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A NATIONAL PROFILE OF STUDENTS WITH AUTISM:

A Special Topic Report from the Special Education Elementary Longitudinal Study

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A National Profile of Students with Autism

What is Autism?[1]

Autism is a complex biological, neurological, developmental disorder that lasts throughout a person's life (Ralabate, 2006). A 2001 report by the National Research Council defines autism as,

> a disorder that is present from birth or very early in development that affects essential human behaviors such as social interaction, the ability to communicate ideas and feelings, imagination, and the establishment of relationships with others. (Lord & McGee, 2001, p. 11)

Autism is part of a broader category known as "autism spectrum disorders" (ASD) and is placed under the diagnostic umbrella category of pervasive developmental disorders (PDD), which includes Asperger syndrome, and PDD not otherwise specified. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IVTR) identifies five deficit areas that are considered as diagnostic criteria for autism: communication, socialization and social skills, sensory integration, behaviors, and restricted interests (American Psychiatric Association, 2000).

The Individuals with Disabilities Education Act (IDEA), as reauthorized in 2004, defines autism as,

> a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three. Other characteristics often associated with autism are engagement in repetitive activities and stereotypical movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences [IDEA 2004 sec300 (8) (c) (1, i)].

The average age of autism diagnosis is 3 years, although behavioral symptoms may be observed much earlier (National Institute of Child Health and Human Development [NICHD], 2005). According to the U.S. Department of Education (2005), more than 220,000 students nationwide diagnosed with autism received special education services under IDEA in the 2005-06 school year. Of these, about 30,000 were ages 3 to 5, about 110,000 were elementary school students; about 72,000 were middle and high school students; and almost 11,000 were students ages 18 through 21 (U.S. Department of Education, 2005). The number of individuals diagnosed with autism is growing rapidly, resulting in greater attention to early diagnosis, accurate reporting, and developing treatments and educational interventions, including school-wide positive behavior supports and tertiary behavior models.

[1] References to "autism" in this report include students diagnosed with ASD conditions, such as Asperger Syndrome and PDD.

About this Report

This special topic report provides a national picture of children and early adolescents ages 8 through 15 identified as having autism and receiving special education services. The report highlights the characteristics, academic performance and progress, and social adjustment during the elementary and middle school years for students with autism. To further our understanding of this population, this report implements a comparative framework for placing the findings in the context of students identified as having other types of disabilities.[2] First, because some students with autism have academic or learning characteristics that are similar to those of students with learning disabilities, we have included students in the latter category as one point of comparison. Second, some students with autism exhibit communication problems similar to those for students with speech and/or language impairments,[3] or cognitive and social impairments similar to those that characterize students with mental retardation. Thus, we present comparisons for students with autism and students in those two disability groups as well. Finally, students with autism are a heterogeneous group and differ from one another in several domains. As reported by the NICHD (1998), the communication problems of students with autism vary, depending on the intellectual and social development of the individual. Therefore, in this report we provide comparisons for students with autism at three levels of communication skills.

Data in this report come from the Special Education Elementary Longitudinal Study (SEELS), funded by the Office of Special Education Programs of the U.S. Department of Education. The study's nationally representative sample consisted of more than 11,000 students with disabilities who were ages 6 through 12 in 2000 when the study began. SEELS has collected longitudinal information from parents, teachers, and students on a range of student characteristics, experiences, services, and outcomes, and provides a comprehensive database of nationally representative information on students with disabilities as a whole, and for each of the 12 federally defined disability categories, including autism.[4]

SEELS has collected data in three waves (2000-01, 2002, and 2004), allowing for longitudinal analysis. The majority of results presented in this report are from the Wave 3 (2004), when students were ages 10 through 17. However, in several

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[2] The designation "other disabilities" includes students in all federal primary disability categories (i.e., learning disabilities, speech/language impairments, mental retardation, serious emotional disturbance, hearing impairments, visual impairments, orthopedic impairments, other health impairments, traumatic brain injury, multiple disabilities and deaf-blindness) and excludes autism.

[3] The disability category is referred to as speech/language impairment in this report.

[4] Data come from the SEELS parent interview, language arts teacher questionnaire, school program questionnaire, and student direct assessment. Appendix A indicates the sample size of students about whom valid information is provided for each exhibit. This report presents statistically significant data for students with autism who differ from students with other disabilities, across time from Wave 1 to Wave 3, or who differ by communication skill level within the autism disability category. Further information about SEELS, and SEELS data are available at www.seels.net.

instances, relevant differences have been observed between Waves 1 (2000-01) and 3 (2004), and those differences are noted.[5] This report addresses the following questions:

- What are the demographic and functional characteristics of students with autism?
- What types of educational programming and supports are provided to students with autism?
- What social and academic outcomes do students with autism achieve?
- How do students with autism differ from students with other disabilities, including those with learning disabilities, speech/language impairments, or mental retardation?
- How do students with autism change over time in regard to functioning, school programs, and academic and social outcomes?
- How do students with autism differ from each other in regard to variations in levels of communication skills?

Demographic Characteristics

In the general population, autism can be found in both genders; in all ethnic, racial, and age groups; and in all income brackets; however, it is most prevalent among white males from high-income households. SEELS data confirm these patterns among school-age children with disabilities (Exhibit 1).

Exhibit 1
Demographic Profiles of Students with Autism and Students with Other Disabilities

	Autism	All other disabilities	Learning disabilities	Speech/ language impairments	Mental retardation
Percent:					
Male	82	67	68	65	55
White	68	67	67	70	55
African-American	15	16	14	12	32
Percent who live in:					
A household with income $25,000 or less	20	32	33	26	48
A household with income greater than $50,000	56	41	39	49	23
A two-parent household	78	71	70	77	61
Poverty	14	22	20	18	39

Source: SEELS Wave 3 parent interview.
Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

[5] Differences described in this report represent statistically significant comparisons at at least the $p < .05$ level.

- Students with autism are more likely to be male and live in a household with an income level exceeding $50,000, compared with students with all other disabilities (82% and 56% vs. 67% and 41%, respectively); and are less likely to live in poverty (14% vs. 22%).
- Students with autism are more likely to be male (82%) than peers with learning disabilities (68%), speech/language impairments (65%), or mental retardation (55%), and are less likely to be African-American (15%) than students with mental retardation (32%).
- School-age students with autism are more likely than their peers with learning disabilities or mental retardation to live in households with an income greater than $50,000 (56% vs. 39% and 23%, respectively), and to live in two-parent households (78% vs. 70% and 61%, respectively).
- It follows that considerably smaller proportions of students with autism are living in poverty (14%), compared with their peers with mental retardation (39%).
- The demographic profile of students with autism is consistent over time, with one exception: the percentage of students with autism from households with incomes greater than $50,000 increased 10 percentage points.

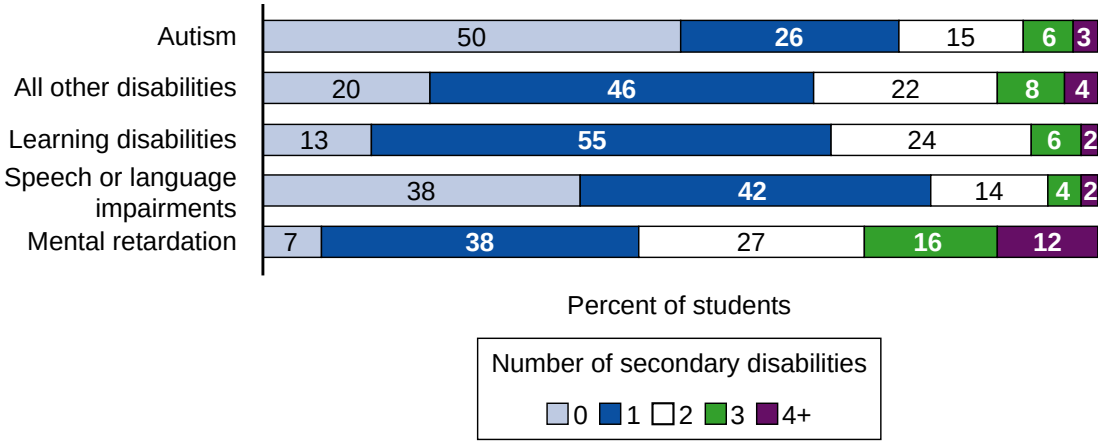
Secondary Disabilities

Disability is multifaceted and affects children in varied and sometimes wide-reaching ways. Autism comprises a complicated set of characteristics and accompanying set of needs that challenge children in a variety of domains. In addition to the deficit areas used as diagnostic criteria (communication and language, social interaction skills, restricted interests, repetitive behavior), children with autism may exhibit varying degrees and combinations of difficulties in integrating sensory information, regulating emotions, processing auditory information, generalizing skills, sequencing information, and transitioning between different activities (National Education Association [NEA], 2006). To address this issue, SEELS has collected information from parents related to students' secondary disabilities (Exhibit 2).[6]

- According to parents, half of the students with autism have a secondary disability in addition to autism, with about one-fourth reported to have one additional disability and the other quarter reported to have two or more.

[6] Of the list of secondary disabilities, those most often mentioned by parents of students with autism are: attention deficit/hyperactivity disorder (ADHD) and attention deficit disorder (ADD), emotional disturbances/behavior disorders, other health impairments, and speech and language impairments.

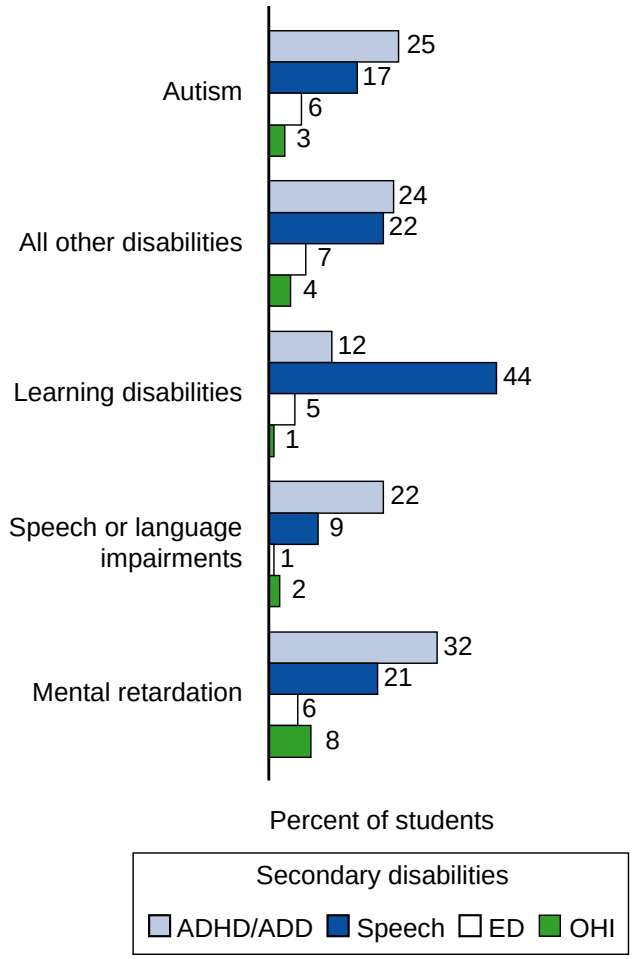
Exhibit 2
Number of Secondary Disabilities among Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 parent interview.
Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

- Parents' reports of secondary disabilities indicate that students with autism are much less likely to have secondary disabilities than students with other disabilities. Half of students with autism have no additional disabilities, compared with 20% of students with other disabilities. This difference results from the lower percentages of students with autism who have 1 or 2 disabilities (26% and 15%), relative to percentages among students with other disabilities (45% and 22%).
- Differences are especially apparent when comparing students with autism and students with learning disabilities or mental retardation. Only 13% of students in the former category and 7% of students in the latter category are reported to have no secondary disabilities, compared with 50% of their peers with autism.
- In contrast, more than one-half of students with learning disabilities and about two-fifths of students with speech/language impairments are reported as having a single secondary disability.
- Students with autism are about half as likely as students with mental retardation to be reported as having two secondary disabilities (15% vs. 27%); for three or more secondary disabilities, they are about one-third as likely (9% vs. 28%).
- The most common secondary disabilities reported by parents for their children with autism are attention deficit or attention deficit/hyperactivity disorder (ADHD/ADD, 25%), speech/language impairments (17%), emotional disturbances (6%), and other health impairments (3%) (Exhibit 3).
- Children with autism are about twice as likely as their peers with learning disabilities to have ADD/ADHD reported as a secondary disability.

