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Career Assessment and the Career Decision-Making Self-Efficacy Scale

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This article begins with a brief overview of the theories underlying the development of the Career Decision-Making Self-Efficacy Scale (CDMSE; Taylor & Betz, 1983), specifically Bandura's self-efficacy (1977, 1986) theory and Crites's career maturity theory (1978). Research on the correlates and consequences of career decision-making self-efficacy is reviewed, especially that showing the strong relationships of career self-efficacy to career indecision and other indices of problems in career decision-making. This article also reviews the uses of the CDMSE in the design and evaluation of educational and counseling interventions designed to increase perceptions of self-efficacy in relationship to the process of career decision-making.

A recent focus of assessment, intervention, and research in the general area of career beliefs and attitudes has been on self-efficacy expectations with respect to career decision-making. On the basis of Bandura's (1977, 1986) theory of self-efficacy expectations as a major mediator of both behavior and behavior change, self-efficacy was first applied to career behavior by Betz and Hackett (1981). Although assessment of career self-efficacy now encompasses many more specific domains of behavior, for example, task-specific occupational self-efficacy (Osipow, Temple, & Rooney, 1993; Rooney & Osipow, 1992), mathematics self-efficacy (Betz & Hackett, 1983), and self-efficacy for the Holland themes (Betz, Harmon, & Borgen, 1996; Lenox & Subich, 1994), the domain that has received the most interest from both researchers and practitioners has been career decision-making self-efficacy and its chief measure, the CDMSE. In this article, we review the theoretical bases for the development of the original 50-item CDMSE and the psychometric evaluations of the CDMSE and the 25-item short form (CDMSE-SF; Betz, Klein, & Taylor, 1996). Following this, we review research on the correlates and consequences of career decision-making self-efficacy. Finally, we discuss the use of the scale in the design and evaluation of

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interventions capable of increasing individuals' perceptions of self-efficacy with respect to the skills required in career decision-making.

Theoretical Bases

Self-Efficacy Theory

Self-efficacy theory may be viewed as one approach to the more general study of the applicability of social learning or social cognitive theory (e.g., Krumboltz, Mitchell, & Jones, 1976; Lent, Brown, & Hackett, 1994) to vocational behavior.

Briefly, as originally proposed by Bandura (1977), self-efficacy expectations refer to a person's beliefs concerning his or her ability to successfully perform a given task or behavior. They are postulated by Bandura to be major mediators of behavior and behavior change. Low self-efficacy expectations regarding a behavior or behavioral domain lead to avoidance of those behaviors, whereas stronger self-efficacy expectations should lead to approach behavior. Thus, self-efficacy expectations can be useful in understanding and predicting behavior. In addition, interventions designed to facilitate approach behavior are effective because, and to the extent that, they increase the individual's expectations of self-efficacy with respect to the problematic, that is, previously avoided, behavior.

In addition to postulating the mechanism by which behavior change occurs, Bandura (1977) specified four sources of information through which self-efficacy expectations are learned and by which they can be modified. These sources of information include: (a) performance accomplishments, that is, experiences of successfully performing the behaviors in question; (b) vicarious learning or modeling; (c) verbal persuasion, for example, encouragement and support from others, and (d) lower levels of emotional arousal, that is, anxiety, in connection with the behavior. Thus, the theoretical context of the self-efficacy construct provides not only a means for understanding the development of self-efficacy beliefs, but the means for their modification through interventions incorporating positive applications of the four sources of self-efficacy information.

Also important for present purposes is the domain-specificity of the self-efficacy construct. The term career self-efficacy is a general term meant to summarize the possibility that low expectations of self-efficacy with respect to some aspect of career behavior may serve as a detriment to optimal career choice and development (Betz & Hackett, 1986). Hackett and Betz (1981) distinguished the uses of self-efficacy theory with reference to career choice content and career choice process (a distinction also made previously in Crites's 1978 theory of career maturity). Career choice content refers to content domains—for example, math, writing, science. Low self-efficacy in a content area would presumably lead to avoidance of that area of course work or of careers in that area. Career choice process domains are those behavioral domains important to the choice and implementation of any career area—career decision-making self-efficacy is the most obvious example of this, but domains such as assertiveness, job search self-efficacy, and self-efficacy with respect to combining home and career are other examples.

