

4. *The Academic Performance of Elementary and Middle School Students with Disabilities* By Jose Blackorby, Michael Chorost, Nicolle Garza, and Anne-Marie Guzman

Much is expected from our education system in terms of preparing future citizens, workers, and leaders. To that end, schools are expected to influence students' learning, socialization, and even vocational preparedness. This agenda is perhaps even more keenly applied for students with disabilities than for those in the general population. Indeed, SEELS' conceptual framework reflects this comprehensive view of educationally relevant inputs and achievements both in and outside of school.

Although the importance of a broad range of outcomes is recognized, academic performance remains central, as codified in NCLB, which make schools and school districts accountable for assessing and improving student performance annually (Linn, Baker, & Betebenner, 2002). Further, limitations in academic achievement represent the primary implication of disability for most students receiving special education services, and those limitations constrain their ability to be successful in school.

Although the importance of academic achievement is rarely questioned, reaching consensus regarding its measurement has been elusive. The measurement of academic performance, particularly for students with disabilities, continues to be a controversial topic among policymakers, measurement experts, and educators (Ahearn, 2000; Elliott, 1998; Johnson, 2000; Koretz & Hamilton, 1999; McGrew et al., 1995). Measuring academic performance can occur at multiple levels and serve multiple purposes. For example, classroom teachers often conduct formative and summative tests to evaluate students' progress in course content and provide grades for students and parents. State tests are designed to measure progress and to ensure accountability for results at the school or school district level. Other standardized tests are used in decision making processes to determine eligibility for special services. Each of these uses encompasses topics of debate and significant questions related to test design, types of assessments, types of decisions supported by the results, alternative assessments, and accommodations (Heubert & Hauser, 1999; Minnema, Thurlow, Bielinski, & Scott, 2001).

Within the evolving accountability environment, it is crucial to understand the progress of all students, including those with disabilities, and the factors that contribute to their positive academic performance. SEELS is designed to provide a national perspective on how students with disabilities are faring academically. This chapter presents descriptive findings and multivariate analyses of four views of academic performance: teacher-given grades, grade retention, deviations from expected grade-level performance in reading and mathematics, and standardized

test scores in reading and mathematics on the Woodcock Johnson III (WJIII; Woodcock, McGrew, & Mather, 2001).¹

Indicators of Students' Academic Performance

This chapter assesses dimensions of students' academic performance that derive from teacher and school perceptions of the adequacy of that performance—course grades teachers give students and teachers' judgments that students' performance has fallen short enough of expectations that students should repeat a grade level. Measures also include test-based assessments—teachers' reports of previously tested reading and mathematics abilities and students' current reading and mathematics abilities as revealed by direct assessment using standardized tests.

Teachers' Perceptions of Students' Academic Performance

Course grades. Although performance on standardized tests receives the greatest attention in discussions of students' academic performance, teachers' evaluations of performance as indicated in course grades represent a common metric that is tied to the day-to-day business of teaching and learning. Although grades serve a number of important functions, perhaps their most important role is communicating to students and parents information about the students' mastery of course content and, presumably, overall progress on individualized education program (IEP) goals as well.

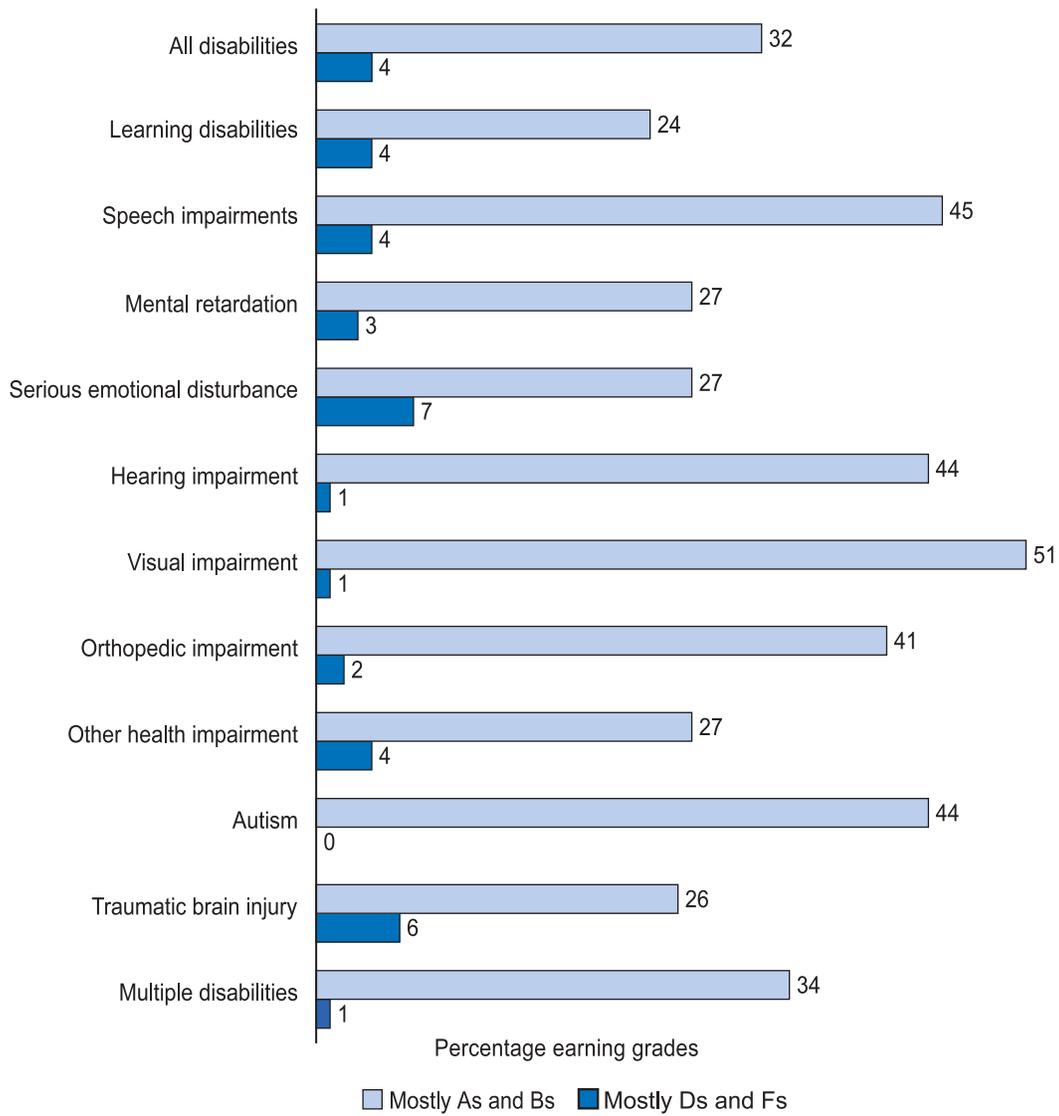
However, as a measure of academic performance, teacher-given grades have well-known limitations. Grade inflation can make comparison of grades across time suspect, variations in grading standards across schools and individual teachers can make it difficult to compare populations meaningfully, and grading standards differ significantly between special education and regular education classes. For example, special education teachers are less likely than general educators to consider homework or attendance to be important in grading student performance, but they are more likely to consider in-class participation to be important (Cameto, Marder, & Guzman, 2003). Finally, some special education students with severe disabilities and low functional skills do not receive grades at all, which skews the picture of student performance by including only higher-functioning students.

