Inclusion

Employment Preparation Experiences of Youth with Intellectual Disability and Autism who Attend College-Based Transition Programs

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Abstract

College-based transition programs offer students with intellectual disability and autism (ID/A) the opportunity to navigate adult learning experiences with similar-aged peers, accessing college coursework and employment experiences while continuing to receive support from or coordinated by their local school system. The present study used data from college-based transition programs included in the Transition and Postsecondary Programs for Students with Intellectual Disability (TPSID) model demonstration program to examine the composition of employment preparation activities including paid employment and the association with having paid employment upon exiting from the program. The findings suggest college-based transition programs hold promise as a model for supporting the transition to paid employment for students with ID/A. Implications for research and practice are discussed.

Introduction

Transition services for students with disabilities should specify post-secondary goals appropriate to education and training, employment, and, if appropriate, independent living skills. Per the Individuals with Disabilities Education Act (IDEA), postsecondary goals are based on the student's individual needs, strengths, interests, and preferences (20 U.S.C. §1400-14). Federal regulations define transition services as a "coordinated set of activities for a child with a disability that are a results-oriented process and meet academic and functional needs" (34 CFR § 300.43 [a]. 20 U.S.C. 1401[34]). For students with intellectual disability or intellectual disability plus autism (collectively referred to here as students with ID/A), transition services focus, in large part, on preparation for future employment goals and connecting these students to state agencies such as state Intellectual and Developmental Disability (IDD) agencies and Vocational Rehabilitation (VR). To a lesser extent, transition services for these students support their access to future higher education and training.

Since 2014, the Workforce Innovation and Opportunity Act (WIOA) has mandated state VR agencies set aside at least 15% of their federal funds to provide pre-employment transition services (pre-ETS) to students with disabilities who are eligible or potentially eligible for VR services. Required pre-ETS services include job exploration counseling, work-based learning experiences, counseling on comprehensive transition or postsecondary educational programs at institutions of higher education, workplace readiness training, and instruction in self-advocacy (Thelin, 2019). Even with strong legislative support for services such as pre-ETS, many transitioning students with ID/A leave their secondary education with poor or nonexistent employment outcomes. The National Core Indicators project found only 4% of students ages 18 to 21 supported by state IDD agencies were employed in individual paid jobs and that rate rose

to only 9% for those service recipients ages 22 to 30 (National Core Indictors, 2019). However, the same study found 65% of young adults ages 18 to 22 who receive support from a state IDD agency but who were not working would like a job in the community.

Transition programs that include effective and applied employment skills training and workplace instruction show promise in addressing employment outcomes for students with ID/A (Southward & Kayzar, 2017). Employment preparation activities for transitioning students with ID/A may include career awareness and exploration activities (Allison et al., 2017; Cease-Cook et al., 2015) and work-based learning activities to develop and practice workplace-specific skills (Test et al., 2009; Mazzotti et al., 2021). Early paid employment while students are in high school has been found to be one of the strongest predictors of later employment outcomes for students with disabilities (Mamun et al., 2018; Mazzotti et al., 2021). Therefore, paid employment is also considered an employment preparation activity for transitioning students with ID/A.

Students with ID/A, depending on the state in which they reside, may qualify for special education services, including transition services, until the age of 21 or 22 (and until age 26 in Michigan). After age 18, transition services may be provided within the high school or in the community, and, in some cases, on a college campus. College-based transition services for transition-aged students with ID and other disabilities between the ages of 18 and 22 provide opportunities to access college courses, internships, and employment, as well as other campus activities during their final two to three years of secondary education. These services have been referred to in number of different ways including dual enrollment, concurrent enrollment, and 18-21 transition programs (Schillaci, et al., 2021).

The provision of college-based transition services is a practice dating back over 20 years

(Hall et al., 2000; Neubert, et al., 2004). These opportunities are often developed by local school systems in partnership with a college or university, and in some cases, with local community rehabilitation providers. Students may receive their transition services completely at the college or spend part of their day in the high school and go to the college or to an employment site for part of the day. Staffing for these programs may straddle both systems, with program staff sometimes being overseen by the college or university and/or employed by the partnering local education agency (LEA).

Most of what is known about the provision of employment services in college-based transition programs comes from descriptions of programs in one or two states. For example, Leach et al. (2013) shared a description of a college-based transition program offered at Winthrop University in South Carolina in which they indicated students choose from a variety of paid and unpaid work experiences across campus based on their personal interests. Rogan et al. (2014) described the activities of students with ID attending a college-based transition program at Indiana University, indicating their program's focus was on ensuring students had paid jobs prior to exiting the program. Grigal and Dwyre (2010) examined data collected between 2005 and 2009 on 96 students with ID in college-based transition programs in two states (Maryland and Connecticut), finding 93% of students were employed while enrolled in their programs. Of those students who completed exit and follow up surveys, 83% from the Connecticut program and 72% from the Maryland programs were engaged in paid employment after they exited the college-based transition program.

Currently college-based transition programs for students with ID/A are not monitored or tracked in federal datasets or in longitudinal transition data sets like the National Longitudinal Transition Study 2 (NLTS-2) or NLTS 2012, making it difficult to ascertain their prevalence or

understand their composition beyond a single program description. One dataset potentially offering a deeper understanding of the composition of services offered in college-based transition programs is a subset of data collected from a national model demonstration program called the Transition Postsecondary Education Programs for Students with Intellectual Disability or TPSID. First funded by the US Department of Education Office of Postsecondary Education between 2010 and 2015, TPSID programs were designed to create, expand, or enhance high-quality, inclusive higher education experiences to support positive outcomes for individuals with ID/A.

