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Relationships Between Self-Determination and Postschool Outcomes for Youth With Disabilities

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Abstract

This article reports the results of a follow-up analysis of 779 students with disabilities who participated in group-randomized, control group studies designed to examine the efficacy of self-determination interventions in secondary school to examine the relationship between self-determination status when exiting high school and adult outcomes 1 and 2 years post-high school. Findings suggest that self-determination status upon exiting high school predicts positive outcomes in the domains of achieving employment and community access 1 year post-school, and that exposure to self-determination interventions in secondary school may lead to more stability in student outcomes over time. The complexity of the relationship between self-determination intervention and outcomes is discussed, as are recommendations for future research and practice.

Keywords

self-determination, postschool outcomes, longitudinal data analysis

Promoting student self-determination emerged as an instructional focus area in special education in the 1990s as a result of efforts to improve the postschool outcomes of youth with disabilities. Researchers have documented a relationship between self-determination and school-based outcomes, including student involvement in transition planning (Test et al., 2009), access to the general education curriculum (Shogren, Palmer, Wehmeyer, Williams-Diehm, & Little, 2012), and academic skills (Konrad, Fowler, Walker, Test, & Wood, 2007). A small body of research has suggested a direct relationship between self-determination and postschool outcomes, such as employment, independent living, and quality of life (Lachapelle et al., 2005; Martorell, Gutierrez-Recacha, Pereda, & Ayuso-Mateos, 2008; Powers et al., 2012; Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997). For example, Powers and colleagues (2012) examined the impact of the TAKE CHARGE self-determination curriculum (Powers et al., 2001) on 69 youth receiving special education who were in the foster care system. They found that youth randomly assigned to the intervention condition (vs. the typical foster care independent living program) had higher rates employment and independent living 1 year post-intervention.

The body of research documenting a relationship between self-determination status and postschool outcomes is promising, but additional research is needed. Existing research is characterized by small samples, making conclusions tentative at best. Second, further research is needed on the impact of exposure to self-determination interventions in secondary school on adult outcomes. As mentioned previously, some of the main reasons for efforts to promote self-determination emerging as a valued instructional area in special education and transition were the hypothesized relationship between instruction in self-determination, higher levels of self-determination when exiting secondary school, and more positive adult outcomes.

Purpose of the Study

The purpose of this study was to follow students who participated in group-randomized, control group studies examining the efficacy of self-determination interventions in secondary school (Wehmeyer, Palmer, Lee, Williams-Diehm, & Shogren, 2011; Wehmeyer, Palmer, Shogren, Williams-Diehm, & Soukup, 2013) into adulthood to explore the relationship between self-determination and adult outcomes, as well the impact of exposure to self-determination interventions. Wehmeyer et al. (2013) and Wehmeyer et al. (2011) conducted group-randomized,

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control group studies to examine the efficacy of several published self-determination interventions on student self-determination in secondary school. Wehmeyer et al. (2011) reported the results of an evaluation of the *Whose Future Is It Anyway?* curriculum over a 1-year period, demonstrating that students with diverse disability labels who were exposed to *Whose Future* showed significantly higher levels of self-determination than students in the control group, in which teachers received training to promote family involvement in transition planning. Wehmeyer et al. (2013) reported the results of an evaluation of multiple self-determination curricula over a 3-year period with students with intellectual disability and learning disabilities. (Note that this study included a subset of the students with intellectual and learning disabilities included in Wehmeyer et al., 2011.) Self-determination was assessed each year, and using latent growth curve modeling, the researchers found that students exposed to self-determination curricula showed significantly greater growth in self-determination.

Using the sample from Wehmeyer et al. (2011) and Wehmeyer et al. (2013), the goal of the present study was to address two primary research questions.

Research Question 1: What is the relationship between self-determination status when leaving secondary school and adult outcomes 1 and 2 years after exiting high school?

Research Question 2: Does exposure to self-determination interventions while in secondary school impact the relationship between self-determination status when leaving secondary school and adult outcomes 1 and 2 years post-school?

A secondary purpose was to explore the measurement of adult outcomes, and determine whether latent outcome constructs could be specified to capture the diverse factors that contribute to meaningful adult outcomes.

Method

Sample

Participants were 779 students with disabilities recruited from six states (Arkansas, Kansas, Missouri, Nebraska, Oklahoma, and Texas) and 50 school districts. Participants were involved in a large-scale project examining the impact of self-determination curricula described previously (Wehmeyer et al., 2011; Wehmeyer et al., 2013). Any participant who was in high school and contributed data to the large-scale project was eligible to participate in the present study. In total, 779 individuals contributed at least one data point to the large-scale project and were included in the present data analysis. At the start of project, participants ranged in age from 14.3 to 21.8 (M = 17.1; SD = 1.5). All participants had Individualized Education Programs (IEPs) while they were in secondary school, and the majority was served under the categorical label of learning (37%) or intellectual disability (30%). Additional demographic information is in Table 1.

Table 1. Demographic Characteristics of the Sample (N = 779).

