

Adult Outcomes for Students with Cognitive Disabilities Three-Years After High School: The Impact of Self-Determination

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Abstract: This article reports a follow-up study of school leavers with mental retardation or learning disabilities who were surveyed 1- and 3-years after they left school to determine what they were doing in major life areas (employment, independent living or community integration). Students were divided into two groups based on self-determination scores collected during their final year at high school. Comparisons between these groups on outcomes at 1 and 3 years post-graduation indicate that students who were more self-determined fared better across multiple life categories, including employment and access to health and other benefits, financial independence, and independent living.

Over the last decade there has been considerable focus in special education literature on the importance of self-determination in the education of students with disabilities. Due largely to the federal emphasis on and funding for promoting self-determination as a component of transition services for youth with disabilities, numerous resources are now available to support instruction to achieve this outcome. Such resources range from curricular materials and guides to instructional strategies and methods (Field & Hoffman, 1996a; Field, Martin, Miller, Ward, & Wehmeyer, 1998a; Test, Karvonen, Wood, Browder, & Algozzine, 2000; Wehmeyer, Agran, & Hughes, 1998), assessment tools (Abery, Stancliffe, Smith, McGrew, & Eggebeen, 1995a, b; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994), teaching models (Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000), model pro-

grams (Ward & Kohler, 1996), position papers (Field, Martin, Miller, Ward, & Wehmeyer, 1998b), and student-directed planning programs (Halpern, Herr, Wolf, Lawson, Doren, & Johnson, 1995; Martin & Marshall, 1995; Powers, Sowers, Turner, Nesbitt, Knowles, & Ellison, 1996; Wehmeyer & Sands, 1998). The process of promoting self-determination has been explored across age ranges, from early childhood (Erwin & Brown, 2000; Wehmeyer & Palmer, 2000) to secondary education (Field & Hoffman, 1996b; Powers et al., 1996) and across disability categories, including learning disabilities (Field, 1996), mental retardation and multiple disabilities (Gast et al., 2000; Wehmeyer, 1998, 2001), and autism (Fullerton, 1998).

In addition to this proliferation of instructional supports and materials, an emerging international knowledge base documents that people with disabilities experience limited self-determination (Stancliffe, Abery, & Smith, 2000; Wehmeyer, Kelchner, & Richards, 1995; Wehmeyer & Metzler, 1995) and limited opportunities to express preferences and make choices (Stancliffe, 1997; Stancliffe & Abery, 1997; Stancliffe & Wehmeyer, 1995), as well as evidence of the impact of environments on self-determination (Stancliffe et al., 2000; Wehmeyer & Bolding, 1999, 2001).

We present this extensive (though still only partial) citation of contributions to the litera-

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ture base on self-determination to illustrate that promoting and enhancing the self-determination of individuals with disabilities has become both an expectation of federal disability policy and a significant focus in the education of students with disabilities. However, while other segments of the self-determination literature base have expanded, few studies have specifically examined the link between enhanced self-determination and positive outcomes in lives of people with disabilities. There are several reasons for this circumstance, not the least of which is that ethical reasons compel us to promote self-determination even in the absence of such evidence. The self-determination construct is used to reflect both a personal sense of the term (e.g., someone who is self-determined because they are causal agents in their lives), the most common use in education, and in a broader political or corporate sense, that of self-determination as a right of nations or peoples to self-governance. In regard to the latter meaning of the term and in relation to people with disabilities, self-determination is widely viewed as a fundamental human right, to govern or direct one's own life without unnecessary interference from others, and the focus on promoting self-determination in education has certainly been influenced by this empowerment focus. In addition to acknowledging importance of promoting self-determination for ethical reasons, however, there is benefit to documenting the impact of self-determination on lives of individuals with disabilities, both as a further reason to focus resources on this effort and to better understand how much promoting self-determination contributes to education's goal to increase self-sufficiency, autonomy, and valued adult outcomes like employment, community integration, or independent living.

Most evidence regarding the impact of being self-determined on the lives of young people with disabilities has been either anecdotal or extrapolated from research examining such impact from component elements of self-determined behavior, like goal-setting, decision-making, problem-solving and self-management skills (see Wehmeyer et al., 1998, for overview). For example, Hickson and Khemka (1999) and Khemka (2000) provided evidence of the importance to community inte-

gration of teaching decision-making skills to people with mental retardation. However, few studies have looked at the impact of self-determination status itself, as opposed to a single component skill of self-determined behavior, on adult outcomes. Sowers and Powers (1995) showed that instruction on multiple components related to self-determination increased the participation and independence of students with severe disabilities in performing community activities. Wehmeyer and Schwartz (1998) found that the self-determination status of adults with mental retardation living in group homes predicted high quality of life status.

