

## Articles

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# Improving Prediction of Significant Career-Related Constructs for High School Students With Learning Disabilities

Abiola O. Dipeolu, Stephanie Hargrave,  
Jessica L. Sniatecki, and Joseph V. Donaldson

Preparing students with learning disabilities (LDs) to make the transition into the world of work is considered an essential preparation that high schools can provide. However, existing services are limited for career development preparation, and available programs rely on assessments normed for samples of students without LDs. This study examined the predictability of critical career-related constructs of dysfunctional career thoughts, career maturity, and vocational identity in high school students with LDs, using a sample of 139 such students. Data analyses were performed using multiple regression and *t* tests. Results indicate that it is possible to predict important career constructs for students with LDs using standardized instruments, which can inform subsequent interventions.

*Keywords:* learning disabilities, high school students with LDs, postschool transition, career maturity, vocational identity

Learning disabilities (LDs) have become the most widespread handicapping disorder in U.S. public schools (Dipeolu, 2002; U.S. Department of Education, 1994). Available prevalence data rates indicate that boys outnumber girls by a 3:1 ratio for LD diagnosis (National Health Interview Survey, 2003). Generally, LDs (in various forms) have been used to describe students who are failing to learn in school as expected. For this population, the discrepancy model was the predominant model for the diagnosis of LDs until 2004. The 2004 version of the Individuals With Disabilities Education Act noted that the “difference between academic performance and ability may not be the only approach used to identify students. The recommended alternative is the use of students’ responses to scientific research-based interventions” (Shaw, 2006, p. 109), hence the emergence of the Response to Intervention model.

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*Abiola O. Dipeolu, Department of Counseling, School and Educational Psychology, University at Buffalo, State University of New York; Stephanie Hargrave, Office of Institutional Research and Assessment, Friends University, Wichita, Kansas; Jessica L. Sniatecki, Department of Health Science, The College at Brockport, State University of New York; and Joseph V. Donaldson, Firststar Rehabilitation and Behavioral Health, Wichita, Kansas. Correspondence concerning this article should be addressed to Abiola O. Dipeolu, Department of Counseling, School and Educational Psychology, University at Buffalo, State University of New York, 409 Baldy Hall, North Campus, Buffalo, NY 14260 (e-mail: adipeolu@buffalo.edu).*

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Recognizing that deficits associated with LDs do not disappear in adulthood, the U.S. government included school-to-work transition programming for high school students in the crafting of Public Law 101-476, in 1990, and specifically mandated career development activities for all students (Ward, 2006). The 2004 revision and reauthorization of Public Law 94-142 (Individuals With Disabilities Education Act) reconsidered issues pertaining to postschool transition planning (Dipeolu & Cook, 2006). Along with other federal mandates, this law emphasized the importance of transition planning to prepare high school students with disabilities for the postschool world. Although transition programming in public schools seems well intentioned, these services do not adequately prepare students for a successful transition from school to work and/or to postsecondary education, especially in the areas of self-advocacy, self-determination, career exploration, and career planning (Carter, Trainor, Cakiroglu, Swedeen, & Owen, 2010; Shaw, Madaus, & Banerjee, 2009).

Nevertheless, public schools have witnessed growth in the array of services tailored to remediate academic challenges facing students with LDs in recent years. Compared with the earlier generations of students with LDs, many are now receiving better academic preparation while in school (Dipeolu, Reardon, Sampson, & Burkhead, 2002); however, services are extremely limited (and sometimes nonexistent) in the area of vocational and career development (Gregg, 2007). Yet, preparing these students to make the transition into the world of work is an essential preparation that service school officials can provide. To attain the level of transition necessary for successful postschool life, existing academic activities need to be augmented with evidence-based career development services to assist young adults with LDs to successfully make the postschool transition. Without an engaging career development and vocational preparation plan, the existing transition mandates alone may not guarantee success for these students.