Characteristic	*n* (%)
Gender	
Male	476 (61.1)
Female	303 (38.9)
Age at start of study	17.1 (SD = 1.5)
Disability	
Learning disability	284 (37.4)
Intellectual disability	223 (29.9)
Other health impairment	85 (10.9)
Emotional disturbance	73 (9.4)
Autism	47 (6.0)
Speech impairment	15 (1.9)
Hearing or vision impairment	10 (1.3)
Orthopedic impairment	5 (0.6)
Missing	20 (2.6)
Race/ethnicity	
Caucasian	442 (56.7)
Hispanic	146 (18.7)
African American	140 (18.0)
Asian or Pacific Islander	11 (1.4)
Other	14 (1.8)
Missing	16 (2.1)
Free reduced lunch status	
Eligible	278 (35.7)
Not eligible	249 (32.0)
Unknown	178 (22.8)
Missing	74 (9.5)

Design and Procedures

Participants were initially recruited to participate in a longitudinal study examining the impact of interventions to promote self-determination in secondary school (Wehmeyer et al., 2011; Wehmeyer et al., 2013). The project also involved a 2-year follow-up to explore the impact on adult outcomes, the results of which are reported here. Informed consent was obtained for both phases of the project at the start of the study. To identify participants, project personnel contacted school districts, and districts that agreed to participate (n = 50) identified high school campuses to participate. As further described in Wehmeyer et al. (2011) and Wehmeyer et al. (2013), each campus that agreed to participate was assigned to be a "treatment" or "control" campus. The first 3 years of the project involved the implementation of a self-determination or control intervention (i.e., family involvement strategies) on the high school campus. The 2-year

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follow-up study involved project staff mailing an adult outcomes survey to students 1 and 2 years post-school. After initial consent and assent to participate were obtained, baseline data were collected prior to study implementation. Baseline data consisted of demographic information and measures of self-determination, including *The Arc's Self-Determination Scale* (SDS). The same data collected at baseline was also collected during the 2nd and 3rd years of the project to explore changes in student self-determination as a function of exposure to self-determination interventions. Each year, updated home contact information for each student was obtained and during the 4th and 5th years of the project (if the student had exited high school), an adult outcomes survey (described below) was sent to the contact address. Multiple attempts to obtain complete surveys were undertaken, including follow-up mailings, phone contact that sometimes involved completing the survey over the phone, and e-mail reminders.

Secondary school interventions. During the first 3 years of the evaluation project, participating high school campuses were randomly assigned to receive a self-determination or control intervention at their high school campus. The characteristics of the interventions are described more fully in Wehmeyer et al. (2013). Campuses randomly assigned to the treatment condition selected from several research-based interventions to promote self-determination—*ChoiceMaker* (with the Self-Directed IEP materials; Martin, Marshall, Maxson, & Jerman, 1996), *NEXT S.T.E.P.* (Student transition and educational planning; Halpern et al., 1995), *Self-Advocacy Strategy* (Van Reusen, Bos, Schumaker, & Deshler, 1994), *Self-Determined Learning Model of Instruction* (Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000), *Steps to Self-Determination* (2nd ed., Field & Hoffman, 1996), and *Whose Future Is It Anyway?* (2nd ed., Wehmeyer et al., 2004). As described in Wehmeyer et al. (2013), all students who were exposed to any of the research-based self-determination interventions constituted the treatment group. Because of the large number of students exposed to *Whose Future Is It Anyway?*, a separate analysis of these student's outcomes was undertaken during Year 1 of the project (cf., Wehmeyer et al., 2011). To minimize attrition typically associated with control groups in educational research, we implemented a control group intervention (i.e., family involvement) not expected to directly impact outcomes.

Measures

Predictors. *The Arc's SDS* (Wehmeyer & Kelchner, 1995) was our primary measure of self-determination. The SDS is a 72-item self-report measure based on the functional theory of self-determination. An overall self-determination score, as well as subscale scores for each of the four essential characteristics of self-determined behavior, autonomy, self-regulation, psychological empowerment, and self-realization, can be calculated. The SDS was developed and normed with 500 adolescents with cognitive disabilities (Wehmeyer, 1996); subsequent research (Shogren et al., 2008) has verified the theoretical structure of the Arc's SDS.

Outcomes. To measure adult outcomes, we used a survey from previous research (Powers et al., 2012; Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997) that included items from the National Consumer Survey (Jaskulski, Metzler, & Zierman, 1990) and the National Longitudinal Transition Study (Wagner, D'Amico, Marder, Newman, & Blackorby, 1992). Structural equation modeling was used to generate latent constructs representing the outcome domains. The *Employment* construct included five items: "Has the individual had a job since leaving high school," "do they currently have a job," "how many hours do they work a week," "are there benefits," and "do they have career development goals?" *Community Access* included five items: "Does the individual have a reliable way to get to school, work, or an appointment"; "do they have a driver's license," "do they have a near," "do they own their own car," "and do they make their own transportation plans?" *Financial Independence* consisted of six items: "Whether the individual paid their own expenses, including rent, utilities, and phone bills"; "whether they shopped for their own groceries," and "whether they earned enough money to pay for all of their expenses." *Independent Living* consisted of two items: "Where the individual lived (i.e., independently vs. nonindependently)" and "whether they chose where they lived." *Life Satisfaction* was assessed using the *Satisfaction With Life Scale* (Diener, Emmons, Larson, & Griffin, 1985).