Career Maturity Theory

Although the concept of self-efficacy expectations provided the primary theoretical basis for scale development, Crites's (1978) model of career maturity provided the original scale authors (Taylor & Betz, 1983) with a framework for deciding how to define and operationalize the skills required in career decision-making. More specifically, Crites, in his model of career maturity, hypothesized that "good" career decisions will be facilitated by competence with respect to five career choice processes and by mature versus immature attitudes regarding the career choice process. Because self-efficacy theory is defined in relationship to competence in specific behavioral domains, Crites's five career choice competencies were used to define the domain of interest, competent career decision-making. These five competencies and, subsequently, the subscales of the CDMSE, were: (a) accurate self-appraisal, (b) gathering occupational information, (c) goal selection, (d) making plans for the future, and (e) problem solving.

Thus, the conceptualization and measurement of career decision-making self-efficacy involved the integration of two major theories, one originally stemming from clinical-social psychology and the other having its origins in counseling-vocational psychology.

Instrument Development and Evaluation

The following section will begin by describing the development of the CDMSE and the CDMSE-SF. Then, evidence for the reliability and validity of the two scales will be provided.

Career Decision-Making Self-Efficacy Scale

The CDMSE was designed to measure an individual's degree of belief that he or she can successfully complete tasks necessary to making career decisions. As mentioned, the basis for scale construction was the five career choice competencies postulated in Crites's (1978) model of career maturity and assessed in the Career Maturity Inventory (Crites, 1978). Thus, the item content included behaviors pertinent to: (a) accurate self-appraisal, (b) gathering occupational information, (c) goal selection, (d) making plans for the future, and (e) problem solving. For the original scale, 10 items were written to reflect each competency. Self-efficacy expectations with regard to the career decision-making tasks were assessed by asking the respondent to indicate his or her ability to successfully complete each task. Responses were obtained on a 10-point scale ranging from 9 (*complete confidence*) to 0 (*no confidence*).

Career Decision-Making Self-Efficacy Scale-Short Form

Because the original CDMSE contained 50 items, a shorter version that could be easily used in counseling assessment and as a pre-post measure for the evaluation of career interventions was desirable. Accordingly, a 25-item form was developed (see Betz, Klein, & Taylor, 1996, for full details). The short form was developed by eliminating 5 of the 10 items from each of the five CDMSE subscales. The items retained were those satisfying criteria of: (a) substantive generality (versus content specificity or narrowness),

(b) item-own scale correlation equal to or greater than .50, (c) loading on the only appropriate factor in the Taylor and Popma (1990) factor analysis, and (d) recommendation for retention on the basis of Gati, Osipow and Fassa's (1994) split-scale analysis of the subscale structure.

Thus, the CDMSE short form consisted of five 5-item subscales, for a total of 25 items. Responses were again obtained using a 10-level confidence continuum, ranging from 1 (*no confidence at all*) to 10 (*complete confidence*).

Reliability

Both versions of the CDMSE have been reported to be highly reliable. In the original normative sample of 346 students from a large state university and a private liberal arts college, internal consistency reliability coefficients (alpha) ranged from .86 to .89 for the subscales and yielded an alpha of .97 for the total score (Taylor & Betz, 1983). Other researchers have reported comparable levels of internal consistency—Luzzo (1993a, 1993b) reported a total scale alpha of .93 and a 6-week test-retest reliability of .83.