Young adults who are able to demonstrate a higher level of career maturity or readiness, show a clear sense of vocational identity, and possess positive career-related thoughts are more likely to be successful in mastering the transition from school to work or further education (Hitchings et al., 2001). Although the postschool transition process is meant to account for students' needs with consideration for their preferences and interests (Etscheidt, 2006), generally, career development activities geared toward helping students acquire these skills are limited for students with LDs who have unique career issues related to career maturity and vocational identity (Fabian & Liesener, 2005; Ochs & Roessler, 2001). Moreover, students with LDs often receive negative messages related to characteristics of LDs, which are reinforced in the environment. These messages are translated into sets of beliefs and career-related cognitions that can hinder effective engagement in the career and transition planning process (Sampson, Reardon, Peterson, & Lenz, 2004). However, the nature of these beliefs and career-related cognitions and the extent to which high school students with LDs exemplify them are not sufficiently understood or researched. The career constructs of negative career thoughts, career maturity, and vocational identity relate to a number of issues that students with LDs grapple with as they embark on their postschool transition journey.

The above-mentioned difficulties are often noted during both career counseling and the career assessment process. Career assessment is an

integral part of the career counseling process, whether the focus is on exploring career options and interests or addressing issues related to career maturity, vocational identity, negative career cognitions, or barriers that might hinder the planning and decision-making process (Osborn & Zunker, 2006). However, the use of scores normed on nonrepresentative samples can result in inaccurate information that can be detrimental when counseling students with LDs. Appropriate test scores are important for enhancing students' self-knowledge and awareness during the career counseling process. Scores derived from assessment outcomes can become tools for fostering career exploration, serving as a springboard for deeper self-understanding for students with LDs. Data gathered through career assessments become tools for helping students with LDs see themselves as total individuals, helping to harness strengths and minimize weaknesses. To be effective, counselors need access to career test results based on representative norms for students with LDs. However, many of the career assessment instruments available to practitioners appear to lack utility for work with students with LDs because they are normed with students without LDs (Dipeolu, 2007). Without representative norms, most tests will be almost impossible to interpret meaningfully.

## Purpose of the Study

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Issues relating to negative career cognitions, career maturity, and vocational identity are significant concerns given the characteristics of students with LDs and the existing gaps in the transition planning process. The purposes of this study were to (a) determine predictability of critical career-related constructs of negative career cognitions operationalized by the Career Thoughts Inventory (CTI; Sampson, Peterson, Lenz, Reardon, & Saunders, 1996) from measures of career maturity and vocational identity using a representative normative sample of students with LDs and (b) explore the relationship between the norms presented in the instruments' manuals and the norms derived from a sample of students with LDs to determine which provided the most usable data for assisting students with LDs in the career development and postschool transition process. The following hypotheses proceeded from the research questions:

*Hypothesis 1:* Normed scale scores for high school students without LDs would be significantly different from the normed scale scores for high school students with LDs for the instruments in this study.

*Hypothesis 2:* Measures of critical career-related constructs of negative career cognitions, as operationalized by the CTI scales of Decision Making Confusion (DMC), External Conflict (EC), and Commitment Anxiety (CA), would be predicted by measures of career maturity and vocational identity in a representative sample of high school students with LDs.

## Method

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### Participants

We drew participants from a rural and an urban school district. Eighty-nine students were from the urban district, and 50 students were from

the rural district. Of the 139 participants, 28% ( $n = 39$ ) were girls and 72% ( $n = 100$ ) were boys. This distribution mirrors the distribution of LDs by gender in the general population. Thirty-five percent were freshmen, 19% were sophomores, 25% were juniors, and 21% were seniors. Participants ranged in age from 14 to 20 years, with a mean age of 16.4 ( $SD = 1.5$ ), and the sample included 71% European American, 13% African American, 8% Hispanic American, 6.5% Native American, and 1% Asian American (Percentages do not total 100 because of rounding). The ethnic representation of participants was compared to the state demographic data (Kansas Department of Education, 2009), which indicated that African Americans (8%) were underrepresented in the sample, Hispanic Americans (12%) were overrepresented, and European Americans matched the state statistics represented at 72%. Information was unavailable for Asian and Native American students. On the demographic data sheet, respondents indicated LDs in the following areas: 28% ( $n = 39$ ) written expression; 26% ( $n = 36$ ) mathematics; 34% ( $n = 47$ ) reading; 5% ( $n = 7$ ) written expression and reading; 4% ( $n = 6$ ) math and reading; 2% ( $n = 3$ ) math, reading, and written expression; and 1% ( $n = 1$ ) in the unknown category.