Missing Data

Types of missing data. Missing data can be classified as either *ignorable* or *nonignorable* (Enders, 2010). Mechanisms that correspond to *ignorable* missing data are *missing completely at random* (MCAR), where the missing data have no relationship with other variables present, and *missing at random* (MAR), where a relationship exists between the missing value and other variables, excluding the variable with missingness. When data are *nonignorable*, the mechanism at play is *missing not at random* (MNAR), where missingness is probabilistically defined by values on that specific variable (i.e., no data on self-determination because the youth is unable to provide responses given the response format of the assessment). Data that are missing via MCAR or MAR mechanisms can be successfully estimated using *maximum likelihood* (ML) procedures such as *full information maximum likelihood* (FIML) and *multiple*

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imputation (MI), that allow for unbiased estimation of the missing data (Enders, 2010).

There was significant attrition in our sample, and it was assumed by the authors that the mechanism present was MAR, that there may be some relationship between the missing data and other values in the data set, but that missingness was not defined based on specific characteristics of the variable. During the intervention phase of the project, there was roughly 30% attrition for students. Students that exited the project for any reason were replaced as new students entered the classrooms, thus, complete data were only available for a subset of the students. For the purpose of this follow-up study, the adult outcomes survey was sent to any secondary student that provided any data during any of the 3 years of intervention for whom we had contact information. We were able to obtain follow-up data for 20% of the overall sample of 779 students. To address this missingness, we used IVEware version 0.1 (Raghunathan, Solenberger, & Van Hoewyk, 2000). IVEware differs from other standard imputation programs by using Sequential Regression Multivariate Imputation (SRMI), which allows for custom estimation of variables; that is, categorical variables will be estimated using logistic regressions, count data will be estimated using Poisson regressions, and so forth (Raghunathan, Lepkowski, Van Hoewyk, & Solenberger, 2001). SRMI is useful when the number of variables closely approaches the number of participants and when there is a large amount of missingness, which inherently leads to multiple patterns of missingness and can cause problems for standard MI software. When there is a large amount of missingness, SRMI is especially useful as variables with the least amount of missing are estimated first, allowing estimation of those with the most missing to be informed by observed and estimated data (Raghunathan et al., 2001); therefore, IVEware was used to carry out 100 MIs at the item level, which is preferable to imputing at the scale level (Gottschall, West, & Enders, 2012; Raghunathan & Siscovick, 1996). All variables from the data set (even those not included in the analyses) were included in the imputation as well as demographic variables such as gender and ethnicity which help inform the estimation process. Employing these practices promotes unbiased estimation of missing data. The *supermatrix* approach (Wu, Lang, & Little, 2009) was used to calculate the sufficient statistics (means, standard deviations, and covariances) on the 100 stacked imputed data sets for all aggregate scores.

Statistical Method

All items included in the analyses were rescaled to be on the same metric using proportion of maximum scoring (POMS), where a given value is divided by its maximum possible score (see Little, 2013). After imputation, parceling was used to decrease the total number of items by combining the observed variables into aggregate (i.e., mean) scores to create a more parsimonious model. A more parsimonious model leads to improved model fit as well as other psychometric benefits (Little, Cunningham, Shahar, & Widaman, 2002). After parceling, no significant departures from multivariate normality were found. Descriptive statistics for the parcels/items can be found in Supplemental Table 1 at http://crmda.ku.edu/main/Supplemental_Materials.

The sufficient statistics extracted from the parcels were analyzed using structural equation modeling (SEM; Kline, 2010). SEM is an attractive method because measurement error—which is modeled as residuals within the SEM framework—does not inform the latent construct, leaving only shared variance to define the latent construct; and because longitudinal and cross-group factorial invariance can be tested, and it is possible to determine model fit (see Little, 2013). SEM was particularly useful for our purposes because it allowed us to move beyond looking simply at single indicators of adult outcomes (i.e., job or no job; live independently or do not live independently) and look at adult outcome constructs defined by multiple indicators. *Mplus Version 6.12* (Muthén & Muthén, 1998–2010) was used for the analyses, using the ML estimator. Models were identified using effects coding for all constructs except *Independent Living* where the fixed factor method of identification (Little, Slegers, & Card, 2006) was necessary to properly identify the dual-indicator construct (i.e., independence and choice of living environment). Because all variables used in the analyses were placed on the same metric, POMS, effects coding was appropriate for all constructs.

A Confirmatory Factor Analysis (CFA), also called the *measurement model*, is the starting point of an SEM model. The purpose of the measurement model is to fully assess the psychometric properties (loadings, variance, etc.) between indicators and latent variables, as well as the relationships with the other latent variables. The model must pass strong invariance (demonstrating the same mean and intercept structure across time; Little, 1997), demonstrating a change in comparative fit index (CFI) of less than 0.01 (Cheung & Rensvold, 2002). After strong invariance is established, relationships in the latent space can be tested, in our case, the degree to which self-determination predicts outcomes as well as differences between the control and treatment groups.