Exhibit 3
Types of Secondary Disabilities among Students with Autism and Students with Other Disabilities

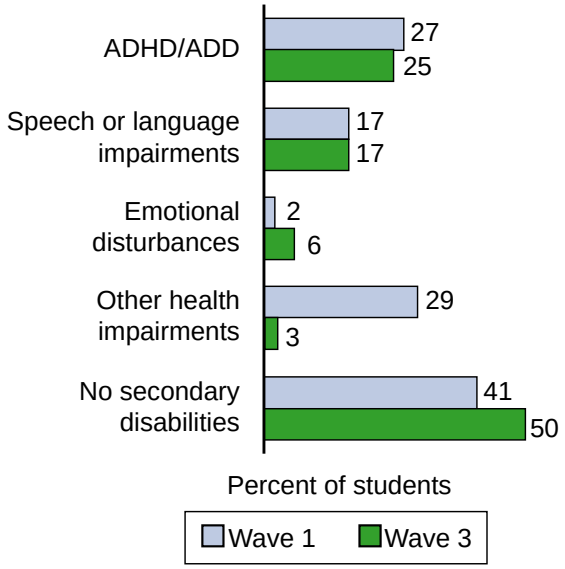


Source: SEELS Wave 3 parent interview.

Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

- The percentage of students with autism reported to have no secondary disabilities beyond autism increased by 9 percentage points between 2000 and 2004 (Exhibit 4).
- Students with autism reported to have other health impairments as a secondary disability decreased 26 percentage points, whereas reports of emotional disturbance as a secondary disability increased 4 percentage points.

Exhibit 4
Types of Secondary Disabilities in Waves 1 and 3
Among Students with Autism



Sources: SEELS Wave 1 and Wave 3 parent interviews.

Student Functioning

Students need a wide range of skills and abilities to be successful in school, the workplace, and the community. Children with autism may exhibit a wide range of functional and emotional deficits, as well as impairments associated with secondary disabilities, that can interfere with four core skill sets necessary for success: cognition, self-care, socialization, and communication. To measure these skills, SEELS asked parents to rate their children on a variety of functional tasks related to each of these skill sets; a rating of "low," "medium," or "high" was calculated from each of these scales.

Functional Cognitive Skills

Parents were asked to rate students with autism on a 4-point scale[7] concerning their ability to independently complete a number of functional tasks, including telling time on a clock with hands, reading and understanding common signs (e.g., "stop," "men," "women," "danger"), and counting change without help, and looking up telephone numbers and using the phone. (Exhibit 5).

- Almost one-third of students with autism (31%) are rated as having low functional cognitive skills, which represents a rate five times that of their peers with all other disabilities (6%). Likewise, about one-fifth of students with autism (18%) are rated as having high functional cognitive skills, compared with more than half of students with all other disabilities (55%).

[7] Possible responses were "very well" (4), "pretty well" (3), "not very well" (2), and "not at all well."

Exhibit 5
Parental Ratings of Skills of Students with Autism and Students with Other Disabilities

	Autism	All other disabilities	Learning disabilities	Speech/ language impairments	Mental retardation
Percent of students with ratings in the following areas:					
Cognitive skills					
Low	31	6	2	2	29
Medium	50	39	43	28	52
High	18	55	55	70	19
Self-care skills					
Low	5	2	†	†	7
Medium	51	18	14	15	30
High	44	80	86	85	63
Social skills					
Low	60	27	25	20	45
Medium	36	60	63	64	50
High	4	12	12	16	5
Overall communication skills					
Low	16	1	†	†	4
Medium	55	17	12	14	61
High	29	82	88	86	53

Source: SEELS Wave 3 parent interview.

† Indicates less than 1% of students.

Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

- The approximately one-fifth of students with autism who receive cognitive ratings in the high range is a considerably smaller proportion than among students with speech/language impairments (70%) or learning disabilities (55%).
- The cognitive skills ratings of students with autism closely resemble those of students with mental retardation.

Self-care Skills

A person’s ability to care for him- or herself is integral to independent living, and some persons with disabilities have difficulties with these tasks even as adults. SEELS measures self-care ability by combining parents’ reports of their children’s ability to dress and to feed themselves independently (Exhibit 5).

- Students with autism receive low and medium ratings on self-care abilities more frequently than other students with disabilities. Fifty-six percent of students with autism are reported to have low or medium self-care skills, compared with 20% for peers with all other disabilities.
- Low or medium self-care ratings among students with autism (56%) are more common than among those with mental retardation (37%).
- Some students with autism do receive high self-care ratings (44%). However, the ratings are well below those of their peers with all other disabilities (80%) and those in each of the three comparison conditions (63% to 86%).

Social Skills

Difficulties in social interactions are part of the diagnostic framework for autism. These problems extend to all realms of social functioning, including processing and understanding social information, as well as following social norms. Social skills are part of this domain of functioning; those skills are measured in SEELS using items selected from the Social Skills Rating System (Gresham & Elliott, 1990), which cover the domains of cooperation, empathy, assertion, self-control, and responsibility. Parent social skill ratings are presented in Exhibit 5.

- More than half of students with autism (60%) have low social skills, according to parents. About one-third receive ratings in the medium range (36%), and very few are considered to have high social skills (4%).
- Such low social skill ratings place students with autism well below students in other disability categories. Students with autism are more than twice as likely to be reported to have low social skills scores than are students with all other disabilities as a group (27%), students with learning disabilities (25%), and students with speech/language impairments (20%).
- Although 45% of students with mental retardation also receive low social skill ratings, the 15 percentage-point difference from their peers with autism is considerable. However, these two groups of students are equally unlikely to receive high social skills ratings (4% for autism and 5% for mental retardation).

Communication Skills

Effective social functioning requires the ability to communicate effectively with family members, peers, and teachers. Communication also is an area that is specifically identified in the diagnostic framework for autism. To provide a measure of communication skills, SEELS parents rated their child's ability to "speak clearly," "carry on a conversation," and "understand what people say" (Exhibit 5).

- Larger proportions of students with autism have low communication skills, according to parents (16%) than do students with all other disabilities (1%), learning disabilities or speech/language impairments (less than 1% each), or mental retardation (4%).

- These differences extend across the communication scale. For example, more than half of students with autism receive medium communication skills ratings, compared with just 17% of peers with all other disabilities.
- Although medium ratings for communication also are received by the majority of students with mental retardation (61%), those students are more likely to receive high communication ratings (53%) than are students with autism (29%).
- Large majorities of students with all other disabilities (82%), and particularly students with learning disabilities (88%), receive high ratings for communication in considerably larger proportions than do their peers with autism (29%).
- Students with autism tend to improve across time in regard to three of the four skill sets. The percentages of students with autism who receive skills rating in the high range increased 9 percentage points for cognitive skills, 11 percentage points for self-care skills, and 8 percentage points for communication from 2000 to 2004. The functional tasks included in the cognitive and self-care domains for students with autism may be responsive to the maturation or learning that occurs over time (e.g., in regard to counting change, understanding signs, feeding or dressing oneself).
- In contrast, students with autism continue to receive low ratings in their social functioning.

Academic Profiles, Settings, and Supports

Students with disabilities attending public schools are required to have an Individualized Education Plan (IEP) that dictates, among other things, where and how a student will receive instruction. Because autism is a spectrum disorder and because academic, communication, and social skills vary widely from student to student with autism, identifying an appropriate school program for these students may be challenging. Below we present findings related to school enrollment, instructional settings and groupings, time spent in general education settings, accommodations and supports, and educational goals.

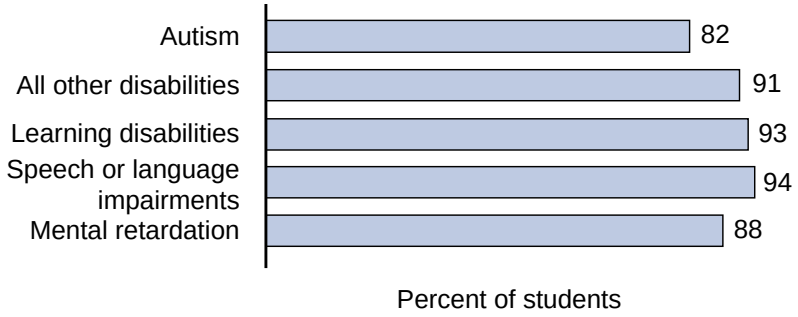
School Type

Most students, with and without disabilities, attend a regular school.[8] Although this observation applies to students with autism, it does so to a lesser degree (Exhibit 6).

- Fewer students with autism attend regular schools (82%) than do students in each of the other comparison groups (88% to 94%).
- The percentage of students with autism attending regular schools decreased 7 percentage points over a 4-year period.

[8] A “regular school” is a public or private school attended by children with and without disabilities; in contrast , a “special school” is attended primarily by students with a specific disability, such as hearing or visual impairments, cognitive impairments, or severe emotional disturbances.

Exhibit 6
Regular School Attendance of Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 parent interview.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

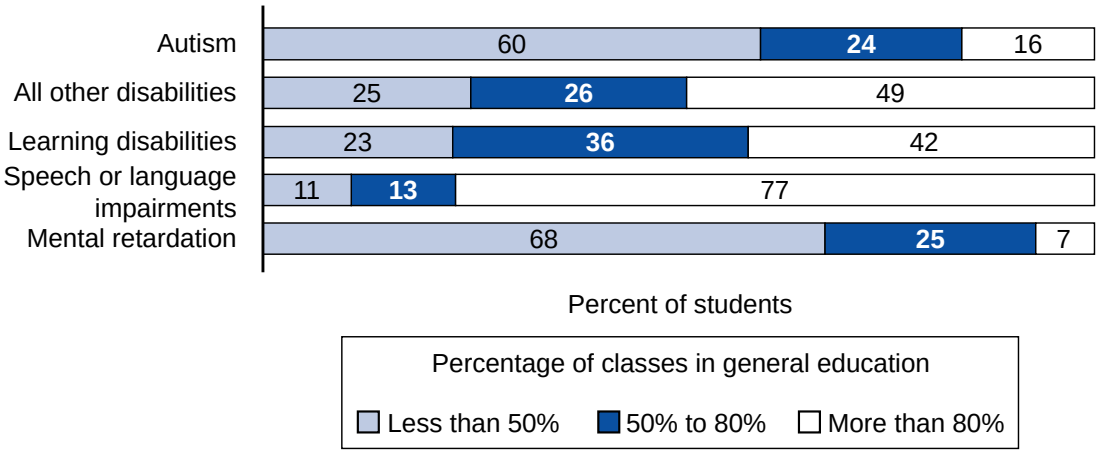
Percentage of Time in General Education Settings

Although the large majority of students with autism attend regular schools, they do not receive instruction in general education classrooms[9] or participate in general instructional activities to the same degree as their peers with other disabilities (Exhibit 7).

- About 60% of students with autism spend less than half of their school day in general education classrooms. In contrast, 25% of students with all other disabilities are in general education classes for less than half of their school day, as are 23% of students with learning disabilities and 11% of students with speech/language impairments.
- Conversely, almost half of students with all other disabilities (49%) spend 80% or more of their school day in general education classrooms, compared with only 16% of students with autism.
- The pattern of general education participation among students with autism is most similar to that of students with mental retardation.

[9] Alternatively, students are taught in self-contained classrooms where most or all of the students have a disability, or in resource rooms, which often serve as pull-out programs for special education students.

Exhibit 7
General Education Participation of Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 school program questionnaire.