The internal consistency reliability of the short form ranged from .73 (Self-Appraisal) to .83 (Goal Selection) for the 5-item subscales and yielded an alpha of .94 for the 25-item total score (Betz, Klein, & Taylor, 1996). In two samples including a total of 347 college students, reliabilities ranged from .69 to .83 for the subscales (again with Self-Appraisal the lowest and Goal Selection the highest) and yielded an alpha of .93 for the total score. A recent psychometric evaluation of the CDMSE (Luzzo, 1996) concluded that adequate reliability of the scale has been repeatedly demonstrated, supporting the use of the CDMSE in research and applied settings.

Content Validity

Evidence for the content validity of any measure begins with a careful definition of the domain of interest (see Walsh & Betz, 1995). Because the construct of self-efficacy refers to beliefs of capability with respect to a specific domain of behavior, adequate specification of that domain is a precondition for content validity. For the CDMSE, a well regarded theory of career maturity, (Crites, 1978) based on the necessity of developing five career choice competencies was used as the basis for scale development.

Although constructed with a sound conceptual basis, evidence from factor analyses has not supported the existence of five subscales. Taylor and Betz (1983) used an iterated principal components factor analysis with varimax rotation to investigate the structure of the 50 items of the CDMSE. Five factors, when rotated, accounted for 52% of the total variance, with Factors 1 through 5 accounting for 16.9%, 11.4% &, 10.7%, 8.1%, and 4.9% of the variance, respectively. More importantly, 27 items had their highest loadings on the first factor; the Self-Appraisal, Occupational Information, Goal-Selection, Planning, and Problem-Solving subscales contributed 8, 5, 5, 6, and 3 items, respectively. Items loading on the other four factors were also heterogeneous with respect to the theoretically based scale from which they originated. In Taylor and Popma's (1990) replication of the factor analysis, a more clear-cut group factor structure resulted, but 17 of the items still loaded on the first factor, which accounted for 8% of the total

variance (only 26% of the variance was accounted for by the factor solution). Given these findings and those of other researchers, Robbins (1985) and Taylor and Popma suggested that the CDMSE is a generalized measure of career decision-making self-efficacy.

On the other hand, Peterson and del Mas (1994) concluded from a components analysis that the CDMSE is constituted of two major factors—decision-making and information gathering. And Gati et al. (1994) reported that when certain problematic items (based on low item-scale correlations or high correlations with other scales) were eliminated from the CDMSE, the five-factor structure did emerge in cluster analyses.

Factor analysis of the short form utilized both the theoretically based five-factor structure and Peterson and del Mas' (1994) two-factor findings. As with previous research, the five-factor theoretical basis for the CDMSE-SF was supported only marginally by factor analysis (Betz, Klein, et al., 1996). Evidence for the existence of Occupational Information and Goal Selection factors is strong, although each factor also included Planning items. Problem Solving and Self-Appraisal items distribute across two other factors, and the fifth factor was constituted by one isolated Self-Appraisal item.

In the two-factor solution, the Decision-Making factor pulled Self-Appraisal and Planning, as well as the Goal Selection items, and the Information Gathering factor pulled Problem Solving as well as Occupational Information items. Interestingly, the Problem Solving items loading on Factor 2 were related to the idea of generating additional options if the first choice doesn't work out (e.g., "Change occupations if you aren't satisfied with the one you enter" and "Identify some reasonable major or career alternatives if you are unable to get your first choice"). This combination of items strongly supports the often-discussed idea that good career decision-making depends on the availability of options and suggests that a crucial part of occupational information gathering is the generation of educational and career options.

Criterion-related and Construct Validity

Conclusions regarding the validity of the construct and measures of career decision-making self-efficacy depend on research showing its relationships to other variables related to educational and career attitudes and progress in particular to career indecision and related attitudes, career exploratory behaviors, and degree of progress toward appropriate educational and career goals. In this regard, evidence for the validity of the CDMSE (and CDMSE-SF) is solid and varied in the nature of criterion variables examined.

