Published in final edited form as:
Remedial Spec Educ. 2012 May 1; 33(3): 150–161. doi:10.1177/0741932510392053.

Examining Individual and Instruction-Related Predictors of the Self-Determination of Students with Disabilities: Multiple Regression Analyses

Youngsun Lee,
Inha University

Michael Wehmeyer,
University of Kansas

Susan Palmer,
University of Kansas

Kendra Williams-Diehm,
University of Oklahoma

Daniel Davies, and
AbleLink Technologies

Steven Stock
AbleLink Technologies

Abstract

This study examined individual and instructional predictors of the self-determination of students with disabilities, as measured by The Arc's Self-Determination Scale and the AIR Self-Determination Scale, Student version. The general findings indicated that instructional, knowledge and dispositional factors predicted students' self-determination over personal predictor variables. In particular, self-efficacy and outcome expectancy scores, student-directed transition planning instruction, and students' pre-intervention transition planning knowledge predicted higher students' self-determination.

Keywords

self-determination; self-efficacy; transition planning; predictors

Promoting the self-determination of youth with disabilities has become best practice in secondary and transition services, in part because research confirms that self-determination is related to more positive academic (Konrad, Fowler, Walker, Test, & Wood, 2007; Lee, Wehmeyer, Soukup, & Palmer, 2010) and transition or adult outcomes, including employment and independent living (Martorell, Gutierrez-Rechacha, Pereda, & Ayuso-

The contents of this report do not necessarily represent the policy of the Department of Education and endorsement by the Federal Government should not be assumed.

Mateos, 2008; Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997) and more positive quality of life and life satisfaction (Wehmeyer & Schwartz, 1998; Lachapelle et al., 2005; Miller & Chan, 2008; Nota, Ferrari, Soresi, & Wehmeyer, 2007; Shogren, Lopez, Wehmeyer, Little, & Pressgrove, 2006). To enable students with disabilities to be more self-sufficient and better able to manage their own lives, promoting self-determination skills must become a critical part of transition services (Wehmeyer, Abery, Mithaug, & Stancliffe, 2003)..

Factors Contributing to Self-Determination of Transition-aged Students with Disabilities

The functional theory of self-determination forwarded by Wehmeyer and colleagues (Wehmeyer, 1999; Wehmeyer et al., 2003)) suggests that individual *capacity*, as influenced by learning and development; *opportunity*, as influenced by environments and experiences; and *supports and accommodations* impact the emergence and development of self-determination. In other words, the development of self-determination is influenced by both personal characteristics (e.g., age, level of cognitive ability, temperament), as well as by external factors, including environment, opportunities, instructional experiences, and so forth.

Instructional factors

Several studies have determined the efficacy of curricula and instructional models to promote self-determination (Test, Karvonen, Wood, Browder, & Algozzine, 2000; Wehmeyer et al., 2003; Zhang, 2001). In a meta-analysis of single subject and group subject design studies, Algozzine, Browder, Karvonen, Test, and Wood (2001) found evidence for the efficacy of instruction to promote component elements of self-determined behavior, including interventions to promote self-advocacy, goal setting and attainment, self-awareness, problem-solving skills, and decision-making skills. Similarly, Cobb, Lehmann, Newman-Gonchar, and Alwell (2009) conducted a narrative metasynthesis—a narrative synthesis of multiple meta-analytic studies—identified seven existing meta-analyses examining self-determination and concluded that there is sufficient evidence to support the promotion of self-determination as effective

Besides studies focused on directly promoting self-determined behavior, there is research documenting the efficacy of efforts to promote student involvement in educational and transition planning (Martin, Van Dycke, Christensen, Greene, Gardner, & Lovett, 2006; Mason, Field, & Sawilowsky, 2004; Test, Mason, Hughes, Konrad, Neale, & Wood, 2004) on more positive transition and self-determination outcomes.

Intraindiviaual and environmental factors

Multiple studies have shown that individual and environmental factors impact a person's relative self-determination (Nota et al., 2007; Shogren et al., 2006; Wehmeyer, & Bolding, 1999, 2001). For example, Wehmeyer and Bolding (1999) found that people living or working in community-based, non-congregate settings were more self-determined, autonomous, had more choice opportunities, and were more satisfied than were IQ and age-

matched peers living or working in community-based congregate settings or non-community-based congregate setting. Stancliffe, Abery, and Smith (2000) found that self-determination and choice opportunities improved for people who moved out of an institution when compared with peers who did not.

With regard to personal characteristics, research shows there is a positive relationship between self-determination and IQ scores (Stancliffe et al., 2000; Wehmeyer, 2006), though Wehmeyer and Garner (2003) determined that IQ was not a significant predictor of self-determination status using regression analysis, while choice availability was the primary predictor. Research examining differences in self-determination by gender has been limited and the findings are mixed. Wehmeyer and Garner (2003) found no differences on overall self-determination scores by gender for people with disabilities, however, Nota et al. (2007) and Shogren Wehmeyer, Palmer, Soukup, Little, Garner et al. (2007) found that gender significantly impacted self-determination, though Nota and colleagues, with an Italian sample, found that males had higher self-determination scores and Shogren and colleagues, with an American sample, identifying females as having higher self-determination scores.

