

Prevalence and Correlates of Work Experiences among High School Students on the Autism Spectrum

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Abstract

This study used nationally representative data to describe the prevalence and correlates of work experiences among high school students with autism who received special education. Four in 10 students with autism experienced any type of work (community-based, school-sponsored, paid or unpaid) within a given year – significantly fewer than peers with and without disabilities. Rates of paid work among students with autism were comparable to students with intellectual disability but half the rate of non-special education peers. Among youth with autism, significant correlates of having work experiences included being white, parent participation in transition planning, and functional skills including navigation. Fostering a variety of early work experiences should be a key goal of disability employment policy at federal and state levels.

Key Words: autism, employment, transition, high school

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Youth with disabilities often struggle during the transition between high school and postsecondary employment (Fernandes-Alcantara, 2015; Osgood, Foster, & Courtney, 2010). Transition-age youth on the autism spectrum experience particularly high rates of disconnection from both employment and postsecondary education in the first two years following high school – nearly twice the rate of disconnection of those with intellectual disability (ID) (Shattuck et al., 2012). Unemployment can contribute to poor overall outcomes and negatively impact health (Vancea & Utzet, 2017; Wight, Chau, Aratani, Schwarz, & Thampi, 2010). Work experience during high school is identified as one of five components of an effective transition to adult employment for youth with disabilities (Advisory Committee on Increasing Competitive Integrated Employment for Individuals with Disabilities, September 2016). However, we know relatively little about the prevalence and correlates of the work experiences of high school students on the autism spectrum, or how these compare to their peers with and without disabilities.

Most youth in the U.S. do experience employment as they transition into early adulthood; according to the Bureau of Labor Statistics (2010), nearly all (97%) transition-age youth in the general population have held a job by the age of 22. Work experiences often begin during high school and take many forms: paid or unpaid, school- or community-based; credit or noncredit; summer, school year, or year-round work. School-sponsored work includes work-study or a co-op job, an internship, or a school-based business - done on or off campus – for pay, school credit or both (Burghardt et al, 2017), as opposed to non-school sponsored work in the community typically done for pay. In all forms, work experiences provide valuable lessons in time

management and problem-solving, establish work history, build social capital and offer opportunities to explore career paths. Guidelines for facilitating school-to-work transition for students with disabilities emphasize exposure to a wide variety of school- and community-based work experiences, paid or unpaid on-the-job training, career exploration, and other opportunities to practice work skills (National Collaborative on Workforce and Disability, 2016).

Prior research found that youth on the autism spectrum did not participate in high school work at the same rate, or to the same degree, as their peers in other disability categories. According to data from the 2001 wave of the National Longitudinal Study-2 (NLTS2), 14.5% of high school special education students with autism (ages 13-17) in the U.S. had any paid community-based employment within the prior year – the lowest rate across disability types – compared to 36% of students with ID and 54% of all students with disabilities (Wagner et al., 2003). In a separate study using the same dataset, Carter, Austin, & Trainor (2011) found that students with ID were nearly four times as likely to have paid work (community-based or work study) in the past year as students with autism (OR=3.94, $p<.001$) after controlling for age, sex, race/ethnicity and disability type. However, these studies were conducted using data that is now nearly two decades old and only included students who received special education services.

Benefits of work during high school

In the general population, teen work is generally considered to have positive long-term benefits and few detrimental effects as long as work hours are not excessive (Vuolo, Mortimer, & Staff, 2014). For students with disabilities, paid work during high school has been correlated with having postsecondary employment (Carr, Wright, & Brody, 1996; Carter, Austin, & Trainor, 2012; Luecking & Fabian, 2000; Mazzotti et al., 2016; Rusch, Hughes, Agran, Martin, & Johnson, 2009; Test et al., 2009; Wehman et al., 2015); although, findings have been mixed

(Chiang et al., 2013). Exposure to career and technical education, work-study, and school-supervised work in the community have also been positively related to postsecondary competitive employment for special education students (Daviso, Baer, Flexer, & Meindl, 2016). Baer et al. (2003) found that special education students who engaged in work study were twice as likely to have postsecondary employment; although others found limited to no relationship (Carter et al., 2012; Park & Bouck, 2018).

Factors associated with participation in work experiences during high school

While many correlates of postsecondary employment for youth with disabilities have been identified, less research has examined correlates of work experiences during high school. One study using NLTS2 data found that teens with disabilities who were ages 16 or older, White, non-Hispanic, or from households with higher incomes were more likely to experience employment during high school (Wagner et al., 2003). Carter et al (2011) constructed a multivariable model of factors of paid work among high school students with significant disabilities including autism. Increasing levels of ability to navigate around the community were associated with increasing odds of paid work, as was parental expectation that the student would be self-supporting as an adult, having household responsibilities, having a vocational goal in student's special education plan, and availability of transportation for people with disabilities within the community (Carter, et al., 2011). Although not significant within the final multivariable model, higher-level communication abilities and self-care skills, and college-educated parents, were significantly associated with having paid employment during high school.