### **Procedure**

Recruitment efforts targeted the parents/guardians of 318 high school students with LDs from 10 schools in two midwestern school districts. These parents/guardians were contacted by mail, and 150 (47.1%) responded and gave permission for their child's participation through a consent form. Additionally, each student signed an assent form indicating a willingness to participate. Eight students failed to sign the assent form, and three indicated that they were not interested in participating. Overall, 139 (43.7%) of the 150 high school students with LDs whose parents gave consent participated in the study. There was no indication of systematic bias affecting the students' decision to be involved in the study.

A graduate assistant and a school administrator helped to proctor the administration of the instruments in the schools. Students were instructed to request accommodations if and when needed prior to the administration of the instruments. For instance, periodic breaks and the use of a reader were made available to participants as specific forms of accommodation; however, no student requested any of the accommodations offered. The first author has an extensive background working in the area of LDs and career development and was primarily responsible for the supervision of instrument administration. The school administrator was a special educator working with students with LDs, and the graduate assistant was a school psychology trainee with background in the area of LDs. We obtained data from participants who completed three instruments, including corresponding demographic data sheets.

### **Measures**

To capture the constructs of interest, we adopted three widely used career instruments: the CTI (Sampson et al., 1996) to assess the nature of negative cognitions, the Career Maturity Inventory–Revised (CMI-R; Crites & Savickas, 1995) to assess the level of career maturity, and

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the Vocational Identity (VI) scale of My Vocational Situation (MVS; Holland, Daiger, & Power, 1980) to determine the level of vocational identity. We used the national norms for each instrument specific to the population of high school students without LDs, as found in the manuals for each respective instrument, to have the closest comparison to the population of high school students with LDs used in the current study. Representative numbers in the norming samples are presented in Table 1.

*CMI-R (Crites & Savickas, 1995).* The CMI-R is used to assess the level of career maturity. Career maturity is considered to be vital to the ability to make realistic career choices (Busacca & Taber, 2002). The CMI-R is the revised version of the Career Maturity Inventory (CMI). In its current form, the CMI-R provides three subscale scores: Attitude (CMI-Att), Competency Test (CMI-Com), and Career Maturity Total (CMI-Tal). Twenty-five of the 50 items tap into the affective dimension of career maturity and constitute the CMI-Att, and the remaining 25 items tap into the cognitive component of career maturity, the CMI-Com. The CMI-Att subscale and the CMI-Com subscale constitute the CMI-Tal. Each of the CMI-R subscale scores could range from 0 to 25 and uses a dichotomous agree/disagree response format. A higher total score represents greater career maturity (Crites & Savickas, 1996).

CMI-R is the most widely used measure of career maturity. Reliability estimates have shown mixed but generally supportive results for the population with LDs. Dipeolu (2007) found consistently higher reliability coefficients for the population with LDs on the CMI-Att, CMI-Com, and CMI-Tal. Moderately strong correlations of .80 for CMI-Tal and .77 for CMI-Att were found; however, correlations for the CMI-Com showed a lower Kuder-Richardson 20 (KR-20) reliability of .69. The current study had KR-20 reliability measures ranging from .71 to .77, all in the moderate range, as presented in Table 1.

*MVS-VI (Holland et al., 1980).* The MVS-VI consists of 18 items. The instrument was developed as a diagnostic measure of an individual's vocational identity, defined as a sense of clarity with regard to one's goals, interests, personality, and talents (Holland et al., 1980). MVS developers believed that vocational identity is evidenced by relatively consistent career decision making in the face of inevitable environmental uncertainty. The VI scale consists of 18 true-false items, which respondents endorse based on their point of view. The score for the VI scale is obtained by tallying the total number of false responses. A high score indicates a relatively strong vocational identity, and a low score represents an unstable sense of vocational identity.

Internal consistency reliability coefficients obtained from samples of high school students, college students, and workers without LDs have been reported. KR-20 coefficients of .86 were obtained for boys and girls in high school samples; for workers and college students, coefficients were .89 for men and .88 for women. Additionally, Toperek and Pope-Davis (2001) obtained KR-20 reliability coefficients for the studied population without LDs of .82 for men and .83 for women. The current study has a moderately strong KR-20 reliability measure of .82 (see Table 1). Construct validity for the MVS scale was reported by Holland et al. (1980).