Wehmeyer and Schwartz (1997) conducted a study to examine outcomes of students with mental retardation or learning disabilities who were graduating from or leaving high school as a function of their self-determination status. Self-determination of 80 students with cognitive disabilities was measured and one year after their departure from secondary education these young people answered questions on a survey concerning their lives and activities at that time. Wehmeyer and Schwartz found that students who were more self-determined (controlling for intelligence level) were more independent, overall, and were significantly more likely to be working for pay at higher hourly wages. The present article reports the outcome of a continuation and extension of that study in which data were collected for students with mental retardation or learning disabilities at both one and three years post-graduation. The purpose of the study was to provide more information about impact of self-determination on the lives of young people with disabilities and to extend the database concerning the relationship between enhanced self-determination and positive adult outcomes.

Method

Sample

Data collection activities, as described in the Procedures section, were completed (e.g., self-determination measure administered at graduation, responses to questions about 1 and 3 year post-graduation outcomes collected by research staff) with 94 students served under

the category of either learning disability or mental retardation through public schools in seven states (Alabama, California, Connecticut, Kansas, North Carolina, Texas and Virginia). Survey return rates and indicators examining non-response bias are included in the Procedures section.

For these 94 students we collected both self-determination scores at graduation and (completed) 1-year and 3-year follow-up surveys. Mean age of this sample at the time we measured self-determination (e.g., during the last semester of each student's final year of high school) was 19.25 years (range = 17–22 years, $SD = 1.56$). The mean IQ for the group was 82.91 ($SD = 21.71$). There were 49 males in the sample and 45 females. Sixty students (64% of the sample) were identified as having a learning disability (mean IQ = 96.2, $SD = 13.41$), while 34 students were labeled with mental retardation (mean IQ = 59.47, $SD = 10.92$). All students were recruited by project personnel through public schools in the seven states listed.

To examine differences between students based on self-determination status, the sample was divided into a high self-determination and a low self-determination group based on their self-determination score. The high self-determination group was identified as those students whose self-determination score was 1 standard deviation or more above the mean ($n = 26$, mean self-determination score = 123.19, $SD = 8.50$), while the low self-determination group consisted of students whose self-determination score fell 1 standard deviation or more below the mean for the group ($n = 22$, mean self-determination score = 74.72, $SD = 18.25$). We opted for students 1 standard deviation or more above and below the mean to ensure these groups were actually different in their self-determination status and were genuinely 'high' and 'low' self-determination groups. To ensure that the low self-determination group did not disproportionately contain students with mental retardation or the high group students with learning disabilities, we identified members of the high and low groups for each disability category (based on mean scores only for students in that disability category) and then combined the high and low groups from both disability categories.

A final grouping used to conduct analyses

was for all students in the sample who held a job at the time of the first-year follow-up ($n = 65$). The entire group of 94 was ranked according to total self-determination score (within each disability category) and then a median split made, resulting in 47 students in the high self-determination group and 47 in the low group. There were 28 students in the low self-determination group who were employed (20 males, 8 females, mean age = 19.45, $SD = 1.45$) and 37 who were employed in the high self-determination group (17 males, 20 females, mean age = 19.23, $SD = 1.32$). This group was used to examine changes in job status and access to important job benefits, including insurance, health care, and sick or vacation leave.

Procedure

Participants were recruited in a variety of ways. Project personnel sought and received permission from school districts to identify graduating seniors with educational labels of learning disability or mental retardation. These students' teachers sent consent forms home to parents of graduating seniors, and parents and students signed and returned these forms. An honorarium of \$10 was offered for participation in initial testing during high school, and a continuing \$10 incentive in merchandise coupons or check was sent as an honorarium for completed surveys at each measurement interval. We obtained informed consent for 103 students in this manner, but of that total, only 77 responded to both first- and third-year follow-up questionnaires.

In addition to these 77 students, we contacted 52 students from Connecticut, Alabama, and Virginia who had been involved in the initial 1-year follow-up study (Wehmeyer & Schwartz, 1997) described earlier, to determine their willingness to respond to questions about their post-secondary outcomes 3-years post-graduation. Seventeen of these students responded to the questions and were paid the honoraria as well. This resulted in the total sample of 94 students. We did this because we were conscious of the difficulty in getting data three years after graduation and we felt that the two sub-samples were comparable. The Wehmeyer and Schwartz sample graduated from high school in 1994, while students not

involved in that study graduated in 1995 or 1996. There were no significant differences on IQ scores between students with either learning disabilities or mental retardation involved in the Wehmeyer and Schwartz study and the sample recruited specifically for this study.