Perhaps the most consistent, and important, correlate of career decision-making self-efficacy is career indecision. As summarized in Table 1, research has consistently demonstrated that stronger perceptions of career decision-making self-efficacy are related to lower levels of career indecision, as measured by Osipow's (1987) Career Decision Scale (CDS). In the original study (Taylor & Betz, 1983), correlations of the CDMSE with the CDS Indecision subscale ranged from –.29 for the CDMSE Problem Solving subscale to –.48 for the Goal Selection subscale; these correlations and that between the total CDMSE and CDS scores (–.40) were statistically

Table 1
A Summary of Relationships of Career Decision-Making Self-Efficacy to Selected Measures of Career Indecision, Attitudes, and Behaviors

Variable	*r*	(*N*)	Study
Career indecision	–.40	(346)	Taylor & Betz, 1983
(Career Decision Scale)	–.51	(407)	Taylor & Popma, 1990
	–.56	(SF, *N* = 184)	Betz, Klein, & Taylor, 1996
	–.62	(SF, *N* = 90)	Betz & Serling, 1995
	–.45	(*N* = 350)	Betz & Klein, 1995
Career certainty	.34	(*N* = 92)	Robbins, 1985
(Career Decision Scale)	.56		Betz, Klein, & Taylor, 1996
	.42		Betz & Serling, 1995
Vocational identity	.34	(*N* = 92)	Robbins, 1985
(My Vocational Situation)	.58		Betz, Klein, & Taylor, 1996
Fear of commitment	–.50		Betz & Serling, 1995
(Fear of Commitment Scale)			
Career maturity	.41	(*N* = 230)	Luzzo, 1993a
(Career Maturity Inventory Attitude Scale)			
Motivation	.42	(*N* = 181)	Niles & Sowa, 1992
(Career Beliefs Inventory)			
Career decision-making	.05	(*N* = 230)	Luzzo, 1993a
(Career Development Inventory)			
Career maturity	.39	(*N* = 115)	Luzzo, 1995
(Career Maturity Inventory Attitude Scale)			
Career decision-making	.24	(*N* = 115)	Luzzo, 1995
(Career Development Inventory)			
Career exploratory behavior	.17	(SF, N)	Betz & Serling, 1995
(Career center visits)			

Note. SF = Short Form of the Career Decision-Making Self-Efficacy Scale.

significant. Robbins (1985) reported CDMSE-CDS correlations ranging from –.18 (Occupational Information) to –.40 (Planning). All but that with Occupational Information were statistically significant. Likewise, Taylor and Popma (1990) reported *r*s of –.38 to –.59 with career indecision and of .32 to .55 with decidedness. A significant relationship between career decision-making self-efficacy and career indecision has been revealed in numerous other investigations as well (e.g., Bergeron & Romano, 1994; Merwin, 1993; Schoon, 1991).

Relationships of the CDMSE-SF to Career Indecision were even stronger—they ranged from –.19 to –.66 for Indecision and from –.03 to –.76 for

Certainty (Betz, Klein, & Taylor, 1996). Using the CDMSE-SF, however, there were several significant gender differences in the magnitude of the CDMSE-CDS Certainty scale correlations, with relationships higher for woman than men. Thus, using the short form there was evidence of a tighter connection between self-perceptions of career decision-making competence and decisional certainty among women than men.

The CDMSE is also related to the 18-item Identity subscale of Holland, Daiger, and Power's (1980) My Vocational Situation (MVS). Robbins (1985) reported values of r ranging from .28 (Planning with VI) to .40 (Goal Selection with VI). In Betz, Klein, et al.'s (1996) sample of 184 participants using the CDMSE-SF, correlations with VI ranged from .40 to .66 (women) and .28 to .56 (men).