Study aims

Given the benefits of working, this paper serves to improve our understanding of how often students with autism experience different types of work during high school compared to

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their peers with and without disabilities, and to identify correlates of work experiences for youth with autism. We aim to answer the following research questions:

1) What are the demographic and disability characteristics that distinguish high school students on the autism spectrum who received special education services from their peers with ID and their peers who were not receiving special education services?

2) What is the prevalence of different types of work experiences for students on the autism spectrum relative to students with ID and non-special education peers?

3) What are the correlates of different types of work experiences among high school students on the autism spectrum who received special education?

Methods

We analyzed secondary data from the National Longitudinal Transition Study-2012 (NLTS2012) – a survey of secondary school students and their parents, designed to yield nationally representative estimates of the characteristics and experiences of youth in the U.S. who received special education services. The NLTS2012 also sampled youth who were not receiving special education services. Use of this data was approved by the U.S. Department of Education and deemed exempt by the lead author's university Institutional Review Board. We rounded unweighted counts to the nearest 10 per data use agreement. NLTS2012 surveyed 1,080 students with autism who were ages 12-23 during academic years 2011-2012 and 2012-2013 and/or their parents. The study used multistage sampling of school districts followed by students within districts. More extensive information regarding study design and survey administration is available online (Burghardt et al., 2017).

The NLTS2012 sampled youth who were receiving special education services through an Individualized Education Program (IEP) in one of 12 federally designated categories including

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autism, intellectual disability, and others. We included students in our autism group if they were *either* receiving special education services under the autism category *or* the student was in another special education category but the parents reported a current diagnosis of autism made by a professional. Previous research using school and medical records shows that students in the autism category are highly likely to meet case criteria for autism (Bertrand et al., 2001; Yeargin-Allsopp et al., 2003). Parent-reported autism, without independent clinical verification, is also generally accepted as valid in studies of national surveys (Blumberg et al., 2013; Kogan et al., 2009).

Two phases of data collection occurred for the NLTS2012. In Phase I (2012), youth and parents participated in computer-assisted telephone interviews (CATI) by phone, which were adapted for youth with disabilities using methods like instant messaging if needed. During Phase II (2013), data collection methods were changed to a web-based interviews due to low response rates in Phase I. If parents/youth did not complete the web-based survey, interviewers followed up with phone or in-person interviews. During Phase II, parents answered some survey questions if youth were unable to respond. If both the youth and parent answered a question, we used the youth's response for analysis.

Study participants

The focus of this study was youth on the autism spectrum (16-19 years) who were in high school at the time of the survey (n=630). This age range corresponds to “teen workers” as defined by the U.S. Bureau of Labor Statistics. We excluded 10 students who received education in settings other than a public high school (e.g., homeschooling, health facility, or correctional facility), as one outcome of interest was school-sponsored work. All included youth had no

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missing information on the main outcomes of interest: community-based or school-sponsored work.

We compared findings for the autism group with same-age peers with ID (n=570) and non-special education (Non-IEP) peers (n=910). We included students in the ID group if they received special education services under the ID category, or if they had a parent-reported ID diagnosis and were receiving special education services under a category other than ID. We excluded students from the ID group if they had parent-reported co-occurring autism or if they received special education services under the autism category. Students with autism and co-occurring ID were included in the autism group only. Non-special education students, who did not have an IEP, were included in the Non-IEP group even if they had classroom accommodations (a “504 plan”) related to a special need. There were 10 students with parent-reported autism who were included in the Non-IEP group.

Measures

Work experiences. Outcome variables came from the youth survey except in instances where parents answered questions because youth were not capable of participating. Students were asked whether they took part in any school-sponsored work activities in the past 12 months. Those who answered “yes” were then asked whether this work was for school credit or pay, and average work hours per week. Students were also asked whether they did any work for pay in the past 12 months, other than work around the house or a school-sponsored job, including babysitting or working for a neighbor. Those who responded “yes” were then asked whether they worked during the summer, the school year, or both; and the average number of hours worked per week during the summer and school year. We used responses to these questions to create four measures of work experiences within the past 12 months: school-sponsored work (paid or

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unpaid), community-based work for pay, any paid work (school-sponsored or community-based), and any work (paid or unpaid; school-sponsored or community-based).

Correlates of work experiences. Youth demographic variables came from the NLTS2012 parent survey and included information about sex, race, and ethnicity. Household demographics and parent characteristics also came from the parent survey and included household income, highest parent education level completed, whether either parent was employed, and whether a language other than English was regularly spoken in the home. We dichotomized household income to above or below 185% of the federal poverty level (FPL) – corresponding to the NLTS2012 threshold for low-income vs higher-income households. We included a marker of whether parents participated in a transition planning meeting to set goals for what youth would do after high school, because family involvement and parent expectations have been associated with postsecondary employment (Wehman et al, 2015).

