accommodated in a special education program solely for one of the impairments. The term does not include deaf-blindness.

Orthopedic impairment. A severe orthopedic impairment that adversely affects educational performance. The term includes impairments such as amputation, absence of a limb, cerebral palsy, poliomyelitis, and bone tuberculosis.

Other health impairment. Having limited strength, vitality, or alertness due to chronic or acute health problems such as a heart condition, rheumatic fever, asthma, hemophilia, and leukemia, which adversely affect educational performance.[2]

Specific learning disability. A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. This term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. This term does not include children who have learning problems that are primarily the result of visual, hearing, or motor disabilities; mental retardation; or environmental, cultural or economic disadvantage.

Speech or language impairment. A communication disorder such as stuttering, impaired articulation, language impairment, or a voice impairment that adversely affects a child's educational performance.

See notes at end of table.

Table A-4. Definitions of the Individuals with Disabilities Education Act Amendments of 1997 disability categories—Concluded

Traumatic brain injury. An acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem solving; sensory, perceptual and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma.
Visual impairment, including blindness. An impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

[1] P.L. 105-17, the Individuals with Disabilities Education Act Amendments of 1997, changed "serious emotional disturbance" to "emotional disturbance." The change has no substantive or legal significance. It is intended strictly to eliminate any negative connotation of the term "serious."

[2] OSEP guidelines indicate that "children with ADD, where ADD is a chronic or acute health problem resulting in limited alertness, may be considered disabled under Part B solely on the basis of this disorder under the 'other health impaired' category in situations where special education and related services are needed because of the ADD" (Davila, Williams, and MacDonald 1991).

SOURCE: Definitions taken from Knoblauch and Sorenson (1998).

The exception to reliance on school or district category assignment involves students with deaf-blindness. Because of district variation in assigning students with both hearing and visual impairments to the category of deaf-blindness many students with those dual disabilities are assigned to other primary disability categories, most often hearing impairment, visual impairment, and multiple disabilities. As a result of these classification differences, national estimates suggest that there were 3,196 students with deaf-blindness who were 12 to 17 years old in 1999 (National Technical Assistance Center 1999), whereas the federal child count indicates that 681 were classified with deaf-blindness as their primary disability (Office of Special Education Programs 2001).

To describe the characteristics and experiences of the larger body of students with deaf-blindness more precisely, students who were reported by parents or by schools or school districts[57] as having both a hearing and a visual impairment were assigned to the deaf-blindness category for purposes of NLTS2 reporting, regardless of the primary disability category assigned by the school or school district.

Reporting statistics. Statistics are not reported for groups with fewer than 30 members. Statistics with a decimal of .5 or higher in the tables and figures are rounded to the next whole number when reported in the text.

[57] Some special schools and school districts reported secondary disabilities for students. For example, a student with visual impairment as his or her primary disability category also could have been reported as having a hearing impairment as a secondary disability.

Appendix References

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