

Quality Learning Experiences, Self-Determination, and Academic Success: A Path Analytic Study Among Youth With Disabilities

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V. Scott Solberg¹, Kimberly Howard¹, Stephen Gresham², and Erik Carter³

Abstract

Although fostering self-determination has emerged as a central element of recommended and evidence-based transition practices for adolescents with disabilities, few studies have examined the paths through which students develop the skills and dispositions that can enhance their self-determination and successful transitions. The authors used path analyses to examine the ways in which exposure to quality secondary learning environments contributed to the development of self-efficacy, motivation, and academic achievement among 135 high school students receiving special education services. Students with disabilities who reported having greater involvement in learning environments reflecting recommended transition practices (i.e., high-quality learning environments) demonstrated increased career-search self-efficacy. Students with greater career-search self-efficacy were more highly engaged in goal setting, which further predicted their motivation to attend school and academic self-efficacy. Finally, students with higher academic self-efficacy were found to have higher grades. The authors offer recommendations for enhancing the self-determination skills and opportunities of youth with disabilities by strengthening the quality and impact of transition education.

Keywords

career and vocational, high school, high incidence, self-determination, student focused

Since the transition mandates were first introduced into the Individuals With Disabilities Education Improvement Act (IDEA) in 1990, numerous research, policy, and advocacy efforts have been directed toward establishing a compelling set of services and supports to equip youth with disabilities to transition successfully to life after high school. Driven, in part, by early follow-up studies documenting the pervasiveness of dismal postschool outcomes for youth with disabilities (e.g., Blackorby & Wagner, 1996; Hasazi, Gordon, & Roe, 1985), this burgeoning interest has coalesced into a set of evidence-based practices (Alwell & Cobb, 2006; Test, Fowler, et al., 2009) and predictors (Test, Mazzotti, et al., 2009) that hold considerable promise for improving the outcomes of youth with disabilities.

Although the field is identifying what serves and supports may be used to design meaningful transition programs, the paths through which access to programs reflecting these recommended components enables youth to develop key assets and capacities have received less attention. Research exploring the extent to which students' involvement in high-quality learning environments shapes their acquisition of essential skills and dispositions could provide important

insights into the critical role that context plays in shaping students' preparation for adulthood and outcomes (Shogren et al., 2007). Path analysis—which explores patterns of associations among multiple variables—is an ideal approach for examining the relationships among learning context, skill development, and student outcomes.

One set of skills and dispositions known to have particular importance for youth with and without disabilities falls under the construct of self-determination (Test, Mazzotti, et al., 2009). Although numerous definitions and dimensions of self-determination have been put forward (e.g., Deci & Ryan, 1985; Solberg et al., 1998; Wehmeyer, 2005; Wehmeyer, Abery, Mithaug, & Stancliffe, 2003), self-determination can be broadly described as having the skills, attitudes,

¹Boston University School of Education, MA, USA

²University of Wisconsin, Madison, USA

³Vanderbilt University, Nashville, TN, USA

Corresponding Author:

V. Scott Solberg, Boston University School of Education, Two Silber Way,
Boston, MA 02215, USA
Email: ssolberg@bu.edu

drive, and supports needed to direct one's life in ways that are personally valued (Field, Martin, Miller, Ward, & Wehmeyer, 1998). As an instructional domain that is highly valued by general educators, special educators, and paraprofessionals (Carter, Lane, Pierson, & Stang, 2008; Lane, Carter, & Sisco, in press), research also suggests that becoming more self-determining during high school may have long-term benefits to youth with disabilities (Goldberg, Higgins, Raskind, & Herman, 2003; Test, Mazzotti, et al., 2009; Wehmeyer & Palmer, 2003). Because many adolescents with high-incidence disabilities (e.g., emotional/behavioral disabilities, learning disabilities, other health impairments) struggle with acquiring the skills and attitudes that can enhance self-determination (Carter, Trainor, Cakiroglu, Swedeen, & Owens, 2010; Wagner et al., 2003), additional research is needed in several areas.

First, prior transition research has focused most heavily on individual student factors (e.g., disability category, gender, age) associated with greater self-determination capacity (Carter, Lane, Pierson, & Glaeser, 2006; Chambers et al., 2007; Cobb, Lehmann, Newman-Gonchar, & Alwell, 2009). Less is known about how self-determination may be shaped by the quality of the learning experiences students have while still in high school. For example, Zhang (2001) examined the contributions of general education placement to students' self-determination capacities and found that students with disabilities enrolled in special education classrooms had greater self-determination. However, Shogren et al. (2007) did not find educational placement to be associated with self-determination. Understanding whether and how experiences within quality secondary learning environments impacts the development of self-determination and other transition-related skills could inform the design and delivery of comprehensive transition programming.

Second, studies addressing this domain among adolescents with disabilities have primarily used one of the two more global measures of self-determination (i.e., *Arc's Self-Determination Scale*, Wehmeyer & Kelchner, 1995; *AIR Self-Determination Scale*, Wolman, Campeau, DuBois, Mithaug, & Stolarski, 1994). Because overall self-determination can comprise multiple dimensions (e.g., decision making, goal setting, motivation, self-efficacy), it would be informative to examine how different aspects of self-determination relate to one another and are shaped by the contexts within which secondary students participate. Such information could also add to the literature by expanding the range measures available to assess self-determination among adolescents with disabilities.