Variables regarding youth health and disability characteristics came from the parent survey and quantified challenges which could influence employment such as health status, functional abilities and communication skills. Questions about how well youth could read common signs, look up phone numbers and use the phone, get to places outside the home (navigate), understand what is said, and converse with others were presented with 4-point response categories (“pretty well,” “not very well,” “not at all well,” and “not at all” or “not allowed”). For “how well youth understands what is said,” we collapsed the categories “with a lot of trouble” and “not at all” to produce cells large enough for analysis. We were unable to analyze functional skills variables (reads common signs, uses phone) for youth with ID given high levels of missing data related to survey skip patterns. For youth in the autism group, we chose not to include parent-reported ID, as preliminary analyses revealed an artificially low

frequency of co-occurring ID in the autism, group in response to an open-ended question about additional conditions the youth had. We included a measure of whether the youth took medication for behavior or mood as a proxy for co-occurring mental health conditions which were not directly assessed. Finally, a school/community level variable was added to account for whether youth's school district was located in a rural, suburban or urban area, as youth with an IEP who lived in rural areas were less likely to have paid employment per NLTS2012 descriptive statistics (Lipscomb et al., 2017).

Data Analysis. Rates of missing information for each covariate ranged from 0%-7%. Household income, hours worked in a paying job during the school year," and "hours worked in a paying job during the summer" were missing up to 5-7% for at least one group. All other variables were missing fewer than 5% of observations. We imputed missing data using multivariate imputation by chained equations (MICE) methods to create 50 implicates using IVEware version 0.3 (Raghunathan, Solenberger, Berglund, & van Hoewyk, 2016). We used routine procedures for analysis of multiply imputed data (Azur, Stuart, Frangakis, & Leaf, 2011; Raghunathan, Lepkowski, Van Hoewyk, & Solenberger, 2001).

We used the weights included with the dataset so that estimates generalize to the national population of youth who were receiving special education services for a given age range and disability type. Weights included adjustment for nonresponse. Detailed information on the weighting strategy is available elsewhere (Burghardt et al., 2017). We used Stata 15 to perform all analyses (StataCorp, 2017).

We estimated univariate proportions with 95% confidence intervals to obtain descriptive statistics for individual and family/household demographics, disability characteristics and school/community-level characteristics for students in the autism,, ID, and Non-IEP groups

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(Research Question 1, Table 1). We repeated this procedure to describe the distribution of participation in work experiences for each group across the four dependent variables of interest (Research Question 2, Table 2). Students may have been counted in more than one category, for example, if they had a school-sponsored job and community-based work for pay within the same year. We then used logistic regression with the dependent variable of interest as the outcome and a dummy indicator for autism versus each group (in succession) to test for significant univariate differences between autism versus ID, and autism versus Non-IEP (Agresti & Kateri, 2013; Lewis, 2017). Finally, we conducted logistic regression to identify correlates of participation in work experiences. Each of the four dependent variables was the outcome in a separate multivariable logistic regression, including all independent variables (Research Question 3, Table 3).

Results

Research Question 1. Demographic and disability characteristics (Table 1)

High school students with autism were significantly more likely to be male, White, from households with incomes above 185% of the federal poverty level, and from English-only homes than their peers with ID and Non-IEP peers. Approximately six in 10 parents of students with autism reported participating in a transition planning meeting at school to set postsecondary goals, similar to parents of students with ID. Students with autism had overall significantly better health than their peers with ID but poorer health than Non-IEP peers. They were significantly more likely than either peer group to be taking medication for behavior or mood regulation, and they also experienced more significant levels of functional than their peers. Only one-third of students with autism were able to navigate to places outside the home very well, compared to half of students with ID and nearly 90% of Non-IEP peers. Significantly more students with

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autism were not allowed to go places outside the home on their own compared to students with ID. Ability to understand language was similar across the autism and ID groups, but ability to converse was significantly more impaired among students with autism.

Research Question 2. Prevalence of work experiences (Table 2)

In regard to types of high school work experiences, 20% of students with autism had any school-sponsored work in the past 12 months (paid or unpaid) – a significantly higher rate than Non-IEP students (8%). Compared to Non-IEP students, more students with autism received school credit versus pay and worked significantly fewer mean hours per week at their school jobs. One-quarter (25%) of high school students with autism had any community-based work for pay within the last 12 months - less than half the rate of Non-IEP students (55%). Students with autism were more likely to have a paid job during the school year compared to Non-IEP peers, but less likely to work year-round. They also worked significantly fewer mean hours per week than Non-IEP peers during the school year, summer, and year-round work; and significantly fewer mean hours than their peers with ID during the school year.