Robbins (1985) also used the "known groups" method of investigating the construct validity of the CDMSE. Subjects were divided into high and low vocational identity groups based on extreme scores on the MVS. Results of ANOVA indicated that the Goal Selection, Planning, and Self-Appraisal subscales and the CDMSE total score significantly differentiated the high- versus low-identity groups. A discriminant analysis of group differences yielded a significant discriminant function to which all five scales were related and which was characterized most strongly by Self-Appraisal and Goal Selection. The overall hit rate for the classification of subjects into high- versus low-identity groups was .70. A similar strategy was employed by Nevill, Neimeyer, Probert, and Fukuyama (1986) and by Neimeyer and Metzler (1987) in their investigations of vocational schemas in career decision-making. Results of both studies indicated that highly integrated and differentiated vocational schemas are associated with the highest levels of career decision-making self-efficacy.

In a sample of 92 students enrolled at a private liberal arts college, Betz and Serling (1995) examined the relationship between CDMSE-SF scores and the Fear of Commitment Scale (Serling & Betz, 1990). The construct of fear of commitment and its associated measure (Serling & Betz) are intended to tap the indecisiveness component of decisional difficulties, as opposed to indecision based primarily on lack of information or knowledge of how to make a career decision. Indecisiveness (Tyler, 1969), also termed chronic indecision (Fuqua & Hartman, 1983), is viewed as a more stable, trait-like condition related to anxiety. Betz and Serling (1995) reported a significant negative relationship ($r = -.50$) between CDMSE scores and fear of commitment.

Several studies have shown CDMSE scores to be related to behavioral (versus self-report) indicators of educational and career adjustment. Taylor and Popma (1990) reported that the CDMSE significantly differentiated three groups of students categorized on the basis of college major status—declared majors, those with tentative major choices, and undecided students. Mathieu, Sowa, and Niles (1993) reported that career undecided college women had significantly lower CDMSE scores than did women preferring either male-dominated or gender-neutral occupations, but their scores did not differ from those preferring traditional female occupations. In a related investigation, Nevill and Schlecker (1988) found that women who scored high

on the CDMSE were more willing to engage in the career-related activities of nontraditional occupations than were women who scored low on the CDMSE.

Research by Blustein (1989) also provided evidence of the relationship between career decision-making self-efficacy and career exploration behavior. Measures of goal instability and environmental and self-exploratory activity were administered along with the CDMSE to 106 college students. Results of a canonical correlation analysis suggested that career decision-making self-efficacy emerged as a more prominent predictor of exploratory activity than did any of the other variables (goal instability, age, and gender).

Peterson (1993a) examined the CDMSE as a predictor of academic and social integration, which, in turn, were postulated to be related to academic persistence (retention). Using a sample of 678 underprepared college students, Peterson reported that CDMSE scores surpassed all other variables as predictors of overall and academic integration, explaining 18% of the variance of each. Scores on the CDMSE also explained 12% of the variance in social integration. Because of the strength of her findings, Peterson suggested that interventions designed to increase career decision-making self-efficacy should be strongly considered in student retention programs.

Other Related Research

Bandura's (1986) formulations of self-efficacy theory include the postulate that increases in self-efficacy expectations relative to one domain should generalize to some degree to other domains; from this general statement, statistically significant relationships among domain-specific measures of self-efficacy would be postulated. It is not surprising, then, that scores on the CDMSE have been moderately related to other measures of self-efficacy. For example, Betz and Serling (1995) found statistically significant correlations of .53, .21, and .29 with the Verbal, Quantitative, and Aesthetic subscales of Rooney and Osipow's (Rooney & Osipow, 1992; Osipow et al., 1993) Task-Specific Occupational Self-Efficacy Scale (TSOSS) in a sample of 90 students. The correlation with the TSOSS total score was .37. Only the correlation between CDMSE scores and the TSOSS Physical Abilities subscale was nonsignificant (r = .18).

Betz and Klein (1996b) reported correlations of .38, .37, and .26 between CDMSE scores and math self-efficacy, nontraditional occupational self-efficacy, and traditional occupational self-efficacy in a sample of 151 students. Correlations with generalized self-efficacy and the social self-efficacy subscale of the GSE were .54 and .39, and the correlation with global self-esteem was .41 (Ns for these three samples were 350; Betz & Klein). Niles and Sowa (1992) reported correlations of .42 and .21 with generalized self-efficacy and social self-efficacy, respectively.