The project director trained research personnel at sites in all states to work with students in administering the self-determination assessment (described subsequently) and to conduct telephone interviews for students who did not respond to mailed questionnaires. Two mailings of the survey for each of the two years (1- and 3-years post-high school) were conducted from the project central location. In many cases, addresses had changed, and research personnel had to contact a close friend or relative who was given as a contact during initial assessment while in high school. For students not involved in the Wehmeyer and Schwartz (1997) study, the return rate was 82.5% for the first-year follow-up questionnaire (85 returned surveys from total of 103 who had provided informed consent). Of those 85 students who were mailed a third-year survey, 77 responded, or a response rate of 90.5%. Overall, from the original sample of 103 students for whom we had informed consent, 77 responded to both first- and third-year surveys, for an overall response rate of just under 75%. From the 52 students involved in the Wehmeyer and Schwartz study who we contacted to obtain 3rd year outcome information, almost 33% ($n = 17$) returned a completed third-year survey. (The lower return rate on this group was attributed to the fact that at the onset of the Wehmeyer and Schwartz study we had indicated we were to conduct only a one-year follow-up and did not put into place any mechanism to track students after that, whereas for the second group we kept track of student location throughout the time period). Thus, there were 43 students for whom we had first-year data but for whom we were unable to obtain third-year follow-up data who were excluded from the final analysis. Mean age of those 43 students was 19.58 ($SD = 1.34$); 25 were male and 18 were female. There were no significant differences between the groups of students ($n = 43$) for whom we collected only first-year follow-up information and those for whom we completed all data collection ($n = 94$) for age, $F(1,$

135) = 1.40, *ns*, IQ, $F(1, 135) = 1.13$, *ns*, or total self-determination, $F(1, 135) = .156$, *ns*.

For the 103 students recruited exclusively for this study, 18 (11%) did not respond to year 1 surveys. The reasons given for non-response were that one former student was in jail, 11 had moved with no forwarding address or available telephone number, and 6 declined to participate. For the third-year post-graduation survey, 43 participants for whom we had first-year follow-up data did not complete third-year data (see details above). The bulk of this group ($n = 35$) was from the original study, and we were never able to contact them with regard to a third-year follow-up. In addition, from the remaining 8 students (who did not respond to third-year surveys but who had responded to first-year survey), one student had died, two had been jailed, and three did not return the survey or declined to participate. We used several methods to find students who had moved, including conducting an Internet "People Search" on Yahoo.com within the states of residence and surrounding states and contacting former teachers and members of the community.

Overall, 76% of the first-year follow-up surveys were returned by mail, with 24% accomplished via telephone interview. In year 3, 54% of the surveys were returned by mail and 46% were conducted by phone. There were no statistically significant differences between mail or telephone respondents for age, $F(1, 68) = .001$, *ns*, or IQ, $F(1, 68) = .439$, *ns*, for year 1 respondents or, similarly, for age, $F(1, 91) = .221$, *ns*, or IQ, $F(1, 91) = 2.315$, *ns*, for year 3 respondents. Similarly, chi-square analyses of responses to survey questions in Table 1 indicated no significant differences in what would be expected from mail or telephone respondents for both year 1 and year 3 survey results. Although most participants (73% year 1 and 68% in year 3) completed their own surveys, recipients were instructed to get whatever assistance they needed to answer the questions, and this support included assistance from parents, other family members, and, in a few cases even staff members and a teacher. In all cases, the young adult was to participate in the process. In one case, a Spanish language translator gathered information from a participant who spoke limited English for both survey years. Research staff was avail-

TABLE 1

Questions from Outcome Survey

-
- Where do you currently live?
 Is this the same place you lived when in high school?
 Did you choose the place you live now?
 Do you pay your own rent? Utilities? Phone bill?
 Do you shop for your own groceries?
 Do you have your own bank account?
 Have you had a job since high school?
 Are you now or have you been in job training?
 Do you have a job at the present time? Full time?
 Part time?
 Does this job have any benefits? Paid Vacation?
 Sick Leave? Health Insurance?
-

able to clarify any information regarding the questionnaires and participants were encouraged to call a toll-free phone number for inquiries. Training for telephone interviews was provided to all staff prior to collecting information.

Demographic data, including age and date of birth, intelligence score, ethnicity, verification of high school exit, and special education eligibility were collected from student records of all participants while still in high school.

