

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

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 $F(1, \text{infinity})$ 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 $F(1, \text{infinity})$ 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 $F(1, \text{infinity})$ 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 result 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.

