

# The Impact of High School Extracurricular Involvement on the Postsecondary Outcomes of Deaf and Hard-of-Hearing Youth

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## Abstract

Involvement in extracurricular activities provides youth with opportunities to develop important personal skills, abilities, and preferences, and to build meaningful social support networks. Historically, students who are deaf or hard of hearing (SDHH) have had limited access to opportunities for both academic and occupational development, including extracurricular participation, although legal changes such as the Americans with Disabilities Act (1990) and the Individuals with Disabilities Education Improvement Act (2004) have shifted this landscape. Drawing from data available in the National Longitudinal Transition Survey 2 (NLTS2) and controlling for demographic covariates, we examine the predictive role overall extracurricular involvement and the breadth of that involvement play in postsecondary outcomes, including education, employment, independent living, and self-beliefs, for approximately 1,000 SDHH ages 14 to 18. We also describe the extracurricular activities in which SDHH are most often involved. Our findings suggest that overall involvement in extracurricular activities significantly predicted independent living, and that involvement in more than one activity significantly predicted postsecondary enrollment. We also discuss the limitations of the study design and implications for future research. It is clear that participation in extracurricular activities in high school benefits SDHH later in life.

Keywords: *Adolescent development, extracurricular involvement, deaf and hard of hearing, postsecondary outcomes*

There is growing recognition in educational research and practice of the important role extracurricular involvement plays in young people's positive development (Eccles, Barber, Stone, & Hunt, 2003; Fredricks & Eccles, 2006; Feldman-Farb & Matjasko, 2012; Feldman & Matjasko, 2005; Mahoney, Larson, & Eccles, 2005; Troutman & Dufur, 2007). Traditional definitions of *extracurricular activity* include a highly structured school- or community-sponsored collaborative activity that is guided by one or more adult supervisors. Examples of extracurricular activities within this definition include school and community athletics, performing arts, academic clubs, leadership clubs, and

Boy Scouts (Gilman, Meyers, & Perez, 2004; Mahoney & Stattin, 2000). Many U.S. high school students participate in extracurricular activities. In *Trends in the Well-Being of American Youth, the National Center for Education Statistics* Fox, Connolly, and Snyder, (2005) reported that, in 2001, 15.3% of high school seniors participated in an academic club, 38.6% in a sport, 25.3% in music or a performing art, 15.3% in an academic club, 10.8% in student council/government, and 10% in the newspaper or yearbook.

The purpose of this article is to explore the extracurricular involvement of students who are deaf or hard of hearing (SDHH), a low-incidence population with

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unique educational backgrounds, language modalities, and identification with cultural communities (Batten, Oakes, & Alexander, 2013; Luckner & Muir, 2001; Marschark & Spencer, 2010; Moeller, 2007). Historically, SDHH have had limited access to opportunities for academic and occupational development, including extracurricular activities. Recent legal changes, including the Americans with Disabilities Act (1990) and the Individuals with Disabilities Education Act (2004), have begun to open doors for SDHH both within and outside the classroom. For example, when the 1975 Education for All Handicapped Children Act was amended and signed into law in 1990 as the Individuals with Disabilities Education Act (IDEA), the term *handicap* was replaced by *disability* (Jacob & Hartshorne, 2003). Furthermore, according to Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act (ADA) of 1990, any programs or services that receive federal money, including educational settings, are required to be accessible to individuals who are deaf and hard of hearing (DHH; DuBow & National Association of the Deaf, 2000). Thus, under ADA, institutions are required to provide accommodations for individuals with disabilities to ensure their equal access to educational opportunities, including extracurricular activities (Cawthon, Nichols, & Collier, 2009).

Previous research on extracurricular activities has explored the important role athletic participation plays in school, community, and cultural life for SDHH (Stewart, 1991; Stewart & Ellis, 1999). However, the impact of involvement in athletics and other extracurricular activities on postsecondary outcomes for DHH youth has yet to be fully examined. Only one study, by Antia, Jones, Luckner, Kreimeyer, and Reed (2011), has found that SDHH participation in school-sponsored extracurricular activities is significantly and positively correlated to both teachers' ratings of students' social skills and students' ratings of their own social skills. Participation in extracurricular activities was significantly and negatively correlated to teachers' problem behavior ratings.

In this article, we first define and discuss the salience of extracurricular involvement as an important context for the adolescent development of all youth. We then review and discuss outcomes specific to DHH youths' participation in extracurricular activities. In our analysis, we use data from the National Longitudinal Transition Study 2 (NLTS2) to investigate the relationship between SDHH extracurricular involvement in high school and their postacademic outcomes. We conclude this article with a discussion of the results and implications for individuals, practitioners, and researchers who work with DHH youth.

## **Extracurricular Involvement as a Context for Adolescent Development**

The ecological systems theory of development provides the theoretical framework for much of the research on extracurricular involvement. It emphasizes a person-environment fit approach to understanding important factors of adolescent development (Bronfenbrenner, 1992; Gilman et al., 2004). This theory accounts for the integration of the individual, the family, and the school and community context, as well as the broader economic and sociological influences on extracurricular participation. This framework has inspired researchers to consider the direct and indirect effects participation in extracurricular activities has on positive youth development and adolescent well-being (Feldman & Matjasko, 2005; Mahoney, Larson, & Eccles, 2005).

Extracurricular activities put adolescents in important leisure environments that create opportunities for them to carry out developmental tasks (Darling, Caldwell, & Smith, 2005), such as exploring and expressing identity, discovering preferences, engaging in challenges outside of academics, building life skills and developing soft skills, social negotiation, and generating academic and social capital. Participating in extracurricular activities gives adolescents the opportunity to develop an extended support network of peers and of adults who serve as mentors (Darling et al., 2005; Eccles & Barber, 1999; Feldman & Matjasko, 2005). For students at risk for academic delay or who struggle with the academic demands of the classroom, extracurricular involvement may offer a place where they can develop important skills and be recognized for successes other than traditional academic achievement (Feldman & Matjasko, 2005).

## **The Impact of Extracurricular Involvement on Youth Development**

Feldman and Matjasko (2005) and Feldman-Farb and Matjasko (2012) systematically examined 88 studies on extracurricular involvement, all published by 2012. Findings from these preeminent literature reviews suggest that extracurricular involvement during secondary school is indeed associated with enhanced academic and social functioning, which in some cases continues into the postsecondary setting. The studies primarily indicate that extracurricular involvement has a positive impact on educational attainment and academic success (Broh, 2002; Camp, 1990; Crosnoe, 2001; Eccles & Barber, 1999). Cooper, Valentine, Nye, and Lindsay (1999) found that extracurricular involvement accounted for 11% of the variance in high school students' GPA above and beyond what was predicted by demographic

information, such as age, race, and socioeconomic status (SES). Marsh (1992) used a large sample (N = 4,422) of nationally representative students and found a curvilinear relationship between extracurricular engagement and GPA. This indicated that stronger extracurricular engagement was associated with a higher GPA, but that the relationship may not be a simple “more is better” result at the upper end of the scale.