Purpose of Study

This study examined the contribution of intra-individual and external factors, including experiential and instructional factors and knowledge about transition, to student self-determination, and examined the contribution of these same factors to transition knowledge and skills. Specifically, the research examined the following research question:

> What intra-individual (age, gender, and IQ group), dispositional (self-efficacy/ outcome expectancy for transition planning), experiential and instructional (student-directed transition planning instruction, computer-based reading support program), and knowledge (understanding transition planning) factors best predict post-intervention self-determination and transition knowledge?

Method

Participants

Study participants were 168 junior high and middle school students receiving special education services. These students were recruited from 12 campuses in six school districts in the midwestern United States. All students in this study were additionally identified by school personnel as having difficulty reading and needing support to read independently. The characteristics of participating students are provided in Table 1.

Procedures

This study is a component of a longitudinal intervention study examining the effect of interventions to promote self-determination, including promoting student involvement in transition planning, and the impact of technology supports on involvement in transition planning. (Lee, Wehmeyer, Palmer, Williams-Diehm, Davies & Stock, in press). The analysis examined, via regression analysis, factors predicting self-determination, but because one such factor was whether the student did or did not receive technology supports

to promote their involvement with a student-directed transition planning process, a brief description of the procedures related to the intervention study reported by Lee et al. (in press) is necessary.

Teachers participated in a 1-hour meeting about the study, which included training about the *Whose Future Is It Anyway?* (WFA)(Wehmeyer et al., 2004) transition planning process, which was the intervention used to promote student involvement. At the end of the training, they were given consent forms to sign if they agreed to participate and, if so, were provided student consent forms to send to parents or guardians of students for whom they had instructional responsibilities who met the study criteria: 1) junior high and middle school student; 2) receiving special education services(e.g., intellectual disability, learning disability) who had reading difficulties.

When informed consent was obtained from each teacher and students' parent/guardiain, the researcher randomly assigned students to a technology or no technology group by school campus level. Teachers working with students in the technology group were provided additional teacher training about using *Rocket Reader*, a cognitively-accessible audio reader (see Lee et al., in press) and were provided digital versions of the WFA lessons for use with students. After baseline data collection, teachers were asked to implement instruction for 10 weeks, and received weekly support from the researchers via e-mail contacts.

Instrumentation and Data Collection

Baseline and post-intervention data collection was conducted using multiple measures of self-determination, self-efficacy/outcome expectancy for educational planning, and knowledge of transition planning, all described subsequently, and teachers were asked to fill out a demographic information form for each student.

Measuring self-determination—*The Arc's Self-Determination Scale* (SDS)(Wehmeyer & Kelchner, 1995) and the *AIR Self-Determination Scale-Student Form* (AIR)(Wolman, Campeau, DuBois, Mithaug, & Stolarski, 1994) were used to measure self-determination. The SDS is a student self-report measure of global self-determination consisting of a 72-item self-report scale that provides data on overall self-determination by measuring individual performance in the four *essential characteristics* (i.e., autonomy, self-regulation, psychological empowerment, and self-realization) of self-determination identified by Wehmeyer, Kelchner, and Richards (1996). On the scale, 148 points are available, and higher scores reflect higher levels of self-determination. *The Arc's Self-Determination Scale* was normed with 500 students with and without cognitive disabilities in rural, urban and suburban school districts in five states (Wehmeyer et al., 1996). The Scale's concurrent criterion-related validity was established by showing relationships between SDS and conceptually-related measures. The SDS had adequate construct validity, including factorial validity established by repeated factor analyses, and discriminative validity and internal consistency (Cronbach alpha = .90) (Wehmeyer, 1996). The SDS has been used to document the importance of self-determination for positive outcomes (Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1998) and student involvement in educational planning for youth with disabilities (Cross, Cooke, Wood, & Test, 1999; Sands et al., 1999; Zhang, 2001), and

has provided validation of interventions to promote self-determination (Wehmeyer et al., 2003).

The AIR (Wolman et al., 1994), examines individual capacity for and opportunity to practice self-determination. The AIR has three Capacity sections, including *Ability, Knowledge, and Perceptions* and two Opportunity sections, including *Opportunity at School* and *Opportunity at Home.* Within each section are two items that focus on *Thinking*, two on *Doing*, and two on *Adjusting*. Specifically, the AIR Student form (AIR-S) was used to measure self-determination in this study. The AIR-S has 24 questions and yields capacity and opportunity subscale scores. The capacity subscale consists of questions pertaining to things students do related to self-determination ("Things I Do" subscale) and how students feel about performing these self-determined behaviors ("How I Feel" subscale). The opportunity subscale has questions regarding students' perceptions of opportunities to perform self-determined behaviors at home and at school, on a scale of 1 (*Never)* to 5 (*Always)*. Total score of the AIR-S was used in this study.

Measuring transition planning knowledge—To measure transition planning knowledge, the *Whose Future Is It Anyway-Knowledge Test* (Wehmeyer & Lawrence, 1995), a criterion-referenced assessment of knowledge presented in the WFA process, was administered before and after instruction. The assessment contains a total of 28 questions, with students asked to select one best answer from four possible answer options for each question. Questions were taken directly from lessons in the WFA process. Students are awarded one point if they select the correct answer and no points if they do not. For the purpose of the study, only questions pertaining to the lessons implemented were included, resulting in 20 items.