Despite these complicating factors, grades do indicate a degree of success both by a teacher's standards and by success relative to other students in the same classroom. They are composite measures that account not only for students' content mastery, but often for other factors, such as their class participation, attitudes, progress over time, and attendance.

¹ Analyses similar to those reported in this chapter were conducted for secondary age students as part of the National Longitudinal Transition Study 2 (NLTS2) and are reported in Blackorby, Chorost, Garza, & Guzman, 2003.

Reports of students’ overall grades would lead most students with disabilities and their parents receiving these results on report cards to conclude that students are making progress (Exhibit 4-1).

Exhibit 4-1
Reports of Students’ Grades, by Disability Category



Source: Wave 1 parent interviews.
Standard errors and sample sizes are in Appendix B.

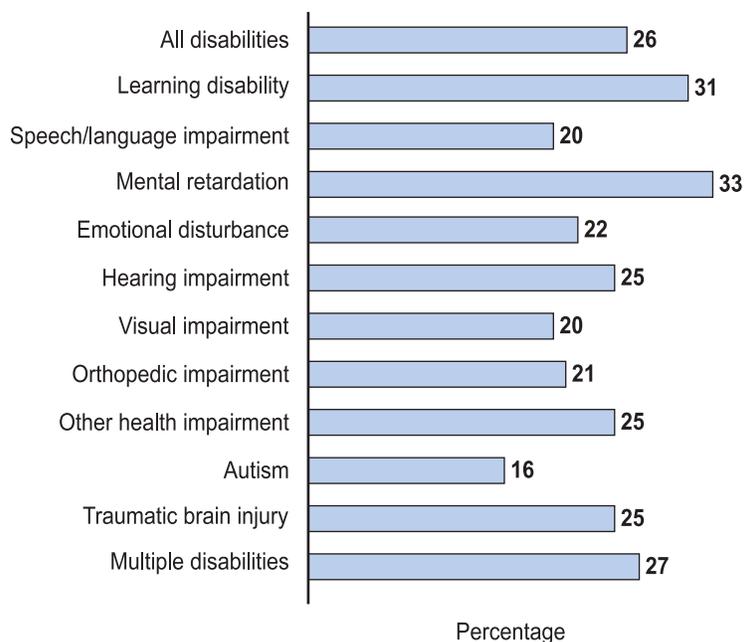
- High grades are common for students with disabilities; one-third receive As or Bs, according to parents' reports.
- At the other end of the grade scale, only 4% are reported to be getting Ds or below.
- This pattern of relatively high grades occurs across disability categories. At least 25% of students in all disability categories receive high grades, including students whose disabilities are cognitive in nature.
- However, receipt of high grades does vary by disability category. For example, 40% or more of students with speech, hearing, visual, or orthopedic impairments or autism receive grades on the high end of the spectrum. In contrast about one-fourth of students with learning disabilities, mental retardation, emotional disturbances, other health impairments, or traumatic brain injuries receive mostly As and Bs.
- Grades are not strongly related to the medical or biological severity of the disability. As many students with mental retardation receive high grades as students with learning disabilities (27% and 24%). Mental retardation is generally considered to present greater challenges to success in academic tasks than learning disabilities. A possible explanation is that students with mental retardation spend a greater portion of their day in special education classes (i.e., 75% vs. 38%) where grading standards often differ from those in general education classes.
- Similarly, students with emotional disturbances get much poorer grades than students with autism (27% vs. 44% receive mostly As and Bs) even though emotional disturbance generally is not associated with cognitive impairment. Autism often entails significant impairments, again leading to greater placement in special education classes and grading by different standards.
- Some students with disabilities may receive good grades on the basis of effort and achievement relative to their potential, rather than for performance according to state standards. Thus, an A given to a child with a significant cognitive disability, for example, would not reflect the same performance as that for the same grade given to a child without a cognitive disability.

Grade Retention

Moving from one grade level to the next is both an academic and a social achievement that most students experience each school year. This promotion is intended to signal that the student has acquired the skills and knowledge consistent with state standards for his or her grade level and is both capable and ready to transition to the next grade. However, some students who have not mastered the skills and knowledge nonetheless are “socially promoted” to the next grade. For decades, the public and policymakers have sought to balance different perspectives on grade retention and social promotion. One view is that promotion from one grade to the next implies that the academic skills and content have been adequately mastered so that the students will be prepared for the

increased demands of the next grade level. If students have not met those criteria, they should repeat the grade so that they have the opportunity to learn the necessary skills. Others argue that mastery of academic skills is important, but part of the educational process involves social development in terms of peer relationships and individual self-concept. When students are retained a grade, they are separated from their age peers and may suffer losses in motivation and self-esteem. Those losses may, in turn, further erode the students' ability to succeed in school. SEELS data show that a sizable number of students with disabilities have been retained at some point in their school careers (Exhibit 4-2).

Exhibit 4-2
Parents' Reports of Students Ever Being Retained, by Disability Category



Source: Wave 1 parent interviews.
Standard errors and sample sizes are in Appendix B.

- Parents of one in four students with disabilities report their children have been retained at some point in their schooling.
- Significant numbers of students in each disability category have been retained at some point in their educational career; however, students with learning disabilities and mental retardation are most likely to have been retained (e.g., approximately twice as likely as students with autism).

Reading and Mathematics Performance

In addition to grades, students both with and without disabilities are assessed in core academic subjects using standardized achievement tests. These tests may be

state accountability tests, high-stakes tests, or tests to determine eligibility for special education (Heubert & Hauser, 1999; Langenfeld, Thurlow, & Scott, 1997). Although they vary in their implementation across states, schools, and test publishers, they all address the core areas of reading and mathematics, and because their results typically can be reported with reference to a population norm, they provide a way to evaluate the academic achievement of students with disabilities in comparison to that of peers without disabilities (Thurlow & Johnson, 2000; Thurlow, Nelson, Teelucksingh, & Ysseldyke, 2000). SEELS has both direct assessment measures of students' reading and mathematics abilities and teachers' reports of the tested grade level equivalent of students' abilities in those areas.