*CTI (Sampson et al., 1996).* The CTI was developed to improve the quality of career decisions and career service delivery for adult clients,

TABLE 1

**Reliability Estimates and *t* Tests Comparing Career Thoughts Inventory, Career Maturity Inventory-Revised, and My Vocational Situation Scales for Non Learning Disabilities (NLD) and Learning Disabilities (LD) Samples**

Measure	<i>t</i>	Cohen's <i>d</i>	NLD High School Sample*			LD High School Sample					
			<i>M</i>	<i>SD</i>	<i>N</i>	Reliability	<i>M</i>	<i>SD</i>	<i>N</i>	Reliability	No. of Items
Career Thoughts Inventory <sup>a</sup>											
Total	4.47**	0.45	48.8	20.5	396	0.96 <sup>b</sup>	39.6	22.0	139	0.95	48
Decision Making Confusion	-1.88		11.9	7.0	396	0.88 <sup>b</sup>	13.2	7.1	139	0.89	14
Commitment Anxiety	0.00		12.2	4.9	396	0.85 <sup>b</sup>	12.2	5.1	139	0.80	10
External Conflict	-8.12**	0.91	3.8	2.2	396	0.74	5.8	3.2	139	0.75	5
Career Maturity Inventory <sup>c</sup>											
Total	11.61**	1.16	34.8	4.3	503	0.61 <sup>d</sup>	29.8	5.0	136	0.77	50
Attitude	6.87**	0.71	17.5	2.8	503	0.54 <sup>d</sup>	15.5	3.7	136	0.74	25
Competence	9.97**	1.00	17.4	3.0	503	0.52	14.4	3.5	136	0.71	25
My Vocational Situation <sup>e</sup>											
Vocational Identity	0.45		9.4	4.6	486	0.86	9.6	4.5	139	0.82	18

Note.  $r^2_{pb}$  = point-by-serial correlation coefficients.

<sup>a</sup>Sampson, Peterson, Lenz, Reardon, & Saunders (1996). <sup>b</sup>Alpha coefficients. <sup>c</sup>Holland, Daiger, & Power (1980). <sup>d</sup>KR-20 value. <sup>e</sup>Crites & Savickas (1995).   
 \*\**p* < .01.

college students, and high school students (Sampson et al., 1996) by helping to identify problematic career-related thoughts. The CTI consists of 48 items, and the total score is considered a single global indicator of dysfunctional or negative career thoughts. Items are scored on a 4-point Likert-type scale, ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Each item reflects a particular dysfunctional thought that could inhibit the process of career problem solving and decision making (Sampson et al., 1996). The researchers identified three cluster areas of dysfunctional thinking: (a) decision-making confusion (DMC), the inability to initiate or sustain the career decision-making process due to disabling emotions and/or limited understanding; (b) commitment anxiety (CA), the inability to commit to a career choice because of anxiety about the anticipated outcome; and (c) external conflict (EC), the inability to balance self-perception with input from significant others, translating into a reluctance to assume independence and/or responsibility for career decision making. Each of the constructs is relatively independent, meaning that respondents may exhibit dysfunctional thoughts within a specific construct area or in multiple construct areas concurrently. When dysfunctional thoughts are identified, they can be targeted through career counseling interventions, increasing the likelihood of a successful outcome.

The CTI construct scales have alpha coefficients ranging from .77 to .91. Internal consistency of the CTI for high school students with LDs, in particular, was consistent with the internal consistency coefficients obtained in the original study. Reported total score test-retest reliability for a 4-week period was .89 for the non-LD college sample and .69 for a sample of high school students without LDs (Sampson et al., 1996). The internal consistency for a sample of undergraduate students without LDs was comparable with that of undergraduate college students with LDs (Dipeolu, 1997; Dipeolu et al., 2002). The current study had alpha coefficients for CTI ranging from .75 to .95, as presented in Table 1. Several research studies have found CTI to be a stable and valid instrument for use during the career counseling process for the non-LD population (Vernick, 2002).

## Results

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The first hypothesis was supported. We used scores from the CTI, MVS-VI, and CMI-R, which were normed for students with LDs. The raw score distribution for students with LDs was significantly different from the published distributions, based on a population without LDs, for the three inventories. The raw score distribution for this study resulted in different normative *T* scores for scoring, when compared with that of the population without LDs, as indicated in Table 1. In addition, we used scores obtained by students with LDs on the MVS-VI and the CMI-R to predict the LD-normed scores on the CTI, to understand the different ways that students with LDs may answer these questions compared to the normed scores of high school students without LDs presented in the manuals. Analysis was performed using multiple regression and *t* tests.