The literature also reveals that participation in extracurricular activities has a positive impact on psychological factors related to academic attitude and behavioral outcomes, such as academic persistence (Hanson & Kraus, 1998; Marsh & Kleitman, 2002). Several studies found that students who participated in athletics were almost twice as likely to remain in school as those who did not participate (Davalos, Chavez, & Guardiola, 1999; McNeal, 1995). Darling et al. (2005) reexamined data collected in 1995 from nine high schools in California and Wisconsin and found that extracurricular involvement positively predicted attitudes toward school, as well as the students’ academic aspirations. Eccles and Templeton (2002) proposed that participation in structured extracurricular activities fosters school engagement, interpersonal competence, educational aspirations, and college enrollment, which is similar to Tinto’s (1975) model of academic persistence. Tinto maintained that student persistence as opposed to withdrawal in postsecondary settings is a function of two major factors: a student’s interactions with (a) social systems and (b) academic systems operating within a given institution. Together these findings suggest that extracurricular activities are fundamental to a student’s development of academic motivation and achievement, and to their sense of engagement in school (Feldman-Farb & Matjasko, 2012). Participation in extracurricular activities may foster a sense of belonging and can strengthen social relationships, particularly among students from different ethnic groups or SES classes (Brown & Evans, 2002; Eccles & Barber, 1999; Feldman & Matjasko, 2005). It can also give academically challenged students a way to achieve a sense of community at school, thus reducing dropout rates and the negative impact of student attrition on community cohesiveness (Darling et al., 2005; Khmelkov & Hallinan, 1999; Reis & Díaz, 1999).

Researchers also have examined the impact of the breadth of involvement in extracurricular activities. This is an important concept because it distinguishes between an individual who spends all of their time and energy on one extracurricular activity, such as playing the piano, and one who is involved in multiple activities, such as music, student council, and a sport. Students with a broader range of activities theoretically

are exposed to a greater variety of peer groups, mentorship models, and social networks than those who participate in fewer activities. In the early research, it seemed that participating in more activities resulted in enhanced developmental outcomes. However, Feldman and Matjasko’s (2005) review suggested a curvilinear relationship that includes a point at which participation in too many extracurricular activities is detrimental to an individual’s well-being. This finding was corroborated by the Marsh (1992) analysis, which showed a similar curvilinear relationship between extracurricular engagement and GPA.

There is significant covariation in the literature that relates to various student characteristics and participation in extracurricular activities. In studies of the prevalence of extracurricular involvement and its impact on youth development, these factors often result in interaction effects. For example, early studies measuring participation trends found that adolescents engaged in extracurricular activities were more likely to be from higher SES backgrounds and of European American descent (Marsh, 1992; McNeal, 1998). More recently, Darling et al. (2005) found differences in the rates of youth participation: high school boys were more likely to participate in extracurricular activities than girls, and youth whose parents had less formal education were less likely to participate in extracurricular activities. These researchers also found that students of Hispanic descent were less likely to participate in extracurricular activities than students from any other ethnic demographic. Given the covariation in the literature related to various student characteristics, the analyses in the current study also include interactions for gender, SES, and academic achievement.

### **Extracurricular Involvement in the Lives of DHH Youth**

Sports have been a strong influence in Deaf culture and DHH communities for decades, and they continue to play a role in the lives of DHH youth today (Arsic, Svetlana, & Jasmina, 2012; Stewart, 1991; Stewart & Ellis, 2005). In Deaf communities, athletics provide an important social context for meaningful interaction and facilitates opportunities for young people to strengthen their self-esteem and self-identity, and to contribute as a member of the community (Stewart, 1991; Stewart & Ellis, 2005). Schools for the Deaf also tend to emphasize the athletic tradition by holding competitions between state schools, which are widely supported by parents, alumni, and students. For DHH youth attending school in mainstream educational settings, involvement in extracurricular activities may be a major factor in their success (Luckner & Muir, 2002).

Participation in extracurricular activities also may facilitate the unique transition of DHH individuals who may not have full access to the linguistic modality of the postsecondary setting (Stewart, 1991). Recent research in Deaf education raises significant concerns about the adequacy of the preparation SDHH are given for life after high school (Luft, 2012). Using the Transition Competence Battery to measure the transition strengths and needs of 53 SDHH in middle and high school, Luft and Huff (2011) found that the majority of them were lacking the skills needed to be employed and to live independently. The authors suggested that school-based transition programming for deaf students in public schools should focus on their long-term needs and skill-building, rather than on the kinds of skills needed immediately after high school. Extracurricular sporting events, for example, provide both a buffer and the shared experiences inherent to group sports, which enables DHH athletes to build intimacy and social bonds with their peers (Stewart, 1991).

### **Outcomes Related to Participation in Extracurricular Involvement for DHH Youth**

SDHH enroll in a variety of postsecondary educational institutions (Pepnet2, 2013). Some choose schools such as Gallaudet University or the National Technical Institute for the Deaf in the United States, which have programs specifically for SDHH. Some mainstream postsecondary institutions have a large DHH student population, but most serve fewer than 10 SDHH (Hochgesang, Dunning, Benaissa, De-Caro, & Karchmer, 2007). The most recent estimates, from the National Longitudinal Transition Study (NLTS2), are that only 53% of students identified as having a hearing impairment (including SDHH) completed their postsecondary degree, including diplomas, certificates, or licenses (Newman et al., 2011). Only 34% of students with disabilities completed a four-year college program, compared to 51% of nondisabled students (Newman et al., 2011).

Although some mainstreamed DHH college students who persist through their first year may be particularly resilient, not all choose to complete their degree. Stinson and Walter (1992) found that many SDHH who withdraw from mainstream colleges reported being dissatisfied with their social lives, having difficulty making friends with hearing peers, and lacking DHH peers to interact with. Stinson, Scherer, and Walter (1987) tested a path-analytic model of several factors on outcomes for 233 first-year SDHH at the National Technical Institute of the Deaf, which specifically serves SDHH, to determine whether such social interactions could be facilitated by involvement

in extracurricular activities. Their results suggested that increased college-sponsored extracurricular participation was negatively correlated with college retention after freshman year; in other words, students who participated in college-sponsored extracurricular activities were more likely to withdraw than those who did not. Stinson, Scherer, and Walter (1987) interpreted this finding to mean that students who over-emphasized social involvement in their first year of college may have not mastered self-management skills or developed deeply satisfying relationships. Their findings suggest that it is essential for first-year students to balance the time they devote to extracurricular and social activities with the time they give to their personal care-taking and academics.