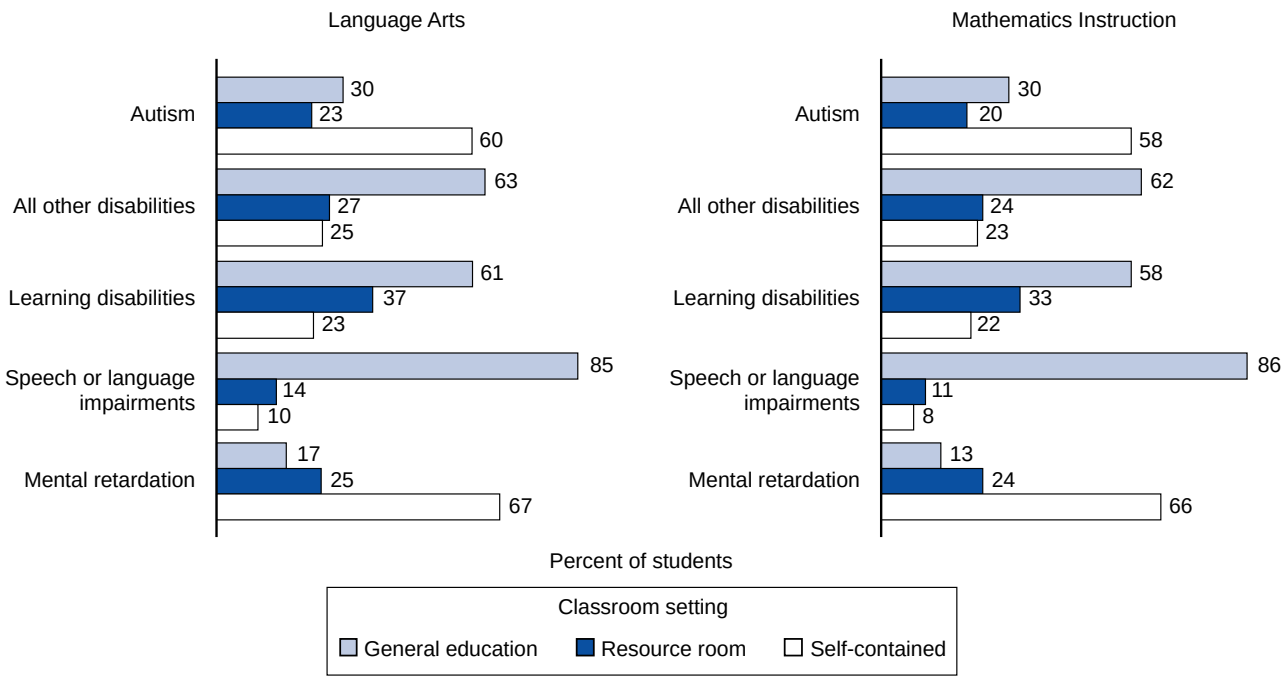
Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

Instructional Settings for Language Arts and Mathematics

Language arts and mathematics instruction are provided for students with disabilities in a range of educational settings, most commonly in general education classrooms. Students with autism, however, are more likely to receive instruction in self-contained special education classrooms than are other groups of students (Exhibit 8).

- Students with autism are about half as likely as students with all other disabilities to receive language arts and mathematics instruction in general education classrooms (30% vs. about 63%).
- Likewise, roughly 60% of students with autism receive language arts or mathematics instruction in self-contained special education settings, compared with about one-quarter of their peers with all other disabilities.

Exhibit 8
Receipt of Language Arts and Mathematics Instruction of Students with Autism and Students with Other Disabilities, by Setting



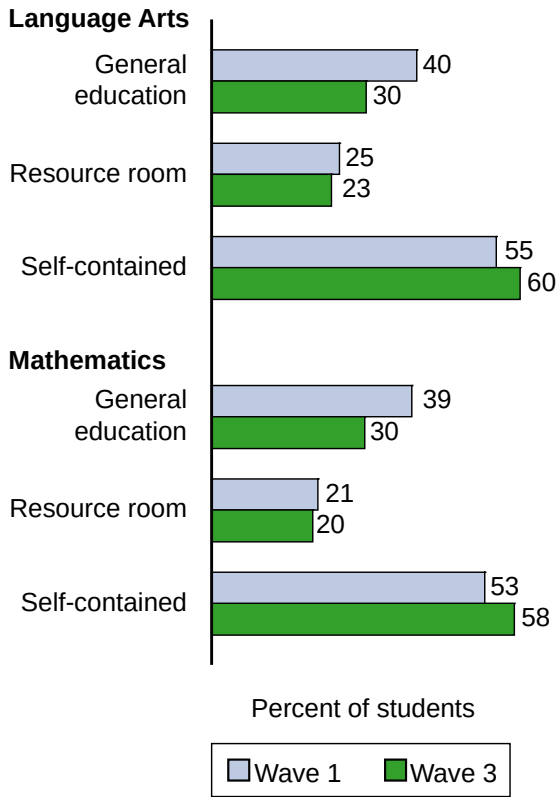
Source: SEELS Wave 3 school program questionnaire.

Note: Percentages may total more than 100% because students may receive instruction in multiple settings.

Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

- For both language arts and mathematics, the profile of instructional settings for students with autism most closely parallels that of peers with mental retardation for which self-contained classrooms are the instructional settings for about two-thirds of students. Although variation is found across all groups, students with learning disabilities or speech/language impairments exhibit the opposite pattern, receiving most of their instruction in general education settings.
- The percent of students with autism receiving language arts instruction in general education settings decreased 10 percentage points from 2001 to 2004 (Exhibit 9).

Exhibit 9
Language Arts and Mathematics Instructional Settings for Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 school program questionnaires.

Note: Percentages may total more than 100% because students may receive instruction in multiple settings.

Instructional Groupings

Most students, regardless of disability and setting, receive a combination of whole-class, small-group, and individualized instruction. However, the relative mix of instructional groupings may vary to accommodate the needs of individual students. In both general and special education settings, students with autism commonly receive instruction from individuals other than their primary classroom teacher—usually another teacher or instructional aide (Exhibit 10).

General education settings

- In general education classrooms, students with autism are less likely to receive whole-class instruction often than are students with speech/language impairments (65% vs. 81%).
- Students with autism in general education settings are more likely often to receive individual instruction from an adult who is not the classroom teacher (31%) than are students with all other disabilities (18%), with learning disabilities (14%), or with speech/language impairments (7%).

Exhibit 10
Instructional Groupings for Students with Autism and Students with Other Disabilities

	Autism	All other disabilities	Learning disabilities	Speech or language impairments	Mental retardation
Percent often receiving instruction in specified grouping in:					
General education settings					
Whole class	65	76	74	81	65
Small group	33	26	28	26	40
Individual, from the teacher	28	24	26	18	36
Individual, from another adult	31	18	14	7	32
Special education settings					
Whole class	38	59	64	62	51
Small group	50	51	46	58	55
Individual, from the teacher	56	42	32	30	53
Individual, from another adult	50	25	17	27	33

Source: SEELS Wave 3 teacher questionnaire.

Note: Percentages may total more than 100% because students may receive multiple types of instruction.

Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

Special education settings

- Students with autism in special education settings are less likely to receive frequent whole-class instruction (38%) and more likely to receive individual instruction from the teacher (56%) or from another adult (50%) than their peers with all other disabilities (59%, 42%, and 25%, respectively).
- Students with autism in special education settings are less likely to receive frequent whole-class instruction (38%) than are students with learning disabilities (64%), speech/language impairments (62%), or mental retardation (51%).
- Likewise, frequent individual instruction from the teacher is more common in special education classrooms for students with autism (56%) than for their peers with learning disabilities (32%) or speech/language impairments (30%).
- Further, students with autism are more likely to receive individual instruction from an adult other than the teacher (50%) than are students with learning disabilities (17%), speech/language impairments (27%), or mental retardation (33%).

- The percentage of students with autism receiving individual instruction from the teacher decreased 15 percentage points and 14 percentage points in general and special education settings, respectively, from 2001 to 2004.

Accommodations and Learning Supports

The success that students with disabilities achieve in school can be influenced by access to a range of services that support their education goals. As part of its mandate, IDEA 2004 requires the provision of related services and supports to students with disabilities who are deemed to need them to benefit from the free appropriate public education that IDEA guarantees. Accommodations made to the presentation, format, and content of instruction; materials; and assessments are intended to help students with disabilities perform at their true ability levels. These accommodations are increasingly a part of the educational programs of all students with disabilities, including those with autism. Students with autism tend to do best in a learning environment that focuses on systematic and individualized teaching practices (Dunlap & Fox, 1999), with supports and instruction that concentrate on communication, behavior, and social adjustment. Because autism affects skill areas other than academics, a variety of accommodations are commonly used. The types of accommodations for students with autism vary with instructional setting and also differ from those that their peers with other disabilities receive (Exhibit 11).

- Students with autism are more likely to be given extra time to complete tests in general education than in special education settings (89% vs. 53%).
- Conversely, students with autism in special education classrooms, compared with their peers with autism in general education classrooms, are far more likely to be given alternate assessments (59% vs. 26%) and to receive support from teachers' aide (75% vs. 51%).
- Students with autism are more likely to use a computer for activities not permitted to their classmates with all other disabilities in general education settings (30% vs. 14%) and in special education settings (19% vs. 12%).
- Students with autism in general education settings are more likely than their peers with learning disabilities or speech/language impairments to receive more time to take tests, take modified or alternate tests, receive the support of teachers' aides, or use computers for activities not allowed other students in the class.
- Students with autism in special education settings are more likely than their peers with learning disabilities, speech/language impairments, or mental retardation to take alternate assessments, receive the support of teacher aides, or use computers for activities not allowed others; they are less likely than their peers in these three disability categories to receive more time to take tests.

Exhibit 11
Classroom Accommodations and Supports for Students with Autism and Students with Other Disabilities, by Classroom Setting

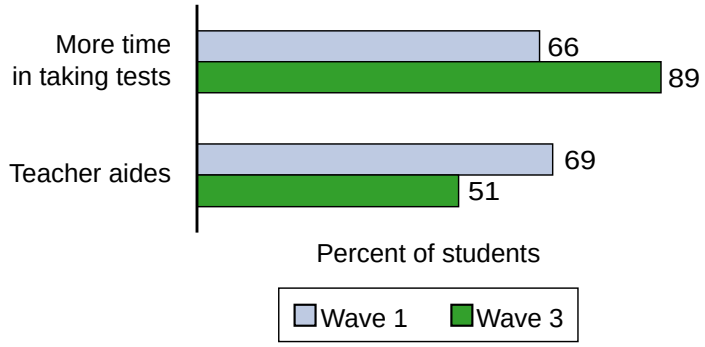
	Autism	All other disabilities	Learning disabilities	Speech or language impairments	Mental retardation
Percent receiving accommodation in:					
General education settings					
More time to take tests	89	80	84	70	87
Modified tests	41	30	31	20	55
Alternate assessments	26	12	13	4	23
Teacher aides	51	25	24	17	48
Behavior management program	26	8	5	3	10
Computer use not allowed for others for selected activities	30	14	16	7	18
Special education settings					
More time to take tests	53	81	86	82	70
Modified tests	43	48	49	39	52
Alternate assessments	59	30	24	22	51
Teacher aides	75	41	34	32	57
Behavior management programs	39	18	14	10	16
Computer use not allowed for others for selected activities	19	12	11	10	11

Source: SEELS Wave 3 school program questionnaire.

Note: The designation “all other disabilities” includes students in all federal primary disability categories except autism.

- In both general education and special education settings, students with autism are more likely to have behavior management programs, compared with peers with learning disabilities, speech/language impairments, or mental retardation.
- As students with autism transition into the higher grade levels, more time in taking test is provided increasingly as an accommodation, especially in general education settings (Exhibit 12). At the same time, middle schools tend to have fewer teacher aides in the classrooms.
- The percentage of students with autism in general education settings receiving more time for test-taking increased 23 percentage points.
- The percentage of students with autism in general education settings working with teachers’ aides decreased 18 percentage points.