Less than one-third (31%) of students on the autism spectrum had any work for pay within the past year, compared to 56% of Non-IEP students. In all, 42% of students with autism did any work within the past year – paid or unpaid, community-based or school-sponsored – significantly fewer than 51% of students with ID and 59% of Non-IEP students.

Research Question 3. Correlates of work experiences (Table 3)

Significant correlates of work experiences included race, parent participation in transition planning, and functional skills such as use of the phone and ability to navigate within the community. Students with autism who were Black/African American were 60-70% less likely to experience school-sponsored work, or any work, in comparison to White students with autism. If

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the parents of students with autism participated in a transition planning meeting to set postsecondary goals, students were 70% more likely to have school-sponsored work, or any work experiences, within the past year.

In regard to functional skills, the odds of having school-sponsored work was 2.6 times higher among students on the autism spectrum who were not able to use the phone very well versus those who used the phone and looked up phone numbers very well. Those who had difficulty navigating, or who were not allowed to go places on their own, had three to four times the odds of experiencing school-sponsored work, and were less likely to experience community-based work for pay, paid work of any type, or any type of work, compared to those who could navigate very well.

Discussion

High school students on the autism spectrum had the lowest rates of participation, and the lowest mean hours worked per week, across all four types of work experiences compared to their peers with ID and Non-IEP peers, with exception of school-sponsored work. Only four of every 10 high school students with autism experienced any type of work (paid or unpaid, community-based or school-sponsored) within a given year – a significantly lower rate than both students with ID and Non-IEP peers. Rates of community-based paid work and “any paid work” among students with autism were roughly half the rate of Non-IEP peers - well over half of whom had work for pay within the past year. The low rate of participation in school-sponsored work among students with autism – around 20% – is also concerning; however, it may represent an increase, given that only 11% of youth autism (ages 15-18 years) reported having school-sponsored work in NLTS2 data from 2003 (Liu et al., 2018). Overall, while other research found that 62% of high school students with autism expected to work after high school (Anderson, McDonald,

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Edsall, Smith, & Taylor, 2016), far fewer appear to be experiencing the activities that could offer the best preparation for postsecondary employment.

We also found that while students with autism and those with ID experienced community-based paid work at only slightly higher rates than school-sponsored work, Non-IEP students experienced community-based work for pay at a frequency nearly seven times their participation in school-sponsored work (55% versus 8%). These differences in proportions of community-based work are concerning given prior research suggesting that having paid work during high school is strongly associated with postsecondary employment. We are not aware of any prior research examining the types of work experiences high school students with autism engage in compared to peer groups.

Prevalence estimates of school-sponsored work, community-based paid work, and “any paid work” among students with autism were not statistically different than peers with ID. The finding of comparable prevalence of school-sponsored work is consistent with NLTS2 youth survey data for students with autism versus ID at ages 15-18 years (Liu et al., 2018). However, findings regarding “any paid work” contrasted with NLTS2 research which did find statistically significant differences between high school students with autism versus ID (Carter et al., 2011).

The finding that parent participation in transition planning to set postsecondary goals was positively correlated with high school work experiences for students with autism was a novel contribution. Furthermore, we found that high school students with autism were less likely to experience work if they were Black/African American, or if they had functional skill deficits in phone use or navigational skills. Difficulty with community navigation was strongly associated with lower odds of community-based paid work. One possible explanation is that costs of transportation for students who cannot get around the community on their own can impact the

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ability of school districts to provide community-based work experiences, particularly within high poverty areas (U.S. Government Accountability Office, May 4, 2017). Within urban areas, the provision of training to use public transportation or ride services may be time intensive.

In contrast to previous research, being from a higher-income household or having better communication skills were not associated with having work experiences. As a whole, the functional abilities of the NLTS2012 cohort of students with autism are improved compared to prior cohorts for skills including communicating by any means, understanding what people say, and performing activities of daily living (Liu et al., 2018), coinciding with decreases in the proportion of youth with autism who have co-occurring ID (Rice et al., 2010). This shift toward less severity of impairment in the autism youth population may help explain why communication and functional skills, like ability to read common signs, were not significantly associated with work experiences in this study. Nevertheless, despite these global improvements, navigation skills still posed more challenge for students with autism versus those with ID, which may help explain the lower frequencies of any work and paid work among students with autism.