Because SDHH are a low-incidence population, quantitative longitudinal studies on the impact community factors have on their higher education outcomes are few and far between. As part of a large five-year study of DHH youth in mainstream educational settings, Antia et al. (2011) examined the correlation between students' participation in school and community extracurricular activities and their social skills and problem behaviors. The study included 191 SDHH in grades two through eight from 125 elementary and middle schools in Arizona and Colorado. Participation in school and community activities were both significantly correlated with high social skills ratings and low problem behavior ratings. Antia et al. (2011) also conducted a principal factor analysis to account for possible collinearity among predictor variables and to obtain the best set of predictors for the social skills and problem behavior ratings. Participation in school and community activities was a consistent predictor under a broad family factor, which included families on the assumption that student participation in an activity is often influenced by their parents' willingness and ability to finance it and provide transportation. This study is the first to provide empirical evidence that extracurricular involvement has a direct effect on the social well-being of DHH students.

### **The Current Study**

The purpose of this study was to investigate a predictive relationship between extracurricular involvement and postschool outcomes for DHH individuals, controlling for the following individual student characteristics: gender, socioeconomic status, Woodcock-Johnson III tests, grades, additional disability, and age. The NLTS2 database contains large samples that have the potential to capture variability within the DHH population, in terms of both individual characteristics

and the family and school contexts of extracurricular involvement. This study occurred in two phases. The first was a descriptive analysis of the number of DHH youth involved in six superordinate categories the researchers created to capture 17 extracurricular activities that NLTS2 reported during the first wave of data collection in the 10-year longitudinal study. The purpose of this first phase was to examine which extracurricular activities DHH youth were involved in. The second phase examined the predictive relationship between extracurricular involvement and the postschool outcomes of education, employment, and life satisfaction. The research questions for this second phase were as follows.

- Research Question 1a: What is the prevalence rate of high school participation in categories of extracurricular activities (athletics, religious, leadership/community, performing arts, knowledge-based, and disability support) for SDHH?
- Research Question 1b: Are there differences in the prevalence rates of participation in extracurricular activity (versus nonparticipation) by socioeconomic status (as measured by household income), gender, and achievement (as measured by scores on the Woodcock-Johnson subtests of achievement)?
- Research Question 2a: Does participation in any extracurricular activity (versus nonparticipation) predict postsecondary outcomes (education, employment, and life satisfaction), after controlling for other student characteristics (gender, family socioeconomic status, Woodcock-Johnson III, grades, additional disability, and age)?
- Research Question 2b: Does breadth of participation in extracurricular activities (as measured by the summed participation in any one of six researcher-categorized groups of activities: athletics, religious, leadership/community, performing arts, knowledge-based, and disability support) predict postsecondary outcomes (education, employment, and life satisfaction), after controlling for other student characteristics (gender, family socioeconomic status, Woodcock-Johnson III, grades, additional disability, and age)?
- Research Question 3a: If an interaction is found between socioeconomic status (as measured by household income) and extracurricular involvement (as a binary variable), does that interaction predict postsecondary outcomes?

- Research Question 3b: If there is an interaction between gender (male or female) and extracurricular involvement (as a binary variable), does that interaction predict postsecondary outcomes?
- Research Question 3c: If there is an interaction between academic achievement (as measured by scores on the Woodcock-Johnson subtests of achievement) and extracurricular involvement (as a binary variable), does that interaction predict postsecondary outcomes?

## **Methods**

### **Dataset**

The U.S. Department of Education funded the second National Longitudinal Transition Study to help scientists understand the achievements of disabled youth who are entering adult life (see <http://www.nlts2.org>). To be included in the study, students had to be between 13 and 16 years of age on December 1, 2000. Many different stakeholders participated, including the students themselves, their parents, teachers, and school staff. The surveyors contacted youth biannually from 2001 to 2009, and collected data via mail surveys, computer-assisted telephone interviews, and direct psychological assessments. This current analysis utilizes data from the first, second, and final waves that were collected in 2001, 2003, and 2009, respectively.

The NLTS2 was intended to be nationally representative for a wide variety of students with a wide variety of disabilities. A simple random sample would do a poor job of achieving this goal, therefore the NLTS2 surveyors used a stratified weighted sampling scheme, which improved the generalizability and precision of estimation. In the rest of this section, we discuss the sampling scheme in more detail.

Stratification occurred at both the local education agency (LEA) level and the disability level. The surveyors first stratified the LEAs by enrollment size, district wealth, and region. The enrollment size stratification was based on the number of students in grades seven through twelve, inclusive. LEAs with fewer than 1,600 students had a “small” enrollment; between 1,600 and 4,700 students had “medium” enrollment; between 4,700 and 15,000 students had “large” enrollment; and more than 15,000 students had a “very large” enrollment. Surveyors based the “district wealth” stratification on the Orshanky index, or the percentage of students living below the poverty line (Fisher, 1992). LEAs where 25% to 43% of its enrollment lived below the poverty line were coded as having “low” district wealth, whereas those where 14%

to 24% were below the poverty line had “medium” district wealth. Outside of this range, LEAs were coded as having either “very low” or “high” district wealth. The NLTS2 surveyors based the final stratification, region, on a grouping scheme that other federal organizations (the U.S. Department of Commerce, U.S. Bureau of Economic Analysis, and National Assessment of Educational Progress) used: Northeast, Southeast, Midwest, and West. This made NLTS2 consistent with other large-scale datasets related to American education and employment. After identifying these stratifications, the surveyors randomly sampled the LEAs and stratified students in the selected schools by disability category. The latter stratification helped ensure that NLTS2 had a nationally representative sample for every disability category sampled.

This study included roughly 950 students who are DHH. To be included, participants had to satisfy two criteria. First, the student’s parents had to verify that their child was deaf or hard of hearing (D/HH). Due to sparsity in the dataset, the surveyors collapsed the participants into the category DHH, despite the diversity of these two groups. Very little audiological information is available in this dataset, so we simply consider them as a whole. The second criterion was that the participant could have no missing data on the dependent variable for any particular analysis. Of the 950 students included in this study, 290 attended schools that specialize in serving students with disabilities. It is unclear what proportion of those students attended a residential school for the d/Deaf, as no variable in the dataset provided this information available. Only 10 of the 950 students participated in a 504 plan.

### Variables

The independent variables in the current study included information about the youth’s extracurricular involvement and various interaction terms. Covariates and auxiliary variables for the missing data model involved both demographic and ability-related data. We took almost all of the independent variables, covariates, and auxiliary variables from the first wave of NLTS2. The only exception was the Woodcock-Johnson measure, which psychologists administered as part of the direct assessment across waves one and two. Sample size depended on the exact variable we looked at, not just the wave. For example, wave 1 of the dataset included data on 950 DHH students; Woodcock-Johnson assessment data from waves 1 and 2 were available for 680 DHH students; data on grades were available for 760 DHH students; and data from wave 5 were available for 540 students. More information on the study variables follows.