Exhibit 12
Accommodations Provided in General Education Settings for Students with Autism in Waves 1 and 3



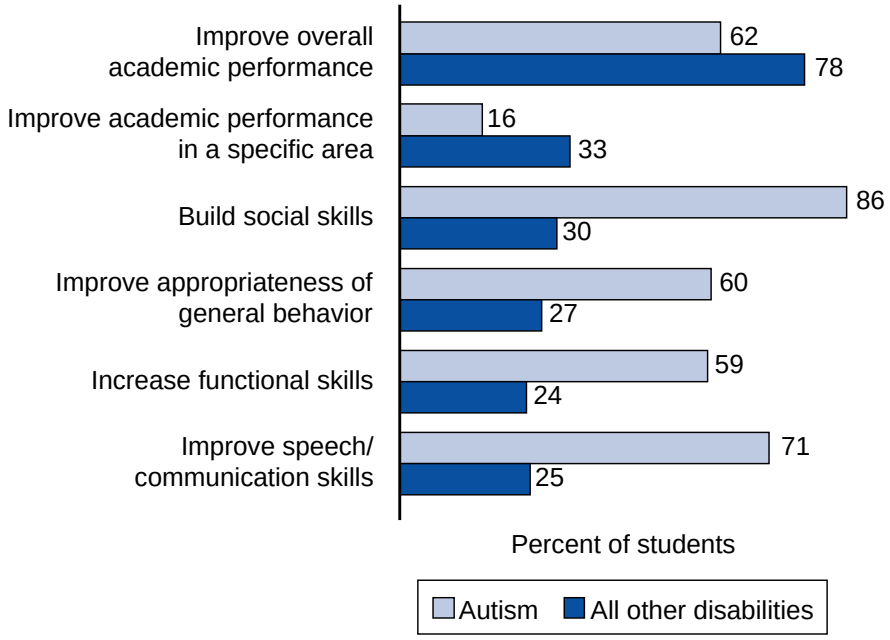
Sources: SEELS Wave 1 and Wave 3 school program questionnaires.

Teacher-reported Educational Goals

Improving academic performance is an important goal for all students, including those with disabilities. However, because autism is primarily associated with deficits in communication, social skills, and behavior, most students in this disability category have goals that focus on those areas (e.g., improving social skills, expanding communication, developing appropriate and positive behaviors). SEELS asked teachers to identify their students' primary educational goals (Exhibit 13).

- About half as many students with autism (16%) have teachers who report those students have a goal for improving performance in a specific academic area (i.e., language arts, mathematics, science) than do students with all other disabilities (33%).
- The large majority of students with autism (86%) have building social skills as a goal, almost three times as many as students with all other disabilities (30%).
- In addition to improving social skills, students with autism are far more likely than their peers with all other disabilities to have teacher-reported goals in other interpersonal areas, such as improving the appropriateness of general behaviors (60% vs. 27%), increasing functional skills (59% vs. 24%), and improving speech and communication (71% vs. 25%).

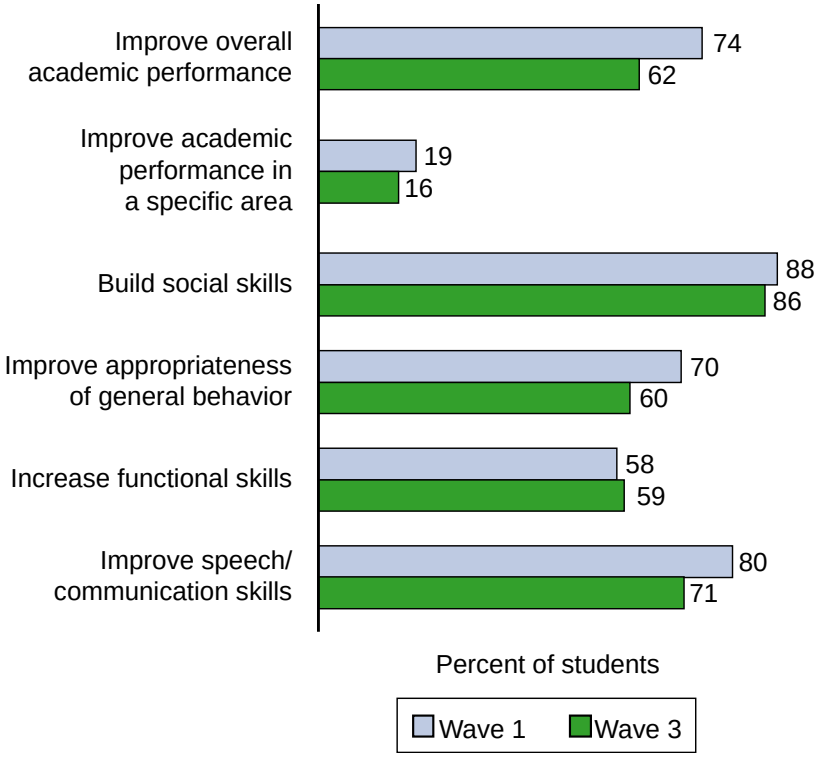
Exhibit 13
Teacher-reported Educational Goals for Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 school program questionnaire.

- The percentage of students with autism reported by teachers to have educational goals for improving overall academic performance, general behavior, and speech and communication skills decreased 12, 10, and 9 percentage points, respectively from 2001 to 2004 (Exhibit 14).

Exhibit 14
Teacher-reported Academic Goals for Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 school program questionnaires.

Academic Performance and Progress

Student learning is the business of education. It is the primary purpose of schools, and the widespread evidence of inadequate student performance has made it the centerpiece of the most recent period of systemic and accountability reforms. Improving academic performance is the goal of the No Child Left Behind Act of 2002 (NCLB) in its efforts to make schools and school districts accountable for assessing and improving student performance annually (Linn, Baker, & Betebenner, 2002).

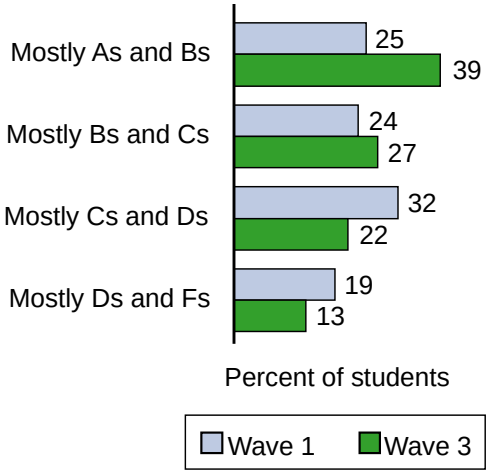
Limitations in academic achievement represent the primary implication of disability for most students receiving special education services, and these limitations often challenge students' ability to be successful in school. Students with autism also may be affected by a range of academic limitations, as well as by the social implications of their disability; these deficits may limit opportunities for students with autism to participate fully in general education academic settings. SEELS examines student performance and progress in school from multiple perspectives, including teacher-given grades and standardized test scores in reading and mathematics (Woodcock, McGrew, & Mather, 2001).

Grades

Teachers' evaluations of student performance, as indicated by course grades, represent a common metric that is tied to the day-to-day business of teaching and learning. Despite some technical limitations, grades serve a number of important functions, and they communicate to students and parents information about the students' mastery of course content.[10]

- The distribution of grades for students with autism is similar to that of their peers with all other disabilities: mostly As and Bs (39% vs. 34%), Bs and Cs (27% vs. 34%), Cs and Ds (22% vs. 24%), and Ds and Fs (13% vs. 9%).
- The percentage of students with autism receiving mostly As and Bs increased 14 percentage points from 2000 to 2004 (Exhibit 15).

Exhibit 15
Course Grades for Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 parent interviews and school program questionnaires.

Because limitations in nonacademic areas such as social skills and communication are typical for students with autism, it also is important to examine factors that influence how teachers grade students in this disability category. Teachers were asked to rate the importance of 10 factors in determining a student's grades: (1) attitude/behavior, (2) class participation, (3) homework, (4) student portfolio, (5) performance on daily class work, (6) performance on special projects/activities, (7) performance relative to a set standard, (8) performance relative to the rest of the class, (9) test results and (10) attendance. Teachers rated each factor as very important, somewhat important, or not important (Exhibit 16).

[10] Parents were the primary source of information about grades. For students without parent interviews, information from the school program questionnaire was used.

Exhibit 16
Grading Factors Considered "Very Important" by Teachers for Students with Autism and Students with Other Disabilities

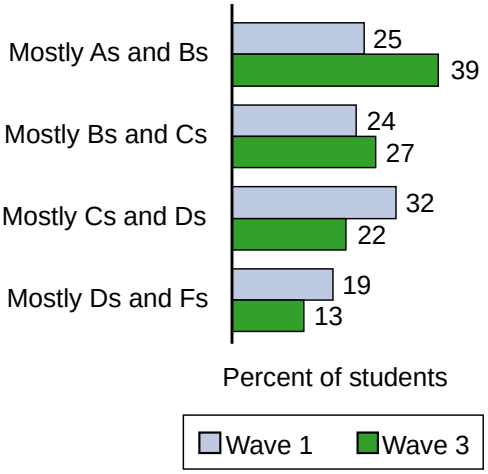
	Autism	All other disabilities	Learning disabilities	Speech or language impairments	Mental retardation
Percent with teachers who reported grading factors identified were "very important":					
Attitude/behavior	42	40	32	31	42
Class participation	43	52	48	39	57
Homework	29	48	49	56	35
Performance on daily class work	73	80	77	75	80
Performance on special projects and activities	27	47	53	66	35
Performance relative to a set standard	33	44	50	60	30
Performance relative to the rest of the class	6	10	11	15	10
Results of tests	26	47	49	64	31
Attendance	40	48	49	39	48

Source: SEELS Wave 3 teacher questionnaire.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

- Overall, most of the grading factors are considered "very important" for larger proportions of students with other disabilities than of students with autism. The exception is attitude and behavior, a grading factor that is considered as "very important" for 42% of students with autism or mental retardation and for a similar proportion of students with other disabilities.
- Teachers rate academic indicators, such as homework, performance on special projects, and test results, as "very important" factors in determining grades for about one-quarter of students with autism, compared with almost one-half of students with other disabilities.
- Nonacademic indicators increased in importance over time for students with autism; attitude and behavior, class participation, and attendance were identified as "very important" grading factors for larger proportions of students with autism in Wave 3 than in Wave 1 (Exhibit 17).

Exhibit 17
Grading Factors Considered "Very Important" for Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 teacher questionnaires.

Standardized Test Scores

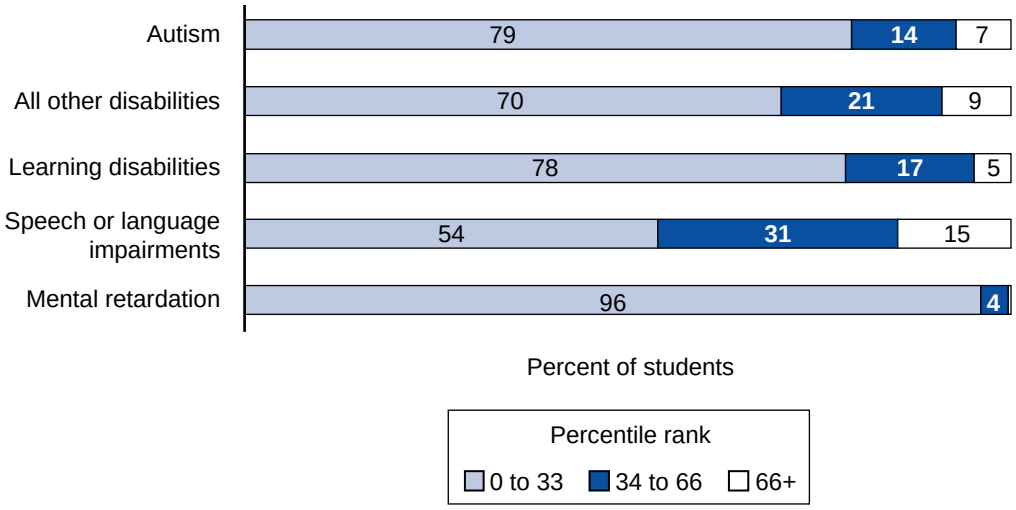
Given NCLB's requirement for greater accountability for the academic achievement of all students, more students with disabilities are participating in their state's standardized testing program. The deficits that impede comprehension and expressive language for students with autism affect their ability to perform on assessments, especially those that rely on short answers or essays. Although some higher-functioning students with autism may be able to remember large amounts of information, they often find it difficult to weed out the details needed, or to integrate information from multiple sources to answer a question (NEA, 2006).