Measuring self-efficacy for educational planning—Self-efficacy refers to the "conviction that one can successfully execute the behavior required to produce a given outcome" (Bandura, 1977, p. 193) and outcome expectations refer to a person's belief that if a specific behavior is performed, it will lead to the anticipated outcome. To measure the degree to which students believed (a) they could perform the behaviors they needed to successfully participate in their transition planning meeting; and (b) that if they did perform these behaviors, the desired outcome would result (e.g., they would be allowed to participate in the meeting), students completed a 20-item questionnaire constructed by Wehmeyer and Lawrence (1995). The first ten items on the questionnaire ask students about their beliefs in their ability to participate in an IEP meeting (purpose of IEP meeting, knowledge of rights, roles of IEP team members, how to communicate preferences, etc.). The second set of 10 questions focuses on anticipated outcomes (e.g., If you participate in your IEP meeting, will that affect the transition goals chosen? If you speak up, will your rights at the IEP meeting be respected?). Wehmeyer and Lawrence (1995) found that the questionnaire scores were positively and significantly correlated ($r = .36$, $p = .008$) with other measures of self-efficacy.

Demographic Information

All teachers participating in this study were asked to complete a demographic information form that included basic information about each student, such as date of birth, gender, race/ethnicity, and disability category under which the student received special education services. This form also included questions pertaining to the student's typical educational setting, inclusion level, estimated level of intelligence, reading level, computer use skills, and classroom learning behaviors. Teachers were asked to provide information about how many hours each day the student typically spent with his or her non-disabled peers.

Data Analysis

A power analysis was conducted to examine how many subjects would be needed under multiple regression analysis to achieve a power of .80. Based on previous research with the WFA (Wehmeyer & Lawrence, 1995), the effect size (Lipsey & Wilson, 2001) of intervening with the WFA was estimated (a) as measured by the WFA *Knowledge Test* (Cohen's d = .43), (b) the *Self-Efficacy assessment* (Cohen's d=.50), and the *Outcome Expectancy assessment* (Cohen's d=.36). These effect sizes indicate that the WFA has a small to moderate impact (WFA *Knowledge Test* and *Outcome Expectancy*) or a moderate impact (*Self-Efficacy*). As a result of these individual analyses, a value of .40 (Cohen's d) was selected for use in the power analysis to ensure that adequate power would be achieved. Factoring in that eight indicators would be used in the model (see Table 3), the total number of participants without the consideration of any grouping was calculated, and 100 participants were estimated as being required.

Missing data—There was a small amount of missing data on several variables. The mean percentage of missing data across the variables in the data set was 0.60% (range 0 to 1%). The EM imputation algorithm using the Missing Value Analysis procedure within SPSS program was used to impute the missing data (Acock, 2005), to preserve important characteristics of our data set and avoid the deleterious effects of not including all available data in the analysis process.

Analytical procedures—To investigate what variables best predicted students' self-determination, multiple regression analyses were conducted. The general purpose of multiple regression is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable (Tabachnick & Fidell, 2001). As articulated in the research question, with self-determination as the dependent variable and eight personal, instructional, knowledge, and dispositional variables as predictor variables, standard multiple regression analyses were performed. A standard multiple regression analysis was also conducted with transition planning knowledge as the dependent variable and nine predictors. All analyses utilized the SPSS Regression program. Table 3 shows each dependent variable and predictors used for analyzing data in this study and how each variable was measured.

Results

Standard multiple regression analyses were performed with post intervention self-determination scores as the dependent variable and personal, instructional, dispositional, and knowledge variables as predictor variables. The dependent variable was a self-determination score, and the predictors were the eight intra-individual, instructional, knowledge, and dispositional variables, including age, gender, approximate IQ group, technology intervention group, the average numbers of completed WFA chapters, pre-intervention test score on *Self-Efficacy and Outcome Expectancy for Educational Planning*, and pre-intervention test score on WFA *Knowledge test* (see Table 3). Separate regression analyses were conducted for each measure of self-determination. Prior to analysis, variables were examined through various SPSS programs for missing data (see above) and fit between their distributions and the assumptions of multivariate analysis. No cases were identified through Mahalanobis distance as multivariate outliers with $p < .001$. Therefore, 168 cases were used for analysis.

Predictors of self-determination measured by The Arc's Self-Determination Scale

Table 4 displays zero-order correlations between each predictor and dependent variable for the analysis with the SDS as the predictor variable, including the unstandardized regression coefficients (*B*), the standardized regression coefficients (β), the semipartial correlations (sr_i^2) and R^2, and adjusted R^2. R for regression was significantly different from zero, F (8, 159) = 9.458, $p < .001$. That is, the linear combination of predictors was significantly related to post-intervention self-determination (a positive relation). For two regression coefficients, the self-efficacy score and WFA *Knowledge Test* score, that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for self-efficacy were 0.2 to 1.366, and those for students' knowledge of transition planning process were .035 to .415. For one regression coefficient, average numbers of WFA chapters completed by students, which marginally differed from zero, 90% confidence limits were calculated. That is, students' self-efficacy and previous knowledge of transition planning meetings and their process significantly predicted post-intervention self-determination, and self-efficacy was the best predictor of self-determination among all factors. Further, how many WFA chapters students completed predicted students' post-intervention self-determination. No other variables, including age, IQ group, gender, outcome expectancy, and technology use predicted post-intervention self-determination.