**Independent variables.** Independent variables may be grouped into three categories: participation, breadth of involvement, and interaction terms. The simplest variable, participation, recorded whether students participated in any organized extracurricular activities. We set this binary variable at one if parents reported that the youth participated in school activities outside of class, or if parents reported that the youth participated in out-of-school activities (variable names: np1F3 and np1F4). Otherwise the variable was set to zero.

The second variable, breadth of involvement, captured the wide variety of extracurricular activities the NLTS2 participants reported being involved in. They originally reported participating in at least 17 different extracurricular activities. We grouped these activities into six larger categories, each of which was binary. For instance, the athletic variable was set to one if parents reported that the youth belonged to a sports team or were in the Special Olympics. Variables were categorized by shared common qualitative features, such as the subject matter or nature of the activity. Otherwise it was set to zero. These larger categories consisted of religious youth groups, leadership and community-related groups, knowledge-based activities, disability support groups, athletic groups, and groups related to the performing arts. For more information on the coding of these six groups, see Appendix A.

The breadth of involvement variable was the sum of these six smaller binary variables. For instance, if students participated in both a sports team and a religious group, their score for this variable would be a two. Students who did not participate in any extracurricular activities would have a zero for this variable, and so on. Finally, a number of interaction terms were used in this analysis. SES status (measured by household income), gender, and academic achievement (measured by the Woodcock-Johnson tests) were hypothesized to interact with the participation variable.

**Dependent variables.** Our research lab has employed these seven dependent variables many times, from a variety of theoretical perspectives (e.g., removed for blind review) We group them into three larger categories: academic outcomes, employment-related outcomes, and general life outcomes. These variables were all collected from the fifth and final wave of NLTS2. The two academic outcomes were binary, one describing enrollment in a postsecondary institution and the other describing graduation from a postsecondary institution.

One employment outcome was binary, while two others were continuous. The binary variable described whether the youth had ever worked for pay outside the home. One continuous variable was the youth’s

hourly wage, the other described the youth's job satisfaction. The job satisfaction score was the sum of seven questions asked about the youth's satisfaction with the social aspects of the job, their compensation, and their career advancement potential. Four of the seven questions were binary, which we coded as zeros and ones. Three of the questions were on a continuous scale, which we rescaled so they varied between one-fourth and one. The individual questions can be found in Appendix B. Finally, we used one binary general life outcome and one continuous general life outcome. We added up five scaled questions to obtain the continuous outcome, which assessed aspects of the student's self-beliefs, in particular their self-esteem and self-efficacy. These questions can be found in Appendix C. The binary outcome described whether the student lived independently, with a spouse or roommate, or in any dormitory, including college housing.

**Covariates and auxiliary variables.** The covariates and auxiliary variables included demographic information and data related to achievement and aptitude. We took these data primarily from the first wave of NLTS2, which had the highest response rate. We used auxiliary variables only in the missing data model, not the research model. The demographic covariates included household income, gender, age, additional disabilities, and parental education level. NLTS2 surveyors created the cross-instrument dataset, which provided the gender and age variables. Parents reported the other variables in the first wave. We had two continuous variables to covary for achievement and ability level. The first covariate was the average of the six selected subtests of the Woodcock-Johnson III that psychologists administered in the first and second wave of NLTS2. The selected subtests included passage comprehension, the synonym-antonym subtest, calculation, applied problems, social studies, and science. The other covariate estimated the students' average grades, which NLTS2 surveyors reported in the cross-instrument dataset. Auxiliary variables helped correct for missingness but were not used in the primary analysis. The binary variables described whether a student's parent or guardian lived with a partner, and whether a student was ever expelled, suspended, or subject to other serious disciplinary action.

### **Missing Data Procedure**

To make this study as representative as possible, we used multiple imputation to deal with missing data. This is consistent with our prior work (authors names removed for blind review). In multiple imputation, the software predicts missing values of the covariates and independent variables, using every other

variable in the dataset. This is done multiple times, which introduces some amount of randomness to the predicted values; the randomness helps to properly estimate standard errors.

This procedure is only appropriate if the data are missing at random. This assumption states that there is no response bias, conditioning on the other variables in the model. In most practical situations, it's not possible to directly evaluate the validity of this assumption. However, we may add variables to the missing data model to make the assumption more credible (Allison, 2001; Collins, Shafer, & Kam, 2001), which is why we added a few auxiliary variables to the missing data model. Table 1 displays the amount of missing data for independent variables, covariates, and auxiliary variables.

Overall, there was a tolerable amount of missing data for most of the independent variables and covariates, in particular the "participation" and "breadth of involvement" variables, which had 0% and 10% missing data, respectively. The one exception was the Woodcock-Johnson III measure and its interaction with the participation variable, which had 40% missing data. This was partly due to simple attrition; some percentage of students took the test in the second wave of NLTS2. However, part of the attrition was intentional. Trained psychologists had the option of deciding whether to administer the Woodcock-Johnson or an alternative assessment. Unfortunately, this decision-making process does not seem to be transparent to researchers. The NLTS2 documentation states that there was a routing questionnaire, but to our knowledge the routing test wasn't provided in the datasets. This uncertainty is one of the biggest reasons why we employed multiple imputation. Students could be included in this research whether or not they took the Woodcock-Johnson subtests. All the basic demographic covariates, like age, gender, additional disabilities, and parental education level, had no missing data. NLTS2 surveyors were not able to ascertain typical grades or household income for 20% of the sample. Finally, we had complete data on student disciplinary action for the auxiliary variables but lacked data on parent spousal status for 20% of the sample.

### **Data Analysis Strategy**

To correct for the high degree of missingness in the Woodcock-Johnson III subtests, we created 20 imputations in R using the "mice" package (Buuren & Groothuis-Oudshoorn, 2011). Predictive mean matching imputed missing values for most of the dataset, while logistic regression imputed missing values for binary data. After R created the imputations, we used

the “survey” package (Lumley, 2004), which created a survey-corrected imputation list. The *glm* function fit the linear models and, finally, the “mitools” package combined the 20 models to give these statistics. Three sets of linear models were fit, each with four binary and three continuous dependent variables. Taylor linearization corrected for the stratified sampling design. The first set of linear models only included the participation IV. The second set included only the breadth of involvement IV. Finally, the last set of models included the participation IV and its associated interaction terms. Test-wise type I error rates are set at 0.01, and we report only statistically significant results.

