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ABSTRACT

This study used data from the National Longitudinal Transition Study of Special Education Students to examine whether social activities had an impact on the academic performance of 832 youth with learning disabilities. More than one-third of the high-school youth were reported to see friends outside of school 6 or 7 days a week. These students had higher absenteeism from school and were more likely to have received a failing grade than did students who were less actively involved with friends outside of school. High absenteeism and grade failure were among the strongest predictors of youth dropping out of school. In contrast, students who were engaged in school or community groups had significantly lower school absenteeism and better grade performance. Findings suggest that students who bonded with school, whose friendships did not overly compete with the time needed to meet school responsibilities, were better students. Schools are encouraged to provide opportunities for students with varying interests to find social memberships and help parents set guidelines for appropriate out-of-school social activities. (DB)

SRI International

THE RELATIONSHIP BETWEEN SOCIAL ACTIVITIES AND SCHOOL PERFORMANCE FOR SECONDARY STUDENTS WITH LEARNING DISABILITIES

FINDINGS FROM THE NATIONAL LONGITUDINAL TRANSITION STUDY OF SPECIAL EDUCATION STUDENTS

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The National Longitudinal Transition Study of Special Education Students
SRI International

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THE RELATIONSHIP BETWEEN SOCIAL ACTIVITIES AND SCHOOL PERFORMANCE FOR SECONDARY STUDENTS WITH LEARNING DISABILITIES

Social activities and school performance are two important dimensions of secondary students' lives. As the developmental stage that focuses on preparing for adulthood, adolescence is a time when social activities increase in importance. When sophomores in a national study were asked to indicate the importance of having friends, more than 98% felt that having strong friendships was important to their lives (CES, 1987). Young people look to peers to validate self concepts and to provide behavior models. Peer relationships shape a wide variety of values, social behaviors, attitudes and perspectives (Hartup, 1976; Johnson & Johnson, 1978, Wahler, 1967). For those still in secondary school, academic performance remains an important priority for many, and an important predictor of later life achievement for most. Students who succeed in school and those who do not have markedly different life prospects, leading the William T. Grant Foundation (1988) to conclude that "this nation may face a future not divided along lines of race or geography, but rather of education." To illustrate, the Foundation estimated that young adults in the general population, ages 18 to 23, with basic academic skills in the bottom fifth of the distribution, relative to their peers in the top half, are:

- 8.8 times more likely to leave school without a diploma;
- 8.6 times more likely to have a child out of wedlock;
- 5.4 times more likely to receive some form of public assistance,
- 5 times more likely to be at poverty level in income and not in school of any type.
- 3.6 times more likely to be neither working, nor in school, nor taking care of a child, and
- 2.2 times more likely to have been arrested in the previous year.

Research suggests a relationship between these two important arenas: social activities and school performance (see for example, Wehlage, 1983,

1989; Holland and Andre, 1987; Steinberg et al, 1988; Epstein, 1983; Green, et.al., 1980; McMichael, 1980). What is the nature of this relationship? Does time spent on social activities conflict with time that should be spent instead on academic goals, or does the increased self esteem from participation in social activities benefit academic performance? Although these are important questions for all youth, they are especially important for those on the margins, youth who are already experiencing problems, and for whom a small impact might make the difference between passing or failing a course. One of these groups of youth are those with learning disabilities.

This paper will address the question of whether social activities have an impact on the academic performance of youth with learning disabilities who attended regular secondary schools.* This question is addressed using data from the National Longitudinal Transition Study of Special Education Students (NLTS). Conducted by SRI International for the Office of Special Education Programs (OSEP) of the U.S. Department of Education, this five year study includes a nationally representative sample of more than 8,000 students, in all disability categories, who were ages 13 to 21, and in special education in the 1985-86 school year. The sample represents youth in all 11 federal disability categories, including youth classified as learning disabled, and permits findings to be generalized nationally for each disability group. This paper focusses on the experiences of a subset of this sample; the 832 youth with learning disabilities who attended regular schools. Data were collected in 1987 from telephone interviews with parents of youth in the study, and from a survey of educators in the schools they attended, and from students' school records.**

In examining the social activities of secondary students with learning disabilities, we will be focussing primarily on the frequency with which youth saw friends socially and the extent to which they belonged to school

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* NLTS data indicate that more than 97% of secondary students with learning disabilities attended regular schools; 2% attended special schools serving only students with disabilities.

** The sample, data collection, data weighting, and analyses are described in detail in appendix A. (Full reports on various aspects of sampling and data collection methods are also available; Wagner, Newman and Shaver, 1989; Javitz and Wagner, 1990.)

or community groups. The paper begins with a description of these social experiences, and then focuses on their relationship to two dimensions of school performance for students with learning disabilities:

- Engagement in the educational process, as measured by students' school attendance (number of days absent from school) and,
- Grade performance, as measured by whether the student received one or more failing course grades.

These two measures of school performance (high absenteeism and grade failure) have been found to be among the strongest predictors of students with disabilities dropping out of school (Wagner, 1991; Thorton, et al., 1987; Donahoe and Zigmond, 1990; Shellenberg, Frye and Tomsic, 1988).

Social Involvement

The word 'sociable' comes from the Latin word, 'sociabilis', meaning to join or associate. One who is sociable is defined by Webster as being "inclined by nature to companionship with others of the same species". This companionship can take many forms. The NLTS examined two aspects of social activities of students with disabilities--their frequency of seeing friends, and membership in school and community groups.

Among adolescents, individual friendships and affiliations with groups of people who share common interests can provide opportunities for learning social skills, identifying with common goals and norms, developing good citizenship through service to others, and trying out alternative social roles, including leadership roles (Grabe, 1976, 1981, Johnson, 1980, Lindsay, 1984, Phillips, 1969). These various forms of relationship can contribute significantly to one's personal development and quality of life. The need to establish relationships with same-sex and opposite-sex peers is no different for youth with disabilities than for their nonhandicapped peers (Johnson & Johnson, 1980; Zigmond and Sainato, 1981). Yet previous research has found that youth with learning disabilities often have problems developing satisfactory social lives and are significantly less well liked than their more academically able peers in the regular classroom (MacMillan & Morrison,

1984; Taylor et al,1987). Those with learning disabilities often are thought to need help learning about appropriate social interactions (Sabornie, 1989). How valid is this image of youth with disabilities?

Frequency of Seeing Friends

To learn about the frequency of students with learning disabilities seeing friends, parents were asked to report "about how many days a week does (NAME) usually get together with friends outside of school?" Answers were coded on a 6 point scale, ranging from '0' (Never) to '5' (6 or 7 days). Here, we consider their responses from two perspectives. Our first concern is with youth who were reported by parents to be relatively socially isolated in terms of friendships--students who saw friends less than once a week outside of school. We then move to the opposite end of the frequency continuum. We examine the extent to which students were reported to see friends outside of school frequently--six or seven days a week--and explore the characteristics of youth with this intensive involvement with friendships outside of school.

Socially Isolated Secondary School Students With Learning Disabilities

Although we use the term "socially isolated" to describe students reported by parents either as never seeing friends outside of school, or as seeing them less than once a week, we recognize that the absence of frequent friendship interactions outside of school is not true isolation. Secondary school students spend most of their school day in classes with other students, interacting during class time, recess, lunch and informally after school; this is far from being truly isolated. However, these interactions may not be synonymous with friendships. By socially isolated, we mean that students rarely spend time with friends informally, outside of the structured school day. Indeed, spending most of one's day surrounded by people and yet having no fiends may speak to just how socially isolated one can be.

Although the majority of secondary school students with learning disabilities were socially connected to friends; as indicated in Figure 1, a