The programs funded between 2010 and 2015 enrolled 2,167 students with ID/A from 23 states in the US (Think College National Coordinating Center, 2021a). Although a large proportion of students who attended these programs were adult students no longer receiving special education services, approximately one quarter of the students enrolled in the TPSID programs were high school students who were receiving special education transition services while attending (Grigal et al., 2016). Previous literature on students with ID/A in college-based transition programs have shed light on employment preparation activities for a particular program or state (e.g., Leach et al., 2013; Rogan et al., 2014), and although these findings are crucial to our understanding of the program operations and effectiveness, they do not speak to the larger population of students with ID/A in college-based transition programs. Thus, this study provides an opportunity to explore the composition of employment preparation activities and outcomes of students with ID/A in college-based transition programs using a national sample of federally funded programs.

The purpose of the present study was to provide a first look at the employment preparation experiences and outcomes of students with ID/A who attend college-based transition programs using the TPSID 2010-2015 dataset. We sought to answer the following research

questions:

- RQ1: What employment preparation activities do students with ID/A experience in college-based transition programs?
- RQ2: What percentage of students with ID/A who are attending college-based transition programs have paid employment while in the program and paid employment when they exit the program?
- RQ3: Do employment preparation activities, paid employment while enrolled, and student and program factors predict having paid employment at exit from a college-based transition program?

Method

Dataset

This study analyzed data gathered from college and university programs funded as part of the TPSID model demonstration program between 2010 and 2015. TPSID projects were required to report data to the National Coordinating Center (NCC) at Think College, Institute for Community Inclusion, UMass Boston, on aspects of their programs including student demographics, academic enrollments, social and employment engagement, and programmatic infrastructure. Data were reported annually by TPSID program staff (e.g., principal investigator, program coordinator, evaluator, or data entry assistant) between August 2012 and September 2015 using an online data collection tool built in the Quickbase platform. Data were obtained for the present study with permission from the Principal Investigator of the NCC. For the present study, annual records were aggregated to create a single record detailing experiences across the entirety of the college-based transition program for each student.

Sample

The present study focuses on a sample of 359 youth with ID/A reported to be (a) still receiving services from their LEA under IDEA during at least one year of TPSID attendance, and (b) between the ages of 18 and 22 on October 1st of the first year they were enrolled in a TPSID program. These youth attended 40 college-based transition programs in 22 states. The full sample of 359 youth was included in the analysis for research questions 1 and 2 in order to analyze the largest possible sample. The sample for research question 3 was a subset of youth who exited their program between 2010 and 2015 (n = 280).

Variables

A list of all variables included in this study and population size for each is provided in Table 1. These variables are grouped as follows: employment preparation activities; paid employment while in the program; paid employment at exit; and student and program factors.

Employment Preparation Activities

We looked at 13 variables across three categories of employment preparation activities: career development experiences, career-related course enrollments, and employment-related program supports. The 13 variables consisted of six unpaid career development experience variables: (1) service learning, (2) unpaid internships for no college/university credit, (3) unpaid internships for college/university credit, (4) volunteering or community service, (5) work training, and (6) other unpaid experience; two career-related course enrollment variables: (1) the student took at least one course related to their career goals and (2) the student took at least two courses related to their career goals; and five employment-related program support variables: the student attended a program where employment supports were provided by entities other than the program staff: (1) career services staff available to all students, (2) peer mentors or supports, (3) LEA transition staff, (4) state VR staff, and (5) state IDD agency staff. For more information on

the employment preparation activities provided by TPSIDs, see Grigal et al. (2016).

Paid Employment While in the Program

Any job held by a student while they were enrolled in the college-based transition program was reported as part of the required data collection from TPSIDs. Students were determined to have had paid employment while in the program if they held any type of paid job, including a paid internship, during the time they were enrolled.

Paid Employment at Exit

Data were collected on each student at the point of exit from their college-based transition program. Students were determined to have had paid employment at exit if they held any job at or within 90 days of program exit. Note that 280 of the 359 students exited their program during the period of data collection and the remaining 79 students had not exited by the time data collection from these TPSID programs ended.

Student and Program Factors

We included six student factors: race (which consisted of five categories: White, Black/African American, Asian, American Indian or Alaska Native, and Native Hawaiian or other Pacific Islander), ethnicity, gender, if the student had disabilities other than ID, age, and number of years the student was enrolled in the program. We included a single program factor: if the program was located at a two-year or four-year institution of higher education. These factors have been included as covariates in prior studies on employment using TPSID data (e.g., Grigal et al., 2019).

Data Analysis

Data were analyzed using IBM SPSS software version 28. We conducted descriptive analysis to answer the first two research questions. A series of regression tests were chosen as

the primary method of analysis to answer research question three as they allow for causal analysis between independent and binary dependent variables and can predict a likely outcome on variables found to be linearly related (Montgomery et al., 2021; Pituch & Stevens, 2015). Regression tests also allowed for reduction of variables to be included in the final model thus guarding against the potential of a type II error. This was an ideal data analysis strategy as many independent variables were of interest and only those found to be linearly related to the dependent variable would be indicative of a likely outcome for paid employment at exit from a college-based transition program for youth with ID/A. Tests of assumptions were conducted for the four models examined in this study (models 1-3 and the final model). The student and program variables of type of institution (two- or four-year) and years of enrollment were collapsed in analysis to indicate whether attending a longer program (i.e., four-years) or being enrolled for longer periods of time affected the outcome.