## Results

### Descriptive Statistics

This section provides descriptive statistics for the independent variables, covariates, and auxiliary variables. We first discuss demographics and ability measurements. There seems to be a fair amount of demographic diversity in the sample. About half of the sample was female and about half of the sample had additional disabilities. Household income varied widely: 20% of households had an income greater than \$70,000 annually, and 20% had incomes less than \$20,000 annually. Other demographic data may be found in Table 2.

Descriptive statistics for ability and achievement covariates are also provided. About 40% of the students made mostly A's and B's or higher. On average, students scored 77.34 points on the Woodcock-Johnson subtests, with a standard deviation of 19.35 points. More information may be found in Table 3.

About 70% of students participated in some sort of extracurricular activity. Out of all those who did so, 30% participated in only one kind of activity, 20% participated in two different kinds of activities, and about 10% participated in three or more activities. Again, these numbers are rounded to the nearest ten in accordance with IES policy. Finally, we provide some descriptive information about which specific extracurricular activities the students participated in. Recall that we broadly categorized extracurricular activities into six groups; see appendix A for details. Of the roughly 950 students who participated in some type of extracurricular activity, 450 participated in athletics, 330 in a religious youth group, and 180 in a leadership or community group. About 110 students participated in the performing arts, 90 in a knowledge-based group, and 40 were in a disability support group.

### Primary Analysis

Overall, none of the interaction terms was significant. We found no evidence to suggest that participating in extracurricular activities interacted with household income, gender, or achievement, as measured by the Woodcock-Johnson III subtests. As such, we discuss the other two sets of linear models. Participating in extracurricular activities significantly predicted independent living ( $t[14270] = 3.02, p < 0.01$ ). Specifically, the odds of living independently were 9.50 times greater for students who participated in extracurricular activities, which is considered a strong effect (Ferguson, 2009; see Table 4 for more details). Table 5 is a contingency table for descriptive purposes. It uses independent living status as an outcome, which was drawn from wave 5 of the dataset, thus around 540 students are accounted for.

Finally, the breadth of involvement variable had a statistically significant impact on postsecondary education enrollment ( $t[793] = 2.61, p < 0.01$ ). Being involved in more than one kind of activity improved the odds of attending postsecondary school by 2.41 times, a mild-to-moderate effect (Ferguson, 2009). More details may be found in Table 6.

## Discussion

Predicting the outcomes (including academic success) of DHH students is challenging for several reasons, primarily because the low incidence of the population makes it difficult to locate participants for such studies (Convertino et al., 2009). Moreover, the linguistic, cultural, and educational heterogeneity within the population contribute to statistical variability, making it a challenge to generalize findings across the entire population. Given this, the use of a large-scale longitudinal database like the NLTS2 was promising because it contained representative sample sizes that had the potential to capture variability within the DHH population.

The purpose of this study was to identify which extracurricular activities DHH youth are involved in and further explore the potential predictive relationship between extracurricular involvement in high school and postsecondary outcomes for these youth. Our findings suggest that overall involvement in extracurricular activities significantly predicted only one of our postsecondary outcomes (independent living), but that involvement in more than one activity significantly predicted postsecondary enrollment. Limitations to the study design and implications for future research are discussed below.

### **Range of Activities in Which DHH Youth Are Involved**

Roughly 950 students who are DHH were included in this study. Our descriptive analysis revealed that approximately 450 participated in athletics, 330 participated in a religious youth group, and 180 participated in a leadership or community group. About 110 students participated in the performing arts, 90 were in a knowledge-based group, and 40 were in a disability support group. As discussed earlier, it is not surprising that the largest percentage (slightly less than half) of students who are DHH participated in some form of athletic activity. The percentage of DHH students involved in athletic activities is fairly consistent with findings from Fox, Connolly, and Snyder (2005), who reported that 38.6% of high school seniors were involved in some form of interscholastic or intramural athletic activity. These descriptive findings highlight which activities DHH youth are most involved in and shed light on the activities of most interest to these youth.

### **Participation in Extracurricular Activities**

Of all the outcomes measured in this study, only one was significantly predicted by DHH youth's involvement (participation versus nonparticipation) in any extracurricular activity. Our findings revealed that participation in any extracurricular activity significantly predicted independent living and was considered a strong effect. The value of this analysis is in understanding where extracurricular involvement contributes to the postschool experience of DHH individuals. Our findings may suggest that engaging in extracurricular activities gives DHH youth the opportunity to develop or strengthen important life skills that are transferable to living independently in postsecondary settings. Important life skills such as time management, decision-making, self-advocacy, self-determination, soft social skills, and social navigation are all examples of the transferable life skills DHH youth may develop through their participation in extracurricular activities (National Secondary Transition Technical Assistance Center, 2010). The lack of a significant relationship between overall involvement in extracurricular activities and postsecondary enrollment was a surprise, given the findings of previous studies indicating a significant and positive relationship between extracurricular involvement and academic aspiration and performance (Eccles & Barber, 1999; Eccles et al., 2003; Eccles & Templeton, 2002; Fredricks & Eccles, 2006; Mahoney, Cairns, & Farmer, 2003). Only a few studies found little or no correlation between general extracurricular involvement and any academically oriented outcome (Antshel & Anderman, 2000; Lisella & Serwatka,

1996). This particular finding from our study seems to add to this small collection.

The lack of significance in our findings is influenced to some degree by our choice of methodological designs. As Marsh (1992) comments, the use of regression analyses implicitly assumes that extracurricular involvement is linearly related to postsecondary outcomes. Although we found a lack of significance between overall extracurricular involvement and postsecondary education enrollment, it may be that extracurricular involvement has an indirect effect on these outcomes. In our study, a potential mediator may exist between extracurricular involvement and our outcomes of interest, such as student motivation. Fredericks and Eccles (2006) highlight an important concern in the field that was raised by researchers employing nonexperimental methods; there is likely some motivational construct underlying both involvement in extracurricular activities and outcomes related to academic achievement. It may be that we have failed to capture the true nature of the relationship between our variables of interest. Stinson and Walter (1997) insightfully argue that DHH students' motivation is a particularly important noncognitive predictor of college achievement. Future studies on the predictive ability of extracurricular involvement that account for the impact of student motivation on the postsecondary outcomes of DHH youth are recommended. Future studies would also do well to incorporate a path analytic approach to examine any indirect effects of extracurricular involvement on the postsecondary outcomes of DHH youth.