The second hypothesis was also supported. We performed a standard multiple regression with CTI scale scores (normed for students with LDs) as the dependent variable and the CMI subscales of CMI-Tal,

CMI-Com, and CMI-Att and the MVS subscale of VI (all normed for students with LDs) as the independent variables. We performed analysis using SPSS regression using the Enter method and SPSS frequencies for the evaluation of assumptions. Correlations for all four scale regressions were significantly different from zero: CTI Total scale score,  $F(4, 119) = 17.96, p < .001$ ; CTI DMC scale score,  $F(4, 135) = 18.61, p < .001$ ; CTI EC scale score,  $F(4, 135) = 12.91, p < .001$ ; and CTI CA scale score,  $F(4, 135) = 9.88, p < .001$ . Table 2 displays the standardized regression coefficients ( $\beta$ ),  $R^2$ , adjusted  $R^2$  values, and the 95% confidence interval (CI) of the effect size for these regression analyses.

The MVS-VI scale contributed significantly to predicting the LD-normed scale  $T$  score for CTI Total, contributing 15% of the unique variance, as indicated by the squared part correlation value ( $sr_i^2$ ) for the significant component of the equation ( $sr_i^2 = .15$ ; see Tabachnick & Fidell, 2001). The CMI-Att scale was also significant, contributing 3% of the unique variance ( $sr_i^2 = .03$ ; see Table 2). The four career-related constructs of MVS-VI, CMI-Att, CMI-Com, and CMI-Tal in combination contributed another 0.20 in shared variability. Altogether, knowing scores for these four constructs increased the prediction of the CTI Total scale score by an effect size of 38% (36% adjusted), CI [0.25, 0.51]. This indicates that there is added predictive power in knowing the MVS-VI and CMI scores for students with LDs.

Four constructs contributed significantly to prediction of the LD-normed scale score of the CTI DMC scale: CMI-Att ( $sr_i^2 = .04$ ), CMI-Com ( $sr_i^2 = .02$ ), CMI-Tal ( $sr_i^2 = .02$ ), and MVS-VI ( $sr_i^2 = .10$ ). The CTI DMC scale was more easily predicted with the MVS-VI and CMI-R scores. Altogether, knowing scores for these four constructs increased the prediction of the CTI DMC scale score by an effect size of 36% (34% adjusted), CI [0.24, 0.49].

Four constructs contributed significantly to prediction of the CTI EC scale: CMI-Att ( $sr_i^2 = .05$ ), CMI-Com ( $sr_i^2 = .02$ ), CMI-Tal ( $sr_i^2 = .03$ ), and MVS-VI ( $sr_i^2 = .06$ ). Altogether, knowing scores for these four constructs increased the prediction of the CTI Total scale score by an effect size of 28% (26% adjusted), CI [0.16, 0.41].

The MVS-VI scale contributed significantly to predicting the LD-normed scale  $T$  score for the CTI Total, contributing 12% of the unique variance ( $sr_i^2 = .12$ ). The four career-related constructs of MVS-VI, CMI-Att, CMI-Com, and CMI-Tal scales in combination contributed another 0.11 in shared variability. Altogether, knowing scores for these four constructs increased the prediction of the CTI Total scale score by an effect size of 23% (21% adjusted), CI [0.11, 0.35].

The results of the  $t$  tests, using a Bonferroni adjustment to address error rates, revealed that most of the scales (CTI Total, CTI EC, CMI-Tal, CMI-Att, and CMI-Com) were consistently different when the two samples were compared. See Table 1 for means, standard deviations, and  $T$  scores, demonstrating the differences between the high school population scores used in the manual and the scores on the CTI based on the current population with LDs. Further analysis indicated that the CTI EC scale raw scores and resultant  $T$ -score values were significantly different from the raw scores to  $T$ -score norm tables for the high school population without LDs provided in the respective manuals. The find-