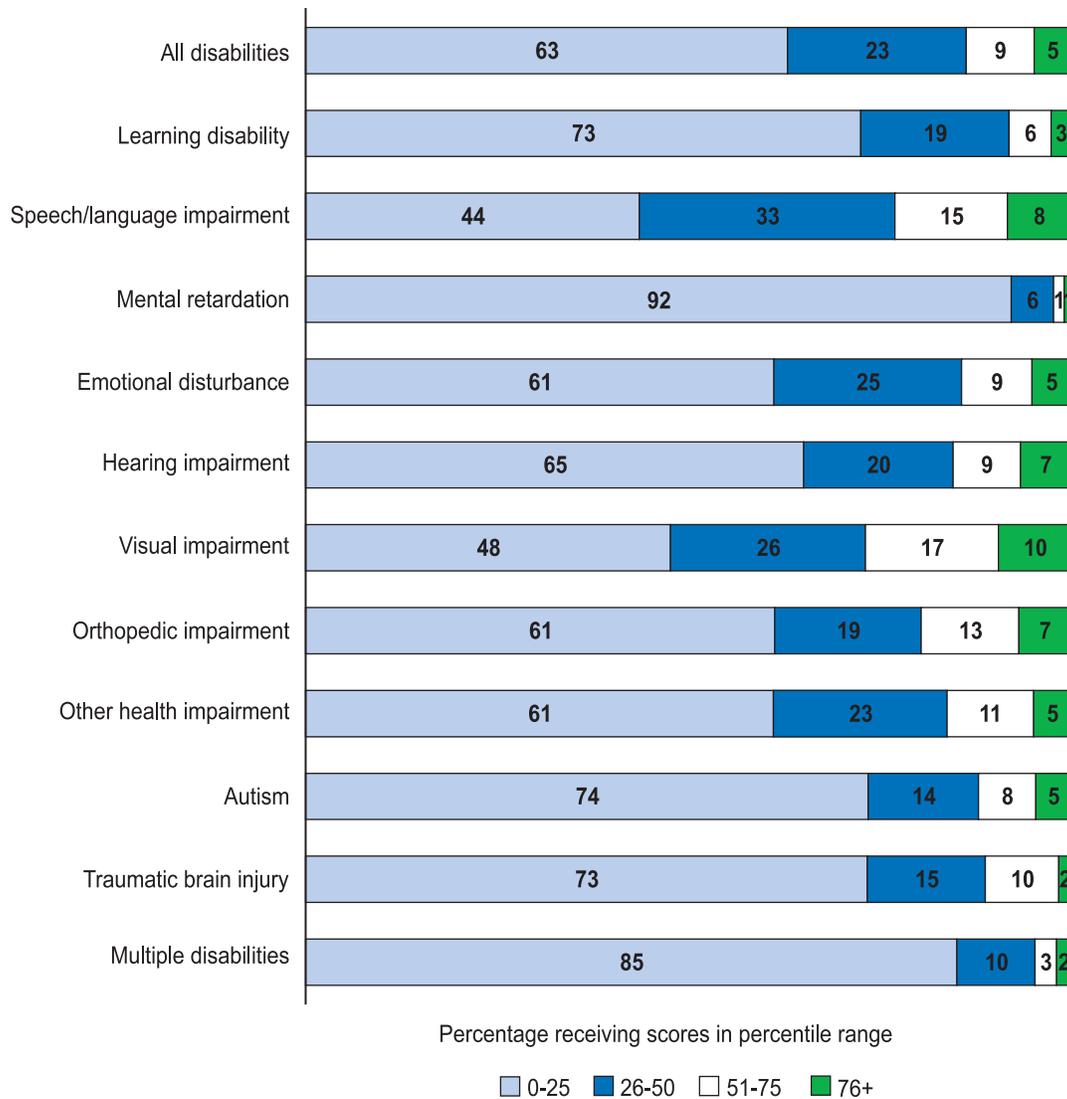
Woodcock Johnson Tests of Achievement

SEELS uses research editions of WJIII to conduct standardized assessments for reading and mathematics (Woodcock, McGrew, & Mather, 2001). WJIII is an individually administered test with excellent technical characteristics that has current norms and that many school districts use to assess students for eligibility for special education.

Passage comprehension. The WJIII passage comprehension test presents students with a series of items using a modified close procedure (i.e., fill in the blank), with the items ordinaly ranked in difficulty. The least difficult items present a sentence in conjunction with a graphic representation, and students must provide the appropriate word to complete the sentence. The more difficult items are entirely text-based, address more technical topics, and require both greater vocabulary and ability to make inferences from context. Students who perform well on this test have well-developed linguistic and cognitive skills, as well as the ability to notice and use textual information.

In contrast to teacher-given grades, which suggest that most students with disabilities are making at least adequate progress, student performance on the WJIII test of passage comprehension (Exhibit 4-3) suggests that most students with disabilities do not fare well compared with peers in the general population, and therefore may not be achieving success to the degree that their high grades might suggest.

Exhibit 4-3
WJIII Passage Comprehension Scores (Percentile),
by Disability Category



Source: Wave 1 direct assessment.
 Standard errors and sample sizes are in Appendix B.