Model 1 examined the association between paid employment at exit status and student and program factors (i.e., first controlling for non-malleable factors). A binomial logistic regression was performed to ascertain the effects of nine student and program variables on the likelihood that participants exited with a paid job. Variables included in model 1 were: five race categories included in the sample, whether the student had another disability (not ID/A), gender, Hispanic/Latino ethnicity, and whether the student attended a two- or four-year institution. A binomial logistic regression is an appropriate test when the aim is to predict the probability that an observation falls into one of two categories of a dichotomous dependent variable (i.e., paid employment at exit – yes/no) based on one more independent variable that are both continuous and categorical (Laerd Statistics, 2017; Pituch & Stevens, 2015). A Bonferroni correction was applied using all nine variables in the model resulting in statistical significance being accepted

when $p < .00555$ (Tabachnick & Fidell, 2014). Statistically significant variables were retained for analysis in the subsequent model.

In model 2, paid employment in the program (i.e., early paid employment, which has been found through prior research to be one of the strongest predictors of post-school employment; Mamun et al., 2018; Mazzotti et al., 2021) was added to the remaining model 1 variables in a hierarchical multiple regression test. This was deemed an appropriate test since the aim was to determine the importance of the additional independent variable in predicting the dependent variable (Ross & Wilson, 2017). Variables with $p < .05$ significance were retained for the subsequent model.

Model 3 included the significant variables from Model 2 and the addition of employment preparation activities (i.e., other malleable factors designed to prepare students for post-school employment). To reduce the large number of potential employment preparation variables, a preliminary linear regression was used to determine which of the 13 employment preparation activities had a linear relationship on paid employment at exit. This crucial step in the analysis identified only those relevant variables that were linearly related to the dependent variable in order to reduce the likelihood of a type II error (Montgomery et al., 2021). Five of these variables were found to be significant at $p < .05$ and were retained for the hierarchical regression. Nonsignificant variables were removed from further analysis. All remaining variables (from model 2 and the linear test) were included in model 3. Significant variables in this model were retained for the final model.

Finally, a binomial logistic regression was performed to ascertain the effects of the remaining variables on the likelihood that participants had paid employment at exit. Tests for the addition of independent variables were completed. Since the remaining variables were

categorical, tests for linearity of continuous variables were not performed. Variables in this final model were assumed to be linearly related to the dependent variable based on results of the hierarchical regression conducted before this test. Odds ratios for the final set of variables were calculated.

Results

RQ1: Employment Preparation Activities

Of the career development experiences: 51% (*n* = 182) of students engaged in volunteer or community service opportunities, 33% (*n* = 117) in unpaid internships for no college/ university credit, 31% (*n* = 111) in work training, 22% (*n* = 80) in unpaid internships for college/university credit, 22% (*n* = 78) in service-learning activities, and 3% (*n* = 10) in other unpaid experiences. Eighty-six percent of students (*n* = 309) participated in one or more of these experiences. Of the career-related course enrollments: 75% (*n* = 269) of students took at least one course related to their career goal(s) and 56% (*n* = 200) took at least two courses related to their career goals. Of the program supports: 68% (*n* = 243) of students attended programs where employment supports were provided by LEA transition staff, 64% (*n* = 228) by the state VR staff, 47% (*n* = 169) by career services staff available to all students attending the college/university, 42% (*n* = 152) by peer mentors or supports, and finally 37% (*n* = 133) attended programs where employment supports were provided by state IDD agency staff.

RQ2: Paid Employment While in the Program and at Exit

Descriptive analysis showed 44% (*n* = 159) of the 359 students had a paid employment position while enrolled in the program. Of those students who exited their program between 2010 and 2015 (*n* = 280), 25% (*n* = 70) had a paid job at the time of exit from the program. Employment status at exit was not reported for 43 students who exited their program and was

recorded as ‘unknown’.

RQ3: Predictors of Paid Employment at Exit

We first conducted hierarchical regression to reduce the large number of potential variables to be examined and guard against the possibility of a type II error. We first describe the results of each of these three models and then provide the results for the final logistic regression model.

Model 1: Student and Program Factors

Results from the Box-Tidwell test (Box & Tidwell, 1962; Guerrero & Johnson, 1982) found all continuous independent variables were linearly related to the logit of the dependent variable (i.e., paid employment at exit) except for age which was removed from further analysis. The binomial logistic regression model (i.e., model 1) was statistically significant, $\chi^2(8) = 38.47$, $p < .001$. The model explained 23% (Nagelkerke R^2) of the variance in paid employment at exit and correctly classified 75% of cases. Sensitivity was 30%, specificity was 94%, positive predictive value was 69% and negative predictive value was 76%. Significant and non-significant student and program factors are shown in Table 2. Of the predictor variables, only three were statistically significant: Asian race ($p = .017$, Odds Ratio [OR] = 6.765), years of enrollment ($p = <.001$, OR = 2.426), and two-or-four-year college/university ($p = .012$, OR = .226). These variables were retained for the subsequent model. Students who were of Asian race, who attended a two-year college/university, or were enrolled for more years, were more likely to have paid employment at exit than students of other races, students who attended a four-year college/university, or who were enrolled for fewer years.