### **Breadth of Participation in Extracurricular Activities**

In terms of the role breadth of involvement plays in postsecondary outcomes for DHH youth, our findings reveal that participation in more than one extracurricular activity significantly predicted postsecondary enrollment. While this effect was only mild to moderate, it validates the body of research that asserts that involvement in diverse activities is associated with better academic outcomes and enhanced psychosocial functioning (Bartko & Eccles, 2003; Fredericks & Eccles, 2006; Mahoney, Lord, & Carryl, 2005). As Fredericks and Eccles (2006) suggest, participating in a wide range of extracurricular activities gives youth additional opportunities to develop important competencies and exposes them to new experiences and peers. Our findings may also contribute to the body of research that suggests a curvilinear relationship between activity participation and student well-being (Feldman & Matjasko, 2005; Feldman-Farb & Matjasko, 2012; Marsh, 1992). Our findings primarily suggest that

increasing extracurricular participation benefits DHH youth and significantly predicts postsecondary enrollment. However, future studies would do well to include an interaction term to test for the curvilinearity in the relationship between extracurricular involvement and postsecondary outcomes for DHH youth, which would validate those findings more explicitly and extend them to DHH populations.

### **Limitations**

There are several limitations to this study. The NLTS2 is primarily a research tool that provides data across a nationally representative sample of students, including those from low-incidence populations, such as DHH youth. This study is longitudinal, following individuals as they transition from high school to postsecondary opportunities and contexts. As such, this dataset, and this study in particular, is not experimental and is not designed to draw inferences between the experiences of individuals who are DHH and those who are hearing. It was not possible to distinguish which of the students in our sample attended a mainstream setting and which attended a d/Deaf school. This is a major limitation of the study, since no investigation of how this difference impacts extracurricular involvement or our selected outcomes was possible. There is also no appropriate control group within the NLTS2 dataset for DHH individuals that does not assume a disability as a function of their inclusion in the study. While this may be seen as a limitation of the analysis, it does provide discussion that moves away from a deficit perspective or expectation of a normative experience. Most of the current research on this topic is either cross-sectional or correlational and has been based on small-scale samples of convenience with very limited generalizability (Marsh, 1992). Future research is needed to directly address causal connections between extracurricular involvement and various outcome variables, using experimental designs to the greatest extent possible (Gilman et al., 2004). Experimental designs certainly would need to account for other methodological issues that are inherent to the topic of extracurricular involvement. However, the issue of student “self-selection” into extracurricular activities is the biggest methodological challenge all researchers face because of the difficulty in separating any real causal effects from preexisting differences among the study subjects (Marsh, 1992).

### **Implications for Individuals, Practitioners, and Researchers in the Field**

Our study supports the current efforts of educational scholars and youth policy advocates who argue for the provision of extracurricular opportunities in schools and communities that will enable youth to engage in important developmental tasks. Participation in structured, organized, extracurricular activities such as athletics and academic and community clubs supports positive youth development and is a productive use of adolescents’ leisure time (Fredericks & Eccles, 2006). These findings can now be extended to DHH youth because, as our study shows, overall participation in extracurricular activities significantly predicts ability to live independently, while increased participation in extracurricular activities significantly predicts postsecondary enrollment. Policy-makers and educators, particularly those who work directly with DHH youth, should provide ample opportunities for their students to become involved in a variety of extracurricular activities and encourage them to do so.

Specific legal or policy implications of these findings may be found within strategies for improving transition planning for students who are DHH. IDEA requires that youth with individualized education programs begin planning for the transition to college by age 16, and in some cases the process starts as early as age 14. These findings thus encourage transition planners, parents, and teachers to consider the benefits of extracurricular activities for students who need to develop skills that lead to independent living outcomes. The transition planning could address these skills specifically and recommend both academic and extracurricular opportunities. These skills may be related to those used in academic settings, but they can also include those that add to an individual’s employability and to their agency in making decisions for themselves. For SDHH in both mainstream and self-contained settings, extracurricular activities may provide the social interaction and mentorship they can use to develop skills for successful life outcomes.

### **Conclusion**

Our study found that participation in structured school or community extracurricular activities fosters one positive postsecondary outcome: independent living. Our study also found that breadth of participation increases the likelihood of enrollment in postsecondary education. Our study appears to validate other researchers’ findings that participation in extracurricular activities is beneficial to youth, especially DHH youth,

for the opportunities it affords (Eccles & Templeton, 2002). Youth who participate in extracurricular activities are given the chance to solve problems and overcome challenges; to develop skills in the social, academic, and physical domains; to belong to peer groups and establish positive and supportive mentoring networks; and to transfer the skills they acquire to a postsecondary setting. From a developmental perspective, all youth, DHH included, should be given the opportunity to engage in school and community activities, as they promote and foster important and positive adolescent growth.

### References

- Allison, P. (2001). *Missing data*. Thousand Oaks, CA: Sage.
- Americans with Disabilities Act of 1990 (Public Law 101-336).
- Antia, S., Jones, P., Luckner, J., Kreimeyer, K., & Reed, S. (2011). Social outcomes of students who are deaf and hard of hearing in general education classrooms. *Council for Exceptional Children, 77*, 489-504.
- Antshel, K., & Anderman, E. (2000). Social influences on sports participation during adolescence. *Journal of Research and Development in Education, 33*, 85-94.
- Arsic, R., Svetlana, S., & Jasmina, K. (2012). Sports activities as a factor in socialization of deaf students. *Journal of Physical Education and Sport, 12*, 3-8.
- Bartko, T., & Eccles, J. (2003). Adolescent participation in structured and unstructured activities: A person-oriented analysis. *Journal of Youth and Adolescence, 32*, 233-241.
- Batten, G., Oakes, P., & Alexander, T. (2013). Factors associated with social interactions between deaf children and their hearing peers: A systematic literature review. *Journal of Deaf Studies and Deaf Education, 19*, 285-302.
- Broh, B. (2002). Linking extracurricular programming to academic achievement: Who benefits and why? *Sociology of Education, 75*, 69-91.
- Bronfenbrenner, U. (1992). *Ecological systems theory*. London: Jessica Kingsley.
- Brown, R., & Evans, W. (2002). Extracurricular activity and ethnicity creating greater school connection among diverse student populations. *Urban Education, 37*, 41-58.
- Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate imputation by chained equations. *Journal of Statistical Software, 45*(3), 1-67.
- Camp, W. (1990). Participation in student activities and achievement: A covariance structural analysis. *Journal of Educational Research, 83*, 272-278.
- Cawthon, S., Nichols, S., & Collier, M. (2009). Facilitating access: What information do Texas post-secondary institutions provide on accommodations and services for students who are deaf or hard of hearing? *American Annals of the Deaf, 153*, 450-460.
- Collins, L., Schafer, J., & Kam, C. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods, 6*, 330-351.
- Convertino, C. M., Marschark, M., Sapere, P., Sarchet, T., & Zupan, M. (2009). Predicting academic success among deaf college students. *Journal of deaf studies and deaf education, enp005*.
- Cooper, H., Valentine, J., Nye, B., & Lindsay, J. (1999). Relationships between five after-school activities and academic achievement. *Journal of Educational Psychology, 91*, 369-378.
- Crosnoe, R. (2001). The social world of male and female athletes in high school. *Sociological Studies of Children and Youth, 8*, 87-108.
- Darling, N., Caldwell, L., & Smith, R. (2005). Participation in school-based extracurricular activity and adolescent adjustment. *Journal of Leisure Research, 37*, 51-76.
- Davalos, D., Chavez, E., & Guardiola, R. (1999). The effects of extracurricular activity, ethnic identification, and the perception of school on student dropout rates. *Hispanic Journal of Behavioral Sciences, 21*, 61-77.
- DuBow, S., & National Association of the Deaf. (2000). *Legal rights: The guide for deaf and hard of hearing people* (5th ed.). Washington, DC: Gallaudet University Press.
- Eccles, J., & Barber, B. (1999). Student council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research, 14*, 10-43.
- Eccles, J., Barber, B., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*, 865-889.
- Eccles, J., & Templeton, J. (2002). Extracurricular and other after-school activities for youth. *Review of Research in Education, 26*, 113-180.
- Education of All Handicapped Children Act (EHA) (Pub. L. No. 94-142) of 1975.
- Feldman, A., & Matjasko, J. (2005). The role of school-based extracurricular activities in adolescent development: A comprehensive review and future directions. *Journal of Educational Research, 75*, 159-210.