Third, although a number of self-determination interventions have been shown to improve measures of academic engagement and performance (Carter, Lane, Crnabori, Bruhn, & Oakes, 2011; Konrad, Fowler, Walker, Test, & Wood, 2007), there is a paucity of studies examining the extent to which acquisition of certain self-determination skills promotes

greater academic achievement. For example, academic self-efficacy and motivation may operate as resiliency factors that enable students to attain positive academic outcomes despite experiencing challenging life events (Deci & Ryan, 1985; Masten, 2001). Because grade point averages (GPAs) can influence graduation rates and entry to postsecondary education, it is important to understand the association between self-determination and this indicator of achievement.

For students with disabilities to develop their self-determination capacities, they must be involved in learning environments that are specifically designed to provide the experiences needed to promote the development of these skills (Cobb et al., 2009; Soresi, Nota, Ferrari, & Solberg, 2008; Webb, Patterson, Syverud, & Seabrooks-Blackmore, 2008). The purpose of this study was to test a theoretically and empirically derived developmental model of learning experiences, self-determination, and academic success (Figure 1). Our model posited that involvement in quality learning environments provides students with a primary context for the development of a range of career, academic, and social-emotional self-determination skills associated with important in-school outcomes.

We began our analyses with the following hypotheses:

Hypothesis 1 (H1): Students with disabilities who had greater involvement in quality learning experiences were expected to report higher career-search self-efficacy.

Hypothesis 2 (H2): Students with disabilities who engaged in career-search activities to the point of feeling competent were expected to be actively setting career and life goals and beginning to look at ways to maximize opportunities to achieve those goals. Thus, we anticipated that career-search self-efficacy would relate directly to use of goal-setting strategies.

Hypothesis 3 (H3): Students with disabilities who reported active engagement in setting goals would also report higher academic motivation, as they would be more aware of how their education was helping them optimize their opportunities to reach those goals.

Hypothesis 4 (H4): Students with disabilities who reported more engagement in goal setting were also expected to have higher academic self-efficacy, as using pursuit strategies provides opportunities to increase academic skills and efficacy expectations.

Hypothesis 5 (H5): Students with disabilities who reported higher academic motivation would report lower distress and higher academic performance because of the increased effort they would be expected to demonstrate in completing their courses.

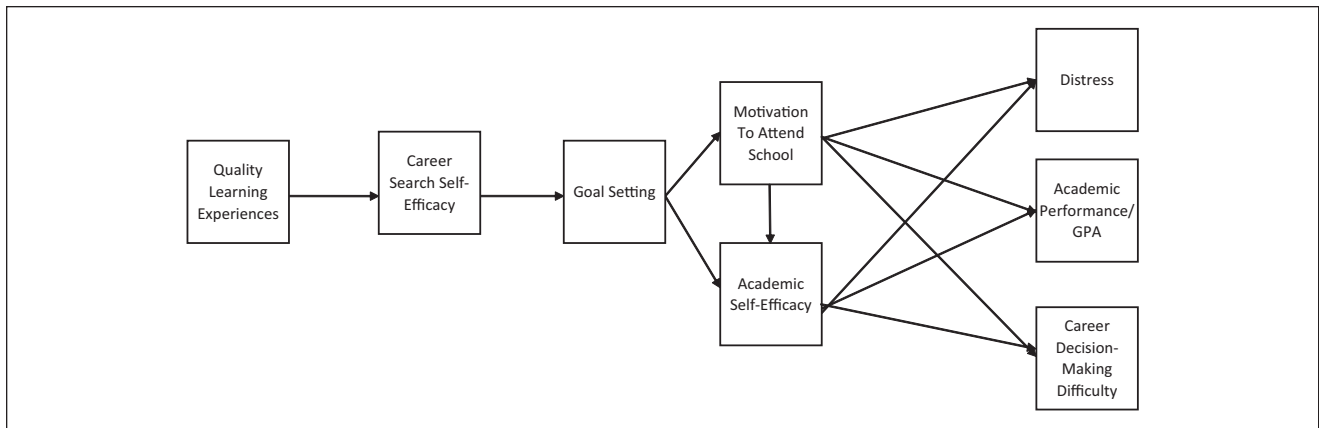


Figure 1. Hypothesized relationships among quality learning experiences, self-determination, and academic success

Hypothesis 6 (H6): Students who reported more academic self-efficacy would have better grades and report lower distress, as self-efficacy involves perceiving that one has the ability to manage situations in ways that lead to a successful performance.

Hypothesis 7 (H7): Students reporting more academic motivation and academic self-efficacy would also be able to identify career interests more readily and therefore would report lower career decision-making difficulty.

To test the proposed developmental model, we used path analysis (Kaplan, 2009) as a method by which the hypothesized relationships that are specified in Figure 1 could be evaluated, and to assess the unique contribution and importance of each variable within the model.