Instrumentation

Measuring adult outcomes. Adult outcomes were determined using a survey-type questionnaire adapted from Wehmeyer and Schwartz (1997) and designed to evaluate outcomes in major life domains. Project personnel reviewed follow-up and follow-along studies to identify instruments to collect data regarding adult outcomes, and identified 24 unique studies conducted since 1984. From this set, we collected all instruments available, either through published report or from authors. After an examination of these survey instruments, we selected and adapted questions from the National Consumer Survey (Jaskulski, Metzler, & Zierman, 1990) and the National Longitudinal Survey (Wagner, D'Amico, Marder, Newman, & Blackorby, 1992). Table 1 lists the questions from the survey. All questions, with the exception of determining where the ex-student lived, were in yes/no format creating a dichotomous variable for

analysis. Respondents indicated their current living arrangements and that information was collapsed into a dichotomous variable indicating independent, community-based living versus congregate living arrangements.

Student self-determination was measured using *The Arc's Self-Determination Scale* (Wehmeyer & Kelchner, 1995) a student self-report measure of global self-determination. *The Arc's Self-Determination Scale* is a 72-item self-report scale that provides data on overall self-determination by measuring individual performance in the four *essential characteristics* of self-determination identified by Wehmeyer, Kelchner, and Richards (1996). Section 1 measures autonomy, including the individual's independence and the degree to which he or she acts on the basis of personal beliefs, values, interests and abilities. The second section measures self-regulation and consists of two subdomains; interpersonal cognitive problem solving, and goal-setting and task performance. The third section is an indicator of psychological empowerment. Psychological empowerment consists of various dimensions of perceived control. People who are self-determined take action based on the beliefs that (a) they have the capacity to perform behaviors needed to influence outcomes in their environment and (b) if they perform such behaviors, anticipated outcomes will result. Respondents choose from items measuring psychological empowerment using a forced-choice method. High scores reflect positive perceptions of control and efficacy. The final section measures self-realization. Self-determined people are self-realizing in that they use a comprehensive, and reasonably accurate, knowledge of themselves and their strengths and limitations to act in such a manner as to capitalize on this knowledge in a beneficial way. Self-knowledge forms through experience with and interpretation of one's environment and is influenced by evaluations of others, reinforcements, and attributions of one's own behavior. Respondents reply to a series of statements reflecting low or high self-realization by indicating that they agree or disagree with items. High scores reflect high levels of self-realization.

On the scale, 148 points are obtainable, and higher scores reflect higher self-determination. *The Arc's Self-Determination Scale* was

normed with 500 students with and without cognitive disabilities in rural, urban and sub-urban school districts in five states. The Scale's concurrent criterion-related validity was established by showing relationships between *The Arc's Self-Determination Scale* and conceptually related measures. The scale had adequate construct validity, including factorial validity established by repeated factor analyses, and discriminative validity and internal consistency (Chronbach alpha = .90; Wehmeyer, 1996). The scale has been used in several research efforts with individuals with cognitive disabilities (Cross, Cooke, Wood, & Test, 1999; Sands, Spencer, Gliner, & Swaim, 1999; Wehmeyer, Agran, & Hughes, 2000; Wehmeyer & Schwartz, 1997, 1998; Zhang, 1998).

Analyses

Comparisons of dichotomous indicators of major adult outcomes by self-determination group were conducted using chi-square analyses. We also examined the significance of changes between the first-year follow-up and the third-year follow-up for students in both the high self-determination and low self-determination group using the McNemar test for the significance of changes (Siegel, 1956). Prior to analyzing data using chi-square and McNemar analyses, we examined differences between high and low self-determination groups on intelligence test scores and age using univariate analysis of variance. Given the results of this analysis, we opted to conduct a discriminant function analysis to examine the degree to which self-determination score and intelligence test scores predicted outcomes on questions identified by chi-square analysis. The discriminant function analysis was conducted with the specific question responses as the grouping variable (always posed as a dichotomous variable) and IQ score and self-determination score entered as independent or predictor variables. Discriminant function analysis has two primary purposes, interpretation of data and classification of data. Klecka (1980) suggested, "a researcher is engaged in interpretation when studying the ways in which groups differ—that is, is one able to discriminate between groups on the basis of some set of characteristics?" (p. 9). The second application, classification, involves the

process of deriving one or more mathematical equations for the purpose of assigning individuals to groups. We were interested only in the first application of discriminant function analysis, that of data interpretation and identifying how groups vary according to a set of independent or predictor variables (IQ, self-determination).

Results

Univariate analysis of variance examining differences between high and low self-determination groups indicated no statistically significant difference between these groups on either age $F(1,46) = .425, ns$, or IQ scores $F(1,46) = 1.04, ns$. The mean age for the low self-determination group was 19.68 years ($SD = 1.881$), while the mean age for the high self-determination group was 19.37 years ($SD = 1.48$). The mean IQ score for the low self-determination group was 78.86 ($SD = 23.34$), while for the high self-determination group it was 85.27 ($SD = 27.07$). Table 2 provides results from chi-square analyses assessing the relation between self-determination status and major life outcome areas (independent living, financial independence, and employment).