Results

An 11-construct measurement model was specified to examine the relationship between self-determination and postschool outcomes. All relevant parameter estimates from the initial measurement model can be found in Supplemental Table 2 which can also be found at http://crmda.ku.edu/main/Supplemental_Materials. The 11 constructs included *Self-Determination* at Time 1, Time 2, and Time 3 (3 years

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Table 2. Invariance Testing Across Time and Group.

Model	χ^2	*df*	*p*	$\Delta\chi^2$	Δdf	RMSEA	90% CI	CFI	TLI	Constraint tenable?
Measurement invariance										
Independence (null)	5,921.648	1,294	—	—	—					
Configural invariance	765.437	968	—	—	—	0.000	[0.000, 0.000]	1.000	1.059	Yes
Weak invariance	837.416	1,004	—	—	—	0.000	[0.000, 0.000]	1.000	1.046	Yes
Strong invariance	993.456	1,040	—	—	—	0.000	[0.000, 0.009]	1.000	1.013	Yes
Invariance of latent parameters										
Variance-omnibus	1,234.034	1,056	<.001	240.578	16	0.021	[0.015, 0.026]	0.950	0.944	No
Group	1,004.352	1,051	.452	10.896	11	0.000	[0.000, 0.009]	1.000	1.015	Yes
Time	1,224.168	1,051	<.001	230.712	11	0.021	[0.015, 0.025]	0.952	0.945	No
Means-omnibus	1,103.241	1,056	<.001	109.785	16	0.011	[0.000, 0.018]	0.987	0.985	No
Group	1,028.237	1,051	<.001	34.781	11	0.000	[0.000, 0.012]	1.000	1.007	No
Time	1,080.813	1,051	<.001	87.357	11	0.009	[0.000, 0.017]	0.992	0.991	No
Betas-omnibus	1,011.385	1,070	.959	17.929	30	0.000	[0.000, 0.006]	1.000	1.018	Yes
Variant means between groups										
SDS_1	1,004.380	1,041	<.000	10.924	1	0.000	[0.000, 0.010]	1.000	1.012	No
SDS_2	1,002.346	1,041	<.000	8.890	1	0.000	[0.000, 0.010]	1.000	1.012	No
LS_4	997.623	1,041	.041	4.167	1	0.000	[0.000, 0.009]	1.000	1.014	No
Community access_4	998.574	1,041	.023	5.118	1	0.000	[0.000, 0.009]	1.000	1.014	No
Career goal_4	1,006.975	1,041	<.000	13.519	1	0.000	[0.000, 0.010]	1.000	1.011	No

Note. The strong invariance model acted as baseline model for testing variant means between groups. *df* = degrees of freedom; RMSEA = root mean square error approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker–Lewis index; SDS = *Self-Determination Scale*; LS = life satisfaction.

of secondary school measurement); *Life Satisfaction, Community Access*, and *Employment* at Times 4 and 5 (1 and 2 years post-school); and *Financial Independence* and *Independent Living* at Year 5. Initially, financial independence and independent living constructs were included for Year 4 and an ongoing education construct for Years 4 and 5, however, the initial measurement models suggested very poor model fit and weak loadings for these constructs, and they were dropped from further analyses; after completing the pruning mentioned above, the model fit of the *measurement model* was sufficient, therefore modification indices were not utilized. Each of the three self-determination constructs were represented by four aggregate (i.e., mean) parcel scores comprising the four subscales of *the Arc's SDS*: autonomy, self-regulation, self-realization, and psychological empowerment, consistent with previous research (Shogren et al., 2008). The remainder of the constructs, with the exception of *Independent Living*, were represented by three aggregate parcel scores (Little et al., 2002); however, only two items were associated with *Independent Living* and each of the items was used as an indicator.

The chi-square test of model fit had a value of 618.69 with 485 degrees of freedom ($p < .001$), however, as sample size increases so does the power to reject model fit (Bentler, 1990); therefore, absolute and relative fit indices were used to assess model fit. Both indicated close fit between the observed and predicted covariance matrices. The root mean square error approximation (RMSEA) was 0.019, 90% CI [0.014, 0.023], and the standardized root mean square residual (SRMR) was 0.034; both statistics fall below the cutoff of 0.05 for close model fit. In terms of relative fit, the CFI value was 0.96, while the Tucker–Lewis index (TLI) value was 0.95, both exceed or meet the criterion for a close fitting model, that being 0.95.