To document their competency in taking standardized tests, SEELS conducted a direct assessment of the academic performance of students with disabilities, including those with autism.[11] Subtests of the research editions of the Woodcock-Johnson III (WJ III; Woodcock, McGrew, & Mather, 2001) test were used to conduct standardized assessments in reading and mathematics. WJ III is an individually administered test that allows comparison with the general population. The WJ III passage comprehension subtest asks students to "fill in the missing word" to complete sentences with the correct meaning. The WJ III mathematics calculation subtest, which ranges in difficulty from elementary (e.g., simple addition) to advanced (e.g., integrating a function), measures students' computation skills.

- For passage comprehension (Exhibit 18), more students with autism score in the bottom third of the percentile distribution than do their peers with all other disabilities (79% vs. 70%); however, few students in either group score in the top third (7% and 9%, respectively).

[11] Compared with students with other disabilities, larger proportion of students with autism participated in the SEELS alternate assessment (30%).

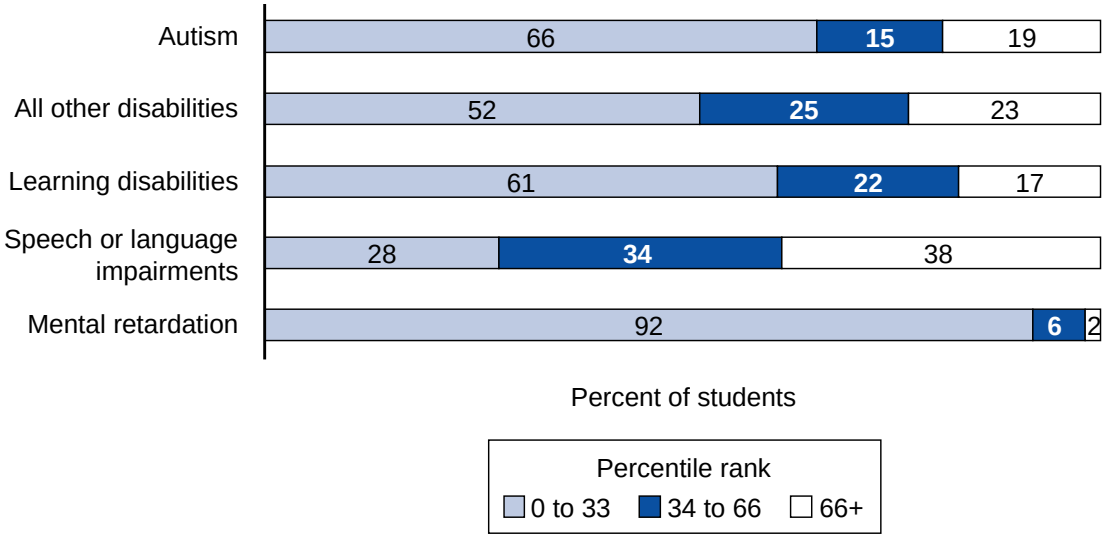
Exhibit 18
Passage Comprehension Percentile Rank for Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 direct assessment.
Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

- Compared with students in specific disability categories, the proportions of students with autism who score in the lowest third of the percentile range on passage comprehension (79%) are smaller that their peers with mental retardation (96%) but much larger than their peers with speech/language impairments (54%).
- Students with autism receive higher scores in mathematics calculation than in passage comprehension (Exhibit 19), although still lower relative to students with all other disabilities. Two-thirds of students with autism score in the lowest third of the percentile range, and 15% score in the middle, compared with scores for their peers with all other disabilities of 52% and 25%, respectively. Similar proportions of students in both groups scored in the top third of the percentile range (19% of students with autism and 23% of students with all other disabilities).
- Change over time for students with autism was evident in mathematics calculation, but not in reading. The percentage of students with autism scoring in the middle third percentile in mathematics calculation decreased 15 percentage points (Exhibit 20).

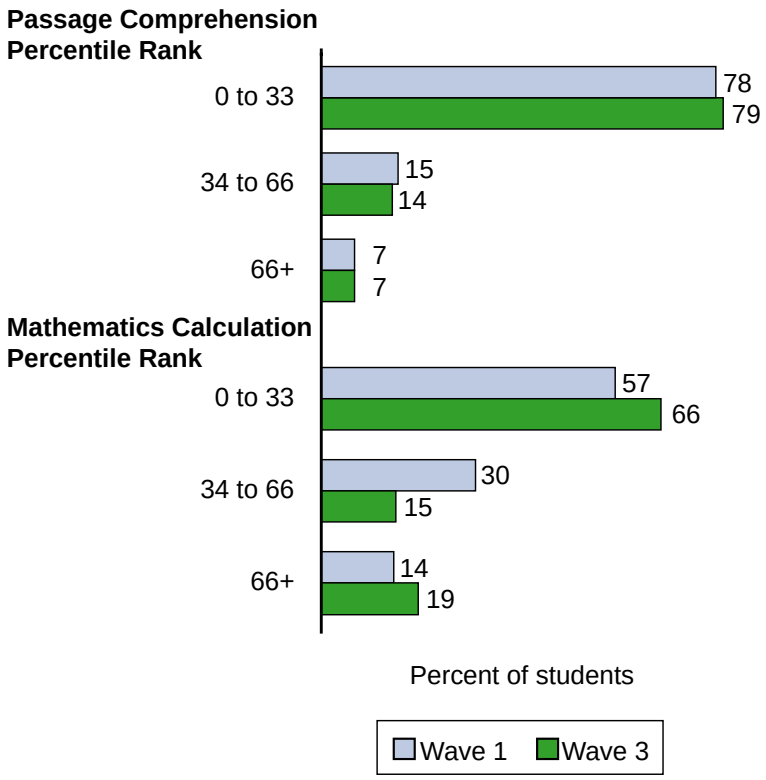
Exhibit 19
Mathematics Calculation Percentile Rank for Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 direct assessment.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

Exhibit 20
Reading and Mathematics Test Score Percentile Ranks of Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 direct assessments.

Social Adjustment

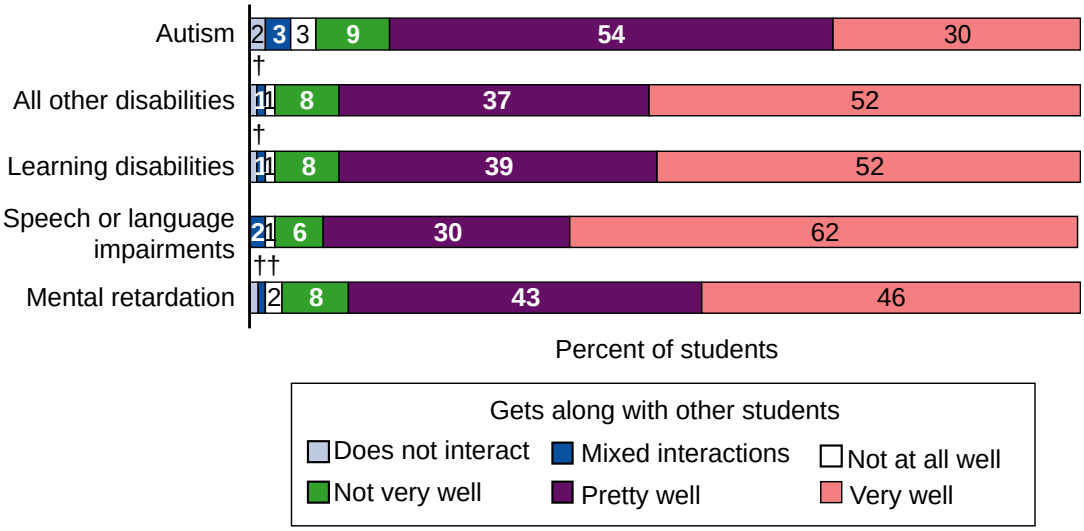
The transition from childhood to early adolescence is a time of dramatic physical, cognitive, emotional, and social change (Cole & Cole, 1993). Children are constantly developing and changing on many levels, beginning new endeavors and experiencing new situations. They begin to learn how to establish healthy relationships, find socially acceptable ways to engage in activities that interest them, and make their ways through school. However, a number of children experience more trials in this transition than do their peers (Ford & Coleman, 1999). Some are unable to find solid emotional and social ground as they progress through developmental stages. An inability to "fit in" can lead to behavioral manifestations that cause significant difficulty both for the children themselves and for those around them.

Many children with autism encounter additional hurdles that complicate this difficult time of development. As they approach adolescence, an age when being like peers is a high priority, many characteristics of autism set these children apart in the way they look, behave, or interact with others, presenting additional challenges to positive social adjustment. The secondary disabilities that are most prevalent among students with autism—particularly ADHD/ADD, emotional disturbances, and communication disorders—are most directly associated with social adjustment difficulties. As a result of the increased challenges associated with autism, children with autism face a greater risk than their peers without disabilities of poor outcomes and social isolation (see Exhibits 21 and 22).

Social Interactions with Peers and Teachers

- Students with autism (30%) are less likely to have parents who report that their children get along "very well" with other children than do students with all other disabilities (52%), learning disabilities (52%), speech/language impairments (62%), or mental retardation (46%).
- More than half (57%) of students with autism are reported to get along with their teachers "very well," a proportion that is similar to their peers with learning disabilities (52%), speech/language impairments (64%), or mental retardation (58%).

Exhibit 21
Interactions with Other Children by Students with Autism and Students with Other Disabilities



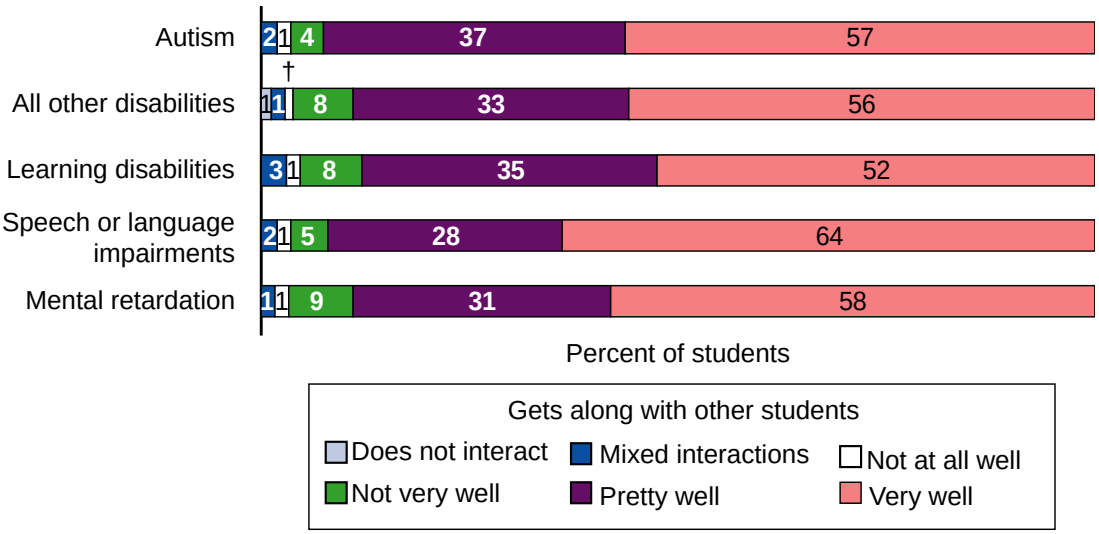
Source: SEELS Wave 3 parent interview.

† 1% or less of students.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

Note: "Does not interact" was not selected for any students with speech or language impairments.

Exhibit 22
Interactions with Teachers by Students with Autism and Students with Other Disabilities



Source: SEELS Wave 3 parent interview.