Figure 1 illustrates outcomes in each follow-up year by self-determination group on major areas of financial independence. Chi-square analyses reveal significant relations between self-determination status on year 1 follow-up for maintaining a banking account, and the McNemar test indicates significant changes from year 1 to 3 only for students in the high self-determination group on paying for groceries.

In addition, there were significant differences on the McNemar test for significance of changes *only* for the high self-determination group on changes in overall benefits ($p = .021$), vacation ($p = .002$), and sick leave ($p = .008$). That is, only persons in the high self-determination group made significant improvements in access to those benefits from year 1 to 3. In addition, there were consistently fewer people in the high self-determination group who lost benefits and more first time receivers of benefits. Figure 2 compares total percentage of people in each group with benefits at the third-year measurement, calcu-

TABLE 2

Results from chi square analyses comparing differences in low and high self-determination groups in adult outcome areas ("yes" responses only)

Area Year	Low SD				High SD				p-value	
	Actual		Expected		Actual		Expected			
	1	3	1	3	1	3	1	3	1	3
Living Independently	1	2	2.7	5.2	5	10	3.3	6.8	.15	.03
Living other than HS home	17	5	13.3	8.7	12	14	15.7	10.3	.03	.028
Maintain bank account	11	11	13	16	24	19	19	16	.001	.123
Received job training	11	7	11	10.3	13	16	13	12.7	.61	.05
Held a job since high school	13	15	14.6	17.9	24	25	22.4	22.1	.15	.02
Holds job currently	10	13	13.9	13.4	21	17	17.1	16.6	.02	.52
Work full time	8	11	5.1	10.3	6	12	8.9	12.7	.04	.45
Work part time	3	3	6.1	3.6	13	5	9.9	4.4	.04	.48

SD = Self-Determination

lated by subtracting the total lost from the initial percentage of members having the benefit and then adding in the percent who did not have the benefit in the first-year but who did by the third-year.

Because there were substantial, if not statistically significant, differences in IQ between the low and high self-determination groups, we conducted the discriminant function analysis, as described previously, for each variable identified through chi-square analyses. Table

3 provides group statistics from the discriminant function analysis, including means and standard deviations for IQ and self-determination scores. Table 4 provides data on tests of equality of group means, canonical discriminant functions identified via the analysis, the function structure matrix, and classification results. Tests of Equality of Group Means, reporting the outcomes of analyses of variance computed for each variable, indicated significant differences in self-determination scores

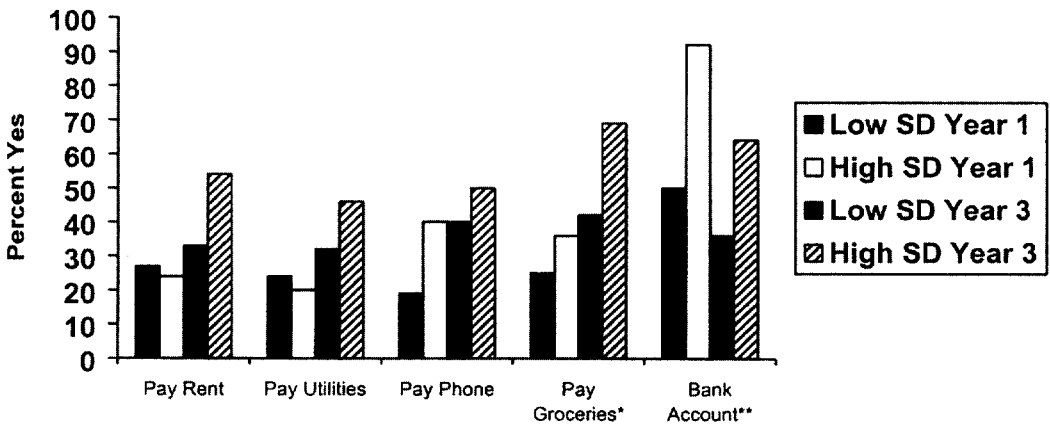


Figure 1. Indicators of financial independence for low and high self-determination groups (Split 1 SD above and below mean self-determination score. * Significant for high self-determination group only at p > .05 using McNemar test for significance of changes. ** Significant differences in year 1 between both groups on chi-square test).