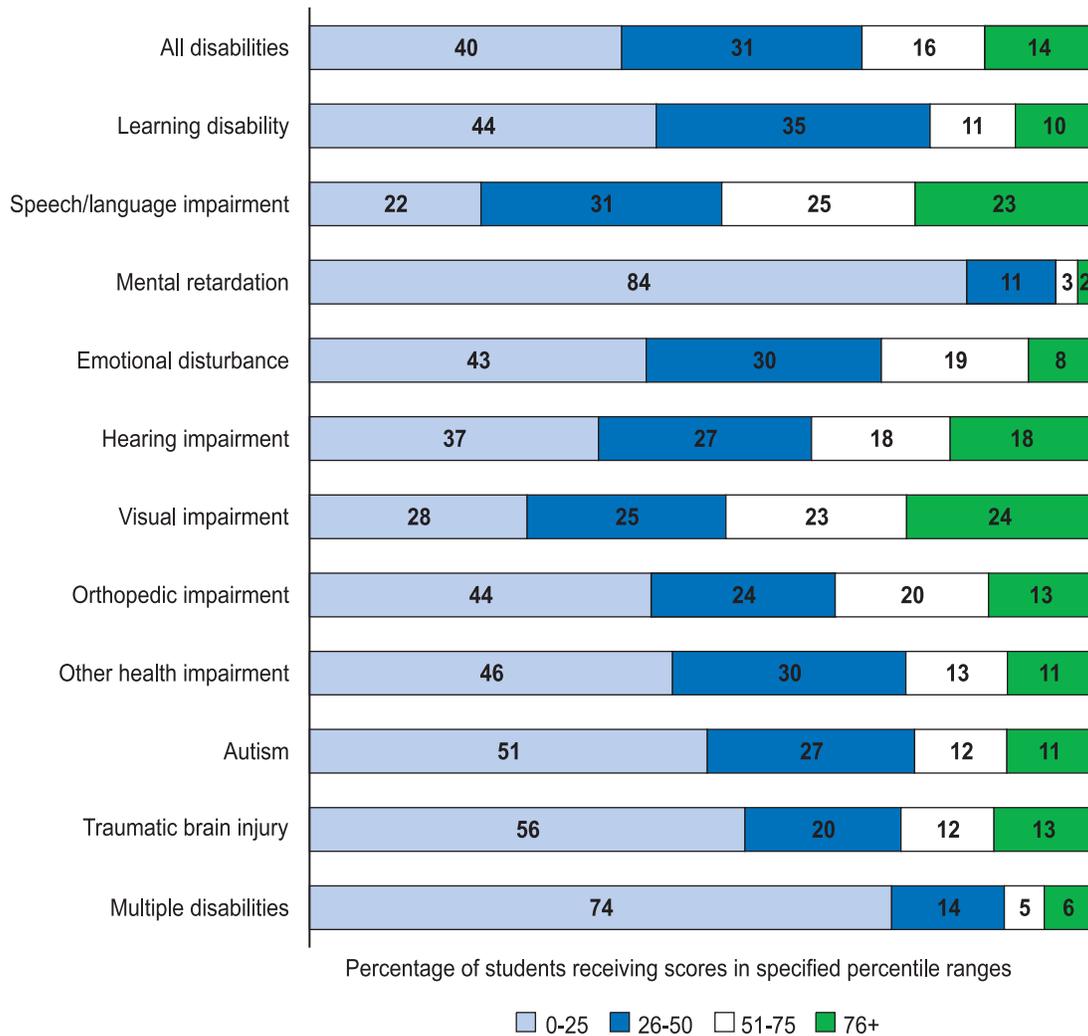
- Although some students with disabilities score above the 50th percentile in passage comprehension, nearly two-thirds of them score below the 25th percentile. This general pattern of the largest group of students in the lowest quartile is evident for students across disability categories. Among the largest group of students receiving special education—students with learning disabilities—3% score above the 75th percentile, whereas 73% score below the 25th percentile.

- In every disability category, some students' performance falls within each of the four quartiles. Students with speech or visual impairments have higher scores than peers in other disability categories and have a distribution of performance most like the general population of students, with 25% of students scoring above the 50th percentile. Students in other disability categories, particularly those associated with cognitive limitations or multiple disabilities, have lower scores than peers in other categories. More than 85% of students with mental retardation or multiple disabilities score in the lowest quartile.
- Students with learning disabilities, serious emotional disturbances, or hearing, orthopedic, or other health impairments have similar scores in passage comprehension and are in the middle of the range of disability categories.

Mathematics calculation. The WJIII calculation subtest measures students' computation skills, ranging in difficulty from elementary (e.g., simple addition) to advanced (e.g., integrating a function). Students are presented with a worksheet that presents the mathematics problems. An important characteristic of these problems is that the employed notation signals the operation (e.g., addition) that is required to produce the correct result. If the student understands the notation, it tests his/her ability to accurately perform the computation. The least difficult items are simple single-digit addition problems, whereas the most difficult ones require knowledge of calculus.

As a group, students with disabilities perform considerably better in mathematics calculation than they do in passage comprehension, and the pattern of results with respect to disability category is similar in the two tests (Exhibit 4-4). However, student performance in calculation still suggests that a considerable gap exists between students with disabilities and their peers in the general population.

Exhibit 4-4
WJIII Mathematics Calculation Scores (Percentile), by Disability Category



Source: Wave 1 direct assessment.
 Standard errors and sample sizes are in Appendix B.

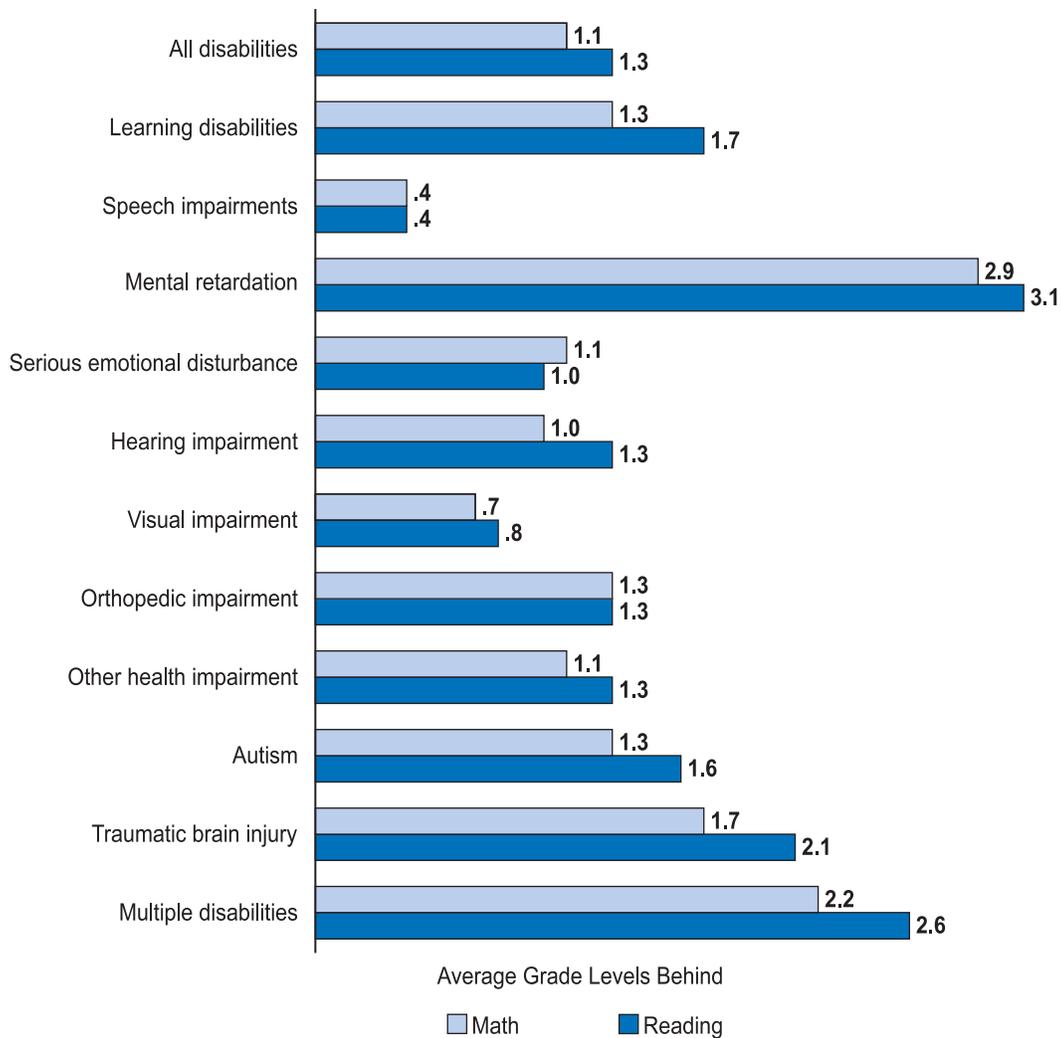
- Overall, 30% of students with disabilities score above the 50th percentile in mathematics calculation, whereas 40% score below the 25th percentile.
- As in the case of passage comprehension, considerable variation occurs across disability categories. Students with speech or visual impairments have higher scores in calculation than peers in other disability categories, with 48% and 47% of such students scoring at or above the 50th percentile, respectively.
- Students with mental retardation or multiple disabilities have the lowest scores in calculation, with about three-fourths of them receiving scores in the lowest quartile.