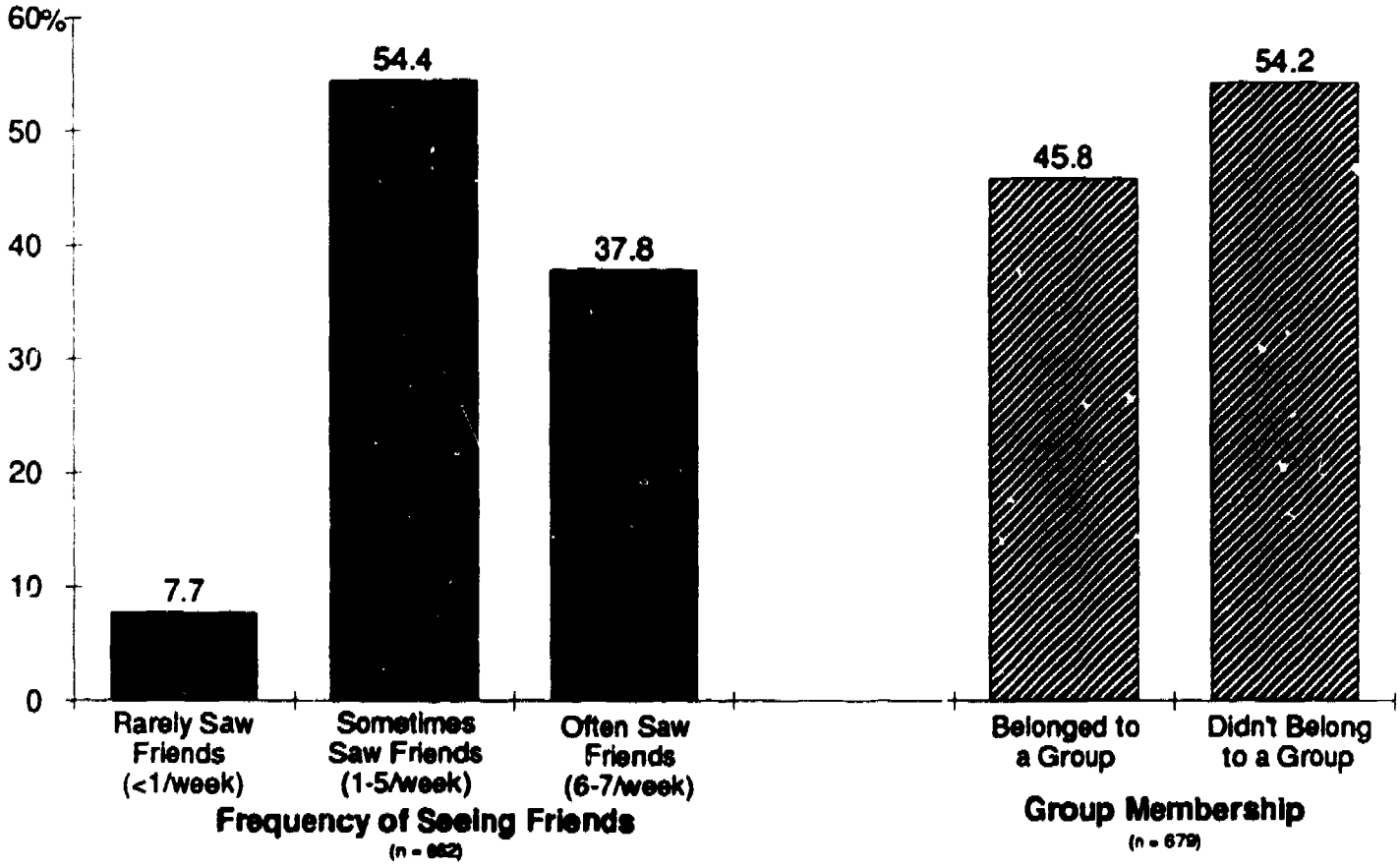

FIGURE 1 SOCIAL INVOLVEMENT OF YOUTH WITH LEARNING DISABILITIES DURING SECONDARY SCHOOL

Source: Parent Report

small proportion (8%) were relatively socially isolated, reported by parents as either never seeing friends outside of school, or seeing them less than once a week.

Students Who Saw Friends Frequently

Focussing on the other end of the social spectrum, we consider youth who did visit with friends. It is important to be aware that data obtained from parents regarding their children's friendships measure the frequency of relationships, not the number of relationships. A young person could have had only one friend whom he or she saw often. It is also not a measure of the quality or closeness of friendships or of the appropriateness or influence of the friends with whom the youth socialized. Although most people would agree that social isolation is to be avoided, we do not intend to imply that greater frequency of contacts is necessarily a positive aspect of friendships. Being a very active part of a social network does not always lead to behaviors that are appropriate to society at large, and spending large amounts of time socializing may limit a youth's time for other positive activities. However, a frequency measure does allow us to learn more about the extent to which youth were particularly socially active and the characteristics of those students.

NLTS findings suggest considerable social involvement with friends among secondary school students with learning disabilities. The majority of these students (92%) were reported by parents to get together socially with friends outside of school at least once a week, with more than a third getting together with friends between six and seven times a week (Figure 1). These rates of contacts with friends for students with learning disabilities are higher than the 68% of a general population of sophomores reported by the High School and Beyond survey to have visited with friends at a local gathering place at least once a week (CES, 1987). This difference might be due in part to differences in question wording; HS&B youth were asked to indicate the time spent visiting with friends "at a local gathering place", while NLTS respondents were only asked to indicate how often youth got

together with friends outside of school, which would include the relatively frequent activity of visiting with friends at home.

Group Membership

Thus far, we have discussed informal friendship interactions of secondary school students that occurred outside of school. Here, we focus on a somewhat more formalized dimension of social involvement: student participation in school or community groups.

Previous research has documented the importance of students bonding with their schools (Wehlage, 1989, Finn, 1989). This social bonding is often seen in the student's commitment to the norms of the school, involvement in school activities, and affiliation with school groups. Participation in extracurricular groups in secondary school has been correlated with higher levels of self esteem, increased student engagement, more expressed satisfaction with school, and increased likelihood of school completion (Pittman and Haughwout, 1987; Holland and Andre, 1987).

Parents of youth with learning disabilities were asked whether their children had belonged to any school or community groups in the previous year. Almost half (46%) of these secondary students were reported by parents to have had group memberships (Figure 1). Although the majority of group members (65%) belonged to one school or community group, more than 28% participated in two groups, and 6% of group members were reported to belong to three or more groups.

Secondary school students with learning disabilities belonged to a variety of types of groups. Sports teams and social/service/hobby groups, were by far the most popular types of activities, with 23% of students participating in sports and 22% involved in social types of groups. Six percent of students belonged to a performing group, such as a choir, band, dance group or theater; 2% participated in school subject matter clubs, such

Table 1

RELATIONSHIP BETWEEN INDIVIDUAL CHARACTERISTICS AND SOCIAL INVOLVEMENT OF SECONDARY STUDENTS WITH LEARNING DISABILITIES

	Percentage Who Saw Friends:				Belonged to a Group	
Youth Characteristics	Rarely (<1/week)	Sometimes (1-5/week)	Often (6-7/week)	N	Yes	N
Functional Ablity Scale Score						
High (15-16)	4.2 (1.3)	58.6 (3.3)	37.2 (3.2)	434	47.8 (2.7)	444
Medium (9-14)	14.2 (3.4)	45.9 (4.8)	39.9 (4.8)	202	46.1 (4.8)	207
Low (4-8)	-	-	-	5	-	6
Gender						
Males	7.7 (1.7)	52.1 (3.1)	40.3 (3.1)	488	44.2 (3.1)	502
Females	7.9 (2.9)	60.9 (5.2)	31.2 (4.9)	174	50.3 (5.3)	177
Age						
15 or 16	9.1 (2.6)	51.3 (4.5)	39.6 (4.4)	218	52.2 (4.5)	223
17 or 18	6.8 (2.0)	56.6 (3.9)	36.6 (3.8)	293	44.6 (3.9)	297
19 or older	6.7 (2.9)	56.8 (5.8)	36.5 (5.6)	151	31.5 (5.3)	159
Grade						
7 or 8	7.6 (5.1)	62.6 (9.4)	29.8 (8.9)	49	51 (9.6)	50
9	7.1 (3.4)	51.5 (6.7)	41.4 (6.6)	102	42.6 (6.5)	105
10	10.4 (4.0)	56.0 (6.5)	33.6 (6.1)	109	49.8 (6.4)	110
11	6.5 (3.1)	60.4 (6.0)	33.1 (5.8)	125	48.4 (6.1)	128
12	5.2 (3.4)	56.7 (7.5)	38.1 (7.4)	89	38.7 (7.3)	93
Ungraded	-	-	-	13	-	13
Ethnic background						
Black	7.0 (3.1)	47.8 (6.1)	45.2 (6.0)	127	45.4 (5.8)	137
White	7.6 (1.7)	54.3 (3.2)	38.1 (3.1)	474	49.5 (3.2)	477
Hispanic	14.4 (7.3)	68.5 (9.7)	17.2 (7.6)	42	21.6 (8.3)	46
Student had had disciplinary problems						
Yes	4.3 (3.1)	45.5 (7.5)	50.1 (7.6)	82	37.9 (7.3)	84
No	8.3 (1.6)	56.2 (2.9)	35.5 (2.8)	575	47.2 (2.9)	590

* Excludes schools that only serve youth with disabilities.

Source: Parent interviews, school background surveys, and students' school records. Standard errors are in parentheses.

as a science or language club, and 3% joined a vocational club, such as Future Homemakers or Junior Achievement. Rates of membership in these kinds of groups among students with learning disabilities were lower than for students in the general population. For example, more than half of sophomores in the general population were reported to have belonged to sports teams (54%; CES, 1987), compared to 1 in 5 secondary school students with learning disabilities.

As indicated in Tables 1 through 3, several individual, household/community and school characteristics were demonstrated to distinguish students who saw friends from those who did not and to distinguish those who were group participants from non-participants.