Factorial Invariance

Measurement invariance. Because we wanted to explore differences in the relationship between self-determination and outcomes for young adults that had participated in the control or treatment group during high school as well as explore the degree to which our proposed adult outcome constructs fit the data over time, we examined the 11 constructs for invariance in their measurement across the two groups and across time. Due to software limitations in calculating relative fit statistics, it was necessary to create a user defined null model. This null model is a completely orthogonal model, where all latent constructs are unrelated to each other, thus creating a model with the poorest fit possible. After defining the null model, model parameters are constrained in sequential steps to explore measurement invariance (see Little, 2013, for details). As shown in Table 2, the model demonstrated weak (i.e., loading) and strong invariance (i.e., intercept), as the change in CFI was less than 0.01

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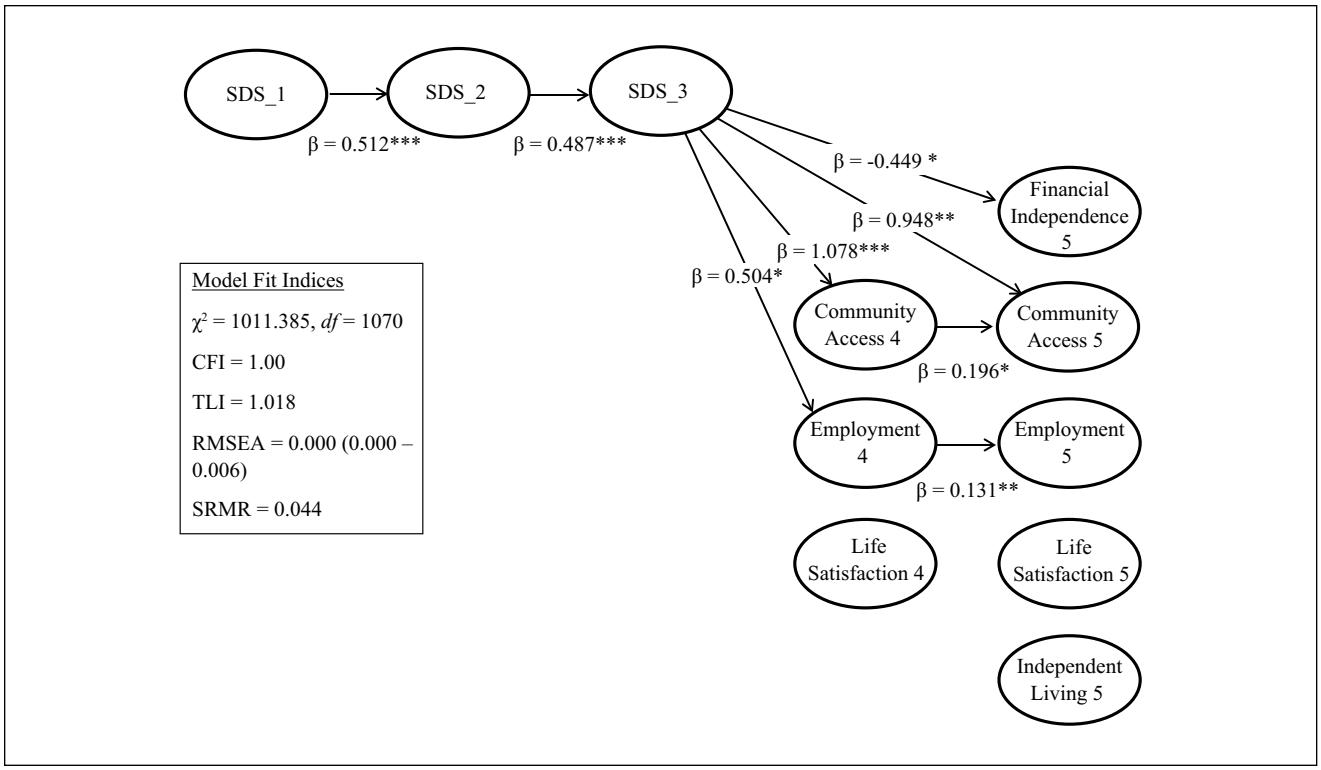

Figure 1. Significant beta pathways collapsed across the control and treatment group in the structural model demonstrating the relationship between self-determination and adult outcomes.
Note. Only significant beta pathways are shown above. Estimates are unstandardized. SDS = *Self-Determination Scale*; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error approximation; SRMR = standardized root mean square residual.
*p = .05. **p = .01. ***p = .001.

for each step, suggesting that the same constructs are being measured across groups and time.

Test of latent parameters. Once *strong invariance* was established, we examined differences in the latent means and variances across groups and over time using change in chi-square to evaluate invariance (or lack thereof; Little, 1997, 2013). As shown in Table 2, neither omnibus test (means or variances) indicated the constructs were invariant, suggesting differences across groups and/or over time. To pinpoint the source(s) of the between-group or across-time variance, each parameter (mean or variance) was then tested individually. Latent variances were invariant across groups, but not across time. In other words, while the control group and the treatment group did not significantly differ in the constructs' latent variances, the same variances did differ as time went on. The construct means were different across group and time, requiring further decomposition, which is described below.