Method

Participants

A total of 135 sophomores and seniors (females [$n = 52$; 38.5%] and males [$n = 83$; 61.5%]) participating in a larger study designed to understand how individualized learning plans (ILPs) support students' ability to make successful postsecondary transitions served as participants in this study. Participants were identified as having high-incidence disabilities (e.g., learning disabilities, emotional and behavioral disabilities, other health impairments) based on their state requirements for Special Education status. This convenience sample was drawn from 14 high schools in four states (Washington, South Carolina, New Mexico, Louisiana) identified by state and district officials as engaging in promising ILP practices. Each school set a goal of at least 50% participation from its 10th and 12th grade student population. With regard to race/ethnicity, 36% of students

were Black/African American ($n = 49$), 16% were Latino/Hispanic ($n = 21$), 10% were Native American ($n = 13$), and 38% were White/European American ($n = 52$).

Measures

Participating youth completed a series of assessments via an online assessment system created by the Center on Education and Work at the University of Wisconsin-Madison. Educators were encouraged to provide any accommodations necessary to support the student's ability to complete the various measures and participants were allowed to complete the survey across multiple sittings. Unless otherwise noted, construct validity and reliability evidence for the instruments described in the following was established using factor analytic procedures with a large diverse sample of 1,135 students who participated as part of a larger study (Solberg, Gresham, & Phelps, 2010). Students receiving special education services constituted about 10% of this sample and all alpha reliabilities reported in the following are based on the original sample of 135 students with disabilities.

Quality learning experiences. For this study, we defined "quality learning experiences" as students' report of the degree to which they were engaged in activities identified in the *Guideposts for Success* (National Collaborative on Workforce and Disability for Youth, 2009) and in various aspects of the ILP process (Budge, Solberg, Phelps, Haakenson, & Durham, 2010). The *Guideposts for Success* synthesizes developmental activities that have strong empirical and/or theoretical support for promoting successful youth transitions. Each of the five guideposts—school-based preparatory experiences, career preparation and work-based learning experiences, youth development and leadership, connecting activities, and family involvement and supports—outlines a collection of specific intervention approaches and programmatic features that schools and communities can implement to better support

youth (National Alliance for Secondary Education and Transition, 2005).

We created a *Quality Learning Experiences Scale* consisting of 45 items addressing students' involvement in, use of, and views regarding the series of learning experiences described in this guide. Students rated their level of agreement with each statement using a Likert-type scale ranging from 1 (*strongly agree*) to 99 (*strongly disagree*). Example items included "I participated in on-the-job training experiences through activities like internships or work-based learning" and "I participated in opportunities that helped me develop my leadership skills." A confirmatory factor analysis (Solberg et al., 2010) found that the *Quality Learning Experiences Scale* comprised six subscales mirroring the six clusters identified in the *Guideposts to Success* (i.e., School-Based Preparatory Experiences, Career Preparation and Work-Based Learning Experiences, Youth Development and Leadership, Connecting Activities, Family Involvement and Supports, Engagement in Other ILP Activities). Internal consistency for each subscale and composite scale total with Cronbach's alpha coefficients were .84, .82, .78, .80, .87, .90, and .94, respectively (Solberg et al., 2010). Adequate internal consistency estimates for each of the scales were as follows: School-Based Preparatory Experiences ($\alpha = .86$), Career Preparation and Work-Based Learning Experiences ($\alpha = .84$), Youth Development and Leadership ($\alpha = .80$), Connecting Activities ($\alpha = .78$), Family Involvement and Supports ($\alpha = .85$), and Engagement in Other ILP Activities ($\alpha = .88$); internal consistency for the Total Scale was .95. For the path analysis, items were combined to create a single indicator of quality learning environment with higher scores indicating students reported having experiences within learning environments characterized by higher quality.

Career-search self-efficacy. The 34-item *Career Search Self-Efficacy Scale* (CSES; Solberg, Good, & Nord, 1994; Solberg, Good, Nord, Holm, et al., 1994) assesses an individual's perceived confidence in his or her ability to perform career-search-related tasks. Individuals provided responses to each career-search activity using a Likert-type scale ranging from 1; scores indicate greater belief in one's ability to perform career-related activities. Example items include, "Describe your skills and abilities to an employer" and "Know where to find information about possible employers." Confirmatory factor analysis indicated the CSES comprised five subscales: Self-Management, Career Planning, Career Awareness, Interviewing, and Networking (Solberg et al., 2010). These five subscales and overall scale have adequate internal consistency, with Cronbach's alpha coefficients of .96, .91, .88, .87, .86, and .98, respectively (Solberg et al., 2010). We found the internal consistency to be adequate for each subscale (Self-Management, $\alpha = .95$; Career Planning, $\alpha = .88$; Career Awareness, $\alpha = .83$; Interviewing, $\alpha = .86$; Networking, $\alpha = .81$) as well as for the Total Scale ($\alpha = .97$). For the path analysis, items were combined

into a single indicator of career-search self-efficacy with higher scores indicating students perceived themselves as more confident to successfully engage in career-search activities.