Model 2: Student and Program Factors Plus Paid Employment in Program

A hierarchical multiple regression was run to determine if the addition of paid

employment while enrolled improved the prediction of paid employment at exit over and above race, two-or-four-year college/university, and years of enrollment. Tests for assumptions showed there was acceptable independence of residuals, as assessed by a Durbin-Watson statistic of 1.558; assessment of partial regression plots and a plot of studentized residual against the predicted values showed there was linearity among variables. There was also homoscedasticity as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. The data was not subject to multicollinearity (all tolerance values greater than 0.1; Hair et al., 2014). There were no studentized deleted residuals greater than ±3 standard deviations; no leverage values greater than 0.2; and values for Cook's distance above 1 (Cook & Weisberg, 1982). The assumption of normality was met, as assessed by P-P plot.

Results from this test provided model fit statistics for the variables in model 1; the significant variables identified in the previous test were also found to be statistically significant here, $R^2 = .113$, $F(3, 218) = 9.289$, $p < .001$. The adjusted $R^2 = .101$ indicates a small effect size by Cohen's (1988) classification. Model 2 was statistically significant $R^2 = .327$, $F(4, 217) = 26.395$, $p < .001$. The adjusted $R^2 = .315$ indicates a small effect size by Cohen's classification (see table 3). The addition of paid employment while enrolled to the prediction of paid employment at exit led to a statistically significant increase in R^2 of .214, $F(1, 217) = 69.019$, $p < .001$. However, when paid employment while enrolled was added, race and two-or-four-year college/university no longer remained statistically significant ($p = .218$ and .173, respectively). In this model, students who enrolled for more years ($p = .011$) or who had paid employment while enrolled ($p = <.001$) were more likely to have paid employment at exit; both variables were retained for analysis in model 3.

Model 3: Student and Program Factors, Paid Employment in Program, and Employment

Preparation Activities

A preliminary linear regression was run to understand the effect of 13 employment preparation activities (six career development experience, two career-related course enrollments, and five program support variables) on paid employment at exit. Results showed there was a linear relationship ($F(13, 216) = 3.662$, $p < .001$) between the dependent variable and (a) service learning ($p = .040$), (b) work training ($p = .006$), (c) employment supports in the program provided by career services staff available to all students ($p = .043$), and (d) employment supports in the program provided by state IDD staff ($p = .029$). Inspection of a plot of standardized residuals versus standardized predicted values using these four variables show there was homoscedasticity; the P-P plot also showed normality of the residuals. These variables were retained for model 3; all other employment preparation variables were eliminated.

A hierarchical multiple regression was then run to determine if the addition of the four employment preparation variables improved the prediction of paid employment at exit over and above model 2. Tests for assumptions showed there was acceptable independence of residuals, as assessed by a Durbin-Watson statistic of 1.759; assessment of partial regression plots and a plot of studentized residual against the predicted values showed there was linearity among variables. There was also homoscedasticity, and the data was not subject to multicollinearity (all tolerance values greater than 0.1). There were no studentized deleted residuals greater than ±3 standard deviations; no leverage values greater than 0.2; and values for Cook's distance above 1. The assumption of normality was met, as assessed by P-P plot. Model 3 was statistically significant, $R^2 = .433$, $F(9, 212) = 17.966$, $p < .001$. The adjusted $R^2 = .409$ indicates a medium effect size by Cohen's classification. The addition of these variables to the prediction of paid employment at exit led to a statistically significant increase in R^2 of .101, $F(4, 212) = 9.404$, $p < .001$.

However, when the employment preparation variables were added, service learning, years of enrollment, and employment support in the program provided by career services staff available to all students no longer remained statistically significant. Table 3 shows the standardized (β) and unstandardized beta (B) coefficients for variables in all three models. The following variables remained statistically significant and were retained for the final model: (a) paid employment while enrolled (p = <.001), (b) work training (p =.002), and (c) employment supports in the program provided by state IDD staff (p = <.001).

Final Model

A final binomial logistic regression was performed to ascertain the effects of these three variables on the likelihood participants had paid employment at exit. There were four cases within the data with standardized residual values greater than 2.5; all four were removed from analysis (Weisberg, 2004). The logistic regression model was statistically significant, $\chi^2(3) = 117.686$, $p < .001$. The model explained 55.7% (Nagelkerke R^2) of the variance in paid employment at program exit and correctly classified 80.6% of cases. Sensitivity was 77%, specificity was 82%, positive predictor value was 64% and negative predictive value was 90%. All three predictor variables were statistically significant. The odds of having a paid job at exit was 47.385 times greater for students who had paid employment in the program than those who did not (p = <.001). The odds of having a paid job at exit was also 3.118 times greater for students who had work training while in the program than those who did not (p = .011). Finally, students enrolled in programs where employment supports were provided by state IDD staff were 5.618 times *less* likely to have paid employment at exit (p = <.001). See Table 4.

Discussion

Students with ID/A enrolled in college-based transition programs implemented by TPSID

model demonstration project grantees engaged in a wide array of employment preparation activities including participation in career development experiences and career related courses and received employment-related program supports. In the following sections, we discuss the extent to which students engaged in these activities and explore the results of the regression analyses before offering implications for research and practice.