Only two of the predictive variables contributed significantly to prediction of students' self-determination; self-efficacy ($sr^2 = .043$) and knowledge of transition planning ($sr^2 = .023$). The eight factors in combination contributed another .25 (32% − 4.3% + 2.3%) in shared variability. Altogether, 32% (29% adjusted) of the variability in self-determination was predicted by the variability in these eight predictive variables.

Self-determination measured by AIR Self-Determination Scale

Table 5 displays the zero-order correlations between each predictor and dependent variable with the AIR-S as the dependent variable, including the unstandardized regression coefficients (*B*), the standardized regression coefficients (β), the semipartial correlations

(sr_i^2) and R^2, and adjusted R^2. R for regression was significantly different from zero, F (8, 159) = 8.775, $p < .001$. That is, the linear combination of predictors was significantly related to students' post-intervention self-determination measured by the AIR-S (a positive relation). For the two regression coefficients, outcome expectancy and self-efficacy score, that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for outcome expectancy were 0.23 to 1.171, and those for self-efficacy were 0.223 to 1.366. That is, students' self-efficacy and outcome expectancy could significantly predict post-intervention self-determination and outcome expectancy is the best predictor of self-determination among all predictors. Only two of all the factors contributed significantly to prediction of student's self-determination; outcome expectancy (sr^2 = 0.033) and self-efficacy (sr^2 = 0.019), however, another six factors did not predict uniquely contribute to prediction of students' self-determination. The eight factors in combination contributed another .25 in shared variability. Altogether, 30% (27% adjusted) of the variability in self-determination was predicted by variability in these eight factors.

Students' understanding of transition planning

To determine what factors predicted post-intervention knowledge of transition planning, a standard multiple regression was performed using students' post-intervention understanding of transition planning as the dependent variable and intra-individual, instructional, and dispositional factors as predictor variables. For this analysis, the same intra-individual, instructional, and dispositional factors were used, except the WFA Knowledge test was removed because of the link between this assessment and the intervention used (WFA), plus scores from the two self-determination measures were added, resulting in nine predictor variables (see Table 3).

Table 6 displays the zero-order correlations between each predictor and dependent variable, the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations (sr_i^2) and R^2, and adjusted R^2. Based on R for regression, the linear combination of 9 predictors was significantly related to students' knowledge of transition planning after student-directed transition planning instruction, F (9, 158) = 8.26, $p < .001$. For the two regression coefficients, approximate IQ group and numbers of WFA chapters students completed, that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for students' approximate IQ group was 4.354 to 10.706 and those for numbers of WFA chapters students completed were −.010 to 1.861. For one regression coefficient, students' pre-intervention self-determination score measured by the SDS, which marginally differed from zero, 90% confidence limits were calculated. That is, students' IQ group and numbers of completed WFA chapters statistically significantly predict post-intervention transition planning knowledge. Moreover, students' self-determination scores, obtained prior to the student-directed transition planning instruction could possibly predict students' post-intervention transition planning knowledge. Only two of the independent variables contributed significantly to prediction of students' post-intervention transition planning knowledge, IQ group (sr^2 = .093) and numbers of completed WFA chapters (sr^2 = .016). However, another seven factors did not uniquely contribute to prediction of students' post intervention transition planning knowledge.

Altogether, 32% (28% adjusted) of the variability in post-intervention transition planning knowledge was predicted by knowing values of these nine factors.

Discussion

Given the emphasis on promoting the self-determination of transition-age students with disabilities as a means to improve school and post-school outcomes, it is important to investigate and understand the relationship among self-determination and students' intra-individual, environmental, and instructional factors. The purpose of this study was to examine the contribution of student and contextual factors, including personal, experiential and instructional factors, and knowledge and dispositional variables to students' self-reported levels of self-determination on two measures of self-determination and to examine the contribution of the same factors to post-intervention transition knowledge and skills measured by a criterion-referenced assessment of knowledge presented in the WFA process.

Limitations of the Study

Before discussing our research findings, it is important to note the limitations of the study. First, the length of time during which the WFA Intervention was implemented was not long enough to examine the potential impact of such instruction as a predictive variable. Second, due to the specific instructional support (e.g., computer-based reading support program) provided in this study, students with learning disabilities were dominant in the sample. These should be considered as interpreting the results from this study.

Predictors of Self-Determination

Findings showed that instructional, knowledge, and dispositional or belief factors predicted students' self-determination over personal predictor variables, such as age, gender, and IQ level. The multiple regression analysis examining contributors to the SDS scores found that of the eight predictor variables, three variables, including self-efficacy scores, student-directed transition planning instruction using *Whose Future Is It Anyway?* lessons, and students' pre-intervention transition planning knowledge, predicted higher self-determination scores. Moreover, the other multiple regression analysis examining contributors to the SDS score found that only two dispositional variables, including self-efficacy and outcome-expectancy predicted students' post-intervention self-determination score.