Goal setting. The 19-item *Goal Setting Scale* (Howard, Ferrari, Nota, Solberg, & Soresi, 2009) evaluates the degree to which students actively select and establish goals, optimize learning experiences needed to reach those goals, and identify potential challenges that may impede their goal pursuits. Development of this measure was based on Selection, Optimization, and Compensation (SOC) theory (Baltes, 1997). Students responded to each statement using a Likert-type scale ranging from 1 (*strongly disagree*) to 99 (*strongly agree*). Example items included "I rank my goals in terms of importance" and "I like to create a step-by-step plan to achieve my goals." Principal component analysis was used to establish construct validity, yielding three subscales: Goal Setting and Pursuit, Use of Resources, and Challenges. Internal consistency for each of the subscales was .93, .82, and .76, respectively (Howard et al., 2009). Internal consistency for each of the subscales was adequate: Goal Setting and Pursuit ($\alpha = .95$), Use of Resources ($\alpha = .86$), and Challenges ($\alpha = .77$). For the current study, only items from the Goal Setting and Pursuit and the Use of Resources subscales were combined to create the Goal Setting measure because they captured the selection and optimization processes, whereas the Challenges subscale addressed perceived barriers to obtaining one's goal pursuits. Internal consistency for the overall scale was .95. Positive scores indicated that students perceived themselves as being more engaged setting goals and seeking opportunities to learn skills needed to achieve those goals.

Motivation to attend school. The 15-item *Motivation to Attend School Scale* (Close & Solberg, 2008) assesses the reasons why students attend school. This measure was developed using a self-determination theory (Deci & Ryan, 1985) that differentiates between two types of internal motivation: performing a task because it is perceived as meaningful and performing a task because it is deemed enjoyable. On this measure, students rated the extent to which they agree with a series of statements using a Likert-type scale ranging from 1 (*strongly disagree*) to 99 (*strongly agree*). Confirmatory factor analysis was used to identify the two subscales. The internal consistency of the scales was adequate: Enjoy School ($\alpha = .69$), Meaningfulness of School ($\alpha = .82$), and Total Scale ($\alpha = .81$; Solberg et al., 2010). For the path analysis, items for these two subscales were combined, with positive scores indicating a greater motivation to attend school because it is deemed enjoyable and meaningful. Internal consistency for the combined indicator using Cronbach's alpha was .86.

Academic self-efficacy. The *Academic Self-Efficacy Scale* (Solberg et al., 1998) is a 25-item measure that assesses the degree to which an individual believes she or

he can successfully perform a number of academic and school-related tasks. Responses are provided on a Likert-type scale ranging from 1 (*not at all confident*) to 99 (*extremely confident*). Positive scores indicate greater belief in one's ability to perform academic/school-related tasks. Example items include "preparing for a test" and "asking a teacher for help outside of a lesson." Principal component analysis using a national sample of students (Gillis & Sedivy, 2009) identified three subscales: Social, Classroom, and Test Taking. Internal consistency for the subscales and Total Scale using Cronbach's alpha was .93, .88, .86, and .95, respectively (Solberg et al., 2010). For the current sample, the internal consistency for the subscales using alpha levels was as follows: Social ($\alpha = .92$), Classroom ($\alpha = .90$), and Test Taking ($\alpha = .88$). The items from the three subscales were summed to create a composite indicator with higher scores indicating students report being more confident to successfully perform various academic tasks. Internal consistency for the composite measure was .96.

Career decision-making difficulty. Career decision-making difficulty was assessed using the *Ideas and Attitudes on Academic-Career Future Scale* (IASCF; Nota, Soresi, Solberg, & Ferrari, 2005). This 17-item scale measures whether a student is engaged in making educational and career decisions. Individuals rate their agreement with a series of statements describing an array of decision-making-related ideas, attitudes, and behaviors, using a Likert-type scale ranging from 1 (*strongly disagree*) to 99 (*strongly agree*). Higher scores indicate the degree to which the student is experiencing career decision-making difficulty such as feeling less able to make a decision due to a lack of sufficient information, not feeling certain about career options, and feeling unable to make a career decision (thus, higher scores indicate more difficulty in making career-related decisions). The IASCF comprised three subscales: Lack Information, Undecided, and Indecisive. For the present sample, adequate internal consistency estimates were found for each subscale: Lack Information ($\alpha = .92$), Undecided ($\alpha = .90$), and Indecisive ($\alpha = .82$). The items were summed to create a composite indicator of career decision-making difficulties, with higher scores indicating more difficulties encountered with career decision making. Internal consistency for the composite scale was .96.

Distress. Psychological and emotional distress was evaluated using the *Well-Being Scale* (Solberg et al., 1998) and *Academic Stress Scale* (Solberg et al., 1998). The 23-item *Well-Being Scale* assesses how often an individual experiences emotional/psychological and physical health-related concerns. Individuals rate how often they have experienced each concern during the past month using a Likert-type scale ranging from 1 (*never*) to 99 (*always*). Example items include "I feel hopeless" and "I become upset easily." The scale comprised five subscales: Agitation, Eating Problems, Feeling Blue, Sleeping Problems, and Physical Problems.