Employment Preparation Activities

Unpaid Career Development Experiences

Eighty-six percent of students participated in one or more unpaid career development experiences, and just over half of students were involved in volunteering. It is worth reflecting on the somewhat high percentage of students with ID/A who engaged in volunteering. Volunteering has been considered a both an alternative to paid employment and part of the preparation process (Trembath et al., 2010). In a joint paper with other federal and national agencies, *A Framework for Community Engagement – A Pathway to Competitive Integrated Employment*, the Office of Special Education and Rehabilitative Services characterizes volunteering as a form of community engagement that might provide meaning and purpose specific to the individual (OSERS, 2022). This guidance also contends serving as a volunteer may help individuals with disabilities learn responsibility, develop financial literacy, learn how to travel independently, or help to developing social skills important in the work environment.

However, volunteering has not been identified as an evidence-based predictor of post-school employment for students with disabilities (Mazzotti et al., 2021). Although some have suggested volunteering may provide students opportunities to explore career interests and abilities and developing essential employment-related skills (Lindsay et al., 2018), it is not clear that volunteering is effective in helping students with ID/A attain paid employment.

Fewer than a third of students participated in other career development experiences such as work training, internships, and service-learning experience. These findings align with a previous analysis of TPSID data that sought to identify predictors of paid employment (Grigal et al., 2019). These authors found the most consistently used employment preparation practice was to provide unpaid career development experiences such as unpaid internships and volunteer activities. However, Grigal et al. (2019) found unpaid career development activities were not a predictor of employment during or after enrollment. One consideration is the extent to which staff are prioritizing the cultivation of unpaid career development experience over those of paid employment experiences. This dynamic has been observed not only in the TPSID programs, but in other inclusive postsecondary programs (Petcu et al., 2015) and transition services in general (Carter et al., 2012). Given our findings, and those of a multitude of previous studies, transition professionals should be encouraged to focus more of their employment supports for transitioning youth with ID/A on helping them engage in paid employment and less on unpaid experiences.

Career-Related Course Enrollment

A large majority of the transitioning students with ID/A enrolled in these programs were found to enroll in at least one course related to their career goal, and more than half of the students took two such courses. Mazzotti et al. (2021) identified occupational courses as a predictor of postschool employment. Occupational courses were defined in Rowe et al. (2015) as "individual courses that support career awareness, allow or enable students to explore various career pathways, develop occupational specific skills through instruction, and experiences focused on their desired employment goals" (p. 118). It is not clear from the data if the courses students with ID/A enrolled in would meet this definition, as the array of coursework across the universities and colleges involved in the TPSID initiative was broad. Courses may or may not

have been vocational in nature but may have related to a broad interest area connected to the student's career plan. However, the data give the initial impression that access to career-related coursework could be an area of strength in college-based transition programming.

Employment-Related Program Supports

We were able to examine data on whether students attended programs where employment-related supports were provided by five entities (LEAs, career services staff, peer mentors, VR, and IDD agency staff). Although not part of our planned analysis, we noted that most students (76%) attended programs where employment supports were provided by more than one of these entities. A small percentage of students (10%) attended programs where all five entities were engaged in the provision of employment supports. Clearly, the provision of employment-related supports in college-based transition programs is a multifaceted affair, with programs drawing on the expertise and skills of many entities. More than two-thirds of the students attended programs where employment supports provided to students with ID/A came from LEA staff. This is reflective of the shared responsibilities often seen in college-based programs (Grigal et al., 2017). This reflects engagement from the LEA, the entity responsible for ensuring students are making progress toward attaining their IEP goals and that will be held accountable for the students' outcomes.

Almost half of the students attended programs where employment related supports came from career services staff available to all students attending the college/university. This is potentially promising for two reasons. First, it demonstrates students with ID/A were provided access to the same services available to other students on the campus, reflecting alignment with existing college/university services. Alignment with existing higher education systems is a noted quality indicator of inclusive postsecondary programs (Think College National Coordinating

Center, 2021b). Second, access to career services staff and their related resources may mean students with ID/A had access to training (e.g., resume workshops or interview simulation) and job search resources including campus job banks and campus career fairs, that might not have been available to them if they were receiving their transition services solely in a high school setting.

Additionally, some students attended programs where employment supports were also provided by VR and IDD agency staff. The engagement of these external partners may reflect positive relationships cultivating interagency collaboration. Postsecondary education program staff have indicated these partnerships help with job placement activities and networking with local businesses (Avellone, 2021). This aligns with Petcu et al. (2015) who found 74.5% of postsecondary programs enrolling students with ID collaborated with VR on employment related services. However, some of our findings to subsequent research questions highlight not all state agency supports result in desired employment outcomes (see later discussion).

Paid Employment While Enrolled and at Exit

Forty-four percent of students with ID/A who were enrolled in the college-based transition programs were employed while enrolled. Employment was defined as any type of employment for which the individual was paid, which could include paid internships. Data from NLTS 2012 collected in 2012-2013 (around the same time as TPSID 2010-2015) show 32% of transition-age youth with ID had paid employment in the last year. Similarly, using the NLTS-2 dataset, Carter et al. (2012) reported 31.3% of transition-age students with ID had paid work in the last 12 months. The percentage of students with ID/A in college-based transition programs with paid work compares favorably to these other national estimates, suggesting access to early employment could be more likely in a college than a traditional high school transition program.