Predictive Relationships

Research Question 1. After establishing that the same constructs were being measured, we tested for invariance in the beta pathways across our control and treatment group. As shown in Table 2, we found that the beta pathways were invariant across groups. Next, we tested the significance of the beta pathways collapsed across the control and treatment group. As shown in Figure 1, SDS at Time 1 predicted SDS at Time 2, which predicted SDS at Time 3. In terms of the relationship between SDS at Time 3 and the adult outcome constructs, SDS at Time 3 significantly predicted *Community Access* at Time 4 (β = 1.078; $p < .000$) and at Time 5 (β = 0.948; $p = .009$). In terms of *Employment*, SDS at Time 3 significantly predicted *Employment* at Time 4 (β = 0.504; $p = .019$), but not at Time 5, although *Employment* at Time 4 predicted *Employment* at Time 5, suggesting an ongoing indirect effect of self-determination. Unexpectedly, SDS at Time 3 predicted a significant decrease in the *Financial Independence* construct at Time 5 (β = −0.449; $p = .036$); meaning that for a 1 unit increase in SDS corresponded to a decrease of −0.449 in *Financial Independence*, which did not have any relationship with *Independent Living* at Time 5, or *Life Satisfaction* at Time 4 or 5. In terms of model validity, it is possible to determine how well parameters are estimated by examining the SRMR index. For the final model, that being the omnibus invariance test of betas, we had a SRMR value of 0.044, which suggests

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Table 3. Latent Cohen's *d* Estimates.

		Control			Treatment		
Variables	Latent *d*	*M*	Variance	*n*	*M*	Variance	*n*
Y1_SDS	0.322	0.693	0.008	200	0.665	0.008	579
Y2_SDS	0.332	0.716	0.006	200	0.691	0.006	579
Y3_SDS	0.165	0.716	0.008	200	0.701	0.009	579
Life Satisfaction 4	−0.194	0.692	0.046	200	0.734	0.051	579
Life Satisfaction 5	−0.292	0.728	0.012	200	0.755	0.008	579
Community Access 4	0.263	0.381	0.197	200	0.277	0.155	579
Community Access 5	0.095	0.222	0.33	200	0.171	0.293	579
Employment 4	0.359	0.502	0.101	200	0.387	0.111	579
Employment 5	0.019	0.372	0.041	200	0.368	0.049	579
Financial Independence 5	−0.154	0.497	0.119	200	0.538	0.06	579
Independent Living 5	0.108	0	1	200	−0.088	0.605	579

Note. Mean and variance estimates for Independent Living construct were fixed for identification purposes. Y = year; SDS = *Self-Determination Scale*.

there were no such problematic residuals present in the model.

Research Question 2. When evaluating factorial invariance, as shown in Table 2, the results suggested that the construct means were variable across group and time. As shown in Table 2, there were significant differences across groups in SDS at Times 1 and 2, as well as significant differences in *Life Satisfaction, Community Access*, and *Employment* at Time 4. With the exception of *Life Satisfaction*, the control group scored higher. Interpretations of these unexpected findings are provided in the *Discussion* section. The remaining constructs were invariant across groups.

In addition to invariance testing, latent effect sizes (d; Hancock, 2001) between-group were calculated using the formula below:

$$d = \frac{\alpha_I - \alpha_C}{\left(\frac{n_I\psi_C + n_C\psi_C}{n_I + n_C}\right)},$$

where α_I and α_C correspond to the latent means of the Intervention and Control groups, respectively; n_I and n_C correspond to the sample sizes of each group; and finally, ψ_I and ψ_C correspond to the latent variances of each group. Table 3 provides the means for the control and treatment group and the latent effect size estimates. Effect sizes were greatest for differences in SDS at Years 1 and 2, and *Employment* at Time 4—with the control groups scoring more adaptively. Those in the treatment group had higher *Life Satisfaction* mean scores in comparison with those in the control group and for the control and treatment groups, there is a decrease in *Community Access* and *Employment* from Time 4 to Time 5. Those in the treatment group, however, experienced a smaller decrease than those in the control group (*Community Access*: −0.106 vs. −0.159; *Employment*:−0.019 vs. −0.130). The treatment group appears to be more stable in their adult outcomes. Young adults who were in the treatment group scored higher on the *Financial Independence* and the latent variance is much smaller for the treatment group (0.06) compared with the control group (0.119), further supporting the stability of the outcomes of the treatment group.

Discussion

Postschool outcomes are influenced by a number of factors related to personal characteristics and available environmental opportunities and supports. One personal characteristic researchers have hypothesized to influence postschool outcomes is self-determination, and a small body of research has suggested a relationship between higher levels of self-determination when exiting school and positive adult outcomes (Powers et al., 2012; Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997). The purpose of the present study was to extend this research, exploring the degree to which self-determination predicted postschool outcomes in a large sample of young adults with disabilities who participated in a self-determination intervention study while in high school. The results suggest that self-determination status when exiting high school does impact adult outcomes, but nature of the relationship is complex.

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Measuring Postschool Outcomes

A first step in this study was to determine if latent postschool outcome constructs could be specified. To assess postschool outcomes, we chose to use a tool that had been used in previous research (Powers et al., 2012; Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997) that focused on major life domains—employment, community access, financial independence, independent living, ongoing education, and life satisfaction. We chose to represent the outcomes as latent constructs, rather than simply using single indicators (e.g., do you have a job) to explore the diverse items that define meaningful postschool outcomes. For example, we defined achieving employment not simply as having a job, but also by the number of hours worked, the benefits provided, and whether the individual had career goals. We were also able to examine the degree to which these constructs were defined in the same way 1 and 2 years post-school. Interestingly, we found that financial independence and independent living demonstrated significant fit issues when included for youth 1 year post-school, but not 2 years. It is possible that constructs like financial independence which was defined by the individual paying their own expenses, including rent, utilities, and phone bills; shopping for their own groceries; and earning enough money to pay for their own expenses is not a meaningful construct for youth 1 year post-school, many of who may still be reliant on others to support them as they are moving into adulthood. Similarly for independent living, the indicators may not be meaningful until students have been out of school for a year or more. Support for these interpretations comes from the National Longitudinal Transition Study–2 (NLTS2), which suggests that a majority of youth with disabilities remain financially dependent and do not live independently immediately after exiting high school (Wagner, Newman, Cameto, Garza, & Levine, 2005), although this percentage decreases over time (Newman et al., 2011).