The result of each multiple regression analysis indicated that self-efficacy (SDS) and outcome expectancy (AIR-S) were the best predictors of students' self-determination. Self-efficacy was the only predictor variable that significantly predicted high self-determination scores on both measures of self-determination. A potential explanation as to why these factors best predict self-determination after transition planning instruction. The results also found that students' transition knowledge and skills predicted students' post-intervention SDS score. This finding parallels several studies focusing on the transition planning process as a means to both teach and generalize skills related to self-determination and students' participation in transition planning (Test et al., 2004). Given that there is now evidence that such instruction to promote student involvement can lead to enhanced transition knowledge

and skills (Cross et al., 1999; Wehmeyer & Lawrence, 1995; Zhang, 2001), these findings suggest that the benefit is reciprocal; that is, by promoting student involvement we can enhance self-determination and by promoting self-determination we can promote student involvement.

We found that no personal variables (e.g., age, gender, IQ group) predicted students' post-intervention self-determination. The relationships between self-determination and age and between self-determination and IQ were not significant and did not contribute to the regression equation after considering all other variables. However, the correlations between gender and the SDS score (r = .153), and between gender and the AIR-S score (r = .183), were consistent with correlations between self-determination and gender in other studies, including Shogren et al. (2007), which indicated that women showed a higher degree of self-determination. Moreover, an additional multiple regression analysis with SDS scores as a dependent variable and only personal factors as predictor variables was conducted to examine only personal factors. R for regression was significantly different from zero, F (3, 164) = 2.69, $p < .05$. That is, the linear combination of personal predictors was significantly related to post-intervention self-determination. For the only one regression coefficient, gender, that differed significantly from zero 95% confidence limits were calculated; that is, female students more likely get higher the SDS score. However, the regression equation with the AIR-R score was not significant (R^2 = .041, F (3, 164) = 2.35, $p > .05$).

Measuring different aspects of self-determination—As mentioned, the finding that self-efficacy and outcome expectancy predicted students' level of self-determination on the AIR-S as well as the SDS, but transition planning knowledge and transition planning instruction predicted self-determination only on the SDS. A previous study indicated that there are differences in the aspects of self-determination measured on the SDS and the AIR scales (Shogren, Wehmeyer, Palmer, Soukup, Little, Garner et al., 2008), and the current study and the Shogren et al. study suggest that each is measuring a different and, perhaps, unique aspects of the self-determination construct. Shogren, Wehmeyer, and colleagues suggested that the skills and capacity being assessed by the SDS is *uncovering skills* which could be more influenced by level of intelligence, and as a result the SDS is possibly more sensitive to detecting differences in intra-individual characteristics than the AIR-S. That transition planning knowledge, which has been shown to be closely related to self-determination, and the specific instruction promoting this knowledge were predictive of students' self-determination when being assessed by the SDS and not the AIR-S could be explained by the suggestions from Shogren et al., that different aspects of self-determination are being assessed by these two measures.

Predictors of Transition Planning Knowledge

Findings showed that students' estimated IQ group, number of student-directed transition planning instruction lessons completed, and students' level of self-determination as measured by the SDS were significant predictors of students' transition planning knowledge. The analysis indicated what would seem logical, that students who completed more lessons from the WFA curriculum, were more likely to get higher scores on the transition planning

knowledge test, which, if nothing else, serves as a means of construct validity for the curriculum itself.

Self-determination promoting transition planning knowledge—In addition, the analysis examining contributors to transition planning knowledge indicated that students with higher self-determination score as assessed by SDS were more likely to have higher transition planning knowledge test scores. This confirmed a previous study providing evidence of the importance of self-determination to the transition planning process for students with intellectual and developmental disabilities (Wehmeyer et al., 2007). Moreover, student self-determination contributes to a student's knowledge and skills about transition planning which are critical to successful student involvement, as discussed previously. At the same time, student involvement could be improved by promoting student's self-determination (Wehmeyer et al., 2003).

We also found that students in the estimated higher IQ group were more likely to have higher transition planning knowledge test scores after receiving transition planning instruction. As previous studies found, there is a significant relationship between IQ scores and self-determination. Moreover, there was a statistically significant correlation between IQ and self-determination (r = .133) and it is consistent with other research studies. Also consistent with other studies, the strength of that correlation (.13) has limited practical significance, supporting the findings from Wehmeyer and Garner (2003) that while IQ status predicts self-determination status, it is not the most important factor in high self-determination.

The analysis examining contributors to transition knowledge scores found that neither self-efficacy nor outcome expectancy predicted transition knowledge score. Statistically significant correlations between self-efficacy and student's transition planning knowledge (r = .370) and that between outcome expectancy and student's transition planning knowledge (r = 349), however, were found. This result implies that self-efficacy and outcome expectancy, which is one aspect of self-determination capacity, should be considered as implementing instructions to enhance students' understanding transition planning process, and that could be strongly influential to students' active participation in transition planning and planning meeting.

In general, the study replicated findings pertaining to the relative contribution of intelligence to self-determination, added information about the potential contribution of self-efficacy and outcome expectancy, and pointed to the potential important role of relevant instructions promoting self-determination and transition planning knowledge, which possibly impact critical components of adult outcomes.