- Feldman-Farb, A., & Matjasko, J. (2012). Recent advances in research on school-based extracurricular activities and adolescent development. *Developmental Review, 32*, 1-48.
- Ferguson, C. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*, 532-538.
- Fisher, G. M. (1992). *The development and history of the poverty thresholds*. Social Security Bulletin, 55, 3-14.
- Fox, M. A., Connolly, B. A., & Snyder, T. D. (2005). *Youth indicators 2005: Trends in the well-being of American youth* (NCES 2005-050). Washington, DC: U.S. Department of Education, National Center for Education Statistics, U.S. Government Printing Office.
- Fredericks, J., & Eccles, J. (2006). Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations. *Developmental Psychology, 42*, 698-713.
- Gilman, R., Meyers, J., & Perez, L. (2004). Structured extracurricular activities among adolescents: Findings and implications for school psychologists. *Psychology in the Schools, 41*, 31-41.
- Hanson, S., & Kraus, R. (1998). Women, sports, and science: Do female athletes have an advantage? *Sociology of Education, 71*, 93-110.
- Hochgesang, J., Dunning, L., Benaissa, S., De-Caro, J., & Karchmer, M. (Eds.). (2007). *College and university programs for deaf and hard of hearing students* (12th ed.) Washington, DC: Gallaudet Research Institute.
- Individuals with Disabilities Education Act of 1990 (Public Law 105-17).
- Individuals with Disabilities Education Improvement Act of 2004 (Public Law 108-446).
- Jacob, S., & Hartshorne, T. (2003). *Ethics and law for school psychologists* (4th ed.). Hoboken, NJ: John Wiley & Sons.
- Khmelkov, V., & Hallinan, M. (1999). Organizational effects on race relations in schools. *Journal of Social Issues, 55*, 627-645.
- Lisella, L., & Serwatka, T. (1996). Extracurricular participation and academic achievement in minority students in urban schools. *The Urban Review, 28*, 63-80.
- Luckner, J., & Muir, S. (2001). Successful students who are deaf in general education settings. *American Annals of the Deaf, 146*, 435-446.
- Luckner, J., & Muir, S. (2002). Suggestions for helping students who are Deaf succeed in general education settings. *Communication Disorders Quarterly, 24*, 23-30.
- Luft, P. (2012). A national survey of transition services for deaf and hard of hearing students. *Career Development and Transition for Exceptional Individuals, 37*, 177-192.
- Luft, P., & Huff, K. (2011). How prepared are transition-age deaf and hard of hearing students for adult living? Results of the transition competence battery. *American Annals of the Deaf, 155*, 569-579.
- Lumley, T. (2004). Analysis of complex survey samples. *Journal of Statistical Software, 9*(1), 1-19.
- Mahoney, J., Cairns, B., & Farmer, T. (2003). Promoting interpersonal competence and educational success through extracurricular activity participation. *Journal of Educational Psychology, 95*, 409-418.
- Mahoney, J., Larson, R., & Eccles, J. (2005). *Organized activities as contexts of development: Extracurricular activities, after-school and community programs*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Mahoney, J., Lord, H., & Carryl, E. (2005). An ecological analysis of after-school program participation and the development of academic performance and motivational attributes for disadvantaged children. *Child Development, 76*, 811-825.
- Mahoney, J., & Stattin, H. (2000). Leisure activities and adolescent antisocial behavior: The role of structure and social context. *Journal of Adolescence, 23*, 113-127.
- Marsh, H. (1992). Extracurricular activities: Beneficial extension of the traditional curriculum or subversion of academic goals? *Journal of Educational Psychology, 84*, 553-562.
- Marsh, H., & Kleitman, S. (2002). Extracurricular school activities: The good, the bad, and the non-linear. *Harvard Educational Review, 72*, 464-514.
- Marschark, M., & Spencer, P. E. (2010). *The Oxford handbook of deaf studies, language, and education* (Vol. 2). New York: Oxford University Press.
- McNeal, R. (1995). Extracurricular activities and high school dropouts. *Sociology of Education, 68*, 62-81.
- McNeal, R. (1998). High school extracurricular activities: Closed structures and stratifying patterns of participation. *Journal of Educational Research, 91*, 183-191.
- Moeller, M. (2007). Current state of knowledge: Psychosocial development in children with hearing impairment. *Ear and Hearing, 28*, 729-739.
- National Secondary Transition Technical Assistance Center. (2010). *Evidence-based practices and predictors in secondary transition: What we know and what we still need to know*. Charlotte, NC: National Secondary Transition Technical Assistance Center.

- Newman, L., Wagner, M., Knokey, A., Marder, C., Nagle, K., Shaver, D., & Schwarting, M. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the national longitudinal transition study-2 (NLTS2)* [NCSE 2011-3005] (NCSE 2011-3005). Menlo Park, CA: SRI International.
- pepnet 2. (2013). *Postsecondary enrollment and completion for deaf and hard of hearing students*. pn2Research Brief. Retrieved from [http://www.pepnet.org/sites/default/files/demographics\\_research%20brief\\_v4.pdf](http://www.pepnet.org/sites/default/files/demographics_research%20brief_v4.pdf)
- Reis, S., & Díaz, E. (1999). Economically disadvantaged urban female students who achieve in schools. *The Urban Review*, 31, 31-54.
- Stewart, D. (1991). *Deaf sport: The impact of sports within the Deaf community*. Washington, DC: Gallaudet University Press.
- Stewart, D., & Ellis, K. (1999). Physical education for deaf students. *American Annals of the Deaf*, 144, 315-319.
- Stewart, D., & Ellis, K. (2005). Sports and the deaf child. *American Annals of the Deaf*, 150, 59-66.
- Stinson, M., Scherer, M., & Walter, G. (1987). Factors affecting persistence of deaf college students. *Research in Higher Education*, 27, 244-258.
- Stinson, M., & Walter, G. (1992). Persistence in college. In S. B. Foster & G. G. Walter (Eds.), *Deaf students in postsecondary education* (pp. 43-64). London: Routledge.
- Stinson, M., & Walter, G. (1997). Improving retention for deaf and hard of hearing students: What the research tells us. *Journal of the American Deafness and Rehabilitation Association*, 30, 14-23.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Troutman, K., & Dufur, M. (2007). From high school jocks to college grads: Assessing the long-term effects of high school sport participation on females' educational attainment. *Youth & Society*, 38, 443-463.