- Although students in all categories do better in mathematics calculation than passage comprehension, the difference is greatest among students with learning disabilities or speech, hearing, or visual impairments. Students in these categories have scores that average 12 percentile points better in calculation than in comprehension.

Discrepancy between tested and actual grade level. When compared with the expected performance for a particular grade level, test results provide a framework for understanding the match or mismatch between expected performance and students' actual proficiency. SEELS data permit calculation of a measure of the deviation between the actual grade level of students with disabilities and the grade-level equivalent of their tested performance in reading and mathematics. School staff reported students' grade-level equivalent performance in reading and mathematics from their most recent assessment and the year of that assessment. When students' tested grade levels are compared with their actual grade level in that same year, the difference indicates how far ahead or behind their actual grade level students are functioning. A negative number indicates students are behind their grade level (e.g., a fourth-grade student who reads at the second-grade level would have a measure of -2 for reading), whereas a positive number indicates that students function in reading or mathematics ahead of their actual grade level (e.g., a third-grade student whose mathematics ability is equivalent to fourth grade would have a measure of +1 for mathematics). Average deviations then can be calculated for groups of students.

This view of student performance aligns more with WJIII test scores than with grades, in that teachers report that students with disabilities are approximately .9 years behind expected performance for their grade level in reading and .7 years behind in mathematics (Exhibit 4-5). These lags are significant, given the age of students, and are evident for students in all disability categories. Achievement gaps of this size, if not narrowed, may have significant implications for students' abilities to deal with the increasingly complex academic content that they will encounter as they advance in grade level.

Exhibit 4-5
Average Number of Grade Levels Students Are Behind in Reading and Mathematics,
by Disability Category



Source: Wave 1 school program questionnaire.
 Standard errors and sample sizes are in Appendix B.

- With average abilities within a few months of grade level, students with speech or visual impairments perform closer to expected levels in both reading and mathematics than other students with disabilities.
- Unlike the WJIII results, students in most categories have comparably large gaps in performance in reading and in mathematics.
- Students with mental retardation, traumatic brain injuries, or multiple disabilities are reported to perform much further from grade level expectations than other groups, scoring between 1.3 years and 2.5 years behind. Given that most of these students are in seventh grade or below, these differences are quite substantial.

- For students in other disability categories, reported performance is between .7 and 1.3 years behind grade level.

Relationships among Measures of Academic Performance

The relative rankings of disability categories on grades, likelihood of grade-level retention, reading and mathematics levels, and test scores are quite different in several cases. Whereas students with visual or speech impairments have among the highest grades and test scores and are among the least behind in their reading and mathematics abilities, other categories of students with disabilities who have relatively high grades have comparatively low test scores and are quite far behind grade level in reading and mathematics skills. For example, one in four students with mental retardation receive “mostly As and Bs” from their teachers, yet on average, they are 3 years behind grade level in reading and mathematics and have test scores overwhelmingly in the lowest quartile. In contrast, students with emotional disturbances or other health impairments are more likely to receive low grades than peers in many other disability categories but are closer to grade level in reading than any other categories of students with disabilities. Not surprisingly, then, the correlation between grades and other performance measures is nearly zero, whereas the observed correlation between reading and mathematics discrepancies and test scores is .75 ($p < .001$).

These patterns reflect schools’ use of different metrics to measure performance and provide multiple perspectives on the performance of students with disabilities as a whole, as well as students in particular disability categories.

Factors Associated with Academic Performance

Indicators of academic performance—grades, teacher-reported discrepancies between reading and mathematics performance, and test scores from WJIII—were analyzed in relationship to independent variables related to the individual students, their households, and their school programs and experiences (Exhibit 4-6).

Individual Characteristics

Disability characteristics. As the descriptive results suggest, disability category is a significant factor in explaining variation in all of the achievement measures:

- Controlling for other factors, students with hearing or visual impairments, autism, or multiple disabilities all receive better grades than the reference group—their peers with learning disabilities.
- Students with emotional disturbances; hearing, visual, orthopedic, or other health impairments; or autism are closer to grade level in reading than are students with learning disabilities. Further, students with emotional disturbances or visual impairments score 5 to 6 points higher in WJIII

passage comprehension compared with students with learning disabilities, other differences between them held constant.

- Relative to students with learning disabilities, students with hearing impairments are both closer to grade level in mathematics and have higher test scores on the WJIII calculation subtest, other factors held constant.
- Students with mental retardation or multiple disabilities, who are nearly one-half year further from grade level in mathematics than students with learning disabilities, have WJIII calculation test scores more than 7 points lower, controlling for other factors.
- The mathematics performance of students in other disability categories is approximately equal to that of students with learning disabilities.
- Among the measures of academic performance considered here, having ADD/ADHD, independent of other disabilities, relates only to lower grades.
- Independent of the nature of a child's disability category, students whose disabilities are detected at an earlier age are somewhat more likely to receive lower grades, yet they perform somewhat better on the WJIII test of passage comprehension than those whose disabilities were diagnosed when they were older.