Only a quarter of the students with ID/A enrolled as transitioning youth in the college-based transition programs had employment at or within 90 days of exiting the program. This is somewhat lower than the percentage of the adult students attending TPSID programs who were employed at exit during this time (which reached a high of 40% in 2014-2015). Several factors may be influencing the employment status of students exiting from college-based transition programs. First, because students are still technically high school students, they may be exiting their transition program with a goal other than employment, such as continuing to additional adult postsecondary education. Second, based on patterns observed in the data about the broader TPSID student population, there is frequently a time of adjustment between students leaving their postsecondary program and attaining employment. Students may opt to take the summer off before beginning employment, meaning their employment status in the first 90 days is not reflective of their actual employment outcome. During this transition period out of the program, students may also be in the process of securing adult services and support from agencies like VR or community rehabilitation providers. Findings from TPSID data suggest that the percentage of graduates of these programs who are employed increases over time (Grigal et al., 2021).

Predictors of Paid Employment at Exit

By far the strongest predictor of paid employment at exit was having paid employment while enrolled. In the final model, the odds of having a paid job at exit was 47 times greater for students who had paid employment in the program than those who did not. It must be acknowledged that it is possible the job held by a student at exit was the same job they held (and maintained) while in their college-based program. However, a previous study of the full TPSID dataset also found a significant predictive relationship between employment while enrolled in inclusive postsecondary education and student employment status at exit: students who worked

paid jobs while enrolled in a TPSID were 15 times more likely to exit the program with paid employment than those who did not work while in the program (Grigal et al., 2019). The predictive nature of early paid work begetting future paid work is not new or unique to transition experiences provided in postsecondary settings. Research has documented this phenomenon for transitioning youth in high school and across a range of disabilities (Gold et al., 2013; Test et al., 2009; Wehman et al., 2015). The present study adds further evidence in support of the importance of early paid work experience for later employment outcomes.

Only two of the 13 other employment preparation variables we examined (work training and attending a program where employment supports were provided by state IDD staff) and none of the student or program factors were retained in the final model. The odds of having a paid job at exit was three times greater for students who had work training while in the program than those who did not. In the TPSID data, work training was defined as spending time at a work site for the purpose of learning about work but without being paid by the employer. It is unclear what specifically about this unpaid career development experience proved advantageous in terms of later employment outcomes for students who were in college-based transition programs.

A previous study looking at predictors of employment at exit for college students with ID/A using the full TPSID dataset did not find any unpaid career development experiences to be predictive of employment either in the program or at exit (Grigal et al., 2019). In the present study, none of the other unpaid career development experiences, including unpaid internships, volunteering and community service, and service learning, were found to be associated with employment at exit. Work training, experienced by just under a third of students, was associated with employment at exit. This finding does not align with the findings of Grigal et al. (2019). It is possible some aspect of the work training available to students in college-based transition

services differed from the work training offered to the larger population of TPSID students studied by Grigal et al. The collection and examination of data on the composition of work training activities and their impact on post school employment could be further explored in future studies to identify if this activity consistently leads to employment or was simply an anomaly in the present data. However, the powerfully predictive nature of paid employment while enrolled far exceeds the impact of work training on this desirable outcome; further punctuating the need to support transitioning youth with ID/A to engage in and maintain paid employment while enrolled in their transition program.

One variable had a significant *negative* relationship with employment at exit: students enrolled in programs where employment supports were provided by state IDD staff were almost six times *less* likely to have paid employment at exit than those who attended programs where employment supports were not provided by state IDD staff. Attending a program where employment supports in the program are provided by state IDD agency staff could have meant there was reduced capacity at the program for supporting employment and therefore a reliance on external services to provide these supports. It could have meant students at these programs had more complex needs associated with their disability since IDD staff were providing supports, although the dataset does not include variables to confirm this line of reasoning. It is important to reiterate that the variable used in the analysis does not confirm all students received supports from state IDD staff; only that the program offered employment supports provided by IDD staff. Future research is needed to determine whether this negative relationship is observed using student-level data reflecting individual receipt of state IDD agency employment supports.

Finally, of the seven student and program factors examined, none reached the level of significance to be included in the final model. This finding is consistent with prior research that

found no student demographics to be associated with employment at exit (Grigal et al., 2019). This is an encouraging finding as it suggests employment outcomes are within the control of the college-based transition program. With the right supports in place and a prioritizing of paid employment while in the program, students with ID/A are highly likely to be able to achieve employment once they complete the program.

Implications for Research

There continues to be a scarcity of research on college-based transition programs including clear statistics regarding the existence or location of programs, their goals, the composition of their services, and their outcomes. Current Office of Special Education Program data does not differentiate between these types of programs in their public datasets. Additional information about college-based transition programs from other data sources would offer a broader base to conduct research on the employment and other vital outcomes of transitioning youth. The college-based transition subset of the TPSID data offer our most comprehensive understanding of the employment preparation practices used in college-based transition programs for students with ID/A. Expanding the sample beyond the programs embedded in the TPSID program and including a broader national sample would offer a more accurate depiction of the status of employment services and outcomes in this model of transition service delivery.