Implications for Future Research

The findings of this study have implications for future research and practice. As discussed, self-determination promotes transition planning knowledge and vice versa. Moreover, these skills and capacity are closely related to critical components of successful transition to adulthood, such as students' actively participating in transition planning meetings. As such, research identifying or examining effective strategies to promote self-determination as

considering its reciprocal relationships, is needed. Additionally, regarding significant relationships between self-efficacy and outcome expectancy, and self-determination, research promoting self-efficacy and outcome expectancy, especially for transition planning meetings, which impacts or is influenced by students' level of self-determination as well as transition planning knowledge, are also needed.

Acknowledgments

Funding for this research was provided by Grant PR Award# H133A031727 from the U.S. Department of Education, National Institute on Disability and Rehabilitation; and Grant PR Award# R324B070159 from the U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research.

References

Acock AC. Working with missing values. Journal of Marriage and Family. 2005; 67:1012–1028.

Algozzine B, Browder D, Karvonen M, Test DW, Wood WM. Effects of interventions to promote self-determination for individuals with disabilities. Review of Educational Research. 2001; 71:219–277.

Bandura, A. Social learning theory. Englewood Cliffs, NJ: Prentice Hall; 1977.

Cobb B, Lehmann J, Newman-Gonchar R, Morgen A. Self-determination for students with disabilities: A narrative metasynthesis. Career Development for Exceptional Individuals. 2009; 32(2):108–114.

Cross T, Cooke NL, Wood WW, Test DW. Comparison of the effects of MAPS and ChoiceMaker on student self-determination skills. Education and Training in Mental Retardation and Developmental Disabilities. 1999; 34:499–510.

Field, S.; Hoffman, A.; Swailowsky, S. Student involvement in transition planning: A proposal submitted to the US Department of Education. Detroit, MI: Wayne State University; 1994.

Konrad M, Fowler CH, Walker AR, Test DW, Wood WM. Effects of self-determination interventions on the academic skills of students with learning disabilities. Learning Disabilities Quarterly. 2007; 30(2):89–113.

Lachapelle Y, Wehmeyer ML, Haelewyck MC, Courbois Y, Keith KD, Schalock R, Verdugo MA, Walsh PN. The relationship between quality of life and self-determination : An international study. Journal of Intellectual Disability Research. 2005; 49:740–744. [PubMed: 16162119]

Lee SH, Wehmeyer ML, Soukup JH, Palmer SB. Impact of curriculum modifications on access to the general education curriculum for students with disabilities. Exceptional Children. 2010; 76(2):213–233.

Martorell A, Gutierrez-Recacha P, Perda A, Ayuso-Mateos JL. Identification of personal factors that determine work outcome for adults with intellectual disability. Journal of Intellectual Disability Research. 2008; 52(12):1091–1101. [PubMed: 18557967]

Martin JE, Van Dycke JL, Christensen WR, Greene BA, Gardner JE, Lovett DL. Increasing student participation in IEP meetings; Establishing the Self-Directed IEP as an evidenced-based practice. Exceptional Children. 2006; 72(3):299–316.

Mason C, Field S, Swailowsky S. Implementation of self-determination activities and student participation in IEPs. Exceptional Children. 2004; 70:441–451.

Miller SM, Chan F. Predictors of life satisfaction in individuals with intellectual disabilities. Journal of Intellectual Disability Research. 2008; 52(12):1039–1047. [PubMed: 18671809]

Nota L, Ferrari L, Soresi S, Wehmeyer ML. Self-determination, social abilities and the quality of life of people with intellectual disability. Journal of Intellectual Disability Research. 2007; 51:1–16.

Sands D, Spencer K, Gliner J, Swaim R. Structural equation modeling of student involvement in transition-related actions: The path of least resistance. Focus on Autism and Other Developmental Disabilities. 1999; 14:17–27.

Shogren KA, Lopez SJ, Wehmeyer ML, Little TD, Pressgrove CL. The role of positive psychology constructs in predicting life satisfaction in adolescents with and without cognitive disabilities: An exploratory study. Journal of Positive Psychology. 2006; 1:37–52.

Shogren KA, Wehmeyer ML, Palmer SB, Soukup JH, Little TD, Garner N, Lawrence M. Examining individual and ecological predictors of the self-determination of students with disabilities. Exceptional Children. 2007; 73:488–509.

Shogren KA, Wehmeyer ML, Palmer SB, Soukup JH, Little T, Garner N, Lawrence M. Measuring self-determination: Examining the relationship between The Arc's Self-Determination Scale and the AIR Self-Determination Scale. Assessment for Effective Intervention. 2008; 33(2):94–107.

Stancliffe RJ, Avery BH, Smith J. Personal control and the ecology of community living settings: Beyond living-unit size and type. Mental Retardation. 2000; 105:431–454.

Tabachnick, BG.; Fidell, LS. Using multivariate statistics. 4. Boston, MA: Allyn and Bacon; 2001.

Test DW, Karvonen M, Wood WM, Browder D, Algozzine B. Choosing a self-determination curriculum: Plan for the future. Teaching Exceptional Children. 2000; 33:48–54.

Test DW, Mason C, Hughes C, Konrad M, Neale M, Wood WM. Student involvement in individualized education program meetings. Exceptional Children. 2004; 70(4):391–412.

Wehmeyer ML. A self-report measure of self-determination for adolescents with cognitive disabilities. Education and Training in Mental Retardation and Developmental Disabilities. 1996; 31:282–293.