† 1% or less of students.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

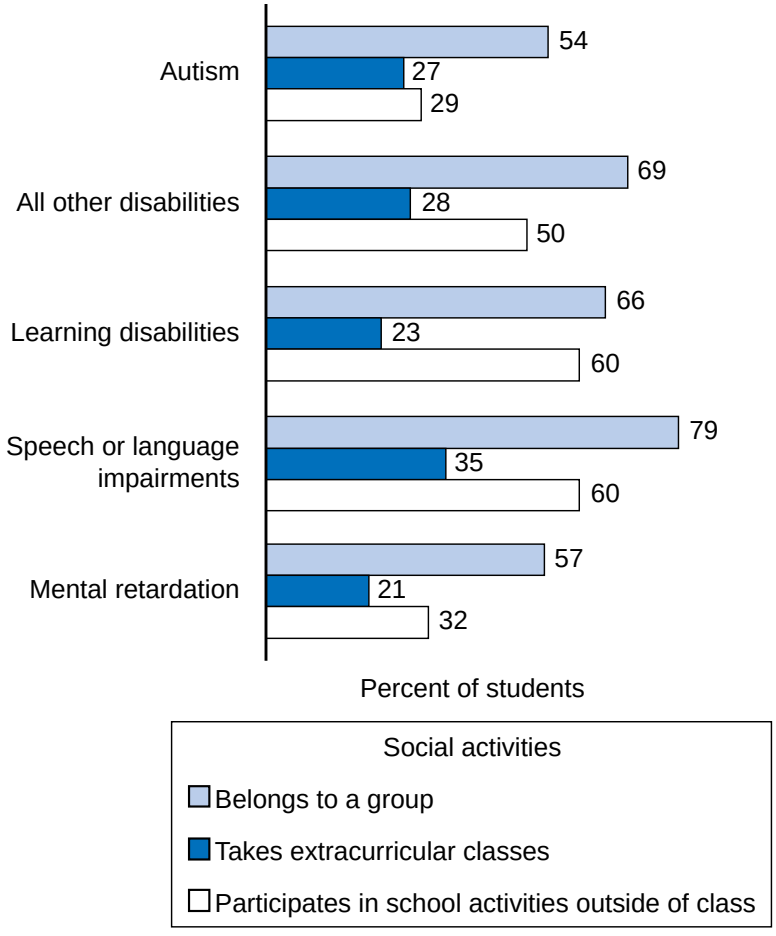
Note: "Does not interact" was not selected for any students with autism, learning disabilities, speech or language impairments, or mental retardation.

Group Memberships and Extracurricular Activities

Although the classroom is an important setting for student learning, social activities outside of the classroom also play a role in their development. The lives of many children are substantially enriched by their participation in organized extracurricular groups, which are defined broadly to include adult-sanctioned organized activities in which children engage outside of the classroom, whether or not the activities are school-sponsored. Extracurricular participation has been shown to have a beneficial effect on academic performance (Camp, 1990; Marsh, 1992) and to diminish the likelihood of students' dropping out of school (Mahoney & Cairns, 1997; Wagner, 1991).

To understand the out-of-school social activities of students with disabilities, parents were asked whether their sons or daughters participate in any type of organized group and how often they see friends outside of school or organized groups (Exhibit 23).

Exhibit 23
Social Activities of Students with Autism and Students with Other Disabilities

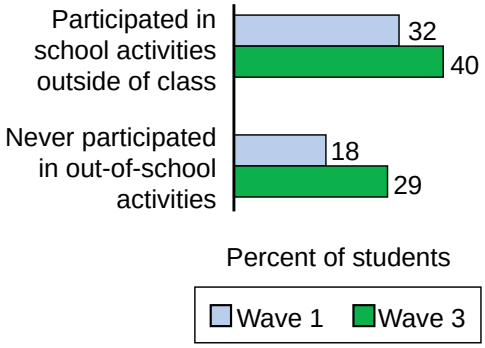


Source: SEELS Wave 3 parent interview.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

- About half of students with autism (54%) are reported to belong to an extracurricular group, a proportion similar to that for students with mental retardation (57%). In contrast, two-thirds of students with learning disabilities (66%) and more than three-quarters of students with speech/language impairments (79%) are members of school or community groups.
- Likewise, students with autism are similar to peers with mental retardation in regard to participation in extracurricular classes (27% vs. 21%) and school activities outside of the classroom (29% vs. 32%).
- Participation in extracurricular classes by students with autism (27%) is similar to students with learning disabilities as well (23%); whereas students with speech/language impairments are more likely than students with autism to participate in extracurricular classes (35%).
- In addition, students with learning disabilities or speech/language impairments are twice as likely to participate in school activities outside of class (60% each) than are students with autism (29%).
- The percentage of students with autism participating in school-organized activities outside of class increased 8 percentage points from Wave 1 to Wave 3 (Exhibit 24).
- The percentage of students with autism reported by parents "never" to participate in out-of-school activities increased 11 percentage points in a 4-year period.

Exhibit 24
Social Activities of Students with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 parent interviews.

Parental Expectations

Family expectations for the future can help shape the academic engagement and achievement of students with disabilities, irrespective of the nature of the students' disabilities and their levels of functioning. If other factors are equal, youth with disabilities whose parents expect them to go on to postsecondary education after high school have more positive engagement and achievements while in high school than youth whose parents do not share that optimism for the future (Newman, 2005).

Considering the relatively low ratings parents give their children with autism in regard to self-care skills, cognition, social skills, and communication, it follows that they could have relatively low expectations that their children would graduate from high school, attend and graduate from postsecondary school, or live independently. These types of postschool activities often require social and communication skills with which many people with autism have difficulty (Atwood, 2000; Bauminger, 2002).

Parents were asked to describe their expectations regarding whether their children "definitely will," "probably will," "probably won't," or "definitely won't" graduate from high school, attend and graduate from a postsecondary institution, or live independently in the future (Exhibit 25).

- One-third of students with autism (32%) have parents who expect that their son or daughter definitely will graduate from high school, far fewer than students with all other disabilities (63%), learning disabilities (62%), or speech/language impairments (78%).

Exhibit 25
Parental Expectations for Students with Autism and for Students with Other Disabilities

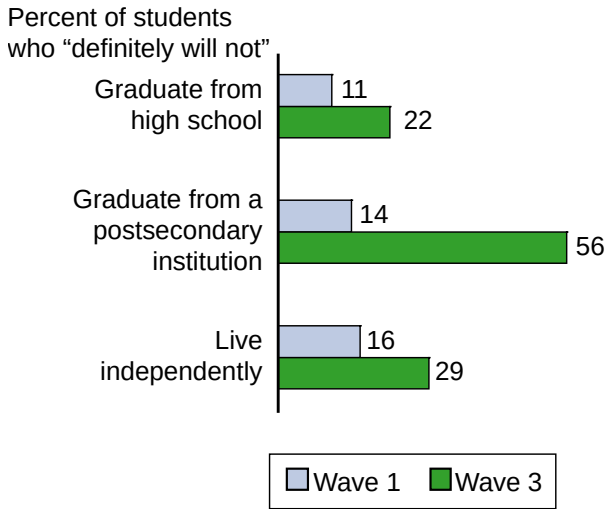
	Autism	All other disabilities	Learning disabilities	Speech or language impairments	Mental retardation
Percent of students who will:					
Graduate from high school					
Definitely will	32	63	62	78	33
Probably will	30	27	30	19	35
Probably won't	16	6	7	3	12
Definitely won't	22	4	2	0.3	19
Graduate from a postsecondary institution					
Definitely will	7	21	16	35	7
Probably will	33	49	54	50	30
Probably won't	3	3	4	2	4
Definitely won't	56	26	25	14	59
Live independently					
Definitely will	10	59	63	72	21
Probably will	31	29	30	22	40
Probably won't	30	8	5	4	21
Definitely won't	29	4	1	2	18

Source: SEELS Wave 3 parent interview.

Note: The designation "all other disabilities" includes students in all federal primary disability categories except autism.

- More than one-third of students with autism (38%) have parents who expect their children probably or definitely will not graduate from high school, a proportion that is greater those of students with all other disabilities (10%), learning disabilities (9%), or speech/language impairments (3%).
- It follows that students with autism are far less likely than students with all other disabilities to be expected definitely or probably to attend and graduate from postsecondary school (40% vs. 70%).
- In contrast to parents' expectations for students with learning disabilities and speech/language impairments, parents of students with autism have expectations very similar to those of parents of students with mental retardation regarding graduation from high school and postsecondary education.
- Parents of students with autism also have relatively low expectations regarding their children's ability to live independently; 41% of students with autism are expected definitely or probably to live independently, fewer than half as many as students with all other disabilities (88%), or students with learning disabilities (93%) or speech/language impairments (94%).
- Students with autism are less likely to be envisioned by envision as living independently (41%) than are students with mental retardation (61%).
- The percentage of students with autism expected to "definitely not" attain a milestone increased for each form of secondary education: 11 percentage points for graduating from high school, 42 percentage points for grading from a postsecondary institution, and 13 percentage points for living independently, (Exhibit 26).

Exhibit 26
Parental Expectations for Children with Autism in Waves 1 and 3



Sources: SEELS Wave 1 and Wave 3 parent interviews.

Communication and Students with Autism

As noted previously, autism, as defined in DSM-IVTR, is in part characterized by varying degrees of impairment in communication skills (Strock, 2004). People with autism exhibit a wide range of communication skills, including about 40% who are reported not to talk at all (National Center on Birth Defects and Developmental Disabilities, 2004). Communication disorders stem from problems with joint attention and symbol development. They can have deficits in auditory attention and memory that impair comprehension; that impairment in turn can impedes academic and social communication (NEA, 2006). Comprehension deficits create challenges in school because of difficulties in understanding figurative language, words with multiple meanings, and transitions between instructional topics, or in recognizing verbal signals that signify conversational change. Socially, students with autism often miss the nuances associated with humor, dialog, and conversation (NEA, 2006).

Are some students with autism more prone to communication challenges than others? Using the three communications scale ratings—low, medium, and high—assigned by parents to their children with autism (see Exhibit 5, presented previously), SEELS examined the demographic, school program, and social adjustment variables for students with autism.

- Males are a larger proportion of students with autism who receive communication scores in the high range (91%) than those with scores in the low range (81%; Exhibit 27).

Exhibit 27
Gender, School Type, and Parental Expectations for Students with Autism, by Communication Score

	Communication Score		
	Low	Medium	High
Percent of students with autism who:			
Are male	81	78	91
Attend a regular school	62	83	94
Have parents who expect they "definitely will":			
Graduate from high school	2	24	64
Graduate from a postsecondary institution	0	3	18
Live independently	0	5	26

Source: SEELS Wave 3 parent interview.

- The great majority of students with autism receiving communication scores in the high range attend regular schools (94%), and their parents expect almost two-thirds definitely to graduate from high school (64%). About one-fifth of this group is expected definitely to graduate from a postsecondary institution (18%), and one-quarter is expected definitely to live independently (26%).
- In contrast, although about three-fifths of students with autism with low communication skills attend regular school, very few are expected to graduate from high school (2%); and none are expected to graduate from a postsecondary institution or live independently.
- Almost all students with autism who have communication scores in the low range spend less than half of their school day in general education classrooms (94%), compared with far fewer students with scores in the high range (35%; Exhibit 28).

Exhibit 28
Instructional Factors and Accommodations for Students with Autism, by Communication Score

	Communication Score		
	Low	Medium	High
Percent of students with autism with:			
Percent of class time in general education settings			
Less than 50%	94	64	35
Classroom setting for language arts instruction			
General education	2	24	55
Resource room	4	20	40
Self-contained	96	66	31
Classroom setting for mathematics instruction			
General education	1	27	50
Resource room	5	15	38
Self-contained	95	63	31
Special education instruction received from:			
An adult other than the teacher	56	29	18
Accommodation			
More time in taking tests in special education classrooms	16	53	77

Source: SEELS Wave 3 parent interview and school program questionnaire.