Previous research with 10th and 12th grade high school students found that each of the subscales and the total composite scale all demonstrated adequate reliability, with alpha coefficients of .83, .77, .70, .79, .72, and .94, respectively (Solberg et al., 2010). We found adequate internal consistency coefficients for each of the scales in the present study: Agitation ($\alpha = .87$), Eating Problems ($\alpha = .72$), Feeling Blue ($\alpha = .71$), Sleeping Problems ($\alpha = .82$), and Physical Problems ($\alpha = .78$).

The 23-item *Academic Stress Scale* assesses how often an individual experiences difficulties completing a variety of academic-related tasks. Students rate the degree of difficulty they experience with each of a series of tasks using a Likert-type scale ranging from 1 (*not at all difficult*) to 99 (*extremely difficult*). The scale comprised three subscales: Academic, Social, and Financial, all of which (along with the overall scale) have been shown to have adequate internal consistency, with coefficients of .87, .86, .86, and .95, respectively (Solberg et al., 2010). For the present study, adequate internal consistency was found for the Academic ($\alpha = .85$), Social ($\alpha = .86$), and Financial ($\alpha = .86$) subscales. The items from the Well-Being and Academic Stress measures were combined to create a composite measure of Distress, with higher scores indicating higher reported levels of distress. The alpha coefficient for the Distress indicator was .96.

Academic performance/GPA. Academic performance was measured using students' cumulative GPA on a 0.0 to 4.0 scale.

Data Analysis

We used path analysis to test the hypothesized relationships among the previously described measures. Path analysis and structural equation modeling (SEM) are important analytic strategies for testing hypothesized causal relationships among variables when it is not feasible or ethical to randomly vary such conditions within the normal environment. For example, it would not be ethical to randomly assign youth with disabilities to learning conditions that are expected to vary widely in their overall quality. Path analysis and SEM allow researchers to make theoretically based predictions and test the unique contribution of each variable within the model. SEM involves two steps: testing the efficacy of the measurement of the variables within the model and then testing the hypothesized paths between the variables. Path analysis involves testing the hypothesized paths and assumes that the construct validity of the model has been previously established. Our study used path analysis because the sample in relation to the number of variables being estimated and the multicollinearity among the variables were such that the measurement model within the structural equation approached but did not reach established adequacy thresholds. We verified the measurement

model by first establishing the construct validity of each of the measures separately and then conducting a principal components analysis of the measures with the sample of 135 students in this sample to determine whether the measures represented unique constructs (Solberg et al., 2010). A six-factor solution indicated that career-search self-efficacy and academic self-efficacy loaded together on one factor, motivation and goal-setting loaded together on one factor which indicates that the self-efficacy measures and motivation/goal-setting measures are assessing similar constructs. The remaining measures loaded on separate factors. Although the self-efficacy measures and the motivation/goal-setting measures are related to one another, we elected to maintain them as separate predictors in the path model because they clearly address different issues that could result in different practical implications. Career-search self-efficacy addresses career-search competencies such as conducting interviews and writing resumes, whereas academic self-efficacy addresses classroom-related competencies such as asking questions in class or preparing for examinations. Similarly, motivation to attend school addresses different content than goal setting which focuses on whether one sets goals and seeks opportunities to reach those goals.

To ascertain path coefficients and evaluate the fit of the proposed path model in Figure 1, Mplus 5.2 software was used with SEM procedures using maximum likelihood parameter estimation. Due to χ^2 's sensitivity to sample size (Martens, 2005), two additional indices that have been shown to be less sensitive to issues related to sample size were used to evaluate goodness of fit: Comparative Fit Index (CFI = .95 or more) and root mean square error of approximation (RMSEA = .06 or less; Hu & Bentler, 1999; Martens, 2005). It should be noted that GPA data were only available for 90% of the participants. However, Mplus 5.2 uses Full Information Maximum Likelihood (maximum likelihood) model-based estimation procedures to provide unbiased and robust parameter estimations and standard errors in the presence of missing data.

Results

Path analysis was used with a sample of students receiving special education services to test a hypothesized postsecondary transition readiness model. Table 1 presents the means, standard deviations, and correlation matrix for the identified exogenous and endogenous variables. Table 2 presents the standardized path estimates that were specified between variables. The standardized correlational estimates between endogenous variables for the model are presented in Table 3.

Fit indices suggested that the proposed model provided an adequate fit of the data $\chi^2 = 50.494$ ($df = 14$; $p < .001$), RMSEA (0.139; 90% CI = [0.099, 0.181]), and CFI (0.919);

the modification indices indicated that a better fit was possible by adding a pathway between career-search self-efficacy and academic self-efficacy. Indices associated with this respecified model indicated a stronger fit. The $\chi^2 = 21.728$ ($df = 13$; $p = .0597$) was not significant and the RMSEA (0.071; 90% CI = [0.000, 0.121]) and CFI (0.981) indices indicate a better goodness of fit. Therefore, the respecified model was accepted as the final path model in Figure 2.