**TABLE 2**  
**Regression Results for Career Thoughts Inventory (CTI) Scale Scores Using Learning Disabilities Norms**

Predictor	CTI Total			CTI External Conflicts (EC)			CTI Commitment Anxiety (CA)			CTI Decision Making Confusion (DCM)		
	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$
Career Maturity Inventory Total	3.50	2.10	0.78	0.72	0.33	1.12*	0.63	0.53	0.63	1.42	0.69	1.00*
Competence	-3.57	2.22	-0.58	-0.75	0.35	-0.80*	-0.58	0.56	-0.40	-1.58	0.72	-0.77*
Attitude	-5.10	2.11	-0.81*	-0.98	0.33	-1.11**	-0.80	0.53	-0.58	-2.03	0.69	-1.04**
My Vocational Situation												
Vocational Identity	-2.07	0.40	-0.44**	-0.21	0.06	-0.29**	-0.44	0.10	-0.40**	-0.56	0.13	-0.36**
Total $R^2$		0.38			0.28			0.23			0.36	
Adjusted $R^2$		0.36			0.26			0.21			0.34	
95% Confidence Interval		[0.25, 0.51]			[0.16, 0.41]			[0.11, 0.35]			[0.24, 0.49]	
F		17.96**			12.91**			9.88**			18.61**	

Note.  $F(4, 119)$  for CTI Total and  $F(4, 135)$  for EC, CA, and DMC scales.

\* $p < .05$ . \*\* $p < .01$ .

ings suggest the need to have a representative norm for the population with LDs. As indicated in the manual, the use of representative norms for comparison can provide more specific and useful data based on the population of interest. This will need further investigation in future studies.

Overall, the internal consistency reliability estimates of the instruments were similar to those found in populations of students without LDs and to previous studies involving students with LDs (see Table 1). Reliability coefficients (represented by alphas and KR-20 coefficients) obtained for the three instruments ranged from .47 to .95. The number of items; internal consistency reliability values for the means of populations with and without LDs; and sample sizes for the CTI, CMI-R, and MVS-VI scales are presented in Table 1.

## Discussion

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Our findings both support and challenge previous research and practice. The new representative norms seem more appropriate to the population with LDs for the CTI, MVS-VI, and CMI-R based on the results of this study. We also found that career maturity and level of vocational identity significantly affected negative career thoughts in students with LDs.

Specifically, the construct of career-related cognitions as measured by CTI Total LD-normed scale scores was predictable, with knowledge of student scores for vocational identity and career maturity measured by the MVS-VI and CMI-R, respectively, with a medium effect size of 38% in CTI scores. Osborn and Zunker (2006) indicated that there is no single best instrument for assessing vocational constructs, and the findings of this study provide further support for administering several instruments for prediction purposes, to increase the validity of the overall assessment process. If career counselors know scores on the CMI-R and MVS-VI scales, they can better predict students' levels of negative career-related thoughts as measured by the CTI Total scale score. Combining the instruments this way allows in-depth analysis in the assessment process, and validity is greatly enhanced by the concurrent use of the three instruments (Hartung, 2005; Levinson, Ohler, Caswell, & Kiewra, 1998). More important, the use of scores that are representative of students with LDs further enhances the validity of the instruments and the adoption of this approach in counseling.

The regression analysis found higher DMC, CA, and EC scale scores of the CTI for students with LDs. Specifically, results of the CTI DMC scale suggest its utility with students with LDs. For instance, students who score high on the DMC scale may lack an understanding of the decision-making process with associated negative emotions. As students consider their career options, these issues can cause them to act too slowly, too quickly, or randomly to make a choice (Sampson et al., 2004), decreasing the likelihood of an appropriate decision. Findings of this study confirm that removing blockages to the decision-making process caused by negative emotions is vital to the success of the career decision-making process for students with LDs.

Another important finding from this study is that the CTI CA scale, which assesses the level of difficulty an individual has committing to a choice, was significantly associated with vocational identity. According to Krumboltz (1990) and Sampson et al. (2004), dysfunctional cogni-

tions inhibit constructive action and discourage people from exploring alternatives and actively seeking information, opinions, or advice that might lead to a career commitment. Therefore, if students have dysfunctional thoughts, as indicated by elevated scores on the CA scale, career counselors can proactively expose them to new possibilities that have previously been missed because of anxiety. This will, in turn, increase students' clarity of career choices, based on additional information provided, and identify and remove barriers to success.