Individual Characteristics Related to Social Involvement

Grade, Age, Functional Ability. Being socially isolated reflects the limiting influence of a more severe disability. For example, the NLTS asked parents how well their children could perform four tasks that involved applying basic mental functions to everyday activities: counting change, telling time on a clock with hands, looking up telephone numbers and using the phone, and reading common signs. Parents rated their children's abilities on each task on a 4-point scale ranging from the ability to do the task "very well" (4 points) to "not at all well" (1 point). Scores on the 4 tasks were summed to create a scale ranging from 4 (did all 4 tasks "not at all well") to 16 (did all 4 tasks "very well"). A score of 15 or 16 on this scale is considered high functional skills. Lower functioning youth were more socially isolated. As seen in Table 1, about 14% of those receiving a medium score on a functional ability scale never or rarely saw friends, compared to 4% of those with high scores ($p<.05$). Those who were socially isolated also had lower IQ scores (80.3 v.s. 88.3; $p<.05$) than youth who where involved with friends. Frequency of seeing friends did not vary by grade or age.

Variations in rates of group membership were not demonstrated for youth in different grades or of different ages, except for those 19 years old and

older, with these older youth being less likely to participate in groups; 32% of students 19 and older were group members, compared to 52% of 15-to-16 year-olds ($p<.01$) and 45% of 17 to 18 year olds ($p<.05$). Youth who were still in secondary school after age 19 have often repeated a grade (Wagner, 1991). It is possible that these students who were older than their peers were not comfortable participating in organized groups with younger students. It is also possible that the kinds of behaviors that were correlated with their being retained, were also correlated to a lower likelihood of being attracted to organized groups. Although these older youth might be more severely disabled, we did not find variation in functional ability to be related to participation in groups. Youth with medium scores on the functional ability scale were as likely to be group members as were those with high scores.

Gender. Among youth with disabilities as a whole, previous research found that boys were significantly more likely than girls to see friends often (6-7 times/week); among youth with learning disabilities, although this relationship continues, it is not statistically significant (Newman, 1991). We also did not find that male and female students with learning disabilities differed significantly in the rate at which they affiliated with groups in a bivariate relationships.

Ethnicity. Ethnic background was not significantly related to whether students were socially isolated. Ethnic differences did appear to be significantly related to seeing friends frequently, in that Hispanic youth were significantly less likely than black youth (17% vs. 48%; $p<.01$) or white youth (38%; $p<.05$) to see friends often. Consistent with this finding, Hispanic youth (22%) were also less likely to participate in a group than those who were white (50%; $p<.01$) or black (45%; $p<.05$).

Disciplinary Problems. Students who had disciplinary problems, such as being suspended or expelled from school, being fired from a job or being arrested, were more likely to see friends frequently (50% vs 35%) and were less likely to participate in groups (38% vs 47%) than those who had not had such problems. Although these bivariate relationships were not statistically

Table 2

RELATIONSHIP BETWEEN HOUSEHOLD/COMMUNITY DEMOGRAPHICS AND SOCIAL INVOLVEMENT OF SECONDARY STUDENTS WITH LEARNING DISABILITIES

Household/Community Demographics	Percentage Who Saw Friends: Rarely (<1/week)	Sometimes (1-5/week)	Often (6-7/week)	N	Belonged to a Group: Yes	N
Household income						
Less than $12,000	9.3 (3.5)	48.8 (6.0)	41.8 (5.9)	129	38.2 (5.7)	136
$12,000 to $24,999	10.2 (3.1)	52.0 (5.0)	37.7 (4.9)	179	41.5 (4.9)	181
$25,000 or more	3.4 (1.5)	62.2 (3.9)	34.4 (3.8)	285	58.8 (4.0)	286
Number of parents in household						
1 Parent	9.1 (3.0)	49.0 (5.3)	41.9 (5.2)	169	38.7 (5.0)	180
2 Parents	7.2 (1.6)	56.7 (3.1)	36.0 (3.0)	486	49.3 (3.1)	490
Attended school in:						
Urban area	5.2 (2.4)	51.3 (5.3)	43.5 (5.3)	171	36.8 (5.0)	180
Suburban area	7.5 (2.3)	55.1 (4.4)	37.4 (4.3)	243	46.8 (4.4)	250
Rural area	9.5 (2.7)	56.4 (4.6)	34.1 (4.4)	218	53.2 (4.6)	218

* Excludes schools that only serve youth with disabilities.

Source: Parent interviews and school background surveys. Standard errors are in parentheses.

significant for youth with learning disabilities, previous NLTS research has shown this to be a significant difference for youth with disabilities as a whole (Newman, 1991).

While group participation was linked with a lower rate of asocial behaviors, the direction of the relationship is unclear. It is possible that youth who had appropriate social skills were the ones attracted to the values inherent in organized group participation. On the other hand, group participation could have reduced the incidence of asocial behaviors. For example, youth who belonged to school sports teams or bands might have been busy with practices and motivated to do their best so that they were less prone to become involved in activities that might lead to disciplinary problems, such as being suspended from school or arrested.

Household/Community Characteristics Related to Social Involvement

Socioeconomic status. Although findings from a recent survey of persons with disabilities (Harris & Associates, 1986) indicate that those with lower household incomes were more likely to say that their disability constrained their social lives than were respondents with higher incomes, NLTS data suggest that, for students with learning disabilities in secondary school, household income was not significantly related to being socially isolated.

Students from higher-income households were the most likely to be group members. As indicated in Table 2, almost 59% of those from households with an income of $25,000 or greater participated in groups, compared to 42% of those from families earning between $12,000 and $24,999 ($p<.01$), and 38% of those from families earning less than $12,000 ($p<.01$). This relationship is stronger than was observed regarding the frequency with which youth saw friends, perhaps reflecting the higher financial demands of belonging to some kinds of groups (e.g., dues, uniforms, fees for activities) compared to the costs of seeing friends informally.

Number of parents in household. Students who lived in two parent families were no more or less likely to see friends frequently, or

Table 3

RELATIONSHIP BETWEEN SCHOOL FACTORS AND SOCIAL INVOLVEMENT OF SECONDARY STUDENTS WITH LEARNING DISABILITIES

School Factors	Percentage Who Saw Friends: Rarely (<1/week)	Sometimes (1-5/week)	Often (6-7/week)	N	Belonged to a Group: Yes	N
Average daily attendance						
≤ 500 students	10.9 (3.7)	56.5 (5.9)	32.6 (5.5)	133	47.3 (5.9)	136
501 to 1,100 students	5.9 (2.1)	56.6 (4.5)	37.5 (4.4)	229	49.0 (4.4)	238
> 1,100 students	7.7 (2.5)	52.5 (4.7)	39.8 (4.6)	223	42.1 (4.7)	227
Percentage of time spent in regular education classes						
0 - 33%	15.9 (5.1)	48.6 (7.0)	35.5 (6.7)	99	31.6 (6.4)	103
34 - 66%	10.7 (4.8)	49.8 (7.7)	39.5 (7.5)	86	35.3 (7.4)	85
67 - 99%	5.2 (2.3)	63.8 (5.0)	31.0 (4.8)	183	49.7 (5.1)	190
100%	2.8 (2.3)	62.3 (6.7)	34.9 (6.6)	95	67.0 (6.5)	96

* Excludes schools that only serve youth with disabilities.

Source: Parent interviews, school background surveys, and students' school records. Standard errors are in parentheses.

participate in groups than were those living in one parent families.

Urbanicity. Although there may be greater distances to travel in order to see friends in rural communities, those who lived in rural areas were no more likely than those living in other areas to see friends rarely.

We would expect that a greater availability of options for group membership in an urban setting might result in students in urban communities participating in group activities at a higher rate. Contrary to this expectation, NLTS data suggest that those who lived in urban areas (37%) were less likely than those in suburban (47%) and significantly less likely than those in rural areas (53%; $p<.05$) to belong to groups. One possible explanation is that, although urban areas often offer a greater range of extracurricular activities outside of the school, urban schools often have fewer resources and more students from poorer homes, which also related to lower group participation. Urban schools attended by students with learning disabilities had 33% of their students body coming from low-income households, compared to 6% of students who attended suburban schools ($p<.001$), and 18% of those attending rural schools ($p<.01$).

School Factors Related to Social Involvement

School size. Although research on the general student population has related attending smaller schools to an increased sense of secondary school community and an increased participation in group activities (for example, Bryk and Driscoll, 1988; Lightfoot, 1983; Wehlage, 1989, Lindsay, 1982, Barker and Gump, 1964, Grabe, 1981, Pittman and Haughwout, 1987), for students with learning disabilities, school size was not related to the rate at which students saw friends, nor to whether students participated in group activities (Table 3).