Exhibit 4-6
Differences in Measures of Academic Performance Associated with Individual Students' Characteristics

	Estimated Difference In: ^a				Comparison Categories	
	Grades ^b	Number of Grade Levels behind in Reading	Number of Grade Levels behind in Mathematics	WJ3 Passage Comprehension		WJ3 Mathematics Calculation
Disability characteristics						
Students classified with:						
Speech impairment ^c					vs. learning disability ^c	
Mental retardation					vs. learning disability	
Emotional disturbance		.5***		4.8	vs. learning disability	
Hearing impairment	.4	.1	.1		vs. learning disability	
Visual impairment	.5	.8***		5.7***	vs. learning disability	
Orthopedic impairment		.3	-.3***		vs. learning disability	
Other health impairment		.3			vs. learning disability	
Autism	.9***	.5***			vs. learning disability	
Traumatic brain injury					vs. learning disability	
Multiple disabilities	.4		-.4	-6.2	-10.1***	vs. learning disability
Attention deficit /hyperactivity disorder (ADD/ADHD) ^d	-.2				Yes vs. no	
Age at identification	-.2			2.3	8 years vs. 4 years	
Number of problem domains					Three vs. one	
Functioning						
Self-care skills for students with:						
Low cognitive skills				9.3	High vs. low (8 vs. 4)	
Average cognitive skills	-.6	-.7		-7.8	High vs. low (8 vs. 4)	
High cognitive skills		-1.0		-17.7***	-12.3	High vs. low (8 vs. 4)
Cognitive skills for students with:						
Low self-care skills		2.1***	1.3	43.0***	32.8***	High vs. low (16 vs. 4)
Average self-care skills	.5	1.4***	1.3***	20.9***	18.6***	High vs. low (16 vs. 4)
High self-care skills	.5	1.3***	1.3***	15.9***	15.5***	High vs. low (16 vs. 4)
Social skills	.4			-5.4***	-3.4	High vs. low (27 vs. 17)
Persistence	.6***					Very often vs. rarely (3 vs. 1)
Demographics						
Age		-1.2***	-1.2***	-6.8***	-5.8***	12 vs. 9
Gender			.1		2.5***	Male vs. female
Race/ethnicity						
African American			-.2			vs. white
Hispanic						vs. white
Other						vs. white
Primarily uses language other than English at home						Yes vs. no

^aStatistics in this exhibit are calculated from models that include all individual characteristics, as well as household characteristics (results shown in Exhibit 4-7) and school programs and experiences (results shown in Exhibit 4-8). All statistics in the exhibit are statistically significant at at least the p<.05 level; those with asterisks are significant at the p<.001 level.

^bGrades are measured on a 9-point scale, ranging from "mostly As" and "mostly As and Bs" to "mostly Ds and Fs" and "mostly Fs."

^cMultivariate analyses require that, for categorical variables, such as disability category, each category be compared with another specified category. Learning disability was chosen as the category against which to compare the relationships for other disabilities because it is the largest disability category. Similarly, white is the reference group for ethnicity because it is the largest.

^dADD/ADHD is included to determine its relationships as a primary or secondary disability to academic performance, independent of youth's primary disability category.

Exhibit reads: In a school year, the grades of students with autism are .9 point higher on a 9-point scale than the grades of students with learning disabilities, other factors being equal. The mathematics test scores of 12-year-olds are 1.2 years farther behind their grade level than the scores of 9-year-olds, other differences held constant. Other analysts could choose different comparisons (e.g., 11- and 12-year-olds), which would result in a different estimate, but would have no effect on its statistical significance.

Functioning. Beyond the influence of identified disability categories, students’ functioning also influences their ability to succeed academically.

- Students’ self-care skills (e.g., dressing, feeding) and functional cognitive skills (e.g., counting change, looking up addresses) are related to several of the academic performance measures. The difference in achievement between students with low and high self-care scores depends in part on their level of cognitive functioning. For example, among students with high cognitive skills, those who also have high self-care abilities (e.g., students with learning disabilities) have much lower WJIII reading and mathematics test scores—by 18 and 12 points, respectively—than students with equally high cognitive abilities but low self-care skills (e.g., a high-functioning student with cerebral palsy that limits physical functioning). In contrast, among peers with low cognitive skills, having high self-care skills is associated with higher reading scores (9 points).
- Accenting the demand on cognitive function from academic learning activities, students rated with higher functional cognitive skills perform better on most of the academic outcome measures, but the magnitude of the association varies considerably for students at different levels of self-care ability. For example, among students with high self-care skills, having higher cognitive skills is reflected in having grades a half point higher, being more than a year closer to grade level in reading and mathematics, and having scores on the WJIII comprehension and calculation tests 16 points higher than students with high self-care abilities but low cognitive skills. Among students with low self-care skills, the effect of having high cognitive skills is also positive, but much greater, being particularly dramatic for the WJIII test scores. The 40-point higher score estimated for students with low self-care skills who have high cognitive skills relative to those with low cognitive skills is quite large, considering the 15 point standard deviation on the standard score scale of the WJIII tests.
- Controlling for other factors, students rated with high social skills obtain higher grades but have lower test scores in passage comprehension (5 points) and calculation (3 points) compared with peers rated with low social skills.
- Students who are reported to exhibit greater persistence in completing tasks (perhaps including homework) receive higher grades than peers who exhibit less persistence.

Student demographics. Studies have demonstrated a consistent relationship between students’ demographic characteristics and academic success. For example, African-American students in the general population tend to receive lower scores in reading and mathematics than white students without disabilities (National Center for Education Statistics, 2002).

- In these multivariate analyses, age is significantly related to four of five measures of academic performance. Controlling for other factors, older students are more than a year farther behind in both reading and mathematics

and have lower test scores by 7 points for WJIII passage comprehension and 6 points for mathematics calculation than younger students, suggesting that students with disabilities may continue to lose ground relative to their peers as they progress through school.

- Independent of other factors, gender is a factor only in mathematics performance, whereby boys are closer to grade level and have higher test scores in calculation—a pattern also noted in the general population (National Center for Education Statistics, 2002).
- Compared with white students, African-American students with disabilities are further from expected grade level performance in mathematics but are not disadvantaged in the other measures of academic performance. Being Hispanic or of another racial/ethnic group is associated with academic performance that is not different from white students with disabilities, independent of other differences between them.