To improve our understanding of existing college-based transition programs, there is a need to capture more granular data regarding the provision of existing employment services including the various types of preparation activities such as career awareness, work-based learning, job seeking activities, and paid employment. Gathering more detailed information about the instructional activities and employment supports could allow future researchers to discern which of these activities impact student outcomes at exit. A recent scoping review of

studies examining employment outcomes for students with ID in postsecondary education programs found information regarding the processes used to support transitioning individuals from these programs to employment, but that follow-up procedures related to job retention were omitted from most of research articles (Avellone et al., 2021). National longitudinal data on college-based transition programs would permit exploration of research questions about the employment status of students with ID/A exiting college-based transition programs and make comparisons possible with students with ID/A exiting conventional transition programs.

Implications for Practice

Current transition practices rely on policy stemming from various legislation including the IDEA, the WIOA, and the HEOA (Lee et al., 2019). While each of these address employment preparation for students with disabilities in some regard, none clarify the best or even recommended approaches to achieving the critical transition outcome of employment. The pre-ETS services authorized by WIOA include multiple employment related activities (i.e., job exploration counseling, work-based learning, counseling on postsecondary educational programs, workplace readiness training, and instruction in self-advocacy); but do not require practitioners to support transitioning youth to attain paid employment experiences.

The HEOA guidance requires TPSID grantees to provide students with integrated work experiences and career skills that lead to gainful employment. Again, the focus is on *preparation* for employment, not *engagement* in employment. Finally, IDEA requires assessment and the development of goals related to employment but offers little to any guidance on the means to help students secure employment. A critical implication of this study is that one of the most effective ways to prepare students with ID/A for eventual employment is to engage students in paid employment. We have repeatedly seen this recommendation from studies of youth receiving

transition services in high school (e.g., Carter, Austin, & Trainor, 2012; Wehman, et al., 2015). Our findings show the principle of paid work begets paid work also can be applied to transitioning youth with ID/A receiving college-based transition services.

Another implication for practice is that college-based transition services offer an opportunity to enhance typical transition programs by offering the college campus community as the landscape of services. Students with ID/A in college-based transition programs may have access to other professionals, such as those from a college career center, and access to campus employment options not as readily accessible to students who remain in high school. College-based transition staff can leverage existing staff and expertise in career development and employment resources at the college or university to better support employment goals of students with ID/A. They may also have access to program staff who have training and experience in specific to employment services such as job development or employment specialist (Domin, et al., 2020).

Evidence of college-based transition programs dates to the 1990s (Grigal et al., 2001), yet the extent to which new college-based transition programs are being developed is not known, and these programs represent a smaller proportion of TPSID-funded programs in the most recent cycle of TPSID funding (2020-2025; Grigal et al., 2022). Although no federal data source captures or shares information about existing college-based transition programs, the existence of this transition delivery model has been acknowledged in recent guidance issued by the Office Special Education and Rehabilitative Services. This guidance confirms IDEA funds can be used to support students with disabilities in college-based transition programs (called dual enrollment programs in this memo; U.S. Department of Education, 2019). Additionally, the memo clarifies VR funds can also be used to support students with disabilities in dual enrollment programs. The

practical implications of this study support the need for federal agencies to expand funding for development and implementation of this method of transition service delivery.

For existing college-based transition programs, there continues to be a need to consider their approach to employment preparation and the skills and training needed by their staff and respective agency partners. Program directors should ensure their staff have the skills and abilities necessary to help students successfully attain and retain employment. Given that college-based transition services may have staff from the college or university, from local education agencies, and potentially from state and local agencies, this is a complex task. Providing all partners with clear guidance about the intended outcomes of paid employment and access to existing resources and training to support that outcome would improve future services.

Additionally, college-based transition programs can and should reach out to inform their state agency staff from VR and their state Intellectual and Developmental Disability agencies about their program and the students' employment support needs. Although our findings did not show state IDD agency support always has a positive impact on employment; recent state agency funding initiatives have emerged seeking to enhance employment outcomes for students with ID/A in postsecondary education. For example, in 2022, the Department of Developmental Disabilities in Ohio offered competitive grants to career and technical centers and other institutions of higher education seeking to improve post-secondary education options for young adults with developmental disabilities. The grant focused on the development of industry-recognized credentials and apprenticeships that lead to successful employment offering higher pay and benefits. Continued outreach and engagement with relevant state and local agencies could enhance understanding of the services needed to ensure transitioning youth in college-based programs become and remain employed. Building those partnerships require consistent

ongoing communication and an understanding of all parties intended goals and outcomes (Suleweski, et al., 2021).

Limitations

There are some limitations readers should consider when interpreting the finding of this study. First, the data in this study were collected between 2010 and 2015, thus may reflect practices and outcomes not representative of current students receiving services in college-based transition programs. A large portion of data regarding students' employment status at exit were missing, which may have impacted our findings and may not represent students' actual outcomes. Employment positions held by students at exit may have been the same jobs they had while in the program, thus these two variables may not be independent of each other. These data were drawn from a subset of national data on TPSID programs which were federally funded and required to meet specific priorities in terms of their services. This status may have impacted their staffing structure, program activities, and outcomes. Other college-based transition programs not receiving federal funds may offer different services and their students with ID/A may have different outcomes. Data were reported by staff at TPSID programs who, although provided with definitions and trained by the NCC, used their own systems for recording data throughout each academic year prior to entering into the NCC's online data collection tool and who may have had differing interpretations of the questions. Data on employment outcomes further than 90 days after exit were not available. Finally, the nature of regression analysis does not permit conclusions to be drawn about causal relationships.