Percentage of time in regular education classes. An important goal of mainstreaming has been to provide students with disabilities access to and constructive interaction with nonhandicapped peers (Johnson and Johnson, 1980). In keeping with this expectation, we find that for students who

attended regular secondary schools, the greater the percentage of the day youth spent in regular education classrooms, the more likely they were to be group participants and the less likely they were to be socially isolated. For example 16% of those who were mainstreamed for less than a third of their classes rarely saw friends outside of school, while only 3% of those who were mainstreamed for all of their classes rarely saw friends ($p<.05$). In terms of group experiences, 67% of those who spent their entire day in regular education classrooms, and 50% of those who were mainstreamed for two-thirds or more of their instructional time were group members, compared to 32% of those mainstreamed for one-third or less of their school day $p<.01$). Although being mainstreamed is confounded with severity of disability, when severity of disability was controlled for in multivariate analysis (Newman, 1991), attending regular education classes was still significantly related both to a lower probability of social isolation and an increase likelihood of group membership.

The Relationship of Social Activities to School Performance

Policymakers, educators, researchers, and parents who have a particular interest in students with disabilities also have a particular interest in issues of school performance. Many students with disabilities are in special education because they were unable to achieve to their potential or to the school expectations in the regular education environment. With the individualized educational program provided through special education, some students are able to overcome early performance deficits. Others continue to struggle academically. That academic struggle can end in early school leaving, which is powerfully related to poorer social and economic outcomes in adulthood (W.T. Grant Foundation, 1988).

The NLTS has examined whether students who saw friends or belonged to groups in their most recent year in secondary school were more likely to experience positive outcomes than their non-socially involved peers. For students in secondary school, the NLTS has assessed the relationship between

frequency of seeing friends and group membership with two dimensions of students' school performance in their most recent year:

- Engagement in the educational process, as measured by students' school attendance (number of days absent from school). A minimum expectation for student performance is that students attend school; without participation in the educational process, its benefits are difficult to attain. However, some students experience involuntary absenteeism due to illness. Others elect to skip school, perhaps because of disaffection or alienation from school. Whether voluntary or involuntary, high absenteeism has been identified as perhaps the single strongest predictor of academic failure and dropout decisions for students with disabilities (Wagner, 1991: Thornton, et al., 1987; Donohoe and Zigmond, 1990; Schellenberg, Frye, and Tomsic, 1988).

- Grade performance, as measured by whether the student received one or more failing course grades. Grades as a measure of school performance have numerous limitations, including their variation from school to school, their inflation over time, and their noncomparability for regular and special education classes. However, course grades do provide students with often powerful messages that combine to shape students' images of themselves as learners and of their competence to perform academic tasks (Bloom, 1976; Finn, 1989). Eckstrom et al. (1986) have found that course grades more powerfully distinguish school prehistories from dropouts than do general measures of achievement.

Students with learning disabilities experienced some problems with school performance, in terms of absenteeism and course failure. They averaged almost 15 days absent from school, with a quarter absent for more than 20 days. More than one third had failed a course in their most recent school year. These aspects of school performance are powerful predictors of youth with disabilities dropping out of school. How did their social involvement relate to this school performance?

A first look at the differences in these two school performance measures for students with learning disabilities reveals that youth who belonged to groups were significantly less likely than non-participants to be absent from school and to have failed one or more classes in their most recent school year. As indicated on Table 4, youth who were group members were absent from school during the year an average of 11 days, as compared to 17 days absent

Table 4

RELATIONSHIP BETWEEN SCHOOL PERFORMANCE AND SOCIAL INVOLVEMENT OF SECONDARY STUDENTS WITH LEARNING DISABILITIES

	Average Days Absent			Has Failed 1 or More Classes		
	Mean	SE	N	%	SE	N
Total	14.5	.8	568	34.4	2.7	606
Belonged to a group						
Yes	11.0	1.0	200	25.9	4.2	213
No	16.9	1.4	240	40.3	4.3	254
Frequency of seeing friends						
Rarely (< 1/week)	10.5	3.7	30	19.1	9.5	34
Sometimes (1-5/week)	13.2	1.2	255	31.8	3.9	268
Often (6-7/week)	16.5	1.6	147	41.1	5.6	156

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* Excludes schools that only serve youth with disabilities.

Source: Data on social behaviors from parent interviews; school performance from students' school records.

for non-participants (p<.001). Group members also were significantly less likely to have failed a class, with 26% of group participants having failed one or more classes in the most recent school year, compared to a failure rate of over 40% for nonparticipants (p<.05).

The significant difference we see in these students' school performance related to frequency of seeing friends is that youth who saw friends frequently were more likely to have failed a course (41%) than youth who rarely saw friends (19%; p<.05). This is contrary to findings of previous research that show relationships between academic achievement and peer acceptance (Green, et al, 1980, McMichael, 1980, Taylor, 1989), yet it is important to remember that we are measuring frequency of relationships outside of school and not between classmates within the school environment.

There does not seem to be a bivariate relationship between frequency of seeing friends and differences in the rate of absenteeism.

This look at simple group differences however, does not present a clear picture of the independent relationships between social behaviors and school performance outcomes because, as was demonstrated earlier, there are important differences in the characteristics of students who did or did not choose to participate in groups, or see friends frequently, that could be expected have an impact on their performance. For example, earlier it was shown that students from higher socioeconomic status families were more likely to be group participants; students from these types of families are also more likely to perform better in school (Wagner, 1991). If the confounding effects of socioeconomic status differences were removed, would there still be significant differences between group participation and school performance? Multivariate analysis is required to identify the relationship of social involvement to school performance, independent of these kinds of confounding influences.

Multivariate Analysis of Relationship between Social Involvement and School Performance.

To identify the relationship between social involvment and student absenteeism, controlling for youth background characteristics, an ordinary least squares regression was performed with the number of days absent from school as the dependent variable. Because the other measure of school performance is dichotomous rather than continuous, logit analysis was employed to analyze factors related to whether students had failed a course in their most recent school year.

Each of these analyses included a dichotomous independent variable measuring whether students had participated in groups in the previous year, as well as a categorical independent variable measuring the frequency parents reported students visited with friends. As discussed earlier, to identify the independent relationship of these social interaction variables to secondary school performances, the influence of other youth background categories must be controlled for in multivariate analyses. Reflecting findings of recent research,* the NLTS has hypothesized that school achievement is affected by student demographic and disability-related characteristics; student behaviors; and school characteristics and experiences. The following variables were included in the multivariate models to determine their independent effects on each of two measures: whether students received failing course grades, and rate of absenteeism, controlling for other variables in the model:

- Student behaviors
  - . Student belonged to school/community group
  - . Frequency of seeing friends
  - . Youth had disciplinary problems

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* See for example Alpert and Dunham, 1986; Bachman, 1970; Bachman, Green, and Wirtanen, 1971; Baro and Kolstad, 1986; Donahoe and Zigmond, 1990; Eckstrom et al. 1987; Fetters, Brown and Owings, 1984; Hendrick, MacMillan, and Balow, 1989; Jones et al., 1986; Mahan and Johnson, 1983; Pallas, Natriello and McDill, 1988;Peng and Takai, 1987; Pittman and Haughwout, 1987; Rumberger, 1983 and 1987; Schellenbergn Frye and Tomsic, 1988; Scott-Hones, 1984; Thornton, et al., 1987; U.S. Bureau of the Census, 1987; Vito and Connell, 1988, Wagner and Shaver 1989; Wehlage and Rutter, 1986; Wehlage, 1983 and 1989; Zigmond, 1987).

- Student characteristics
  - . IQ
  - . Functional Ability scale score (ranges from 4 to 16).
  - . Age
  - . Gender
  - . Ethnic background (minority vs. nonminority).
  - . Household income (5 point scale)
  - . Single-parent household
  - . Urban/suburban/rural residence

- School and program characteristics
  - . School size
  - . Percentage of time in regular education classes

(Description of these variables, their hypothesized relationships to school performance, their definitions and coding are included in Appendix B).

As a proxy for social bonds, we hypothesized that students who belonged to a group would be more likely than non-participants to attend school more regularly, thereby having fewer days absent, and would be less likely to fail courses. Conversely, recent research has suggested that students who spent a significant amount of time seeing friends outside of school may have been doing so at the cost of more productive activities (Newman, 1991; Jay, 1991). We would therefore expect students who spent more time socializing to have poorer school performance.

Table 5 presents the results of these multivariate analyses.* Because interpretation of logit coefficients is not straightforward, they have been converted in Table 5 into the percentage point change in the predicted probability of failing a course, given the specified value of the variable,

* Actual logit coefficients are included in Appendix C, Table C-1. Appendix C also includes a table (Table C-2) presenting the unweighted means for all variables included in the model for the 427 students included in the multivariate analysis and for the full sample of students classified as learning disabled in regular schools. Correlations between the dependent variable and independent variables for both groups are also included. Virtually no significant differences exist between the subsample included in the model and the larger sample of students, indicating the subsample is representative of the larger group of students.