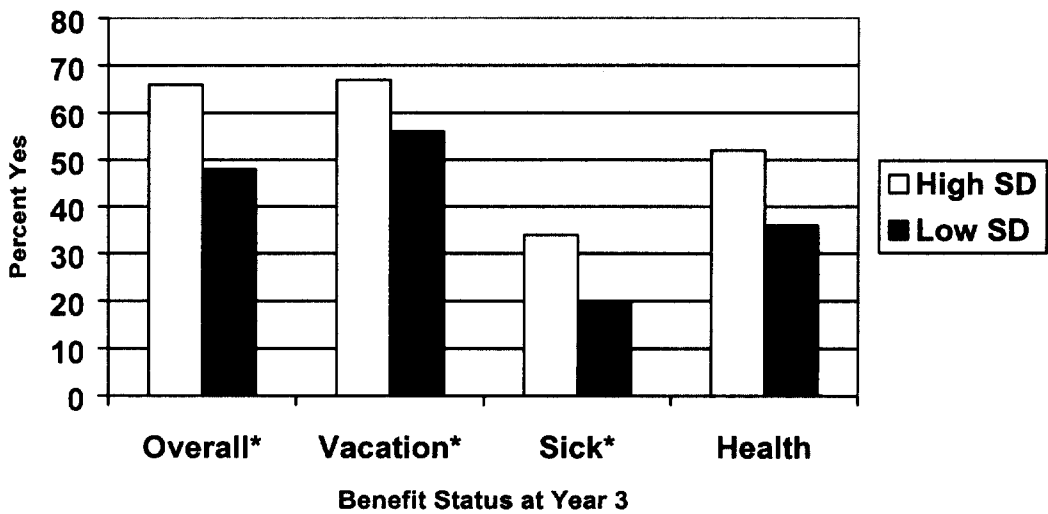


Figure 2. Percent total with benefits at year 3 by self-determination status (median split). * Significant differences for high self-determination group only on McNemar test of changes.

across all variables except living outside the family home 1-year post high school and working full-time 1-year post graduation. There were significant differences for IQ on all but 3

variables, job training since high school, holding a job currently, and working part-time in year 1. Chi-square analyses conducted as part of the canonical discriminant function analy-

TABLE 3

Discriminant Function Analysis: Group Statistics

Variable	Level	Mean		Std Deviation	
		IQ	SD	IQ	SD
Live Year 3	Family	78.68	99.45	21.74	21.45
	Independently	94.04	111.15	17.14	16.78
Live Other HS, Year 1	Yes	84.56	103.81	21.74	18.72
	No	88.69	106.04	22.24	20.47
Live Other HS, Year 3	Yes	77.84	98.89	21.45	21.02
	No	90.39	108.60	20.09	18.20
Bank acct Yr 1	Yes	86.14	106.42	20.24	17.54
	No	74.46	93.38	23.51	24.39
Job Training since HS, Yr 3	Yes	84.62	108.75	23.94	14.71
	No	80.51	96.54	17.47	24.37
Held Job since HS, Yr 3	Yes	84.58	105.40	20.17	18.44
	No	65.45	84.72	20.61	26.15
Holds job currently, Yr 1	Yes	85.44	106.49	19.21	18.69
	No	77.24	94.58	25.95	21.94
Work full time, Yr 1	Yes	91.50	101.43	19.84	19.53
	No	79.93	104.56	21.51	21.34
Work part time, Yr 1	Yes	81.97	110.40	19.79	17.08
	No	84.92	99.47	23.00	21.03

SD = Self-Determination

TABLE 4

Discriminant Function Analysis: Tests of Equality of Group Means, Summary of Canonical Discriminant Functions, and Function Structure Matrix

Variable	Test of Equality of Group Means		Canonical Discriminant Functions		Function Structure Matrix	
	IQ	SD	Wilk's Lambda	Chi-square	IQ	SD
Live: Yr 3	$F(1, 86) = 10.54,$ $p = .002$	$F(1, 86) = 6.29,$ $p = .014$	.858	13.06, $p = .001$	.859	.664
Live Other HS, Yr 1	$F(1, 74) = .571,$ $p = .002$	$F(1, 74) = .215,$ $p = .644$	.991	.690, $p = .708$	.901	.554
Live Other HS, Yr 3	$F(1, 92) = 8.15,$ $p = .005$	$F(1, 92) = 5.37,$ $p = .023$	.890	10.626, $p = .005$	.846	.687
Bank acct Yr 1	$F(1, 92) = 5.72,$ $p = .019$	$F(1, 92) = 8.29,$ $p = .005$	.886	10.99, $p = .004$	.696	.838
Job Training HS Yr 3	$F(1, 89) = .859,$ $p = .357$	$F(1, 89) = 8.57,$ $p = .004$	.912	10.99, $p = .004$	.316	.998
Held Job HS, Yr 3	$F(1, 91) = 8.68,$ $p = .004$	$F(1, 91) = 10.97,$ $p = .001$	.847	14.95, $p = .001$	.588	.701
Current job, Yr 1	$F(1, 92) = 2.94,$ $p = .091$	$F(1, 92) = 7.29,$ $p = .008$	.914	8.158, $p = .017$	.581	.918
Work full time, Yr 1	$F(1, 87) = 6.052,$ $p = .016$	$F(1, 87) = .451,$ $p = .504$	.917	7.424, $p = .024$	.878	-.240
Work part time, Yr 1	$F(1, 86) = .395,$ $p = .531$	$F(1, 86) = 6.7653,$ $p = .011$	.908	8.25, $p = .016$	-.212	.878