The final path model indicates several key findings. First, students reporting to have more engagement in quality learning experiences reported higher career-search self-efficacy ($\beta = .74$). Second, students reporting higher career-search self-efficacy reported engaging in more goal-setting activities ($\beta = .75$) and reported higher academic self-efficacy ($\beta = .48$). Third, students reporting to have engaged in more goal-setting activities reported being more motivated to attend school because it was deemed meaningful and enjoyable ($\beta = .60$). Fourth, students reporting higher motivation to attend school reported higher academic self-efficacy ($\beta = .36$). Fifth, students reporting higher academic self-efficacy reported less distress ($\beta = -.31$) and recorded better academic outcomes ($\beta = .32$). Finally, students reporting higher motivation to attend school reported more career indecision ($\beta = .22$).

Discussion

In response to strengthened transition mandates within the IDEA of 2004, there has been a growing emphasis among researchers and educational leaders on identifying factors that support youth with disabilities to develop the knowledge, skills, and dispositions needed to make successful postsecondary transitions, including self-determination (Alwell & Cobb, 2006). We explored the pathways of self-determination skill development beginning with involvement in a secondary learning environment reflecting key elements of recommended and best practices in transition. This study offers empirical evidence supporting a link between learning context and the development of an array of career, academic, and social-emotional learning skills known to contribute to the long-term success of youth. Moreover, our model demonstrates that these self-determination skills are integrally related to one another. As a result, this study extends the literature in several ways.

First, this study reinforces the value and necessity of providing students with disabilities meaningful access to a compelling and comprehensive high-school program. In our study, a quality learning environment was operationalized as comprising school-based preparatory experiences, career preparation and work-based learning experiences, youth development and leadership experiences, connecting activities, family involvement and supports, and engagement in ILPs. Students who reported more involvement in

Table 1. Mean, Standard Deviation, and Correlation Matrix for Scales

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Quality learning experiences	60.90	16.29	—	.74*	.68*	.56*	.46*	-.02	-.02	.13	.12
2. Career-search self-efficacy	66.35	18.63		—	.75*	.70*	.49*	-.02	-.02	.16	.14
3. Goal setting	59.96	20.60			—	.63*	.60*	-.04	-.02	.11	.09
4. Academic self-efficacy	68.04	19.21				—	.62*	-.24*	-.23*	.04	.22*
5. Motivation to attend school	55.55	16.40					—	-.13	-.11	.15	.04
6. Distress	35.79	19.74						—	.51*	.30*	.06
7. Well-being	39.90	20.09							—	.49*	-.22*
8. Career decision-making difficulties	42.22	22.84								—	.06
9. Academic performance/GPA	2.387	0.716									—

Note: GPA = grade point average. Table 1 indicates the means, standard deviations, and correlations among the observed variables. Scales range from 0 to 99 with the mean representing the arithmetic average across students for a given variable.

* $p < .05$.

these activities had greater confidence in their abilities to successfully engage in career planning, career exploration and management, career awareness, conducting interviews, and networking. Using Cohen's (1992) effect size criteria for path coefficients (i.e., .10 = small effect, .30 = medium effect, .50 = large effect), the path between quality learning environments and career-search self-efficacy represented a large effect ($\beta = .74$). Yet, access to the array of learning and connecting experiences reflected in this measure continue to be limited for students with disabilities in many schools (cf. Carter et al., 2010; Wagner et al., 2003).

Second, we found that the path between career-search self-efficacy and goal setting also represented a large effect ($\beta = .75$), indicating students who reported higher career-related self-efficacy also reported being more proactive in setting goals and seeking out the learning opportunities and resources needed to optimize their chances of realizing those goals. This suggests that as students become more engaged in career exploration and planning activities, they may be more likely to become interested in setting their own educational and occupational goals. We also found that career-search self-efficacy was directly related to academic self-efficacy. Although not hypothesized in the fully mediated model, it is not a surprising outcome as both constructs relate to the degree to which the student is able to "learn how to learn." As students gain competence in the career-search process, they may want to experience similar levels of competence in other areas of their life. This close connection between career and academic development

may serve to reduce some teachers' hesitation that vocational and academic goals represent competing or mutually exclusive priorities.

Third, goal setting was found to have a large effect on motivation ($\beta = .60$), suggesting that students reporting being more proactive and engaged in goal setting viewed school as more meaningful and enjoyable (Lee, Palmer, & Wehmeyer, 2009). In this study, we defined goal setting in terms of whether the student was actively setting goals and seeking out learning opportunities to increase the likelihood of successfully realizing those goals. An important aspect of the SOC theory is that self-determining individuals are future-oriented and demonstrate adaptability by modifying goals and being able to take advantage of new opportunities as they emerge (Baltes, 1997). Goldberg et al. (2003) found this attribute central to individuals with disabilities who were able to make successful transitions into adulthood. The link between career-search self-efficacy and goal setting indicates that students who are exposed to career development activities that support self-awareness, exploration, and management may be more likely to actively engage in setting goals and optimizing opportunities to reach those goals.