Table 5

ESTIMATED CHANGE IN SCHOOL PERFORMANCE ASSOCIATED WITH SOCIAL BEHAVIORS AND OTHER STUDENT AND SCHOOL CHARACTERISTICS

Independent Variables	Estimated Change in: Average Number of Days Absent	Estimated Change in: Rate of Course Failure (Percentage Points)	For Increment
Student belonged to school/community group	-4.3***	-11.6*	Yes vs. No
Frequency of seeing friends (6 category scale)	2.7+	8.4*	6-7 days/week vs. once a week
Functional Ability			
Functional ability score	-.07	-3.6	High (16) vs. medium (12)
IQ score	.3	-1.5	100 vs. 80
Demographic Characteristics			
Age	-.5	-7.1*	Age 18 vs. 16
Youth was male	.1	9.6	Yes vs. no
Youth was a minority	1.7	10.7	Yes vs. no
Household income (5 category scale)	-.9	-1.6	$36,000-$50,000 vs. <$12,000
From a single-parent household	2.8	5.7	Yes vs. no
Youth attended school in urban area	4.3*	5.7	Urban vs. suburban
Youth attended school in rural area	.1	-2.1	Rural vs. suburban
Student Behaviors			
Has had disciplinary problems	7.6***	16.2*	Yes vs. no
School Characteristics			
Student enrollment	-.0	.8	1,200 students vs. 800
Percentage of time in regular education classes	.7	10.2**	6 classes vs. 3 classes

Significance: + = < .C6; * = < .05; ** = < .01; *** = < .001.

with all other variables in the analysis at their mean values for students attending regular secondary schools.

We see a consistent pattern of relationship between group participation and better school performance. Students who belonged to groups were absent from school significantly fewer days, other factors being equal. Those belonging to school or community groups were estimated to miss 4.3 days less in the school year than students without such affiliations ($p<.001$), independent of other factors. Similarly, group members were significantly less likely to have failed a course in their most recent school year ($p<.05$), other factors being equal. The NLTS estimates that the likelihood of failing a course was 11.6 percentage points lower for group participants than for non-participants.

The frequency of seeing friends relates to school performance in the opposite direction to group affiliation. Students who saw friends frequently were likely to be absent from school more days; those who saw friends 6 to 7 days per week as opposed to once a week were estimated to miss three days more of school ($p<.06$) and to have a significantly greater likelihood of having failed a course ($p<.05$). The NLTS estimates that the likelihood of failing a course was 8.4 percentage points higher for students who saw friends frequently.

Discussion

In examining the social activities of youth with learning disabilities, we have focused largely on the frequency with which youth saw friends socially and the rate at which they belonged to school or community groups. Our initial expectation regarding these facets of socialization was that they would act in tandem; i.e., that youth who saw friends often would also belong to groups often.
Further, we expected that the two measures would relate to other outcomes in similar ways; e.g., that youth who belonged to groups and those who saw friends often would be better performers in school. We were surprised to

discover that frequency of activities with friends and group memberships are largely independent of each other; their simple correlation is .02. They also relate to several other outcomes in opposite ways. Findings regarding the two measures are summarized below.

Frequency of Getting Together with Friends

In contrast to the positive social aspects of group memberships, troublesome findings have emerged regarding young people who were reported by parents to get together with friends often, perhaps as many as six or seven days per week. Although relative social isolation was reported by parents for a minority of youth with learning disabilities (8% saw friends less than one day a week), the weakness or absence of friendship circles for those youth may limit their opportunities for learning social skills and establishing satisfying relationships that can add significantly to the quality of one's life. On the other hand, more than one-third of youth with learning disabilities were reported to see friends outside of school 6 or 7 days a week. Students who got together with friends this frequently outside of school had higher absenteeism from school than did students who were less actively involved with their friends outside of school, and also were more likely to have received one or more failing grades in their most school year. High absenteeism and grade failure were among the strongest predictors of youth dropping out of school (Wagner, 1991).

It is important to note that frequency of activity is the only dimension of friendships that was measured in the NLTS; the nature and quality of friendships were not addressed. If an indicator of "good" friendships vs. "bad" friendships were introduced into the analysis, it is quite possible that frequency of contact would have been related to outcomes in a different way. Perhaps, for example, seeing friends often who exert a positive influence would be related to positive outcomes. However, without such a measure of quality, we are left with a troubling picture of the potential effects of high levels of social involvement with friends.

Perhaps it is the sheer amount of time invested in social activities that contributes to the negative relationships we have observed, regardless of the quality or nature of the friendships; i.e., a high level of social involvement with friends simply may take time away from other productive activities. Perhaps social activities, which may last late into the evening, make it difficult for students to get up and go to school, resulting in higher absenteeism. Perhaps such activities detract from time to do homework, leading to a reluctance to go to school unprepared and to poor grades. Whatever the underlying dynamics of the relationship, NLTS findings raise a red flag of warning regarding the outcomes of very frequent social activities among adolescents with learning disabilities.

Group Affiliations

We have seen a consistent pattern of positive outcomes for students who were engaged in school or community groups. Students who found a niche in organized groups had significantly lower school absenteeism and better grade performance.

There could be several explanations for these relationships. Perhaps, among in-school youth, having group affiliations increased students' commitment to school as a place that had social as well as academic value. Alternatively, perhaps the kind of young person who belonged to groups, with the commitment to group norms that such membership implies, differed from nonmembers in important and unmeasured ways and it was the difference in youth that explains positive outcomes for group members. Either explanation supports the importance of young people identifying with social institutions, accepting and internalizing social values and norms, and learning social skills and behaviors that will enable them to have positive experiences in social organizations. All of these are aspects of good citizenship. Good citizenship and the behaviors it entails are learned; to be learned, they must be taught. They can be taught at home and at school, beginning at an early age. Schools can support a wide variety of social, hobby, athletic, service, leadership, and other groups so that students with widely diverse

interests and abilities have opportunities to establish social affiliations and exercise the roles and behaviors of good citizenship. NLTS data suggest that young people who have established such social affiliations benefitted in many ways throughout their secondary school careers and early adulthood.

The strong relationships noted for group participation suggests several leverage points for those interested in improving students' school performance. Findings suggest that school performance is not influenced only by disability characteristics, IQ, or demographic characteristics of students that are impervious to change. Even when given similar characteristics of poverty and disability, some students do better than others. Students who bonded with school, whose friendships did not overly compete with the time needed to meet school responsibilities were better students. These behaviors are learned, beginning at an early age. Schools can encourage such behaviors by providing opportunities for students with widely varying interests to find social memberships, and by working with parents to set guidelines for appropriate out-of-school social activities.

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APPENDIX A

OVERVIEW OF THE NATIONAL LONGITUDINAL TRANSITION STUDY OF SPECIAL EDUCATION STUDENTS

As part of the 1983 amendments to the Education of All Handicapped Children Act (EHA), the Congress requested that the U.S. Department of Education conduct a national longitudinal study of the transition of secondary special education students to determine how they fare in terms of education, employment and independent living. A 5-year study was mandated, which was to include youth from ages 13 to 21 who were in special education at the time they were selected and who represented all 11 federal disability categories.

In 1984, the Office of Special Education Programs (OSEP) of the U.S. Department of Education contracted with SRI International to determine a design, develop and field test data collection instruments, and select a study sample. In April 1987, under a separate contract, SRI began the National Longitudinal Transition Study of Special Education Students (NLTS).

In the field of research on youth with disabilities, the NLTS is unique in several respects. For many years, the research base on youth with disabilities has consisted largely of studies of relatively few youth who were in particular disability categories, in a few school districts or a single state, or in a specific educational placement or treatment program. It has been very difficult to paint a broad picture of students from this fragmented research base. With the NLTS, findings are based on a sample that is large and nationally representative. The data presented here were collected in 1987 for a sample of more than 8,000 youth who represent the national population of secondary special education students who were ages 13 to 21 in the 1985-86 school year. The sample permits us to estimate with fairly high precision many of the characteristics of youth with disabilities and their experiences in adolescence and early adulthood. Further, the sample is nationally representative of 1985-86 secondary special education students both as a whole and for those in each of the 11 federal disability categories separately. Therefore, for the first time we know what the transition experiences were for youth with mental retardation, for example, and how they differed from those of youth with orthopedic impairments or multiple handicaps.

The NLTS is also unusual in its longitudinal design. The students for whom data were gathered in 1987 are being retained in the study so that follow-up data can be collected about them in 1990. These follow-up data will enable the estimation of trends in experiences as youth age. For example, we will be able to describe the movement in and out of jobs and in and out of school that often characterizes youth in their early adult years.

Finally, the NLTS is extremely broad in scope, gathering information on a wide range of characteristics, experiences, and outcomes of youth with disabilities, including the following:

- *Individual and family characteristics* (e.g., demographics, disability-related characteristics).
- *Independent functioning* (e.g., residential independence, financial independence, functional abilities).
- *Social experiences* (e.g., belonging to school or community groups, socializing with friends).
- *School programs* (e.g., courses taken, support services provided, educational placements).
- *School characteristics and policies* (e.g., type of school attended, policies related to mainstreaming, programs available for special education students).
- *School achievement and completion* (e.g., grades received, absenteeism, dropout/graduation behaviors).
- *Employment characteristics* (e.g., rates of employment, job types and duration, wages).
- *Postsecondary education participation in vocational schools and 2-year and 4-year colleges.*
- *Services provided by the school and other sources* (e.g., job training, physical therapy, counseling).
- *Parental expectations for youth in the areas of education, employment, and independence.*

This breadth of scope provides the most comprehensive picture yet available of youth with disabilities during adolescence and early adulthood.