Wehmeyer ML. A functional model of self-determination: Describing development and implementing instruction. Focus on Autism and Other Developmental Disabilities. 1999; 14:53–61.

Wehmeyer, ML. Self-determination and transition. In: Wehman, P., editor. Life beyond the classroom: Transition strategies for young people with disabilities. 3. Baltimore: Paul H. Brookes Publishers; 2001. p. 35-60.

Wehmeyer, ML.; Abery, B.; Mithaug, DE.; Stancliffe, RJ. Theory in Self-Determination: Foundations for Educational Practice. Springfield, IL: Charles C Thomas Publisher, LTD; 2003.

Wehmeyer ML, Bolding N. Self-determination across living and working environments: A matched-samples study of adults with mental retardation. Mental Retardation. 1999; 37:353–363. [PubMed: 10581921]

Wehmeyer ML, Bolding N. Enhanced self-determination of adults with intellectual disabilities as an outcome of moving to community-based work or living environments. Journal of Intellectual Disabilities Research. 2001; 45:371–383.

Wehmeyer ML, Garner NW. The impact of personal characteristics of people with intellectual and developmental disability on self-determination and autonomous functioning. Journal of Applied Research in Intellectual Disabilities. 2003; 16:255–265.

Wehmeyer, ML.; Kelchner, K. The Arc's self-determination scale. Silver Springs, MD: The Arc of the United States; 1995.

Wehmeyer ML, Kelchner K, Richards S. Essential characteristics of self-determined behaviors of adults with mental retardation and developmental disabilities. American Journal on Mental Retardation. 1996; 100:632–642. [PubMed: 8735576]

Wehmeyer ML, Lawrence M. Whose future is it anyway? Promoting student involvement in transition planning. Career Development for Exceptional Individuals. 1995; 18:69–83.

Wehmeyer, ML.; Lawrence, M.; Kelchner, K.; Palmer, SB.; Garner, NW.; Soukup, J. Whose Future Is It Anyway? A student-directed transition planning process. 2. Lawrence, KS: Beach Center on Disabilities; 2004.

Wehmeyer ML, Palmer SB. Adult outcomes from students with cognitive disabilities three years after high school: The impact of self-determination. Education and Training in Developmental Disabilities. 2003; 38:131–144.

Wehmeyer ML, Palmer S, Soukup JH, Garner N, Lawrence M. Self-determination and student transition-planning knowledge and skills: Predicting involvement. Exceptionality. 2007; 15:31–44.

Wehmeyer ML, Schwartz M. Self-determination and positive adult outcomes: A follow up study of youth with mental retardation or learning disabilities. Exceptional Children. 1997; 63:245–255.

Wehmeyer ML, Schwartz M. The relationship between self-determination and quality of life for adults with mental retardation. Education and Training in Mental Retardation and Developmental Disabilities. 1998; 33:3–12.

Wolman, J.; Campeau, P.; Dubois, P.; Mithaug, D.; Stolarski, V. AIR self-determination scale and user guide. Palo Alto, CA: American Institute for Research; 1994.

Zhang D. The effect of Next S.T.E.P. instruction on the self-determination skills of high school students with learning disabilities. Career Development for Exceptional Individuals. 2001; 24:121–132.

Table 1

Demographic Description of Participating Students

	n	(%)
Gender		
Female	44	(26.2)
Male	124	(73.8)
Age	13.60 (SD = .84)	
Disability		
ADD/ADHD	14	(8.3)
ED or BD	18	(10.7)
MR	23	(13.7)
Speech	15	(8.9)
OHI	13	(7.7)
Autism	7	(4.2)
LD	78	(46.4)
IQ Level		
IQ within normal limit (70 and above)	137	(81.5)
Mild MR (60–69)	19	(11.3)
Moderate MR (45–60)	10	(6.0)
Severe/Profound (44 or below)	2	(1.2)
Receiving Technology Support		
Yes	86	(51.2)
No	82	(48.8)

Note. ADD/ADHD = Attention Deficit Disorder/Attention Deficit and Hyperactivity Disorder; ED or BD = Emotional Disorders or Behavioral Disorders, MR = Mental Retardation; Speech = Speech Disorder, OHI = Other Health Impairment; LD = Learning Disability.

Table 2

Descriptive Information of Intervention Groups

Intervention Groups	Technology Group	Non-Technology Group
N	86 students	82 students
Average age	▪ 13.89 (*SD* = .78)	▪ 13.29 (*SD* = .78)
Gender	▪ 20 females / 66 males	▪24 females / 58 males
IQ groups	▪58 within normal limit (70 and above); 18 mild MR; 8 moderate MR; and 2 severe/profound MR	▪79 IQ within normal limit (70 and above); 1 mild MR; and 2 moderate MR
N (teachers)	14 teachers	11 teachers
Average age	▪44.08 (*SD* = 6.54)	▪41.10 (*SD* = 9.41)
# of teaching yr	▪14.43 (*SD* = 8.99)	▪16.09 (*SD* = 5.94)
Received instructions and material	▪Student-directed transition planning instruction using the *Whose Future Is It Anyway?* lessons	▪Student-directed transition planning instruction using the *Whose Future Is It Anyway?* lessons
	- Student's book/ Teacher's notebook	- Student's book/ Teacher's notebook
	▪*Rocket Reader*, a computer-based reading support	
	- *Rocket Reader* software	
	- *Whose Future Is It Anyway?* – Tech binder (Student's & Teacher's)	