Household Characteristics

SEELS multivariate analyses show that household income and parental support and expectations are related to several aspects of academic performance (Exhibit 4-7).

- Students from higher-income households show a consistent pattern of higher performance, controlling for disability and other factors. They receive better grades than peers from lower-income households, perform closer to grade level in both reading and mathematics, and score 2 points better on the WJIII passage comprehension test.
- Parental expectations for future education are significantly related to most measures of academic performance. Parental expectations that their children “definitely” will attend postsecondary school are associated with students having higher grades, being closer to grade level in reading and mathematics, and scoring nearly 3 points higher on the WJIII passage comprehension test relative to students whose parents believe they “probably won’t” pursue postsecondary education.

Exhibit 4-7
Differences in Measures of Academic Performance Associated with Household Characteristics

	Estimated Difference In: ^a				Comparison Categories
	Grades ^b	Number of Grade Levels behind in Reading	Number of Grade Levels behind in Mathematics	WJIII Passage Comprehension	
Income	.2	.2***	.1	2.1***	\$55,000 to \$60,000 vs. \$20,000 to \$24,000 (12 vs. 5)
Expectations for postsecondary education	.5***	.2	.2	2.6	Definitely will vs. probably won't (4 vs. 2)
Family involvement at home	-.4***			1.8	High vs. low (8 vs. 5)
Family involvement at school	.2				High vs. low (8 vs. 5)

^aStatistics in this exhibit are calculated from models that include the household characteristics shown in this exhibit, as well as individual characteristics (results shown in Exhibit 4-6) and school programs and experiences (results shown in Exhibit 4-8). All statistics in the exhibit are statistically significant at at least the $p < .05$ level; those with asterisks are significant at the $p < .001$ level.

^bGrades are measured on a 9-point scale, ranging from "mostly As", and "mostly As and Bs" to "mostly Ds and Fs" and "mostly Fs" (see Chapter 1 for further details).

Exhibit reads: In a school year, the grades of youth with household incomes of \$55,000 to \$60,000 are .2 point higher on a 9-point scale than the grades of youth with household incomes of \$20,000 to \$24,000. The passage comprehension scores of youth with high family support at home are 1.8 points higher than the scores of students with low family involvement at home. Other analysts could choose different comparisons (e.g., \$30,000 to \$34,000 and \$40,000 to \$44,000), which would result in a different estimate, but would have no effect on statistical significance.

- Family involvement at school shows relationships with teacher-given grades but not with the other indicators of academic performance. Higher levels of family involvement at school are related to students receiving slightly higher grades, whereas greater involvement at home is associated with lower grades. This difference may result from parents being more likely to help with homework when students are receiving poor grades; help with homework is a key part of the scale of family support at home. Higher levels of family involvement at home also are associated with higher WJIII passage comprehension scores.
- No household factors addressed in SEELS are significantly related to mathematics computation scores.

School Programs and Experiences

The final set of variables included in these multivariate analyses relate to school programs and other school experiences. It is arguably most important to understand the relationships of this set of factors to academic performance because it includes factors that are amenable to change in schools and classrooms and that can have direct effects on students.

- Aspects of students' school programs and experiences are less strongly related to teacher-given grades than to other measures of academic performance.
- Participation in general academic education classes by students with disabilities has increased over the past decades, and it appears that students able to participate to a greater degree in general education have achieved some success. Students with disabilities who spend three-quarters of their class time in general education settings are closer to grade level in both reading and mathematics than peers who spend a quarter of their time there (Exhibit 4-8). Moreover, these same students score nearly 7 points higher on both the WJIII passage comprehension and calculation tests, controlling for other factors.
- SEELS analyses show that students with disabilities in smaller classes receive lower grades but are closer to grade level in both reading and mathematics, independent of other factors in the analyses.
- Students' needs for curriculum modifications are related to several aspects of achievement. Students who are able to participate in an unmodified language arts curriculum are closer to grade level in both reading and mathematics than peers whose needs require substantial curriculum modifications, controlling for other factors. This difference also is reflected in a difference of 5 points on the WJIII passage comprehension test and 2 points on the WJIII calculation test.
- Students who receive accommodations to gain access to instruction and assessment also frequently have lower levels of achievement. Therefore, although the accommodation may raise student performance, it may not raise it to the level of a student who did not need it. This situation would result in analyses showing a negative relationship between receiving accommodations and academic performance, as is found in SEELS analyses. Students who receive instructional or testing accommodations (e.g., more time for assignments or tests, shorter assignments, modified grading standards) have lower grades, perform further from grade level in both reading and mathematics, and have lower test scores on passage comprehension and mathematics calculation than peers who receive (and presumably need) no accommodations.

Exhibit 4-8
Differences in Measures of Academic Performance Related to School Programs and Experiences

	Estimated Difference In: ^a					Comparison Categories
	Grades ^b	Number of Grade Levels behind in Reading	Number of Grade Levels behind in Mathematics	WJIII Passage Comprehension	WJIII Mathematics Calculation	
School Programs						
Percentage of time in general education academic classes		.4***	.4***	7.2***	6.8***	75% vs. 25%
Class size	-2	.2***	.2***			22 students vs. 10
Modifications to curriculum materials		-.7***	-.4***	-5.2***	-2.2	Substantial modification vs. no modification
Number of modifications to tests	-1	-.2***	-.2***	-2.7***	-1.9***	Three vs. none
Number of social adjustment supports provided		.3	.2			Two vs. none
Number of presentation/communication aids provided						Two vs. none
Tutoring						Yes vs. no
Degree of whole class instruction						Frequent (4) vs. rare (1)
Degree of small group instruction						Frequent (4) vs. rare (1)
Degree of individual instruction from teacher			-.3	-5.4		Frequent (4) vs. rare (1)
Participation in:						
General classroom activities		.4	.5***	3.9		Frequent (22) vs. occasionally (10)
Literature-related activities		.4***	.3	10.4***	7.3***	Frequent (12) vs. occasionally (6)
Skills-based activities						Frequent (12) vs. occasional (6)
Education level of language arts teacher						BA with credential vs. BA
Other School Experiences						
Retention at grade level	-.2***	.1	.2***			Yes vs. no
Absenteeism	-.3			2.2		5 days vs. 0 days
School mobility						Three school changes vs. none

^aStatistics in this exhibit are calculated from models that included the characteristics shown in this exhibit, as well as individual characteristics (results shown in Exhibit 4-7), and household characteristics (results shown in Exhibit 4-8). All statistics in the exhibit are statistically significant at at least the $p < .05$ level; those with asterisks are significant at the $p < .001$ level.