Study Components

The NLTS has four major components:

- *The Parent/Guardian Survey*. In the summer and fall of 1987, parents were interviewed by telephone to determine information on family background and expectations for the youth in the sample, characteristics of the youth, experiences with special services, the youths' educational attainments (including postsecondary education), employment experiences, and measures of social integration. Parents rather than youth were selected as respondents for the first wave of data collection because of the need for family background information and because, with most students still being in secondary school and living at home, parents were believed to be accurate respondents for the issues addressed. A survey will be conducted in the fall of 1990, when youth will be interviewed if they are able to respond.
- *School Record Abstracts*. Information has been abstracted from students' school records for their most recent year in secondary school (the 1985-86 or 1986-87 school year). This information

relates to courses taken, grades achieved (if in a graded program), placement, related services received from the school, status at the end of the year, attendance, IQ, and experiences with minimum competency testing. In the second wave of data collection in 1990, secondary school transcripts will be sought for all youth who were in secondary school at any time since the 1986-87 school year.

- *School Program Survey*. Schools attended by sample students in the 1986-87 school year were surveyed for information on enrollment, staffing, programs and related services offered to secondary special education students, policies affecting special education programs and students, and community resources for the disabled. A similar survey will be conducted in 1991 for youth still in secondary school in the 1990-91 school year.

- *Explanatory Substudies*. Studies involving two subsamples of youth have looked in greater depth at 1) students' secondary school programs (the school program substudy), 2) the patterns of transition outcomes achieved by youth who were out of secondary school (the exiter substudy), and the relationship between school experiences and outcomes. Substudies were conducted in 1989 and 1990

The NLTS Sample

The NLTS sample was constructed in two stages. A sample of 450 school districts was randomly selected from the universe of approximately 14,000 school districts serving secondary (grade 7 or above) special education students,* which had been stratified by region of the country, a measure of district wealth involving the proportion of students in poverty (Orshansky percentile), and student enrollment. Because not enough districts agreed to participate, a replacement sample of 178 additional districts was selected. More than 80 state-supported special schools serving secondary-age deaf, blind, and deaf-blind students were also invited to participate in the study. A total of 303 school districts and 22 special schools agreed to have their students selected for the study.

Analysis of the potential bias of the district sample indicated no systematic bias that would have an impact on study results when participating districts were compared to nonparticipants on several characteristics of the students served, participation in Vocational Rehabilitation programs, the extent of school-based and community resources for the disabled, the configuration of other education agencies serving district students, and metropolitan status (see Javitz, 1990 for more information on the LEA sample). Bias may exist, of course, on factors for which data were not available for such comparisons.

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* The 1983 Quality Education Data, Inc. (QED) database was used to construct the sampling frame. QED is a private nonprofit firm located in Denver, Colorado. Special education cooperatives and other special service units were not sampled directly (83% of special education students are served directly by school districts; Moore et al., 1988). However, instructions to districts for compiling student rosters asked districts to include on their listing any students sent from their district to such cooperatives or special service units. Despite these instructions, some districts may have underreported students served outside the district.

Students were selected from rosters compiled by districts, which were instructed to include all special education students in the 1985-86 school year who were in grades 7 through 12 or whose birthdays were in 1972 or before, whether or not they were served within the district or outside the district (e.g., in a state-supported residential school). Rosters were stratified into 3 age groups (13 to 15, 16 to 18, over 18) for each of the 11 federal disability categories and youth were randomly selected from each age/disability group so that approximately 800 to 1,000 students were selected in each disability category (with the exception of deaf-blind, for which fewer than 100 students were served in the districts and schools included in the sample).

In part because of the time lapse between sample selection and data collection, many students could not be located at the addresses or telephone numbers provided by the schools. Of the 12,833 students selected for the sample, about one-third could not be reached by telephone for the parent interview. (For more than half of these, addresses and telephone numbers were not provided by the schools/districts from which they were sampled.) This relatively high rate of inability to reach sample members confirmed the importance of including in the NLTS a substudy of nonrespondents to determine whether those who were reached for the telephone interview were a representative sample of the population to which the study was intended to generalize. To identify whether bias existed in the interview sample, interviewers went to 28 school districts with relatively high nonresponse rates to locate and interview in person those who could not be reached by telephone. Of the 554 sought for in-person interviews, 442 were found and interviewed, a response rate of 80%. A comparison of telephone interview respondents with in-person interview respondents showed that the telephone sample underrepresented lower-income households. The sample was reweighted to adjust for that bias, as described in the next section.

Of the 10,369 sampled students for whom addresses or telephone numbers were provided by schools or districts, some portion of the needed data was collected for 84%; the response rates for individual components of the study were as follows:

	N	Response Rate
Parent interview	7619	71%
School records	6241	60
School survey	6672	64

Weighting Procedures and the Population to Which Data Generalize

Youth with disabilities for whom data could be gathered were weighted to represent the U.S. population of special education students in the 1985-86 school year who were in grades 7 through 12 or at least 13 years old. Because it is a sample of students at various ages, the NLTS sample does not generalize to youth who had dropped out of school before that age. For example, the sample of 18-year-olds generalizes to youth who were 18 and still in secondary school in 1985-86, not to all 18-year-olds with disabilities, many of whom may had left school at an earlier age.

In performing sample weighting, three mutually exclusive groups of sample members were distinguished:

(A) Youth whose parents responded to the telephone interview.

(B) Youth whose parents did not respond to the telephone interview but were interviewed in person.

(C) Youth whose parents did not respond to either the telephone or in-person interview but for whom the we obtained a record abstract.

A major concern in weighting was to determine whether there was a nonresponse bias and to calculate the weights in such a way as to minimize that bias. There was a potential for three types of nonresponse bias:*

(1) Bias attributable to the inability to locate respondents because they had moved or had nonworking telephone numbers.

(2) Bias attributable to refusal to complete an interview (only 3% of those available to be interviewed refused).

(3) Bias attributable to circumstances that made it infeasible to locate or process a student's record.

Of these three types of nonresponse, the first was believed to be the most important, in terms of both frequency and influence on the analysis. Type 1 bias was also the only type of nonresponse that could be estimated and corrected.

The magnitude of type 1 nonresponse bias was estimated by comparing responses to items available for the three groups of respondents (after adjusting for differences in the frequency with which youth in different disability categories were selected and differences in the size of the LEAs selected). Group A was wealthier, more highly educated, and less likely to be minority than group B. In addition, group A was more likely to have students who graduated from high school than group B or C (which had similar dropout rates). Groups A and B were compared on several additional measures for which data were unavailable for group C. The youth described by the two groups were similar on these additional items, including gender, employment status, pay, functional skills, association with a social group, and length of time since leaving school. Adjusting the weights to eliminate bias in the income distribution eliminated bias in parental educational attainment and ethnic composition, but did not affect differences in dropout rates. It was also determined that groups B and C were large enough that if they were treated the same as group A in the weighting process, the resulting dropout distribution would be approximately correct.

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* We assumed that nonrespondents who could not be located because LEAs did not provide student names would have chosen to participate at about the same rate as parents in districts in which youth could be identified. The remaining nonrespondents would presumably have been distributed between the three types of nonresponse mentioned above.

Weighting was accomplished using the following steps:

- Data from the first groups of sample members were used to estimate the income distribution for each disability category that would have been obtained in the absence of type 1 nonresponse bias.

- Respondents from all three groups were combined and weighted up to the universe by disability category. Weights were computed within strata used to select the sample (i.e., LEA size and wealth, student disability category and age).

- Weights from three low-incidence disability categories (deaf, orthopedically impaired, and visually impaired) were adjusted to increase the effective sample size. These adjustments consisted primarily of slightly increasing the weights of students in larger LEAs and decreasing the weights of students in smaller LEAs. Responses before and after these weighting adjustments were nearly identical. In addition, because there were only three deaf/blind youth from medium-size or smaller districts, who had large weights, they were removed from the sample to increase the effective sample size. Thus, NLTS results do not represent the very small number of deaf/blind students in medium-size or smaller LEAs.

- The resulting weights were adjusted so that each disability category exhibited the appropriate income distribution estimated in step 1 above. These adjustments were of modest magnitude (relative to the range of weights within handicapping condition); the weights of the poorest respondents were multiplied by a factor of approximately 1.6 and the weights of the wealthiest respondents were multiplied by a factor of approximately .7.