Table 3

All Dependent Variables and Predictors Used for Data Analyses

Variables		Measures
DV	▪ Self-Determination	Post-intervention test scores on *The Arc's Self-Determination Scale* and the *AIR Self-Determination Scale*
	□ Transition planning knowledge	Post-intervention test scores on *Whose Future Is It Anyway? knowledge* test
Predictors: Personal variables	▪□ Age	Reported by teacher
	▪□ Gender	Reported by teacher
	▪□ Approximate IQ group	Reported by teacher
Predictors: Instructional variables	▪□ Rocket Reader intervention group	Group Assignment (control or Experimental group)
	▪□ # of Whose Future Is It Anyway? chapters completed by students	Reported by teacher and/or students using Teacher's/ Student's Quick Survey
Predictors: Dispositional variables	▪□ Self-efficacy	Pre-intervention test score on *Self- Efficacy and Outcome Expectancy for Educational Planning*
	▪□ Outcome expectancy	
	□ 2 Self-determination scores	Pre-intervention test scores on *The Arc's Self-Determination Scale* and the *AIR Self-Determination Scale*
Predictor: Knowledge variable	▪ Knowledge of transition planning	Pre-intervention test score on *Whose Future Is It Anyway?* Knowledge test

Note.

▪ Variables used in multiple regression analysis with self-determination as a dependent variable;

□ Variables used in multiple regression analysis with transition planning knowledge as a dependent variable

Table 4

Standard Multiple Regression of Personal, Experiential/Instructional, Dispositional, and Knowledge Variables on Student's Self-Determination (SDS)

Variables	Zero-Order Correlation between each predictors and Arc's SD (*p*)	*B*	B	sr^2 (unique)
Age	.089 (.127)	1.724	.069	.004
Gender	.153** (.024)	2.597	.055	.003
Approximate IQ group	.085 (.136)	−.155	−.005	.000
Self-Efficacy	.513*** (.000)	1.101***	.331	.043
Outcome-Expectancy	.452*** (.000)	.441	.130	.007
# Completed WF chapter	.212*** (.003)	1.255*	.122	.014
RR Intervention	−.091 (.121)	−.134	−.003	.000
WF knowledge test	.306*** (.000)	.225**	.172	.023
				R^2 = .32[a]
				Adjusted R^2 = .29
				R = .57***

Note. Dependent Variable: *the Arc's Self-Determination Scale* score; RR: Rocket Reader; WF: *Whose Future Is It Anyway?;* Gender: 1- Male, 2 - Female; RR intervention: 1- No, 2 – Yes.

* p <.10,

** p<.05,

*** p<.01

[a] Unique variability = .07; shared variability = .25.

Table 5

Standard Multiple Regression of Personal, Experiential/Instructional, Dispositional, and Knowledge Variables on Student's Self-Determination (AIR)

Variables	Zero-Order Correlation between each predictors and AIR SD (*p*)	*B*	B	sr^2 (unique)
Age	.082 (.144)	.894	.043	.002
Gender	.183** (.009)	3.819	.097	.009
Approximate IQ group	.001 (.492)	1.643	.059	.003
Self-Efficacy	.490 (.000)	.597*	.216	.019
Outcome-Expectancy	.492** (.000)	.795**	.283	.033
# Completed WF chapter	.171* (.013)	.710	.083	.006
RR Intervention	−.049 (.264)	.086	.002	.000004
WF knowledge test	.233** (.001)	.121	.111	.010
				R^2 = .31[a]
				Adjusted R^2 = .27
				R = .55**

Note. Dependent Variable: *the Arc's Self-Determination Scale* score; RR: Rocket Reader; WF: *Whose Future Is It Anyway?;* Gender: 1- Male, 2 - Female; RR intervention: 1- No, 2 – Yes.

* p <.05,

** p<.01

[a] Unique variability = .06; shared variability = .25.

Table 6

Standard Multiple Regression of Personal, Experiential/Instructional, Dispositional, and Knowledge Variables on Student's Transition Planning Knowledge

Predictors	Zero-Order Correlation between each predictors and DV (*p*)	*B*	β	sr^2 (unique)
Age	−.105* (.087)	−.595	−.036	.001
Gender	.067 (.194)	1.262	.040	.001
Approximate IQ group	.401*** (.000)	7.575***	.337	.093
Self-Efficacy	.370*** (.000)	.302	.135	.006
Outcome-Expectancy	.349*** (.000)	.362	.159	.010
# Completed WF chapter	.227*** (.002)	.921**	.134	.016
RR Intervention	−.199*** (.005)	−.115	−.004	.00002
AIR SD	.162** (.018)	−.053	−.065	.002
ARC's SD	.348*** (.000)	.105*	.150	.013
				R^2 = .32[a]
				Adjusted R^2 = .28
				R = .57***

Note. Dependent Variable: *the Arc's Self-Determination Scale* score; RR: Rocket Reader; WF: *Whose Future Is It Anyway?;* Gender: 1- Male, 2 - Female; RR intervention: 1- No, 2 – Yes.

* p <.10,

** p<.05,

*** p<.01

[a] Unique variability = .07; shared variability = .25.