Fourth, students reporting more motivation to attend school also reported higher academic self-efficacy. Self-determination theory (Deci & Ryan, 1985) argues that engaging in behavior because it is meaningful and enjoyable represent two internalized forms of motivation, both of which indicate a person is engaged in self-regulation. The

Table 2. Standardized Path Estimates for the Respecified Learning Experiences and Academic Success Model

Effect	Estimate (path estimate)	SE	Est./SE (z score)	StdYX (p value)
Career decision-making difficulties on				
Motivation to attend school	0.218 ^a	0.107	2.032	.042
Academic self-efficacy	-0.105	0.108	-0.972	.331
Distress on				
Motivation to attend school	0.057	0.106	0.533	.594
Academic self-efficacy	-0.309 ^a	0.102	-3.017	.003
Academic performance/GPA on				
Motivation to attend school	-0.160	0.118	-1.360	.174
Academic self-efficacy	0.317 ^a	0.113	2.799	.005
Motivation to attend school on				
Goal setting	0.602 ^a	0.055	10.976	.000
Academic self-efficacy on				
Goal setting	0.067	0.091	0.734	.463
Career-search self-efficacy	0.475 ^a	0.081	5.837	.000
motivation to attend school	0.356 ^a	0.070	5.071	.000
Goal setting on				
Career-search self-efficacy	0.749 ^a	0.038	19.825	.000
Career-search self-efficacy on				
Quality learning experiences	0.741 ^a	0.039	19.115	.000

Note: $\chi^2(df = 13) = 21.728, p = .0597$.

^a $Z > 1.96, Z < -1.96$.

results found here replicate previous research linking motivation to academic self-efficacy among students without disabilities (Close & Solberg, 2008). Rather than resisting the learning process, students who are motivated to engage in school because it is deemed meaningful and enjoyable may be relating to teachers and students differently by engaging in a number of self-regulating classroom behaviors such as focusing on lessons, completing work, and seeking support when needed.

Fifth, students who had more confidence when performing academic tasks also reported having higher grades and feeling less distress. This result is consistent with previous research (Close & Solberg, 2008; Multon,

Table 3. Standardized Correlational Effects Between Endogenous Variables for the Respecified Learning Experiences and Academic Success Model

Effect	Effect (correlation)	SE	Est./SE (z score)	StdYX (p value)
Career decision-making difficulties with				
Academic performance/GPA	0.065	0.101	0.643	.520
Distress with				
Academic performance/GPA	-0.044	0.099	-0.438	.661
Career decision-making difficulties	0.487 ^a	0.066	7.427	.000

Note: GPA = grade point average. $\chi^2(df = 13) = 21.728, p = .0597$.

^a $Z > 1.96, Z < -1.96$.

Brown, & Lent, 1991; Solberg et al, 1998; Torres & Solberg, 2001). One explanation for this finding can be found in the theory of Conservation of Resources (Hobfoll, 1989). Students with more academic self-efficacy perceive themselves as possessing the psychological, emotional, and behavioral resources needed to manage academic situations. As a result, they may experience less academic stress and psychological/emotional distress. Contrary to our original hypotheses, academic self-efficacy was not related to career decision-making difficulties. It is not clear why students with disabilities who are feeling competent in managing the complexities of doing well in school would not feel being able to engage in career decision making. One possibility is that career decision making is somewhat more complex for students with disabilities than it is for their peers without disabilities (Wehmeyer, 1993).

Limitations and Future Research

This study has several limitations that should be addressed in future studies. First, we used a correlational design to examine the relationships among key variables, making it impossible to attribute causality to the effect sizes associated with different paths. Well-designed experimental studies are needed to explore the ways in which increasing access to high-quality transition experiences and targeted skill interventions impacts the constellation of skills addressed in this study. Second, we relied on the self-reports of students with disabilities in this study. Although students do represent a compelling source of information about many of the internal constructs addressed in this