SD = Self-Determination

sis replicated findings for the sample as a whole from the chi-square analyses for the high and low groups configured based on the standard deviation split (e.g., Table 2) with the exception of one variable, living somewhere other than the student's high school home. Finally, the function structure matrix, providing within groups correlations of each predictor variable with the canonical variable and indicating which variable has the largest correlation with the canonical variable score, indicated that in 5 of the 9 variables, the self-determination score was the more useful variable in the discriminant function.

Discussion

These results replicate findings from our earlier study examining adult outcomes one-year after high school (Wehmeyer & Schwartz, 1997) and provide additional validation of importance of self-determination in lives of stu-

dents with disabilities. As reflected in Table 2, by one-year after high school, students in the high self-determination group were disproportionately likely to have moved from where they were living during high school, and by the third-year they were still disproportionately likely to live somewhere other than their high school home and were significantly more likely to live independently. As depicted in Figure 1 and Table 1, there were several indicators of financial independence, with students in the high self-determination group more likely to maintain a bank account by year 1. There were also significant changes in paying for their own groceries by year 3, as well as a trend toward greater financial independence across multiple indicators (Figure 1). This trend in financial independence is likely due to differences in employment status and training. Students in the high self-determination group were disproportionately likely to hold a job by the first-year follow-up, work-

ing either full- or part-time and to have held a job or received job training by year 3. Finally, for students across the complete sample who were employed, those scoring higher in self-determination made statistically significant advances in obtaining job benefits, including vacation and sick leave and health insurance, an outcome not shared by their peers in the low self-determination group. Overall, there was not a single question on which the low self-determination group fared more positively than the high self-determination group.

Although there were no statistically significant differences between the low and high self-determination groups on IQ scores, there was a difference of over 6 points between means of the groups that should be considered when interpreting these outcomes. To ensure that differences in outcomes between the groups were not just a function of cognitive ability, we conducted discriminant function analysis, as summarized in Tables 3 and 4 and in the Results section. These findings illustrate the complexity of untangling the impact of self-determination from other variables, particularly intelligence, but also support the fact that when considering how to promote positive outcomes, educators and others are well served to consider factors like self-determination in addition to intelligence testing information. The impact of intelligence on positive adult outcomes is, obviously, not orthogonal to the impact of self-determination, as intellectual capacity also contributes to one's capacity to become self-determined. However, our research suggests that students' opportunities to learn skills related to self-determination and to practice such skills are often limited by teacher beliefs about student capacity to become self-determined as a function of the severity of the student's intellectual capacity. Wehmeyer, Agran, and Hughes (2000) found that teachers working with students with severe cognitive disabilities were significantly less likely to use student-directed learning strategies, which teach students to self-regulate learning and behavior, than teachers working with students with mild disabilities, primarily because they did not believe that these students were capable of becoming more self-determined.

While there is no doubt that intellectual ability contributes to one's capacity to become

self-determined, our own work and that of others suggests that intelligence level, in and of itself, cannot account for differences in self-determination. Results from Wehmeyer and Schwartz (1997) were consistent with those in this study and there were no significant differences on IQ scores between low and high self-determination groups in that study. Wehmeyer and Bolding (1999) conducted a matched-samples study to examine the role of environmental settings on the self-determination of people with mental retardation *independent* of the contribution of level of intelligence. Two-hundred and seventy-three adults with mental retardation were recruited based on whether they worked or lived in one of three environments hypothesized to limit or promote self-determination; (1) community-based (e.g., independent living or competitive employment), (2) community-based congregate (e.g., group home or sheltered employment), and (3) non-community based congregate (e.g., institution, work activity program). Participants in each environmental group were matched with one other person in each other group based on IQ score (within 5 points), and, when possible, by age and gender. This resulted in 91 matched triplets, in which individuals differed *only* by the environment in which they lived or worked. Data analysis indicated significant differences in level of self-determination, autonomy, life satisfaction, and opportunities to make choices based on environment, with persons who lived or worked in non-congregate community-based settings having more adaptive levels on each measure (despite the fact that the groups were similar in mean age and mean IQ scores). Wehmeyer and Bolding (2001) also conducted a within-person study (thus controlling for IQ) of individuals with mental retardation who were moving from a more restrictive setting (group home, sheltered workshop) to a less restrictive setting (supported living or work). The self-determination of each person was measured 6 months (on the average) prior to and after his or her move and changes in self-determination scores as a function of the change in environments were looked at. There were significant increases in self-determination scores as a function of movement to environments that, presumably, supported more choice and autonomy.