^bGrades were measured on a 9-point scale, ranging from “mostly As”, and “mostly As and Bs” to “mostly Ds and Fs” and “mostly Fs.” Exhibit reads: In a school year, the grades of students who spend 75% of their class time in general education classes score 7 points higher on passage comprehension than students who spend 25% of their time in general education classes, other factors being equal. Other analysts could choose different comparisons (e.g., 40% and 60%), which would result in a different estimate, but would have no effect on its statistical significance.

- This principle does not appear to apply equally to all types of accommodations or supports, however. In contrast to findings for instructional and testing accommodations, students receiving presentation or communication accommodations (e.g., help from a reader or interpreter, communication aids) do not demonstrate different academic performance than nonrecipients, other factors being equal.
- Students who need and receive supports for social adjustment are closer to expected grade level performance in reading and mathematics than peers who do not, controlling for other factors.
- Classroom grouping approaches illustrate a similar pattern to that of accommodations. The frequency of whole-class and small-group instruction is unrelated to any of the academic outcome measures. However, students who require and receive frequent individual instruction from a teacher perform further from grade level in mathematics and have lower WJIII passage comprehension scores (5 points) than students who rarely have such help.
- Compared with students who occasionally participate in general class activities, students with disabilities with higher levels of participation in general class activities (e.g., answering questions, participating in class discussions), as well as literature-oriented activities (e.g., literature, poetry, writing), have higher grade level performance in reading and mathematics and higher WJIII passage comprehension (4 points and 10 points, respectively). In the case of literature-oriented activities, frequent participation also is associated with higher test scores for mathematics calculation (7 points).
- Neither receiving tutoring nor having programs that frequently focus on skill-building activities (e.g., phonics, vocabulary) are associated with the five academic outcome measures.

Other School Experiences

- Relationships exist between a variety of current and past experiences of students with disabilities and their academic performance. For example, students who have been retained at grade level at some point during their school career have lower grades but perform closer to grade level in reading and mathematics than peers who had not, controlling for other factors.
- When students miss class, they are assumed also to miss the opportunity to access new curriculum content, ask questions, or generally participate in class activities, and those missed opportunities adversely affect learning. SEELS multivariate models only partially support this perspective, however. Higher levels of absenteeism are related to lower grades but also to higher test scores in passage comprehension, other differences between students held constant.

- Changing schools frequently, for reasons other than changing grade levels, appears to have little relationship to student outcomes at this age level.

How Much is Explained?

The amount of variation in grade-level discrepancies and WJ test scores (r^2) explained by the factors discussed above increases substantially as each set of factors is considered. Disability and functioning alone account for 39% of variation in grade-level discrepancies in reading, 43% in grade-level discrepancies in mathematics, 37% of variation in WJIII passage comprehension, and 33% of WJIII calculation. When all factors are combined, the amount of variation explained increases to 54%, 55%, 53%, and 43%, respectively. In contrast, the fit for models predicting student grades is approximately 17% and does not substantially improve with the addition of independent variables beyond those related to disability and functioning.

Summary

Student academic performance is at the forefront of efforts to reform education now more than ever before, and the move to improve that performance specifically includes students with disabilities. The national look at academic performance of elementary and middle school students with disabilities that SEELS is enabling suggests that different indicators of performance present divergent perspectives on the progress that some students are making. When using the grades that teachers assign to students, most students with disabilities receive passing or even exemplary grades that would indicate successful accomplishment of curriculum goals. However, significant numbers of students in all disability categories have been retained at grade level at some point in their school careers and function significantly below grade level in reading and mathematics, thus raising the question of their ability to learn increasingly challenging course work. Standardized test scores in reading and mathematics illustrate considerable diversity in performance, but also show that many students with disabilities score in the lowest quartile can improve considerably. Interestingly, the correlation between grades and the other measures of academic functioning is nearly zero, indicating that teachers consider factors other than actual academic ability in grading. The correlation between the two test-based measures—WJIII scores and tests and grade-level discrepancies—is high.

Individual, household, and school program factors all contribute significantly to explaining variation in students' academic performance, with the amount of variation explained in multivariate analyses increasing substantially with the addition of each set of factors. Although individual and household characteristics all bear on how students fare academically, choices made at the school level regarding programs, services, and supports also are related to student performance. What schools do can make a difference in the academic performance of students with disabilities.

Although students' primary disability categories and the severity of their disabilities play important roles in analyses across indicators, different disabilities relate to outcomes differently. Controlling for other factors, students with sensory impairments receive higher grades, are closer to grade level in reading, and have better test scores than their peers with learning disabilities. In contrast, students with emotional disturbances are closer to grade level in reading, have significantly higher scores in passage comprehension, but do not differ from those with learning disabilities in grades received. Students with mental retardation or multiple disabilities face persistent challenges, with comparatively low scores in passage comprehension and calculation, and they are further from grade level in those subjects, even though they have higher grades than peers with learning disabilities. Moreover, students with higher cognitive skills exhibit a pattern of better performance in grades, grade level discrepancies, and standardized test scores than peers who have lower functional cognitive skills—a pattern that is particularly pronounced among those who have low self-care skills. Many students with low self-care skills but high cognitive skills perform well on achievement tests.

Demographic and family background factors are significantly related to academics as well. Students with disabilities from low-income families score significantly below higher-income peers on most measures of academic performance. SEELS multivariate analyses also show that the involvement and expectations of parents are related to some, but not all, academic outcomes that students achieve. Students with disabilities whose parents expect them to attend postsecondary school receive significantly higher grades, are closer to grade level in reading and mathematics, and have higher standardized test scores than their peers whose parents do not hold those expectations. Similarly, students whose families are involved in school activities have better grades.

School program factors, too, are associated with variations in student performance. For example, controlling for other factors, students who spend more of their class time in general education settings perform closer to grade level and have higher achievement test scores than peers who spend less time there. In addition, receiving social supports is positively related to being closer to grade level. However, students who require and receive accommodations in testing are further behind grade level and have lower test scores in reading and mathematics than peers who do not require or receive the accommodations, other factors held constant. Finally, active participation in class activities generally and in activities related to literature in particular are associated with being closer to grade level and having higher test scores in reading and mathematics. This suggests that choices regarding placements, groupings, and supports sometimes relate to performance but that the effectiveness of specific supports requires longitudinal analysis of the growth in academics experienced by students, rather than analyses that compare the performance of those who receive supports at a given time with the performance of others without need of such services. Future SEELS analyses will to address these issues.