Implications for policy and practice

Several recommendations emerge from our findings. First, the fact that only about 40% of students on the autism spectrum in this study experienced any type of work before leaving high school is highly concerning – especially given the broad scope of work types we examined. Guidelines for school-to-work transition recommend exploration of “multiple on-the-job activities and experiences in paid and unpaid settings” with the goal of leaving high school with a job or an active plan for seeking a job (American Association on Intellectual and Developmental Disabilities, 2012). Opportunities to practice job skills across a variety of work environments within students’ neighborhoods and communities is especially important for

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students with autism who often have difficulty with generalization of learned skills (Luecking & Luecking, 2015; U.S. Government Accountability Office, November 2016). Instead, we find that only about one-fourth of students with autism are participating in work across either school-sponsored or community-based settings. Increasing the participation of high school students with autism across a variety of work experiences should be a target of school-to-work transition programs for these youth – particularly those who are non-white.

Specific goals for obtaining work experiences would typically be documented in students' transition plans. Federal law requires special individualized transition planning to begin by age 16; yet, findings from this study suggest significant undercompliance, given reported low rates of parent participation in transition planning. Improving the consistency of transition planning within the special education process must be a national priority within efforts to improve school-to-work transition outcomes for students with autism.

While work for most youth in the U.S. typically occurs outside of a school context, work and school may be more interrelated for youth with disabilities, since schools are vehicles for delivering employment-related transition services and vocational education. However, a recent survey of school districts found that only 69% provided work experiences to students with autism (U.S. Government Accountability Office, May 2017). Our finding of very low rates of school-sponsored work experiences further validates this problem. Policy-level interventions include enhancing vocational training, and internship or apprenticeship opportunities during the secondary years (Federal Partners in Transition Workgroup, February 2015; OECD et al., 2016). Youth employment rates are higher in countries like Germany which actively promote work-study schemes and apprenticeships as avenues to employment (Quintini & Martin, 2014). A move away from an over-focus on college preparation, which some have suggested is codified in

our educational policy (Lombardi, Dougherty, & Monahan, 2018), and a shift in emphasis to vocational preparation could be beneficial for students with autism and other disabilities.

Implications for research

Findings from this study suggest that analyzing and tracking work experiences by type is valuable – rather than simply focusing on community-based paid work, which is a common focus of disability employment research. It is possible that the reported positive association between paid work during high school and later employment outcomes may be spurious and obscure other underlying characteristics that predispose some youth with disabilities to seek early work experience and secure employment in adulthood. Until we have a definitive answer to this question, it is important to understand the range of types of work that students with autism experience and how varying experiences contribute to postsecondary employment outcomes.

The NLTS series is currently the best source of nationally representative data on the employment of youth with autism. Unfortunately, NLTS2 and NLTS2012 study designs differed in how employment questions were asked, time periods of measurement, and age ranges, and thus offer little opportunity for comparison of employment experiences across cohorts. Further, postsecondary outcomes data was not collected in the NLTS2012; therefore, we are unable to analyze the association of high school work experiences with post-secondary outcomes.

Understanding whether employment experiences and their associated outcomes are changing across time is a critical question for future research.

Some researchers have called for disability-specific research to better understand how vocational education and career readiness programs might be better differentiated based on disability type (Lombardi et al., 2018). For example, the association between navigational skills and work experiences in this study suggests a need for research to identify barriers to community

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navigation which may be unique or enhanced for students with autism, and to develop supports and resources to address navigation skills and public transportation use.

Limitations and strengths

This study had several limitations. First, it is likely that we did not capture all students with a diagnosis of autism. The parent first had to report that their child had ever been diagnosed with a disability or condition by a doctor, and then supply the condition name. They were not directly asked if their child had ever been or was currently diagnosed with autism. However, we improved our capture rate by including parent-reported autism.

Second, we examined high school students at ages 16-19 years. Given that employment experiences increase with age, our inclusion of 16 and 17 year-old students who were just entering the labor market could have lowered the overall rates of work experiences. However, use of this age range provided a point of comparison with federal statistics for teen workers.

Third, we were unable to examine several key variables that likely affected high school work experiences. The NLTS2012 lacks measures of IQ or co-occurring intellectual disability, or psychiatric disorders, making it difficult to gauge complexity of impairments or service needs. While measures of functional impairment and communication skills provide some indication of impairment severity, these are not clinical measures. The NLTS2012 also did not collect information regarding the receipt of vocational services, which are often a key to finding and supporting paid, community-based work.

This study also had several strengths. Use of NLTS2012 data provided a large cohort of high school students with autism, opportunity for comparison to their peers with and without disabilities, and opportunity to assess participation in different types of work experiences.

Conclusions

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While more focus to date has been placed on understanding postsecondary work for people with autism, increasing our understanding of earlier work experiences may be critical in shaping their employment trajectories. Despite noted improvements in the overall functional skills of the NLTS2012 cohort of students with autism, overall employment rates remain low and the gaps in work experiences between students with autism and non-special education students remains sizeable. Therefore, our findings indicate that high school students with autism are missing important opportunities for vocational skill building, networking, and prevention of future employment disconnection. Fostering work experiences as early as possible should be the goal of disability employment policy at federal and state levels and the aspiration of school-to-work transition programs as a means of interrupting a cycle of accumulating disadvantage.