Conclusion

The findings of the present study provide for the first time a national picture of the employment preparation activities and paid employment outcomes of students with ID/A

attending college-based transition programs. The results of the study suggest college-based transition programs may have several advantages, including a focus on early paid employment, that could lead to later post-school employment success for students with ID/A. These findings also underscore that early paid employment is a very strong predictor of post-school employment outcomes in college-based transition programs, just as it is in other models of transition services. Expanding representation of college-based transition programs in large, national datasets would permit deeper exploration of this model in future research.

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Table 1

Variables in the Study

Variable	*n (%)*
Career development experiences variables	
Service learning	78 (22%)
Unpaid internships for no college/university credit	117 (33%)
Unpaid internships for college/university credit	80 (22%)
Volunteering or community service	182 (51%)
Work training	111 (31%)
Other unpaid experience	10 (3%)
Career-related course enrollment variables	
Student took at least one course related to their career goals	269 (75%)
Student took at least two courses related to their career goals	200 (56%)
Employment-related program support variables (*student attended a program where employment supports were provided by …*)	
Career services staff available to all students	169 (47%)
Peer mentors or supports	152 (42%)
LEA transition staff	243 (68%)
State VR staff	228 (64%)
State IDD agency staff	133 (37%)
Paid employment while in the program	159 (44%)
Paid employment at exit[1]	70 (25%)
Student and program factors	

Race	
White	242 (67%)
Black/African American	76 (21%)
Asian	17 (5%)
American Indian or Alaska Native	3 (<1%)
Native Hawaiian or other Pacific Islander	4 (<1%)
Ethnicity: Hispanic or Latino[2]	40 (11%)
Gender	
Male	219 (61%)
Female	140 (39%)
Disability other than ID/A	177 (49%)
Age	
18 years old	39 (11%)
19 years old	90 (25%)
20 years old	147 (41%)
21 years old	60 (17%)
22 years old	23 (6%)
Years enrolled in the program	
1 year	217 (60%)
2 years	117 (33%)
3 years	22 (6%)
4 years	3 (<1%)
Two-year or four-year institution	

Two-year	64 (18%)
Four-year	295 (82%)

Note. N = 359 youth with ID/A were included in the dataset.

[1]The denominator here is n = 280 youth with ID/A who exited their program between 2010 and 2015. [2]Ethnicity was not reported for 5 students.

Table 2

Non-Significant and Significant Student and Program Variables Included in Model 1

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI	
							Lower	Upper
Race								
White	-	-	6.477	4	.166	-	-	-
Black/African American	-.142	.409	.121	1	.728	.867	.389	1.934
Asian[1]	1.912	.801	5.691	1	.017*	6.765	1.406	32.54
American Indian or Alaska Native[1]	-18.09	40192.9	.000	1	1.00	.000	.000	.000
Native Hawaiian or other Pacific Islander[1]	-18.98	19798.5	.000	1	.999	.000	.000	.000
Ethnicity: Hispanic or Latino	-.300	.587	.262	1	.609	.741	.234	2.341

Gender	.259	.356	.530	1	.466	1.296	.645	2.603
Disability other than ID/A	-.626	.344	3.317	1	.069	.535	.273	1.049
Age	.095	.178	.286	1	.593	1.100	.775	1.561
Years enrolled in the program	.886	.261	11.504	1	.001**	2.426	1.454	4.048
Two-year or four-year institution	-1.489	.594	6.272	1	.012*	.226	.070	.723
Constant	-3.911	3.47	1.270	1	.260	.020	-	-

Note. [1]populations with low n's affecting values, * p <.05, **p <.001.

Table 3

Hierarchical Multiple Regression Models Predicting Paid Employment at Exit

	Model 1		Model 2		Model 3	
Variable	B	β	B	β	B	β
Constant	.070		-.155		-.189	
Race: Asian	.392*	.202	.172	.088		
Two-or-four-year	-.197*	-.173	-.094	-.082		
Years of enrollment	.182**	.271	.100*	.149	.078	.117
Paid employment while enrolled			.446**	.486	.500**	.545
Service learning					.034	.032
Work training					.186*	.189
Career services staff					-.001	-.001
State IDD staff					-.244**	-.253
R^2	.139		.332		.433	
F	8.75**		21.47**		18**	
ΔR^2	.139		.193		.101	
ΔF	8.75**		62.46**		9.40**	

Note. N = 218. * p <.05, **p <.001.

Table 4

Final Logistic Regression Predicting Paid Employment at Exit

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Paid employment while enrolled	3.86	.59	42.284	1	<.001	47.385	14.811	151.6
Work training	1.14	.45	6.516	1	<.011	3.118	1.302	7.464
Employment supports at program provided by state IDD staff	-1.725	.45	14.855	1	<.001	.178	.074	.428
Constant	-4.496	.74	37.426	1	<.001		-	-

Note. Paid employment while enrolled refers to students who had a paid employment position compared to those who did not. Work training refers to students who had work training compared to those who did not. Employment supports at program provided by state IDD staff refers to students who attended programs where employment supports were provided by state IDD staff compared to those who attended programs where state IDD staff did not provide employment supports.