Other studies have suggested that career decision-making self-efficacy is also related to other indices of a so-called healthy personality. For example, Niles and Sowa (1992) reported that CDMSE scores were positively related to the commitment and components control of psychological hardiness (Kobasa, 1985). Betz and Klein (1996b) reported that CDMSE-SF scores were significantly related to both generalized self-efficacy (rs = .59 in men

and .50 in women) and to a measure of global self-esteem (*r*s = .43 in men and .39 in women). Especially noteworthy may be the finding that in regressions using the CDMSE as well as several other domain-specific measures of career self-efficacy (including mathematics, self-efficacy for traditional and nontraditional occupations, and self-efficacy with respect to the six Holland themes), CDMSE scores were the predominant predictor of generalized self-efficacy. Multiple correlations squared for predictive equations in which the CDMSE total score was the sole significant predictor ranged from .20 to .59. Total CDMSE scores were significantly related to global self-esteem (r = .58) and trait anxiety (r = .24) in the study of Robbins (1985). Taylor and Popma (1990) reported a correlation of –.30 with locus of control, indicating that the more external the locus of control, the lower the career self-efficacy.

In the social cognitive models of career behavior of both Bandura (1986) and Lent, et al. (1994), self-efficacy expectations are also postulated to be related to outcome expectations. Betz and Klein (1996a) measured career decision outcome expectancies—beliefs that successfully engaging in educational and career decision-making behaviors will lead to desired academic and career outcome behaviors. Results in a sample of 350 college students indicated that correlations between efficacy and outcome were higher in men (.35–.53) than women (.12–.33). A few of the paired differences in correlations were statistically significant, suggesting a closer association between self-efficacy and outcome expectations in men than in women.

Other research has examined antecedent or background and demographic variables related to career decision-making self-efficacy. One such variable is, of course, gender, for which few significant differences in either subscale scores or the total score have been reported in research on the CDMSE or CDMSE-SF (e.g., Betz, Klein, & Taylor, 1996; Luzzo, 1993a; Taylor & Betz, 1983). This lack of gender differences implies gender homogeneity in the background experiences related to development of perceived competency in career decision-making tasks. If the lack of gender differences does not imply homogeneity, then some type of compensatory experiences or factors must apply if there are differential background experiences.

Peterson (1993a, 1993b) studied the antecedents and consequences of CDMSE in 678 underprepared college students enrolled in the General College at the University of Minnesota. Background variables related to higher career decision-making self-efficacy included higher career aspirations, higher age, and higher grades (Peterson, 1993b). African American students reported significantly higher career decision-making self-efficacy (M = 6.9) than did Native American (M = 5.3), Asian (M = 5.8), or Caucasian (M = 6.14) students. Both Hispanic (M = 6.6) and Caucasian students scored significantly higher than did Native American or Asian students. Other correlates of higher career self-efficacy were higher levels of parental education and having mothers who work in professional positions.

Finally, available research has suggested low relationships between CDMSE scores and Scholastic Aptitude Test (SAT) scores. In Taylor and Betz's (1983) liberal arts sample, relationships of CDMSE scores with SAT scores ranged from r = .07 (SAT-Math and the Problem Solving subscale) to

r = .25 (SAT-Verbal and the Occupational Information subscale); correlations between SAT-V and SAT-M and the total CDMSE score were r = .19 and r = .18, respectively. In the large university sample, relationships with American College Test (ACT) scores ranged from r = –.11 (ACT-Math and Goal Selection) to r = .21 (ACT-English and Occupational Information); correlations with the total CDMSE score were r = .15 (English) and r = –.02 (Math). A nonsignificant relationship between CDMSE score and grade point average was also reported by Luzzo (1993b).