Unfortunately, we were not able to define an ongoing education construct at 1 or 2 years post-school, perhaps because such few students in the sample accessed ongoing education. However, this is a critical postschool outcome domain, and further research is needed to explore diverse factors that define outcomes particularly in the years immediately post-school. Such understandings have the potential to allow for better specification of relevant transition goals and instruction.

Relationship Between Self-Determination and Postschool Outcomes

After defining and establishing adult outcome constructs, we were able to address the nature of the relationship between self-determination and adult outcomes. When examining Figure 1, as one might expect, self-determination status at Time 1 predicted self-determination status at Time 2, which predicted self-determination status at Time 3. Essentially, youth's current level of self-determination predicts their future level of self-determination. Self-determination status at Time 3, which represented students' final year of high school, predicted higher levels of community access and employment outcomes 1 year post-school. The employment outcomes are consistent with Wehmeyer and Schwartz (1997) and Wehmeyer and Palmer (2003), both of whom found that youth with higher levels of self-determination were more likely to have a job and have access to job benefits 1 year post-school. The findings are also consistent with research with a Spanish sample of adults with intellectual disability (Martorell et al., 2008) which suggested self-determination predicted integrated employment and access to benefits.

Self-determination status at Time 3 did not directly predict employment at Time 5, although employment at Time 4 predicted employment at Time 5, suggesting that the influence of self-determination on employment 1 year post-school may carry through employment at Time 4 to Time 5. Further research is needed, however, on the degree to which self-determination predicts outcomes as young adults with disabilities move further and further away from school, particularly as young adults work to establish job tenure and job promotion. For example, data from the NLTS2 suggest that students with disabilities did not have significantly different rates of employment if they had been out of high school less than 3 years or 3 to 5 years (Newman et al., 2011), supporting our findings that job outcomes 1 year post-school could be a strong predictor of ongoing job outcomes. Neither our study nor NLTS2, however, directly looked at opportunities for career advancement. One variable that did contribute to our employment construct was having goals for career development, suggesting this is an important aspect of employment outcomes. Exploring how self-determination may contribute to this outcome is an important area for further research (Izzo & Lamb, 2003) as is research that explores the degree to which students with disabilities have access to jobs with opportunities for career advancement.

The finding that self-determination status at Year 3 predicted community access at Times 4 and 5 is an interesting finding. Researchers have not routinely explored in this domain; however, the importance of transportation to employment and other valued adult outcomes cannot be overstated. For example, Magill-Evans, Galamvos, Darrah, and Nickerson (2008) found that being dependent on others for transportation accounted for 42% of the variance in employment outcomes for young adults with physical disabilities. Further research is needed on the relationship between self-determination and accessing reliable means of transportation, particularly, the degree to which self-determination enables young adults to navigate the complex systems that provide transportation support.

Unexpectedly, we found that self-determination status at Time 3 did not predict independent living or life satisfaction,

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and showed a significant, negative relationship with financial independence at Time 5. In terms of independent living, Wehmeyer and Palmer (2003) and Wehmeyer and Schwartz (1997) did not find a significant relationship between independent living and self-determination status 1 year post-school, but Wehmeyer and Palmer, who also tracked students 3 years post-school, did find that students with higher levels of self-determination were significantly more likely to live independently 3 years post-school. Powers et al. (2012) found a relationship between self-determination and independent living, but this was related to youth remaining in or exiting foster care, an outcome unique to this population. Our study only followed students for 2 years post-school, perhaps suggesting that it takes longer periods of time for young adults to access opportunities to live independently. These findings are supported by other sources that suggest that young adults with and without disabilities are living at home longer after exiting high school. For example, NLTS2 reported that young adults with disabilities out of school 5 to 8 years were more likely to live independently than their peers out of school for shorter periods of time (Newman et al., 2011); however, NLTS2 also found that satisfaction with living arrangement decreased the further removed from school young adults with disabilities were, which could account in part for our findings as we defined living independently not only as where one lived but also whether one had choice in where he or she lived. Further research is needed to explore the congruence between the living status of young adults with disabilities and their preferences over time, the factors that contribute to young adults with disabilities achieving their living preferences, and the role of self-determination in predicting living in preferred environments.