- Almost all the students with communication scores in the low range receive language arts and mathematics instruction in self-contained classrooms (96% and 95%, respectively), whereas about half of students with communication scores in the high range receive language arts and mathematics instruction in general education classrooms (55% and 50%, respectively).
- In special education classrooms, frequent individual instruction from an adult other than the teacher is more common among students with low communication scores (56%) than for those with moderate or high communication scores (29% and 18%, respectively).
- In contrast, students with autism with low communication scores in special education classrooms are less likely to receive more time in taking tests (16%), compared with students with moderate or high communication scores (53% and 77%, respectively).
- The connection between communication and functional cognitive skills is apparent for students with autism. The majority of students with low communication skills also receive low functional cognitive skills ratings (91%), almost three times the proportion of students with scores in the medium range (31%). Only 2% of students with autism who receive high communication scores are rated low in functional cognitive skills (Exhibit 29).

Exhibit 29
Functional Cognitive Skills Rating, Teacher-reported Goal, Grades, and Standardized Test Scores for Students with Autism, by Communication Score

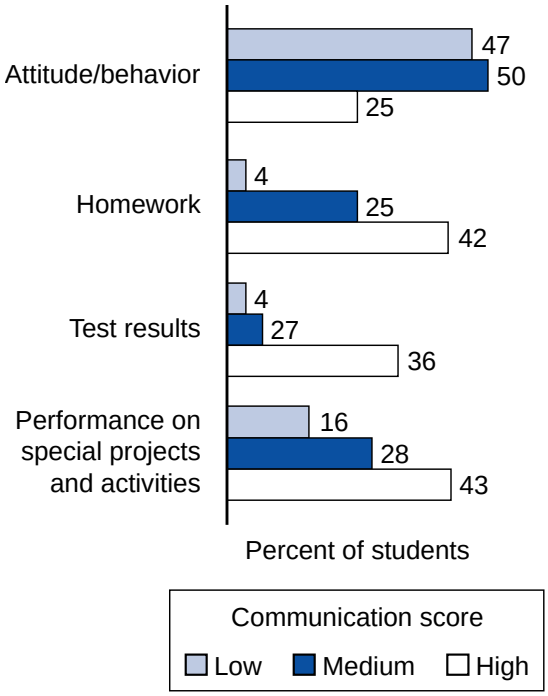
	Communication Score		
	Low	Medium	High
Percent of students with autism with:			
Low cognitive skills ratings	91	31	2
Teacher-reported goal			
Increase functional skills	97	63	28
Grades			
Mostly As and Bs	21	40	44
Mostly Ds and Fs	29	14	3
WJ III passage comprehension subtest percentile ranges			
0 to 33	*	87	65
34 to 66	*	6	26

* N is too small to report percentages.

Sources: SEELS Wave 3 parent interview, teacher questionnaire, and direct assessment.

- It follows that almost all of the students with communication scores in the low range have a goal to increase functional skills (97%), compared with a much smaller proportion of students with high communication scores (28%).
- Academic performance also is related to students' communication skills. Students with high communication skills are more likely to receive mostly As and Bs (44%) and less likely to receive mostly Ds and Fs (3%), compared with students with low communication skills (21% and 29%, respectively).
- Students with autism with high communication skills are less likely to score in the low range on the WJ III passage comprehension subtest than are peers with moderate communication skills (65% vs. 87%, respectively), and they are almost four times as likely to score in the middle of the percentile range (26% vs. 6% of students with moderate communication skills).
- Attitude and behavior are more likely to be rated by teachers as very important factors when determining grades for students with communication scores in the low range than for students with scores in the high range (Exhibit 30).
- Conversely, academic indicators such as homework, test results, and performance on special projects and activities are more likely to be very important factors when determining grades for students with communication scores in the high range than for students with scores in the low range.

Exhibit 30
Grading Factors Considered "Very Important" for Students with Autism, by Communication Score



Source: SEELS Wave 3 teacher questionnaire.

Summary

Although autism is prevalent across genders, income levels, and racial/ethnic and age groups, students with autism who receive special education services are predominantly white and male and live in two-parent households with incomes greater than $50,000.

Most students with autism attend regular school but spend less than half their class time in general education settings. The majority of students with autism receive language arts and mathematics instruction either in self-contained classrooms or in resource rooms. In general education settings, students with autism frequently participate in whole-class reading instruction but do so less frequently in special education settings. Students with autism in general education settings are more likely to receive more time to take tests, whereas teachers' aides are more commonly provided in special education settings. Educational goals for students with autism tend to focus on building social skills and improving communication skills. The functional cognitive skills ratings of students with autism generally fall in the medium or low ranges, even though their teachers assign grades of mostly As, Bs, and Cs. Most students with autism receive standardized test scores in reading and mathematics that fall within the lowest third of the percentile range for the general population; and although many are at or above grade level in reading and mathematics, most are 1 or more years below. Although some students with autism are definitely expected by their parents to graduate from high school, most are definitely not expected to attend or graduate from a postsecondary institution or to live independently.

SEELS findings accentuate the importance of communication skills for this population. Students with autism with high communication skills are more likely to participate in general education and whole-class instruction, to perform well academically, and to have higher functional cognitive skills ratings. Many are not only expected to graduate from high school, but also to graduate from a postsecondary institution and to live independently. However, like other students with autism, students with high communication skills also experience difficulty in developing social skills and in taking standardized assessments.

This report highlights the characteristics, academic profiles, performance and progress, and social adjustment of students with autism during their transition from elementary and middle to middle and high school. The analysis indicates a population performing less well than other students with disabilities as a whole on several measures—a finding that is especially prevalent among students with autism with low communication skills.

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APPENDIX A
Sample Sizes (Ns) and Standard Errors (SEs)

Exhibit A-1
Demographic Profiles of Students with Autism and of Students with Other Disabilities

	Autism		All other disabilities		Learning disabilities		Speech or language impairments		Mental retardation	
	N	SE	N	SE	N	SE	N	SE	N	SE
Gender										
Male	829	2.2	5,508	1.5	639	2.6	535	2.9	517	3.0
Race/ethnicity										
White	829	2.7	5,505	1.5	639	2.6	534	2.8	516	3.0
African-American	829	2.0	5,505	1.2	639	2.0	534	2.0	516	2.8
Socioeconomics										
A household with income $25,000 or less	816	2.3	5,441	1.5	636	2.7	531	2.7	507	3.0
A household with income greater than$50,000	816	2.9	5,441	1.6	636	2.8	531	3.0	507	2.5
A two-parent household	766	2.4	4,809	1.5	589	2.7	500	2.6	411	3.2
Poverty	767	2.1	4,751	1.4	533	2.4	477	2.5	420	3.2

Exhibit A-2
Number of Secondary Disabilities Among Students with Autism and Students with Other Disabilities

	0		1		2		3		4+	
	N	SE	N	SE	N	SE	N	SE	N	SE
Autism	828	2.9	828	2.5	828	2.0	828	1.4	828	0.9
All other disabilities	5,504	1.3	5,504	1.6	5,504	1.3	5,504	.9	5,504	0.7
Learning disabilities	639	1.9	639	2.8	639	2.4	639	1.3	639	0.8
Speech or language impairments	534	2.9	534	3.0	534	2.1	534	2.2	534	0.9
Mental retardation	516	1.5	516	2.9	516	2.7	516	2.2	516	2.0

Exhibit A-3
Types of Secondary Disabilities Among Students with Autism and Students with Other Disabilities

	ADHD/ADD		Speech		Emotional Disturbance		Other Health Impairments	
	N	SE	N	SE	N	SE	N	SE
Autism	828	2.8	828	1.4	828	1	828	2.2
All other disabilities	5,504	1.4	5,504	.8	5,504	.6	5,504	1.3
Learning disabilities	639	2.3	639	1.2	639	.8	639	1.6
Speech/language impairments	534	1.9	534	.7	534	.7	534	3.0
Mental retardation	516	2.8	516	1.4	516	1.7	516	2.5

Exhibit A-4
Secondary Disabilities of Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
ADHD/ADD	1,100	2.2	828	2.8
Speech or language impairments	1,100	.7	828	1.4
Emotional disturbances	1,100	2.2	828	1
Other health impairments	1,100	1.8	828	2.2
No secondary disabilities	1,100	2.4	828	2.9

Exhibit A-5
Parental Ratings of Skills for Students with Autism and Students with Other Disabilities

	Autism		All other disabilities		Learning disabilities		Speech/language impairments		Mental retardation	
	N	SE	N	SE	N	SE	N	SE	N	SE
Functional cognitive skills										
Low	808	2.7	5,372	0.8	624	0.8	523	0.9	501	2.8
Medium	808	2.9	5372	1.6	624	2.8	523	2.7	501	3.1
High	808	2.2	5372	1.6	624	2.8	523	19.0	501	2.4
Self-care skills										
Low	829	1.2	5,480	0.4	632	0.2	532	0.5	514	1.6
Medium	829	2.9	5,480	1.2	632	2.0	532	2.1	514	2.8
High	829	2.8	5,480	1.3	632	2.0	532	2.2	514	2.9
Social skills										
Low	809	2.8	5,362	1.4	625	2.5	524	2.4	503	3.0
Medium	809	2.8	5,362	1.6	625	2.8	524	2.9	503	3.1
High	809	1.1	5,362	1.1	625	1.8	524	2.3	503	1.4
Overall communication skills										
Low	828	2.1	5,468	0.4	634	0.3	533	0.4	513	1.5
Medium	828	2.8	5,468	1.2	634	1.8	533	2.1	513	3.0
High	828	2.6	5,468	1.2	634	1.8	533	2.1	513	3.0

Exhibit A-6
Regular School Attendance of Students with Autism and Students with Other Disabilities

	N	SE
Autism	824	2.2
All other disabilities	5,406	.9
Learning disabilities	626	1.4
Speech/language impairments	529	1.5
Mental retardation	506	2.0

Exhibit A-7
General Education Participation of Students with Autism and Students with Other Disabilities

	Less than 50%		50% to 80%		More than 80%	
	N	SE	N	SE	N	SE
Autism	571	3.5	571	3.1	571	2.6
All other disabilities	3,474	1.7	3,474	1.8	3,474	2.0
Learning disabilities	418	2.9	418	3.3	418	3.4
Speech/language impairments	321	2.4	321	2.6	321	3.3
Mental retardation	329	3.5	329	3.3	329	1.9

Exhibit A-8
Receipt of Language Arts and Mathematics Instruction of Students with Autism and with Students Other Disabilities, by Setting

	General education classrooms		Resource rooms		Self-contained classrooms	
	N	SE	N	SE	N	SE
Language arts						
Autism	560	3.3	560	3.1	560	3.5
All other disabilities	3,412	1.9	3412	1.8	3,412	1.7
Learning disabilities	414	3.4	414	3.4	414	2.9
Speech/language impairments	316	2.8	316	2.7	316	2.4
Mental retardation	324	2.9	324	3.3	324	3.6
Mathematics						
Autism	548	3.4	548	2.9	548	3.6
All other disabilities	3,327	2.0	3,327	1.7	3,327	1.7
Learning disabilities	408	3.5	408	3.3	408	2.9
Speech/language impairments	314	2.7	314	2.5	314	2.2
Mental retardation	315	2.6	315	3.3	315	3.6

Exhibit A-9
Language Arts and Mathematics Instructional Settings for Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Language arts				
General education class	650	3.2	560	3.3
Resource room	650	2.8	560	3.1
Self-contained class	650	3.2	560	3.5
Mathematics				
General education class	648	3.1	548	3.4
Resource room	648	2.6	548	2.9
Self-contained class	648	3.2	548	3.6

Exhibit A-10
Instructional Groupings for Students with Autism and Students with Other Disabilities

	Autism		All other disabilities		Learning disabilities		Speech/language impairments		Mental retardation	
	N	SE	N	SE	N	SE	N	SE	N	SE
General education										
Whole class	185	5.6	1,547	2.1	404	3.2	460	2.5	96	6.8
Small group	185	5.6	1,547	2.2	404	3.3	460	2.8	96	7.0
Individual, from the teacher	185	5.3	1,547	2.1	404	3.2	460	2.5	96	7.0
Individual, from another adult	185	5.5	1,547	1.9	404	2.5	460	1.7	96	6.8
Special education										
Whole class	538	3.4	2,146	2.1	386	3.5	137	5.9	501	3.2
Small group	538	3.5	2,146	2.2	386	3.7	137	6.0	501	3.1
Individual, from the teacher	538	3.5	2,146	2.1	386	3.4	137	5.5	501	3.1
Individual, from another adult	538	3.5	2,146	1.9	386	2.7	137	5.3	501	3.0