Estimation of Standard Errors

The statistical tables present data for various subgroups of youth with disabilities. Most of the variables presented in the tables are reported as percentages of youth In some cases, rather than percentages, the figures refer to means, such as the mean age of youth contacting VR. Percentages and means are weighted to represent the national population of youth with disabilities and youth in each disability category. However, the percentages and means are only estimates of the actual percentages and means that would be obtained if all youth with disabilities were included in the study. These estimates vary in how closely they approximate the true measures that would be derived from a study of all youth. To aid the reader in determining the precision of the estimates, for each percentage and mean the tables present the approximate standard error and the unweighted number of cases on which the statistic is based.

The standard errors for the NLTS were computed using procedures that differ from standard calculation routines. Such routines assume a simple random sample. However, the NLTS used a stratified cluster sample design, which introduces design effects that reduce the precision of estimates for a

sample of a given size, compared with a simple random sample. The design effects within the NLTS affect the precision of estimates to varying degrees for different subpopulations and different variables. Pseudo-replication is widely accepted as a variance estimation technique in the presence of design effects. However, it is not cost-effective for estimating the standard errors of the thousands of variables and subpopulations tabulated in the 10 volumes of the statistical almanacs. Therefore, pseudo-replication was conducted on a limited number of variables to calibrate an approximation formula that is cost-effective for purposes of the almanacs, using the following procedures:

- A set of 25 variables representing the parent interview, school program survey, and record abstract was identified for the purpose of developing a statistical approximation formula; these included 16 nominal variables and 9 continuous variables.

- Standard errors of the weighted means of the selected variables were estimated in two ways. The first procedure involved pseudo-replication. For each variable, standard errors were calculated for students in each handicap category and for the total sample (300 standard errors) using a partially balanced experimental design specifying how students were to be allocated to 16 half-samples. The sample was split on the basis of the school districts and special schools from which youth were originally sampled. Districts and schools were paired on the basis of enrollment and a measure of poverty, and one member of each pair was assigned to each half-sample. Sample weights for students were computed for each half-sample as if those in the half-sample were the only study participants.

  The following formula was used to estimate the standard error of the mean for students in all conditions:

$$\text{Standard error} = [(1/16) \sum_i (M_i - M)^2]^{1/2}$$

  where M_i is the mean calculated for students in one of the 16 half-samples), M is the mean response calculated from the full sample, and the summation extends over all 16 half-samples. (Note that responses to questions from the school program survey were attached to the records of students in the responding schools so that means for these items were computed using student weights.)

- The second estimation procedure involved an approximation formula based on an estimate of the effective sample size for each handicap category and the total sample. The sampling efficiency (E) for a group was calculated using the following formula:

$$E = M_w^2/(M_w^2+S_w^2)$$

  where M_w and S_w are the mean and standard deviation of the student weights over all members of the group. The approximation formula for the standard error of the weighted mean of nominal variables is:

$$\text{Standard error} = [P(1-P)/(E \times N)]^{1/2}$$

where P is the full-sample weighted proportion of "yes" responses to a particular question in the group, N is the unweighted number of "yes" or "no" responses to the question in the group, and E is the sampling efficiency of the group. The approximation formula for the standard error of the mean of a continuous variable is:

$$\text{Standard error} = [S^2/(N \times E)]^{1/2}$$

where S^2 is the variance of responses in the group for the continuous variable (computed with frequencies equal to full-sample weights) and N is the unweighted number of respondents to the question in the group. These formulas were used to compute a total of 300 standard errors for the same variables and groups addressed using pseudo-replication.

- To assess the accuracy of the standard errors produced by these formulas, we used scatter plots to compare them with standard errors produced using pseudo-replication. For both nominal and continuous variables, the approximate best fit was a 45 degree line. That is, on average, the formula based on estimates of effective sample size neither systematically overestimated nor underestimated the standard error obtained using pseudo-replication, arguing for use of the more cost-effective estimation formulas. However, because error remains in the estimates that might result in underestimating the true standard errors in some instances, we took a conservative approach and multiplied the standard errors produced using the estimation formulas by 1.25. The vast majority of the standard errors so obtained were larger than the standard errors obtained by pseudo-replication. Thus, the standard errors included in the almanacs were calculated using the effective sample size estimation formulas and increased by a factor of 1.25.

Caveats to Users of the Data

To minimize the potential that data in this report will be misinterpreted, the reader should keep in mind the following considerations.

- *Estimation of Sampling Errors.* The data tables contain approximate standard errors for means and percentages. Users should interpret data in light of the standard errors. Percentages or means based on subgroups with relatively few cases have a considerably greater margin of error than those based on larger subgroups.

- *Subgroup Definitions.* Results are often calculated for subgroups of youth; readers should be clear about the subgroup to which data refer to avoid misinterpreting findings. Of particular note are the subgroups based on the youth's designated disability. Assignment to a disability category is based on the primary disability designated

by the youth's school or district in the 1985-86 school year. Category definitions, assessment methods, and rules of thumb for categorizing students vary widely between states and often between school districts within states. NLTS data should not be interpreted as describing youth who truly had a particular disability, but rather as describing youth who were categorized as having that disability by their school or district.

- *Sources of Data and Data Reliability.* Each table indicates the source of the data reported in it (e.g., parent interview). The confidence the reader places in the data should be based in part on a recognition of their source. The accuracy of parent reports about their adolescent or adult children may vary depending on the subject of an item. For example, parents were expected to be quite accurate reporters of data on family characteristics, but to be less aware of--and, therefore, report less accurately on--the kinds of services their children were provided in school or by other agencies. When two sources of data were available for a given item (e.g., parent reports and school record indications of whether the youth graduated or dropped out), consistency checks were performed. For many variables, a high level of agreement was found, while for other items, larger discrepancies were noted. Such discrepancies were resolved using decision rules reported elsewhere (see Wagner and Javitz, 1990). However, for most items, only one source of data was available, making it impossible to verify the accuracy of the responses.

- *Missing Data* Missing data result from item nonresponse, the absence of the whole instrument from which an item was taken, or a logical skip of an item because it was inappropriate to a particular respondent (e.g., some items were asked only of parents of youth with particular kinds of disabilities). Missing data of all kinds were eliminated from calculations of percentages and means. Hence, the reported percentages and means are based on those for whom the question was appropriate and who answered the question. The approximate standard errors increase as the sample size decreases, drawing the user's attention to statistics that are based on particularly small samples.

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Appendix B
INDEPENDENT VARIABLE DEFINITIONS AND HYPOTHESES SUPPORTING THEIR INCLUSION IN ANALYSES

This appendix describes the sources, construction, and hypotheses of the factors included in multivariate analyses, along with measures of social involvement described in the text.

Individual/Household/Community Characteristics

Disability-Related Characteristics.

- *Disability category.* Information on the nature of youths' disabilities were gathered from three sources. The original designation of youths' primary disabilities that was the basis for their being sampled for the NLTS came from rosters of secondary special education students submitted by districts included in the study. In addition parents were asked in telephone interviews: "For what learning problems or other disabilities has (NAME) gotten special services? Which of these has been (NAME'S) main learning problem or disability?" Finally, data collectors who abstracted information from students' school records were asked to record all disabilities for each student that were designated in the school record or IEP.

  For all crosstabulations throughout this report, youth are assigned to the learning disability category based on the primary disability designated by the youth's school or district in the 1985-86 school year. Descriptive data are nationally generalizable to youth who were classified as having a learning disability in the 1985-86 school year.

  In multivariate analyses, somewhat different groupings were used because our purpose was different. Rather than present findings for youth in a particular category, the purpose of using variables designating disability categories in multivariate analyses was to identify the independent effects of having a particular kind of disability. For this purpose, it was important to eliminate some of the measurement variability within the categories; e.g., some youth with IQs that exceeded their state's limit for designation as mentally retarded were still classified as mentally retarded, whereas other youth with the same IQ from a different district in the same state were classified as learning disabled . This kind of variability reduces the power of the variables to distinguish significant differences in outcomes. Hence, we sought to establish somewhat more homogenous groupings of youth, in essence imposing a more standard definition of a disability on the variability that exists naturally.

  We also sought to resolve several apparent discrepancies between our three sources of data regarding the nature of youths' disability or disabilities. For example, some reports of youths' disabilities that

were taken from their individual school records in 1986-87 differed from the disability classification reported for them by their school district in 1985-86, indicating a change in their classification.

- *Functional mental skills*. Parents were asked: "How well does (NAME) do each of the following things on his/her own, without help? Look up telephone numbers in the phone book and use the phone; tell time on a clock with hands; read and understand common signs like STOP, MEN, WOMEN, OR DANGER; count change. (FOR EACH TASK) Would you say very well, pretty well, not very well, or not at all well?" A scale was formed by assigning a value of 4 to "very well." 3 to "pretty well," 2 to "not very well" and 1 to "not at all well." Scores were summed for the 4 tasks to create a scale ranging from 4 to 16.

  For multivariate analyses, in which maintaining a maximum sample size was a major concern, youth who were missing a single item in the scale were imputed a value on that item by predicting a value for the single missing item using the three present components of the scale, the disability category of the youth, and age.