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Table 1

Descriptive statistics for covariates among high school students compared among groups

	Autism, % (95% CI)		ID, % (95% CI)		Non-IEP, % (95% CI)	
Youth Demographics:						
Male	81.8	(78.3, 85.2)	55.7***	(50.3, 61.1)	48.3***	(44.3, 52.3)
Race						
White	78.6	(74.2, 82.9)	60.9***	(54.4, 67.4)	69.6**	(65.1, 74.2)
Black	12.3	(8.8, 15.8)	27.8***	(21.4, 34.3)	18.3*	(14.4, 22.1)
Other/Mixed	9.1	(6.4, 11.9)	11.3	(7.5, 15.1)	12.1	(9.1, 15.2)
Hispanic/Latino	12.8	(9.2, 16.3)	17.1	(12.3, 21.9)	26.0***	(21.3, 30.6)
Household Demographics and Parent Characteristics:						
Higher-Income ¹	63.5	(59.1, 68.0)	37.4***	(31.3, 43.6)	53.9**	(49.2, 58.5)
Parent Education						
Graduate-level	19.2	(14.8, 23.6)	6.5***	(4.1, 8.8)	14.0*	(11.0, 17.0)
Technical or College	41.2	(36.7, 45.7)	32.0*	(26.4, 37.6)	42.6	(38.5, 46.6)
High School Diploma	34.4	(29.4, 39.4)	43.7*	(38.1, 49.2)	30.5	(26.4, 34.6)
Less than High School	5.2	(3.3, 7.1)	17.9***	(14.0, 21.8)	12.9***	(10.0, 15.8)
Parent Employed	83.0	(79.5, 86.5)	73.3***	(69.0, 77.5)	87.6*	(84.8, 90.4)
Language Other Than English in Home	10.7	(7.5, 13.9)	17.5**	(13.1, 22.0)	32.1***	(27.3, 36.9)
Parent Participated in Transition Planning	58.1	(52.9, 63.2)	62.1	(56.9, 67.2)	--	--
Youth Health and Disability Characteristics:						
General Health						
Excellent, Very Good	65.5	(61.0, 70.0)	55.2**	(49.6, 60.8)	84.6***	(81.5, 87.8)
Good, Fair, Poor	34.5	(30.0, 39.0)	44.8**	(39.2, 50.4)	15.4	(12.2, 18.5)
Takes Medication for	46.9	(42.2, 51.6)	25.2***	(20.6, 29.8)	7.2***	(5.0, 9.4)

	Autism, % (95% CI)		ID, % (95% CI)		Non-IEP, % (95% CI)	
Behavior/Mood						
Reads Common Signs						
Very Well	62.2	(57.3, 67.1)	--	--	--	--
Pretty Well	19.1	(15.3, 22.9)	--	--	--	--
Not Very Well	8.4	(5.8, 10.9)	--	--	--	--
Not at all Well	10.3	(7.3, 13.2)	--	--	--	--
Uses Phone						
Very Well	37.8	(32.6, 43.0)	--	--	--	--
Pretty Well	21.9	(17.8, 26.1)	--	--	--	--
Not Very Well	12.9	(9.6, 16.2)	--	--	--	--
Not at all Well	27.4	(22.8, 32.0)	--	--	--	--
Navigates						
Very Well	32.4	(27.3, 37.4)	50.0***	(44.5, 55.6)	89.1***	(86.3, 91.8)
Pretty Well	24.8	(20.3, 29.3)	20.7	(17.0, 24.4)	9.1***	(6.4, 11.8)
Not Very Well	8.4	(5.5, 11.4)	5.8	(3.5, 8.1)	1.0***	(0.3, 1.8)
Not at all Well	16.0	(12.5, 19.6)	12.7	(9.7, 15.7)	0.1***	(0.0, 0.1)
Not Allowed	18.4	(14.6, 22.1)	10.8**	(8.1, 13.5)	0.7****	(0.1, 1.4)
Understands Language						
With No Trouble	27.6	(23.6, 31.7)	29.9	(25.0, 34.8)	94.7***	(93.0, 96.5)
A Little Trouble	53.8	(49.0, 58.6)	55.4	(49.9, 60.9)	4.6***	(3.1, 6.2)
A Lot of Trouble/ Not at All	18.6	(15.0, 22.1)	14.7	(10.1, 19.3)	0.7***	(0.0, 1.3)
Carries on a Conversation						
With No Trouble	22.8	(18.6, 27.0)	45.4***	(39.9, 50.9)	92.4***	(90.2, 94.6)
A Little Trouble	44.6	(39.8, 49.5)	36.5*	(31.5, 41.5)	7.4***	(5.2, 9.6)
A Lot of Trouble	21.4	(17.6, 25.2)	12.3**	(9.3, 15.3)	--	--
Not at All	11.2	(8.4, 14.0)	5.8**	(3.7, 7.8)	--	--