The results of this study extend previous work with high school and college students with LDs (Dipeolu, 2007; Dipeolu & Keating, 2010; Dipeolu et al., 2002). Findings suggest that high CTI EC scale scores for students with LDs may indicate struggles with finding an appropriate balance between internal perception and external directedness about career issues. These findings support the need to examine student scores on the EC scale, in particular, to help enhance appropriate and positive career choices for students with LDs. Practitioners need to pay close attention to the EC scale for students with LDs to enhance the effectiveness of intervention strategies and may need to assess the extent to which the career decision made is a reflection of the student's choice or that of others and if the student is comfortable with the choice.

For students with LDs, self-determination skills may be critical to establishing a career and making future choices for postsecondary education and training (Durlak, Rose, & Bursuck, 1994; Martin, Van Dycke, D'Ottavio, & Nickerson, 2007). Few instruments are available to help career counselors assist students to identify and improve their self-determination skills. Scores on the CTI EC scale for this study confirm previous findings indicating that career counselors can use this score to gain an awareness of the extent to which students with LDs present with self-determination skills deficits (Dipeolu & Keating, 2010). Additionally, the findings of this study show that the reliability estimates of the three measures for students with LDs are consistent with or higher than the reliability estimates recorded in the manual (see Table 1) for high school students without LDs. This indicates that these scales can be used with high school students with LDs confidently. Our results also give further evidence of the construct validity of the CTI, MVS, and CMI-R (see Table 3).

**TABLE 3**

**Correlations of Career Thoughts Inventory (CTI) Scales, Career Maturity Inventory (CMI) Scales, and My Vocational Situation Vocational Identity Scale**

Variable	1	2	3	4	5	6	7	8
1. CTI Total	—							
2. CTI Decision Making Confusion	.92**	—						
3. CTI Commitment Anxiety	.84**	.76**	—					
4. CTI External Conflict	.80**	.70**	.56**	—				
5. CMI Attitude	-.48**	-.49**	-.32**	-.44**	—			
6. CMI Competence	.05	-.03	.06	.02	-.05	—		
7. CMI Total	-.29**	-.36**	-.18*	-.28**	.68**	.68**	—	
8. Vocational Identity	-.56**	-.50**	-.45**	-.43**	.47**	-.01	.34**	—

*Note.* \*Correlation is significant at the 0.05 level (2-tailed). \*\*Correlation is significant at the 0.01 level (2-tailed).

Probably the most common framework used in interpreting the significance of test scores is the performance of other people (Osborn & Zunker, 2006). However, counselors must carefully evaluate the population from which test norms have been derived to determine whether it is representative of their clients. An examination of the means and standard deviations of the sample of those with LDs, as compared with those of the population without LDs used in the manuals, revealed that the scores are significantly different on a number of the scales (see Table 1). It could be suggested that scores on these inventories cannot be interpreted the same way for all people. In other words, the construct validity of the measures could be in doubt if used without regard for the differences (Savickas & Spokane, 1999; Subich, 2005). This supports the need to develop a more representative norm, particularly for students with LDs, as suggested by Dipeolu (2007) and Sampson et al. (1996). Renorming the instruments using a representative sample of students with LDs will allow career counselors to be more effective and more sensitive to smaller changes in the students' scores. This would allow for better recognition of what is typical in that population, how large the variance is in the population, and where intervention may truly be necessary.

## Limitations and Future Directions

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The current study has both strengths and limitations. A major strength of this study is that the results were derived from representative norms for students with LDs. Although the current sample size is robust, re-search using a larger sample size may be warranted for future studies. Additional larger samples of students with LDs may also help to confirm the stability of the norms for the population with LDs found in the current study. This study is also based on a convenience sample of students whose parents were willing to participate. Future studies with random sampling of students with LDs could help advance knowledge in this area. Another limitation is that the participants came from a midwestern state and therefore are all informed by the same educational process. Alternative samples that broaden the base of participation beyond the midwestern region would be informative. Despite these limitations, the current study advances the literature by using normative data, further confirming the connection between the EC scale of the CTI and the skills of self-advocacy and self-determination and providing further evidence of construct and convergent validity of the assessment measures (see Table 3). The approach used in this study—developing representative norms for the instruments involved—can be applied to other instruments to enhance their usefulness for students with LDs.

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