Adaptations of the CDMSE

After eliminating problematic items from the CDMSE, Gati et al. (1994) developed a Hebrew version of the scale, using 6-item subscales. Gati et al. reported values of coefficient alpha as follows: Goal Selection and Planning (.83), Self-Appraisal (.79), Occupational Information (.76), and Problem Solving (.65). The total score (30 items) value was .92.

Fouad, Smith, and Enochs (in press; also Fouad & Smith, 1996) adapted the CDMSE for use with middle school students. Twelve items were selected to retain the conceptual meaning of the scale while making the questions understandable to seventh and eighth grade students ranging in age from 12 years to 15 years. Fouad et al. (1996) reported a value of coefficient alpha of .79 in this sample of predominantly lower SES Hispanic and African American students.

Counseling and Educational Intervention Studies

On the basis of research reviewed to this point indicating that career decision-making self-efficacy is strongly related to both statements of, and actual difficulties in, making and implementing career decisions, several vocational psychologists have encouraged the development and evaluation of counseling interventions designed to increase career decision-making self-efficacy (Bergeron & Romano, 1994; Betz, 1992; Hackett & Betz, 1992; McAuliffe, 1991; Peterson, 1993a). As Hackett and Betz (1992) explained, "...there is a compelling need to determine the usefulness of self-efficacy theory in enhancing career development and broadening career choices" (p. 241).

Foss and Slaney (1986) were the first to report the results of a systematic effort to increase CDMSE scores. In their investigation, college women completed the CDMSE prior to exposure to a videotaped career intervention designed to broaden women's ranges of perceived career options by reducing sex-role stereotyping in career planning and education. Results of the study indicated significant increases in participants' CDMSE scores 2 weeks following exposure to the video.

Two years later, Fukuyama, Probert, Neimeyer, Nevill, and Metzler (1988) reported results of an investigation designed to evaluate the effects of a computer assisted career guidance program on the career decision-making self-efficacy and career decidedness of undergraduates. All participants completed the CDMSE and the CDS (Osipow, 1987) prior to an initial orientation session in which an overview of DISCOVER (Rayman & Bowlsbey, 1977) was presented. Participants randomly assigned to the

control group completed the CDMSE and CDS a second time 3 days later, prior to their interaction with DISCOVER. Students assigned to the treatment group also completed the career measures 3 days later but only after they interacted with the DISCOVER program. Results indicated significant gains in CDMSE scores and a decrease in career indecision following students' exposure to DISCOVER.

More recently, Luzzo and Taylor (1994) evaluated the effects of verbal persuasion on the CDMSE scores of first-year college students. Eighty-eight students completed the CDMSE as a pretest measure and were then randomly assigned to either a treatment or control group. Students in the treatment group completed the World of Work Inventory (WOWI; Ripley & Neidert, 1987) and subsequently met with a career counselor to discuss the results. During the feedback session, the counselor verbally persuaded students that they possess adequate skills and opportunities to engage in effective career decision-making activities. Students in the control group also completed the WOWI but did not receive the verbal persuasion treatment. Results indicated significant gains in CDMSE scores of students who received verbal persuasion, whereas CDMSE scores of students in the control group were unchanged.

The most recently published study addressing changes in career decision-making self-efficacy was an evaluation of the effects of attributional retraining on the CDMSE scores of college students (Luzzo, Funk, & Strang, 1996). The study examined whether 60 college students, grouped according to career locus of control, were differentially affected by a videotaped career intervention. The intervention was an attributional retraining procedure designed to persuade students to attribute low levels of confidence in making career decisions and career-related failures to a lack of effort. Results revealed that the CDMSE scores of students who initially exhibited an external career locus of control significantly increased following the attributional retraining procedure.