	Autism, % (95% CI)		ID, % (95% CI)		Non-IEP, % (95% CI)	
School/Community Level Characteristics:						
School's Locale						
City	25.6	(19.2, 32.0)	27.2	(21.0, 33.5)	26.2	(20.6, 31.7)
Suburb	35.4	(28.6, 42.3)	29.6	(22.8, 36.4)	37.8	(31.6, 44.0)
Town or Rural	39.0	(32.4, 45.6)	43.2	(36.0, 50.4)	36.0	(30.4, 41.7)

¹ Household income >185% FPL. --values too small to report

Statistical significance is noted for each group in comparison to the ASD group. *p<0.05; **p<0.01; ***p<0.001.

Weighted to population levels. Multiply imputed to 50 multiples

Table 2

Prevalence of participation in high school work experiences within past 12 months, by type compared among groups

	Autism, % (95% CI)		ID, % (95% CI)		Non-IEP, % (95% CI)	
School-Sponsored Work	20.2	(16.5, 23.9)	25.1	(20.6, 29.6)	8.4***	(6.2, 10.7)
For Credit	67.8	(58.1, 77.5)	69.6	(61.7, 77.4)	56.0	(42.1, 69.9)
For Pay	33.8	(24.2, 43.4)	32.2	(23.2, 41.3)	26.5	(15.3, 37.8)
Hours/Week (Mean)	5.4	(4.5, 6.2)	6.5	(5.1, 8.0)	9.4**	(6.7, 12.1)
Community-Based Work for Pay	25.3	(20.3, 30.2)	32.7	(27.0, 38.3)	55.3***	(50.9, 59.7)
Summer	28.2	(18.8, 37.7)	19.6	(12.6, 26.6)	21.2	(16.7, 25.8)
Hours/Week (Mean)	11.9	(9.1, 14.7)	14.5	(9.5, 19.5)	18.8**	(17.0, 20.6)
School year	19.4	(10.5, 28.2)	14.9	(9.1, 20.8)	10.4*	(6.9, 14.0)
Hours/Week (Mean)	3.9	(2.4, 5.4)	7.9*	(4.6, 11.3)	9.6***	(8.1, 11.1)
Year-Round	52.4	(41.7, 63.1)	65.5	(57.1, 73.9)	68.3*	(63.2, 73.5)
Any Work for Pay	30.8	(25.8, 35.9)	38.1	(32.3, 43.9)	55.9***	(51.6, 60.3)
Any Work (Paid or Unpaid)	41.8	(36.3, 47.2)	50.6*	(44.6, 56.5)	58.5***	(54.4, 62.6)

Statistical significance is noted for each group in comparison to the ASD group. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Weighted to population levels. Multiply imputed to 50 multiples

WORK AMONG HIGH SCHOOL STUDENTS WITH AUTISM

Table 3

Correlates of work experiences within past 12 months among high school students with autism. Adjusted odds ratios (95% CI)

	School-Sponsored Work, Paid or Unpaid	Community-Based Work for Pay	Any Paid Work	Any Work, Paid or Unpaid
Male	1.50 (0.83, 2.71)	1.51 (0.78, 2.93)	1.37 (0.78, 2.42)	1.58 (0.96, 2.61)
Race				
White	1	1	1	1
Black	0.37 (0.14, 0.99)*	0.55 (0.22, 1.41)	0.55 (0.25, 1.23)	0.42 (0.21, 0.86)*
Other/Mixed	1.36 (0.59, 3.14)	0.50 (0.20, 1.23)	0.53 (0.22, 1.27)	0.79 (0.39, 1.61)
Hispanic/Latino	1.09 (0.51, 2.37)	0.83 (0.33, 2.08)	0.89 (0.43, 1.85)	1.13 (0.54, 2.36)
Higher-Income ¹	1.37 (0.75, 2.50)	1.07 (0.56, 2.06)	1.07 (0.60, 1.92)	1.12 (0.68, 1.83)
Parent Education				
Graduate-level	1.33 (0.61, 2.91)	1.57 (0.70, 3.50)	1.35 (0.65, 2.80)	1.67 (0.90, 3.12)
Technical or College	1.11 (0.61, 2.01)	0.92 (0.48, 1.76)	1.06 (0.61, 1.87)	1.07 (0.65, 1.77)
High School Diploma	1	1	1	1
Less Than High School	1.21 (0.43, 3.46)	0.66 (0.18, 2.45)	1.26 (0.42, 3.77)	0.86 (0.33, 2.26)
Parent Employed	0.54 (0.26, 1.11)	1.21 (0.53, 2.75)	1.10 (0.52, 2.31)	0.91 (0.49, 1.68)
Language Other Than English in Home	0.95 (0.40, 2.26)	0.93 (0.34, 2.57)	0.92 (0.38, 2.21)	0.87 (0.40, 1.90)
Parent Participated in Transition Planning	1.76 (1.10, 2.81)*	1.48 (0.87, 2.53)	1.58 (0.97, 2.56)	1.78 (1.19, 2.65)**