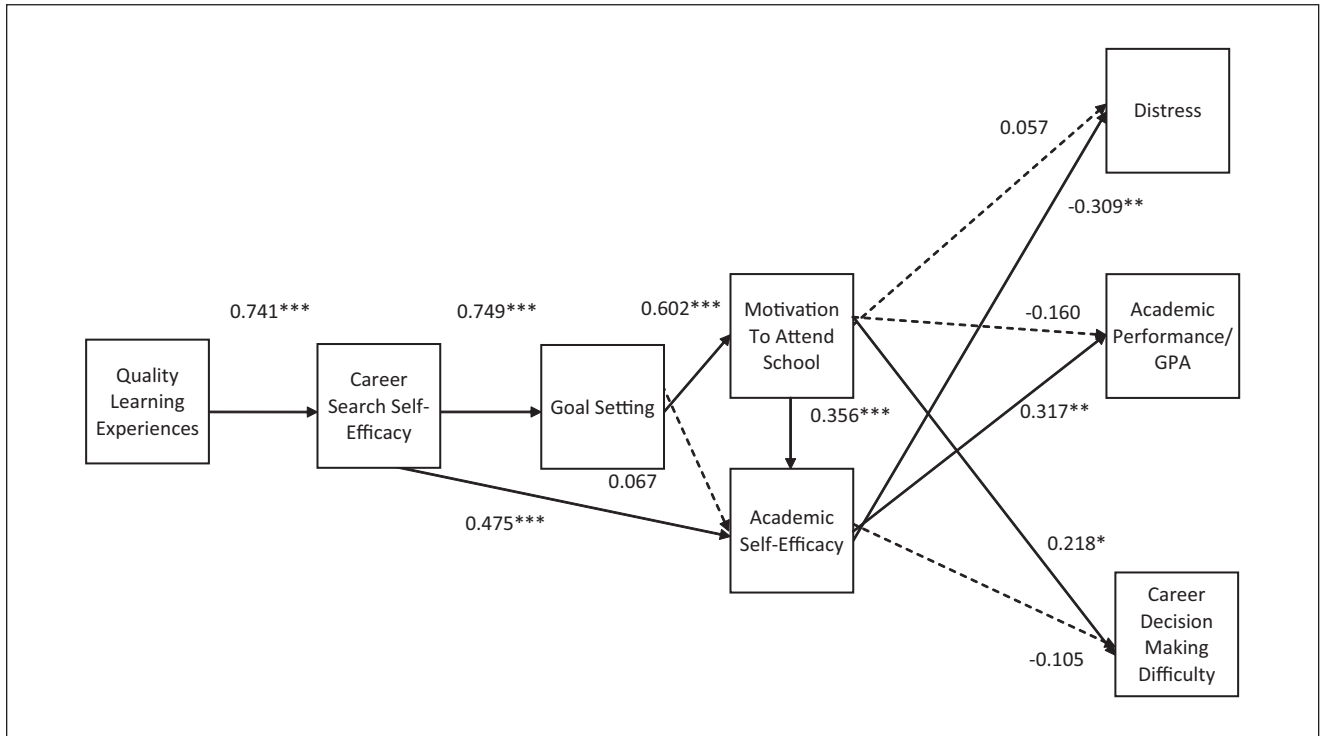


Figure 2. Revised model depicting relationships among quality learning experiences, self-determination, and academic success
 Note: Standardized coefficients are shown. Note that → indicates a hypothesized, but insignificant, relationship.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

study, future researchers should concurrently solicit the perspectives of other key stakeholders to construct a more comprehensive portrait of students' secondary school experiences and skill development. Third, we relied on special education classifications provided by participating school districts. As a result, we were unable to explore in detail whether and how these developmental paths might vary for students with divergent educational and support needs. Because the depth and consistency of information contained in students' school records can vary widely from one district to the next, future researchers should incorporate additional assessment instruments to better capture the current needs and strengths of participating students. Fourth, although prior studies have not focused on the association between involvement in quality learning environments and skill development for transition-age students with disabilities, care should be taken when attempting to generalize the findings from this preliminary study. Future studies should replicate our study procedures with a larger and more representative sample of students with disabilities. Because this study took place within high schools already engaged in and committed to promising ILP practices, future researchers should also explore these associations in schools not yet using these particular planning approaches.

Implications for Practice

Findings from this study suggest that involvement in quality learning environments and individualized planning are strongly associated with developing an array of valuable skills and dispositions that can enhance student self-determination and preparation for adulthood. As a free resource written in an accessible format, the *Guideposts for Success* (2009) could be used by schools as a tool for reflecting on the degree to which they are offering the breadth and depth of learning experiences known to promote improved outcomes for all students. Planning teams comprised school leaders, educators, families, students, and community partners might work collaboratively to identify areas of current programmatic strength and next steps for further improving the quality of transition services and supports available to students.

For practitioners and researchers, our findings also suggest there may be value in considering a broader range of measures when addressing the self-determination and career development of students with disabilities. Although the IDEA (2004) requires transition planning and programming be built on a foundation of meaningful assessment, it does not dictate which tools IEP teams must use when identifying students' strengths, needs, interests, and future

plans. By incorporating multiple measures of students' skills, attitudes, and experiences in these areas, teams may obtain a more comprehensive portrait of the degree to which students' are well prepared to transition successfully to adulthood.

An array of online career information systems is also available to foster career-search self-efficacy and support career exploration among adolescents with and without disabilities (e.g., Career Cruising, CareerLocker/WISCareers, Kuder Navigator, Oregon Career Information System). These systems can facilitate active career exploration and planning by providing students with access to validated assessments, occupational information, educational pathways, and an electronic portfolio or ILP. Ensuring that students with disabilities also have access to these widely available systems can be an important element in fostering their career development.

Finally, promoting student self-determination is now firmly entrenched as a recommended practice for transition-age students with disabilities (Field et al., 1998). There exists a fairly deep and rapidly expanding evidence base of embedded, stand-alone, and curricular intervention approaches effective at promoting self-determination skills and opportunities for adolescents with and without disabilities (e.g., Carter et al., 2011; Cobb et al., 2009; Konrad et al., 2007; Wehmeyer, Palmer, Lee, Williams-Diehm, & Shogren, 2011). Directing professional development efforts toward equipping educators, paraprofessionals, and other school staff to implement these promising intervention approaches for the students with whom they work holds promise for strengthening the individual pathways addressed in this study.

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