While Wehmeyer and Schwartz (1997) and Wehmeyer and Palmer (2003) found that higher levels of self-determination predicted having a checking account 1 year post-school, and Wehmeyer and Palmer (2003) found higher levels of self-determination predicted paying for groceries 3 years post-school, we found a negative relationship between higher levels of self-determination and financial independence, defined by paying one's own expenses, shopping for groceries, and paying for all expenses. This unexpected finding needs further research. It is possible it was an artifact of this study and sample, but it is also possible that young adults who are more self-determined may actually be more likely to recruit sources of support that enable them to pay all of their expenses, particularly during the time when they are transitioning from school. However, it is important for youth to have access to banking accounts to build a credit profile as well as to learn important money management skills. Further research is needed that decomposes financial independence outcomes and their relationship to self-determination.

Finally, a relationship was not found between self-determination and life satisfaction. This finding is not completely unexpected, as other researchers have failed to find a direct relationship between self-determination and life satisfaction (Shogren, Wehmeyer, Pressgrove, & Lopez, 2006). Some researchers have suggested that life satisfaction may actually play a mediating role between predictors and outcomes, while other researchers have found that self-determination may predict specific domains of life satisfaction (McDougall, Evans, & Baldwin, 2010). Further research is needed to explore the measurement of subjective well-being among young adults with disabilities, particularly given the relationship that has been documented between self-determination and self-reported quality of life outcomes (Lachapelle et al., 2005) and to analyze the relationships between self-determination, life satisfaction, and quality of life.

Differences Based on Exposure to Self-Determination Interventions

We were also interested in exploring the degree to which exposure to self-determination interventions while in secondary school influenced the relationship between self-determination and adult outcomes. It is important to note that the findings related to the impact of self-determination interventions in secondary school on self-determination outcomes have already been reported in Wehmeyer et al. (2011) and Wehmeyer et al. (2013) and that, in this study, we included any student who contributed any data to either of these studies. Therefore, our primary purpose in the present study was not to explore the influence of self-determination interventions on self-determination status in secondary school, but to explore differences in the relationship between self-determination and adult outcomes. As shown in Table 3, when collapsing the entire sample of students that participated in the large-scale self-determination intervention evaluation project, the control group showed higher levels of initial self-determination, despite random assignment at the campus level. This finding is consistent with Wehmeyer et al. (2011) but not Wehmeyer et al. (2013). However, by the third time point, these differences were no longer significant suggesting that while students in the treatment group may have started with significantly lower levels of self-determination, the fact that students in the control group did not demonstrate the same increase in self-determination scores suggests that the intervention may have been the contributing factor.

There were differences in several adult outcome constructs 1 year post-school for youth in the treatment and control group. Students in the control group actually scored higher in community access and employment, although not in life satisfaction. However, differences for community access and employment were significantly reduced 2 years post-school. Unfortunately, as shown in Table 3, the control and treatment group students showed reductions in community access and employment 2 years post-school. Of note,

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however, is that the reductions were significantly lower in the treatment group. This difference could be interpreted as the treatment group demonstrating more stability in adult outcomes, perhaps because of their self-determination skills. Further research is needed to examine this possibility.

In addition, despite the previously mentioned negative relationship between financial independence and self-determination, the treatment group had slightly higher levels of financial independence. Similarly, young adults in the treatment group reported slightly higher levels of life satisfaction, again suggesting possible positive influences of access to self-determination interventions in secondary school. The findings do suggest, however, that exposure to self-determination interventions may serve as a buffer to limit the reductions in employment and community access that some young adults with disabilities may experience the further they move away from the supports provided in the school context. Further research is needed on the influence of disability and other personal and environmental characteristics on self-determination and outcomes.

Limitations

Clearly, there are several limitations to the present study. First, the sample was not a national sample, although it did represent diverse geographic regions in the Midwest and South. Second, students with diverse personal characteristics were included in the sample, but because of power issues, we were not able to undertake analyses exploring the degree to which these personal characteristics impacted the results. Relatedly, although there was possible nesting within the data (e.g., students nested within schools) because of the sample size and the complexity of the current analyses given the missing data, we were unable to explore the potential impact of the nesting. Third, there were large amounts of missing data. Best practices to address missing data were used; however, exploring additional ways to track student outcome data will be important in future research. Fourth, we chose to include all students who contributed data at any point during the large-scale intervention study. This choice meant that students who provided data for the adult outcomes survey may have been exposed to the intervention for varying periods of time. This influences the interpretation of the treatment group's outcomes, and indicates the need for further research exploring the relationship between exposure to self-determination interventions and outcomes. Finally, we were only able to explore a limited number of postschool outcome variables because of the need to keep the postschool outcomes survey brief. While we were able to represent outcomes as latent constructs providing additional insight into how multiple variables cluster together to define outcomes, some latent constructs were difficult to define, particularly at 1 year post-school. Specifically, we were unable to fit an ongoing education construct. This not only suggests the complexity of defining this outcome but also represents a major limitation of the study as postsecondary education may impact employment and satisfaction outcomes, particularly in the years immediately following school.

Implications for Future Research and Practice

Despite these limitations, this study does suggest that self-determination impacts adult outcomes. The manner and degree of impact needs to be further explored in future research; however, when considering the multiple personal and environmental factors that impact adult outcomes, the consistent positive relationship across research studies between self-determination and employment is very promising. It suggests that, in practice, teachers can consider self-determination interventions a useful component of their limited instructional time, particularly to promote employment and community access in adulthood.

Authors' Note

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