WORK AMONG HIGH SCHOOL STUDENTS WITH AUTISM

	School-Sponsored Work, Paid or Unpaid	Community-Based Work for Pay	Any Paid Work	Any Work, Paid or Unpaid
General Health				
Excellent, Very Good	1	1	1	1
Good, Fair, Poor	0.74 (0.45, 1.22)	1.73 (0.97, 3.10)	1.44 (0.84, 2.48)	1.18 (0.73, 1.90)
Takes Medication for Behavior/Mood	0.87 (0.54, 1.39)	0.71 (0.42, 1.19)	0.66 (0.41, 1.06)	0.75 (0.49, 1.15)
Reads Common Signs				
Very Well	1	1	1	1
Pretty Well	1.27 (0.64, 2.49)	0.58 (0.25, 1.32)	0.69 (0.35, 1.37)	0.99 (0.55, 1.76)
Not Very Well	1.44 (0.54, 3.83)	1.34 (0.38, 4.65)	1.00 (0.35, 2.82)	1.19 (0.49, 2.90)
Not at all Well	0.74 (0.25, 2.17)	0.48 (0.07, 3.25)	0.49 (0.10, 2.44)	0.54 (0.20, 1.51)
Uses phone				
Very Well	1	1	1	1
Pretty Well	1.03 (0.50, 2.11)	0.71 (0.39, 1.32)	0.65 (0.36, 1.18)	0.77 (0.45, 1.33)
Not Very Well	2.62 (1.13, 6.07)*	0.54 (0.24, 1.24)	0.91 (0.43, 1.93)	1.32 (0.66, 2.63)
Not at all Well	1.26 (0.48, 3.28)	0.33 (0.10, 1.02)	0.51 (0.21, 1.23)	0.62 (0.29, 1.32)
Navigates				
Very Well	1	1	1	1
Pretty Well	3.09 (1.46, 6.57)**	0.63 (0.34, 1.17)	0.94 (0.52, 1.69)	0.85 (0.48, 1.49)
Not Very Well	4.53 (1.85, 11.12)**	0.56 (0.22, 1.44)	1.05 (0.46, 2.39)	1.15 (0.55, 2.43)

WORK AMONG HIGH SCHOOL STUDENTS WITH AUTISM

	School-Sponsored Work, Paid or Unpaid	Community-Based Work for Pay	Any Paid Work	Any Work, Paid or Unpaid
Not at all Well	2.10 (0.85, 5.14)	0.07 (0.02, 0.31)***	0.24 (0.09, 0.65)**	0.34 (0.15, 0.78)*
Not Allowed	3.05 (1.19, 7.80)*	0.10 (0.03, 0.34)***	0.25 (0.09, 0.64)**	0.48 (0.23, 0.99)*
Understands Language				
With No Trouble	1	1	1	1
A Little Trouble	1.35 (0.72, 2.54)	0.77 (0.42, 1.41)	0.95 (0.56, 1.60)	0.77 (0.48, 1.23)
A Lot of Trouble/ Not at All	1.82 (0.76, 4.37)	1.26 (0.58, 2.74)	0.95 (0.47, 1.92)	1.21 (0.65, 2.26)
Carries on a Conversation				
With No Trouble	1	1	1	1
A Little Trouble	0.59 (0.28, 1.22)	0.83 (0.47, 1.46)	1.00 (0.59, 1.71)	0.89 (0.54, 1.48)
A Lot of Trouble	0.71 (0.31, 1.64)	0.69 (0.30, 1.57)	0.99 (0.50, 1.98)	0.99 (0.52, 1.92)
Not at All	0.85 (0.28, 2.62)	0.75 (0.18, 3.14)	0.44 (0.12, 1.53)	1.32 (0.54, 3.18)
School's Locale				
City	1	1	1	1
Suburb	0.71 (0.38, 1.34)	1.60 (0.72, 3.53)	1.48 (0.73, 2.97)	0.98 (0.55, 1.77)
Town or Rural	0.74 (0.40, 1.40)	1.35 (0.64, 2.88)	1.28 (0.64, 2.57)	0.94 (0.53, 1.68)

¹ Household income >185% FPL. Statistical significance is noted in comparison to referent group. *p<0.05; **p<0.01; ***p<0.001

Weighted to population levels. Multiply imputed to 50 multiples