Recently Stancliffe, Abery, and Smith (2000) reported findings from a study that examined the personal control exercised by 74 adults with mental retardation who lived in community-based settings. Using multiple measures of adaptive and challenging behavior, self-determination knowledge and competencies, and environmental variables, these authors found that personal characteristics (intelligence, adaptive behavior, challenging behaviors), self-determination skills, and environmental factors (residential size, type of funding stream, community living situation) all contributed to personal control. These and other findings suggest that while IQ is related to self-determination, other factors contribute significantly to this outcome. In all, these findings call for the need to look at multiple variables that go beyond intelligence test scores to examine successful outcomes for youth, including self-determination.

Another competing explanation for differences in adult outcomes was the school experiences of students. That is, it is possible that students in the high self-determination group received qualitatively different (i.e., better) educational services and supports than their peers in the low self-determination group and, as such, differences in adult outcomes could be attributed to educational experiences rather than self-determination. We find this explanation unlikely, given that data were collected from public school districts in seven states and that students from the same school districts were represented in both the high and low self-determination groups. In addition, our sample included both students with mental retardation and students with learning disabilities and students from two sub-samples. We did such to ensure that we could recruit a large enough sample to conduct research activities. We examined differences in students in the original (Wehmeyer & Schwartz, 1997) sample and students recruited strictly for this study, and there were no observable differences in variables, including IQ scores. As to including students from two disability categories, there was no theoretical reason that students in either disability category would not show benefits in adult outcomes from greater self-determination. In many cases these students were served in similar educational programs and, in some cases,

in the same classrooms. In fact, the impact of collapsing the outcomes for young adults with learning disabilities with those for young adults with mental retardation would, hypothetically, be to constrain the overall findings. That is, for a variety of reasons, it may be more likely that students with mental retardation would have less positive adult outcomes than their peers with learning disabilities, and thus collapsing outcomes limits the potential for differences based on self-determination status. While we recognize this, we believe it is important to look at outcomes related to self-determination across all students and in this case we believe that the experiences of students with learning disabilities and of students with mental retardation, particularly students with limited support needs, are similar enough to warrant examining those outcomes together. Nevertheless, there is a need to examine such outcomes for each disability category and to control more closely for differences that might have been introduced by using different sub-samples (primarily differential school and learning experiences and employment opportunities) in subsequent research.

There are other limitations inherent in this study, which are pertinent to most longitudinal investigations. All former students did not answer their own questions (Peraino, 1990), and the data-collection methods for follow-up surveys included both mail and telephone formats, rather than a consistent method for every survey. Halpern (1990) recommended personal and telephone interviews over mail surveys, but expenses and proximity of participants to research sites precluded obtaining the information exclusively through interviews. These limitations should be considered along with benefits of collecting longitudinal data.

Certainly self-determination status did not contribute to differences in all areas or on all items. However, in addition to statistically significant differences between groups and changes from first to third-year measurement periods, a general trend showed that students in the high self-determination group were achieving more successful outcomes. As mentioned previously, there was no question or item on which students in the low self-determination group fared better than the high group. In all, we believe that findings from

this study support ongoing efforts to enhance self-determination in relation to more positive transition outcomes. The next step in evaluating the impact of such efforts, in addition to replication of these findings, would be to examine longer term outcomes for students who receive specific interventions that promote self-determination, compared with students who do not receive similar learning experiences. Such an examination would provide the causal link between self-determination and positive outcomes missing from this study.

Implications for practice. Over the past decade there has been increasing awareness that promoting or enhancing self-determination is an important effort. This study provides further confirmation of this direction, emphasizing the potential benefit to students who leave school as self-determined young people. As described in the Introduction, there are now multiple resources to support teachers to promote self-determination (Field et al., 1998a; Wehmeyer et al, 1998; Wehmeyer, Palmer, et al., 2000). Moreover, it is the case that many state and local curricula for all students include standards and benchmarks pertaining to self-determination related skills (e.g., goal setting, decision making, problem solving, etc.), and instruction to promote self-determination can both enhance student access to the general curriculum and promote student capacity to progress in the curriculum (Wehmeyer, Lattin, & Agran, 2001).

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