Exhibit A-11
Classroom Accommodations and Supports for Students with Autism and Students with Other Disabilities, by Classroom Setting

	Autism		All other disabilities		Learning disabilities		Speech or language impairments		Mental retardation	
	N	SE	N	SE	N	SE	N	SE	N	SE
General education setting										
More time in taking tests	180	4.0	2,015	2.2	333	2.9	129	5.6	88	5.0
Modified tests	180	6.2	2,015	2.5	333	3.7	129	4.9	88	7.4
Alternative assessments	180	5.5	2,015	1.7	333	2.7	129	2.4	88	6.2
Teacher aides	180	6.2	2,015	2.3	333	3.4	129	4.7	88	7.4
Behavior management program	180	5.5	2,015	1.5	333	1.8	129	2.2	88	7.4
Computer use not allowed for others for selected activities	180	5.7	2,015	1.9	333		129		88	7.4
Special education settings										
More time in taking tests	531	3.6	3,226	1.6	394	2.5	128	4.7	505	2.9
Modified tests	531	3.5	3,226	2.1	394	3.7	128	6.0	505	3.1
Alternative assessments	531	3.5	3,226	1.9	394	3.1	128	5.1	505	3.1
Teacher aides	531	3.1	3,226	2.1	394	3.5	128	5.8	505	3.1
Behavior management program	531	3.5	3,226	1.6	394	2.6	128	3.8	505	2.3
Computer use not allowed for others for selected activities	531	2.8	3,226	1.4	394	3.3	128	3.7	505	2.0

Exhibit A-12
Accommodations in General Education Settings for Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
More time to take tests	245	5.2	180	4.0
Teachers' aides	245	5.1	180	6.2

Exhibit A-13
Teacher-reported Educational Goals for Students with Autism and Students with Other Disabilities

	Autism		All other disabilities	
	N	SE	N	SE
Improve overall academic performance	533	3.6	2,390	1.9
Improve academic performance in a specific area	533	2.7	2,390	2.2
Build social skills	533	2.6	2,390	2.1
Improve appropriateness or general behavior	533	3.6	2,390	2.0
Increase functional skills	533	3.6	2,390	2.0
Improve speech/communication skills	533	3.4	2,390	2.04

Exhibit A-14
Teacher-reported Academic Goals for Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Improve overall academic performance	653	2.8	533	3.6
Improve academic performance in a specific area	653	2.5	533	2.7
Build social skills	653	2.1	533	2.6
Improve appropriateness or general behavior	653	3.0	533	3.6
Increase functional skills	653	3.2	533	3.6
Improve speech/communication skills	653	2.5	533	3.4

Exhibit A-15
Course Grades for Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Mostly As and Bs	1,071	2.0	818	1.9
Mostly Bs and Cs	1,071	2.3	818	2.4
Mostly Cs and Ds	1,071	2.1	818	2.6
Mostly Ds and Fs	1,071	2.2	818	2.8

Exhibit A-16
Grading Factors Considered "Very Important" by Teachers for Students with Autism and Students with Other Disabilities

	Autism		All other disabilities		Learning disabilities		Speech or language impairments		Mental retardation	
	N	SE	N	SE	N	SE	N	SE	N	SE
Attitude/behavior	643	3.2	3,487	1.7	715	2.5	579	2.7	568	2.9
Class participation	640	3.2	3,489	1.7	717	2.7	582	2.8	567	2.9
Homework	638	2.9	3,467	1.7	716	2.7	579	2.9	569	2.8
Performance on daily class work	644	2.9	3,478	1.4	715	2.3	581	2.5	567	2.4
Performance on special projects and activities	643	3.0	3,471	1.7	709	2.7	580	2.8	569	2.8
Performance relative to a set standard	641	3.0	3,455	1.7	709	2.7	576	2.9	565	2.7
Performance relative to the rest of the class	642	1.5	3,458	1.8	710	1.7	578	2.1	569	1.8
Results of tests	645	2.8	3,469	1.7	712	2.7	574	2.8	569	2.7
Attendance	639	3.2	3,469	1.7	711	2.7	579	2.8	567	3.0

Exhibit A-17
Grading Factors Considered "Very Important" for Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Attitude/behavior	597	3.0	643	3.2
Class participation	596	3.2	640	3.2
Attendance	594	2.9	639	3.2

Exhibit A-18
Passage Comprehension Percentile Rank for Students with Autism and Students with Other Disabilities

	0 to 33		34 to 66		66+	
	N	SE	N	SE	N	SE
Autism	382	3.6	382	3.1	382	2.3
All other disabilities	3,069	1.9	3069	1.7	3,069	1.2
Learning disabilities	381	3.0	381	2.7	381	1.6
Speech/language impairments	320	3.9	320	3.6	320	2.8
Mental retardation	284	1.6	284	1.5	284	0.4

Exhibit A-19
Mathematics Calculation Percentile Rank for Students with Autism and Students with Other Disabilities

	0 to 33		34 to 66		66+	
	N	SE	N	SE	N	SE
Autism	368	4.3	368	3.2	368	3.6
All other disabilities	2,988	2.1	2988	1.8	2,988	1.8
Learning disabilities	372	3.6	372	3.0	372	2.8
Speech/language impairments	313	3.5	313	3.7	313	3.8
Mental retardation	266	2.3	266	2.0	266	1.1

Exhibit A-20
Reading and Mathematics Test Score Percentile Ranks of Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Passage comprehension percentile rank				
0 to 33	366	3.7	382	3.6
34 to 66	366	3.2	382	3.1
66+	366	2.3	382	2.3
Mathematics calculation percentile rank				
0 to 33	316	4.7	368	4.3
34 to 66	316	4.3	368	3.2
66+	316	3.3	368	3.6

Exhibit A-21
Interactions with Other Children by Students with Autism and Students with Other Disabilities

	Not at all well		Not very well		Pretty well		Very well	
	N	SE	N	SE	N	SE	N	SE
Autism	797	1.0	797	1.6	797	2.9	797	2.7
All other disabilities	5,293	.4	5,293	.9	5,293	1.6	5,293	1.6
Learning disabilities	616	.6	616	1.5	616	2.8	616	2.9
Speech/language impairments	524	.5	524	1.5	524	2.8	528	3.0
Mental retardation	498	.8	498	1.6	498	3.0	498	3.1

Exhibit A-22
Interactions with Teachers by Students with Autism and Students with Other Disabilities

	Not at all well		Not very well		Pretty well		Very well	
	N	SE	N	SE	N	SE	N	SE
Autism	801	.5	801	1.1	801	2.8	801	2.9
All other disabilities	5,304	.3	5,304	.9	5,304	1.5	5,304	1.6
Learning disabilities	614	.7	614	1.6	614	2.8	614	2.9
Speech/language impairments	524	.3	524	1.3	524	2.7	524	2.9
Mental retardation	498	.6	498	1.8	498	2.8	498	3.0

Exhibit A-23
Social Activities of Students with Autism and Students with Other Disabilities

	Belongs to a group		Takes extracurricular classes		Participates in school activities outside of class	
	N	SE	N	SE	N	SE
Autism	820	2.9	821	2.6	802	2.6
All other disabilities	5,405	1.5	5,400	1.4	5,287	1.6
Learning disabilities	625	2.7	625	2.4	612	2.9
Speech/language impairments	525	2.5	525	2.9	521	3.0
Mental retardation	505	3.0	504	2.5	494	2.9

Exhibit A-24
Social Activities of Students with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Participated in school activities outside of class	1,098	1.9	802	2.6
Never participated in out-of-school activities	1,069	2.3	806	2.8

Exhibit A-25
Parental Expectations for Students with Autism and for Students with Other Disabilities

	Graduate from high school		Graduate from a postsecondary institution		Live independently	
	N	SE	N	SE	N	SE
Autism						
Definitely will	805	2.7	805	1.5	808	1.8
Probably will	805	2.7	805	2.7	808	2.7
Probably won't	805	2.1	805	1.1	808	2.7
Definitely won't	805	2.4	805	2.9	808	2.6
All other disabilities						
Definitely will	5,356	1.6	5,344	1.3	5,354	1.6
Probably will	5,356	1.6	5,344	1.6	5,354	1.5
Probably won't	5,356	1.1	5,344	.6	5,354	.9
Definitely won't	5,356	1.1	5,344	1.4	5,354	.6
Learning disability						
Definitely will	623	2.8	619	2.1	621	2.8
Probably will	623	2.6	619	2.9	621	2.6
Probably won't	623	1.4	619	1.1	621	1.3
Definitely won't	623	.8	619	2.5	621	.6
Speech/language impairment						
Definitely will	521	2.5	522	2.9	523	2.8
Probably will	521	2.4	522	3.1	523	2.6
Probably won't	521	1.1	522	.8	523	1.2
Definitely won't	521	.3	522	2.1	523	.8
Mental retardation						
Definitely will	498	2.9	493	1.5	499	2.5
Probably will	498	2.9	493	2.8	499	3.0
Probably won't	498	2.0	493	1.3	499	2.5
Definitely won't	498	2.4	493	3.0	499	2.4

Exhibit A-26
Parental Expectation for Children with Autism in Waves 1 and 3

	Wave 1		Wave 3	
	N	SE	N	SE
Definitely will not:				
Graduate from high school	1,078	1.5	805	2.4
Graduate from a postsecondary institution	1,073	1.7	805	2.9
Live independently	1,073	1.8	808	2.6

Exhibit A-27
Gender, School Type, and Parental Expectations for Students with Autism by Communication Score

	Low		Medium		High	
	N	SE	N	SE	N	SE
Gender						
Male	135	5.4	457	3.2	236	3.1
School Type						
Regular school	135	6.6	454	2.9	235	2.7
Parents expect students definitely will:						
Graduate from high school	129	2.1	447	3.4	229	5.4
Graduate from a postsecondary institution	129	0.0	449	1.4	227	4.3
Live independently	131	0.0	446	1.7	231	4.8

Exhibit A-28
Instructional Factors and Accommodations for Students with Autism, by Communication Score

	Low		Medium		High	
	N	SE	N	SE	N	SE
Percentage of class time in general education settings						
Less than 50%	90	4.0	325	4.5	155	6.8
Classroom setting for language arts instruction						
General education	83	2.6	322	4.1	154	7.1
Resource room	83	3.6	322	3.8	154	7.0
Self-contained	83	3.4	322	4.5	154	6.6
Classroom setting for mathematics instruction						
General education	74	2.1	319	4.2	154	7.1
Resource room	74	4.4	319	3.4	154	6.9
Self-contained	74	4.1	319	4.6	154	6.6
Special education instruction received from						
An adult other than the teacher	88	8.4	315	4.7	148	5.9
Accommodation						
More time to take tests in special education classrooms	76	7.4	252	5.1	94	7.7

Exhibit A-29
Cognitive Skills Rating, Teacher-reported Goal, Grades, and Standardized Test Scores for Students with Autism by Communication Score

	Low		Medium		High	
	N	SE	N	SE	N	SE
Low functional cognitive skills rating	123	4.1	453	3.6	232	1.6
Teacher-reported goal						
Increase functional skills	88	3.2	306	4.6	138	6.9
Grades						
Mostly As and Bs	128	5.7	454	3.8	235	5.4
Mostly Ds and Fs	128	6.3	454	2.7	235	1.9
WJ III passage comprehension subtest percentile ranges						
0 to 33	*	*	222	3.8	147	7.0
34 to 66	*	*	222	2.9	147	6.4

Exhibit A-30
Grading Factors Reported as Very Important for Students with Autism by Communication Score

	Low		Medium		High	
	N	SE	N	SE	N	SE
Attitude/behavior	74	9.2	292	4.8	141	6.1
Homework	73	4.1	286	4.3	141	7.0
Performance on special projects and activities	74	7.3	291	4.3	142	7.0