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### Footnote

<sup>1</sup> This was measured with a set of 17 Likert-scale items assessing frequency of participation in activities such as sports, fraternities/sororities, etc. Total scores were obtained by summing individual scores across the 17 items.

Table 1

#### *Missing Data Percentages*

Variable	Percentage Missing
<b>Independent Variables</b>	
Participation	0
Breadth of involvement	10
Interaction: Participation*Gender	10
Interaction: Participation*SES	20
Interaction: Participation*WJ	40
<b>Covariates</b>	
Age	0
Gender	0
Presence of additional disabilities	0
Household income	20
Woodcock-Johnson III measure	40
Typical grades	20
Parents highest education level	0
<b>Auxiliary Variables</b>	
Whether child was suspended	0
Whether parent lives with a partner	30

*Note.* Since these data are individually identifiable, these numbers are rounded to the nearest ten, in accordance with IES policy.

Table 2

*Participant Demographics*

Variable	Percentage
<b>Covariates</b>	
Youth is female	50
<b>Age (as of 2002)</b>	
14	20
15	20
16	20
17	30
18	10
<b>Has additional disability</b>	50
<b>Yearly household income</b>	
\$20,000 or less	20
\$20,001-\$30,000	20
\$30,001-\$40,000	10
\$40,001-\$50,000	10
\$50,001-\$60,000	10
\$60,000-\$70,000	10
\$70,001 or more	20
<b>Parents highest education level</b>	
No GED/High school diploma	20
GED/High school diploma only	30
Some postsecondary education	10
Vocational degree	<10
Associate's degree	10
Bachelor's degree	10
Some graduate work	<10
Graduate degree	10
<b>Auxiliary variables</b>	
Parent has a partner living in the home	90
Student subject to disciplinary action	30

*Note.* These numbers are rounded to the nearest ten, in accordance with IES policy.

Table 3

*Ability Covariates*

Students' Grades Are...	Percentage	
Mostly D's or below	<10	
Mostly C's and D's	10	
Mostly C's	10	
Mostly B's and C's	30	
Mostly B's	10	
Mostly A's and B's	30	
Mostly A's	10	
Woodcock-Johnson III subtests: Standard-score*	Average score	Std dev
Grand mean	77.34	19.35

*Note.* Because NLTS2 provides individually identifiable data, the percentages reported here are rounded to the nearest ten, in accordance with IES policy.

Table 4

*Logistic Regression Results for Independent Living*

Variable	Odds Ratio Estimate	<i>t</i> -statistic	<i>p</i> -value	Odds Ratio 95% Confidence Interval	
Extracurricular Participation	9.50	3.03	0.0025*	2.21	40.92
Parent education	1.01	0.04	0.9681	0.75	1.35
Household income	0.95	-0.63	0.5312	0.82	1.11
Presence of additional disabilities	0.46	-1.47	0.1400	0.16	1.29
Woodcock-Johnson III score (standardized)	1.05	1.75	0.0824	0.99	1.10
Typical grades	0.86	-0.76	0.4460	0.58	1.27
Youth is female	0.89	0.66	0.8297	0.30	2.63
Youth's age	0.90	0.42	0.7356	0.49	1.65

*Note.* \**p* < .01

Table 5

*Contingency Table: Student Extracurricular Participation and Independent Living Status*

Independent Living	Extracurricular Participation	
	Did not participate	Participated
No	110	30
Yes	240	200

Table 6

*Logistic Regression Results for Postsecondary Enrollment*

Variable	Odds Ratio Estimate	<i>t</i> -statistic	<i>p</i> -value	Odds Ratio 95% Confidence interval	
Breadth of involvement	2.41	2.61	0.0094*	1.24	4.69
Parent education	1.40	1.74	0.0818	0.96	2.05
Household income	1.01	0.11	0.9117	0.85	1.20
Presence of additional disabilities	0.22	1.97	0.0500	0.05	1.00
Woodcock-Johnson III score (standardized)	1.10	3.23	0.0016*	1.04	1.17
Typical grades	1.41	2.03	0.0426	1.01	1.98
Youth is female	2.04	1.09	0.2755	0.57	7.33
Youth's age		1.42	0.1574	0.84	

*Note.* \* $p < .01$

## Appendix A

## Categorizing Extracurricular Activities

Category	Category includes...	Variable names
Leadership & community groups	Scouting groups YMCA/YWCA/JCC/Boys-Girls club 4-H club Student Government Volunteer service Group Cultural Affinity Group Leadership/Group Development club	np1F5_01 np1F5_03 np1F5_06 np1F5_09 np1F5_11 np1F5_13 np1F5_15
Knowledge-based groups	Special interest clubs School subject matter club Homework club Vocational club	np1F5_07 np1F5_10 np1F5_14 np1F5_16
Religious youth groups	Religious youth groups	np1F5_02
Disability-related groups	Disability-oriented support group	np1F5_12
Athletics	Sports team Special Olympics	np1F5_04 np1F5_05
Performing arts	Performing group	np1F5_08

## Appendix B

## The Job Satisfaction Score

Prompt	Scale
Youth thinks he/she has opportunities to work his/or her way up	Binary
Youth thinks he/she is paid pretty well for his or her work	Binary
Youth thinks he/she is treated pretty well by others at work	Binary
Youth thinks his or her education is being put to good use	Binary
How well youth gets/got along with co-workers at current or most recent job	Likert 1-4
How well youth gets/got along with boss at current or most recent job	Likert 1-4
How well youth usually likes/liked his/her current or most recent job	Likert 1-4

**Appendix C**

**The Self-Beliefs Score**

<b>Prompt</b>	<b>Scale</b>
Youth identification with statement: you know how to get the information you need	Likert 1-3
Youth identification with: you can handle most things that come your way	Likert 1-3
Youth identification with statement: you are proud of who you are	Likert 1-3
Youth identification with statement: you feel useful and important	Likert 1-3
Youth identification with: You feel your life is full of interesting things to do	Likert 1-3