- *Measured IQ* IQ scores were taken from students' school records for their most recent year in secondary school and recorded on the school record abstract form. IQ data were not available for all youth and the fraction of students for whom IQ scores were available varied considerably for youth in different disability categories. For example, IQ scores were present in school records for 86% of youth classified as mentally retarded, but for only 47% of youth with other health impairments. The relatively high rate of missing data for youth in some categories raised the question of whether available IQ scores were systematically biased downward.

  To address this issue, the functional ability levels were compared for youth with and without IQ scores in each disability category. To the extent that functional ability correlates with measured IQ ($r=.54$; $p<.001$), bias would be indicated if lower functional ability scores were observed for youth with IQ scores and higher functional ability scores for youth without IQ data. For youth classified as learning disabled there were no significant differences between youth with and without IQ test scores, indicating an absence of bias for those youth.

  In multivariate analyses, data were imputed for some missing cases by predicting a value for IQ based on an regression equation predicting IQ as a function of the primary disability category, whether the youth was mildly, moderately, or severely mentally retarded as a secondary disability, the functional mental skills scale score, ethnic background, and household income.

Demographics--Demographic measures were included in analyses because they capture important variations in social involvement and because a substantial body of literature suggests their influence on school performance

(see for example Rumberger, 1987; Eckstrom et al., 1986; GAO, 1986; Pallas, Natriello, and McDill, 1988; Peng and Takai, 1987; Scott-Jones, 1984; U.S. Bureau of the Census, 1987). Specific demographic variables and their sources are included in Table B-1.

Characteristics of Youths' Secondary Schools/Programs

- *Percentage of instructional time in regular education.* Recent literature has determined that characteristics of effective programs for students with poor school performance include low student/teacher ratios and individualized programs. Although the NLTS does not measure these factors directly, they often are more characteristic of special education programs than of regular education classes. Further, grading standards in regular education courses are often more stringent. We hypothesize that students with more time in special education and, therefore, a lower proportion of instructional time in regular education, would have better school performance.

  Data on class placement was taken from students school records. Data abstractors indicated for each class taken in the most recent school year the amount of time spent per week in the class, the number of semesters the class was taken, and whether it was regular or special education. The total amount of class time was calculated by multiplying the hours per week by the semesters taken and summing over all classes. A similar calculation was then made for all courses taken in regular education. The percentage is calculated by dividing the time spent in regular education classes by the total amount of class time.

- *School size.* Recent research on the relationship of social bonding to better attendance suggests that students in smaller schools can more readily establish social bonds that support commitment to school and to good performance in school than can students in larger schools (GAO, 1987; Grabe, 1981; Wehlage, 1983 and 1989; Pittman and Haughwout, 1987; Gump, 1978). The Survey of Secondary Special Education Programs asked school administrators to report the average daily attendance at the school (number of students typically attending).

Student Activities/Behaviors

- *Group membership.* As a proxy for social bonds, whether parents reported students had belonged to a school or community group in the previous year is expected to be positively associated with school bonding and related to higher school performance. Parents of youth were asked whether their children had belonged to any school or community group in the previous year.

- *Frequency of seeing friends.* Recent research has suggested that students who spent a significant amount of time seeing friends outside

Table B-1
DEMOGRAPHIC VARIABLES USED IN NLTS ANALYSES

Variable	Source	Values	Definition/Construction
Gender	Parent interview	1	Male
		0	Female
Ethnicity	Parent interview	1	Black
		2	White
		3	Hispanic
		4	American Indian/Alaskan Native
		5	Asian, Pacific Islander
Youth's age	Parent interview or school record	15-24	In analyses of youth outcomes or activities in 1987, age in 1987 is used. Analyses of experiences in the most recent school year (e.g., grades received), use age in that school year.
Head of household's highest education	Parent interview	1	Less than high school
		2	High school graduate
		3	Some college or associate degree
		4	College graduate
		5	Postgraduate education
1986 household income	Parent interview	1	Less than $12,000
		2	$12,000 to $19,999
		3	$20,000 to $24,999
		4	$25,000 to $37,999
		5	$38,000 to $50,000
		6	$50,000 or more
Youth came from single-parent household	Parent interview	1	Single-parent household
		0	Two-parent household
Community location	Quality Education Data (QED)	1	Urban
		2	Suburban
		3	Rural
			Community location reflects the community in which the youth attended secondary school.

of school may have done so at the cost of more productive activities (Newman, 1991; Jay, 1991). We would expect students who spent more time socializing to have poorer school performance and a lower likelihood of employment. Parents of students still in secondary school were asked about how many days a week the student usually got together with friends outside of school. Parents of youth who were out of school were asked about how many days a week the youth got together socially with friends or family members, other than those he/she lived with.

- *Having had disciplinary problems.* The NLTS has constructed a variable indicating whether parents reported youth had had one or more of the following disciplinary problems: being suspended or expelled from school in the previous year, being fired from a job in the previous year, or ever being arrested. This variable is a gross indicator of youth who exhibited behaviors suggesting they had trouble abiding by rules needed to maintain their social roles as students, workers, or members of society generally. Hence, it is expected to relate negatively to measures of school performance.

Table C-1

LOGISTIC REGRESSION COEFFICIENTS FOR FACTORS RELATED TO PROBABILITY OF YOUTH FAILING A COURSE

Analytic Variables	Logistic Regression Coefficient
Social Involvement	
Belonged to group	-.55*
Frequency of seeing friends	.17*
Functional Ability	
Functional ability score	-.04
IQ score	-.00
Individual Characteristics	
Age	-.16*
Youth was male	.47
Youth was a minority	.48
Household income (5 category scale)	-.02
From a single-parent household	.26
Youth attended school in urban area	.26
Youth attended school in rural area	-.10
Student Activities/Behaviors	
Youth had disciplinary problems	.70*
School Factors	
Student enrollment	.00
Percentage of time in regular education classes	.01**

Significance: * = < .05; ** = < .01; *** = < .001.

Table C-2

COMPARISON OF MEANS FOR YOUTH IN THE TOTAL SAMPLE AND THOSE IN EACH MULTIVARIATE MODEL OF SCHOOL PERFORMANCE

Analytic Variables	Mean Values for Students in: Total Sample	Absenteeism Model	Course Failure Model
School Performance			
Average days absent	13.8	13.1	NA
Received failing grade	33.2	NA	31.1
Social Involvement			
Belonged to group	44.9	46.8	47.0
Frequency of seeing friends (5 item scale)	3.7	3.6	3.6
Functional Ability			
Functional ability score	14.7	14.6	14.6
IQ score	91.1	89.5	89.5
Individual Characteristics			
Age	17.4	17.3	17.4
Youth was male	74.1	73.8	73.4
Youth was a minority	28.6	25.4	25.7
Household income (5 category scale)	3.6	3.6	3.6
From a single-parent household	26.8	23.4	24.4
Youth attended school in urban area	27.0	24.2	24.2
Youth attended school in rural area	35.5	35.8	34.8
Student Activities/Behaviors			
Youth had disciplinary problems	12.9	12.8	12.5
School Factors			
Student enrollment	1002.5	948.9	978.1
Percentage of time in regular education classes	65.6	66.5	65.5
N	617-832	397	425

The sample includes students in school in the past 12 months.

Table C-3

COMPARISON OF CORRELATIONS BETWEEN INDEPENDENT VARIABLES AND SELECTED MEASURES OF SCHOOL PERFORMANCE FOR STUDENTS IN THE TOTAL SAMPLE AND THOSE IN EACH MULTIVARIATE MODEL OF SCHOOL PERFORMANCE

Analytic Variables	Correlations with Absenteeism for: Full Sample	Absenteeism Model	Correlations with Course Failure for: Full Sample	Course Failure Model
School Performance				
Average days absent	1.00	1.00	NA	NA
Received failing grade			1.00	1.00
Social Involvement				
Belonged to group	-.18***	-.19***	-.13**	-.11*
Frequency of seeing friends (5 item scale)	.11*	.12*	.10*	.12*
Functional Ability				
Functional ability score	-.03	.00	.03	.01
IQ score	.00	-.01	-.01	.02
Individual Characteristics				
Age	.04	.01	-.05	-.09
Youth was male	.00	.05	.06	.09
Youth was a minority	.21***	.17***	.10*	.13**
Household income (5 category scale)	-.17***	-.16***	-.07	-.08
From a single-parent household	.20***	.18***	.08	.09
Youth attended school in urban area	.17***	.21***	.06	.12*
Youth attended school in rural area	-.05	-.11*	-.06	-.07
Student Activities/Behaviors				
Youth had disciplinary problems	.24***	.22***	.13**	.11*
School Factors				
Student enrollment	.06	.11*	.06	.07
Percentage of time in regular education classes	-.12**	-.09	.04	.05

Significance: * = < .05; ** = < .01; *** = < .001.