Development and validation of the CDMSE has also led to several investigations evaluating the effects of career counseling workshops and career exploration courses on the career decision-making self-efficacy of college students (Foltz, 1993; McNeill, 1990; Oreshnick, 1991; Shaw, 1988). Although the findings of many of these studies are reported in unpublished doctoral dissertations, results consistently indicate that the CDMSE scores of students who receive a viable intervention tend to increase, whereas CDMSE scores of students who do not receive an appropriate intervention remain relatively stable over time.

Future Directions

Despite the results of research indicating the effectiveness of various strategies for increasing the CDMSE scores of college students, important empirical questions about these and other interventions have yet to be addressed. One of the clearest weaknesses of the intervention-based research in this domain is the lack of clarity regarding the particular sources of self-efficacy that are responsible for observed changes in CDMSE scores. Bandura (1977) clearly specified four sources of self-efficacy (performance

accomplishments, vicarious learning, verbal persuasion, and emotional arousal) that influence an individual's self-efficacy expectations within a given domain. The majority of the research conducted to date, however, has failed to indicate which sources of self-efficacy have been targeted as a means of altering students' self-efficacy expectations. Future investigations aimed at increasing CDMSE scores should clearly identify those self-efficacy sources that are addressed by a particular intervention and indicate how certain strategies are designed to alter self-efficacy expectations of participants.

Longitudinal research addressing the long-term impact of interventions on career decision-making self-efficacy is also lacking. Although previous investigations have consistently indicated that a variety of techniques are effective in increasing CDMSE scores over a relatively brief period of time, there is a need to evaluate the long-term impact of such strategies. It will be important to determine whether changes in CDMSE scores are temporary or stable over time.

Attribute-treatment interaction (ATI) studies represent another domain yet untapped by researchers interested in evaluating the effectiveness of interventions designed to increase CDMSE scores. As Fretz (1981) argued, ATI evaluation studies provide essential information for making well informed decisions "...about which types of programs can be offered cost effectively for diverse clientele and what innovative programs or combinations of programs might best increase the impact of career interventions" (p. 87). A comprehensive evaluation of strategies for increasing career decision-making self-efficacy must include an analysis of client attributes that might differentially affect the results of interventions.

Another important extension of previous research that has yet to be systematically addressed is the extent to which changes in career decision-making self-efficacy lead to other adaptive changes associated with career decision-making. Future research might help to clarify the degree to which changes in CDMSE scores serve as a catalyst for other changes in career development. Do increases in CDMSE scores lead to decreases in career indecision, or is it a decrease in career indecision that leads to increases in CDMSE scores? If an individual's career decision-making self-efficacy is increased, will she or he also exhibit changes in career exploration behavior? Will interventions designed to increase a person's awareness of her or his vocational interests, abilities, and skills serve as effective strategies for increasing CDMSE scores? Studies designed to answer these and other important questions about changes in CDMSE scores will help clarify the role of career decision-making self-efficacy in the broader context of career development.

Based on the numerous reliability and validity studies of the CDMSE and the CDMSE-SF that have been conducted over the past 15 years, researchers can focus on the development and evaluation of interventions designed to increase career decision-making self-efficacy with assurance that a psychometrically sound instrument for measuring such change is available. In addition to further work in evaluating educational and career interventions using the CDMSE, research such as that of Fouad et al.

(1996) investigating the utility of the CDMSE with different age, racial, and ethnic groups is especially needed.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191-215.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bergeron, L. M., & Romano, J. L. (1994). The relationships among career decision-making self-efficacy, educational indecision, vocational indecision, and gender. *Journal of College Student Development*, *35*, 19-24.

Betz, N. E. (1992). Counseling uses of career self-efficacy theory. *Career Development Quarterly*, *41*, 22-26.

Betz, N. E., Borgen, F., & Harmon, L. (1996). *Skills Confidence Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Betz, N. E., & Hackett, G. (1981). The relationship of career-related self-efficacy expectations to perceived career options in college women and men. *Journal of Counseling Psychology*, *28*, 399-410.

Betz, N. E., & Hackett, G. (1983). The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior*, *23*, 329-345.

Betz, N. E., & Hackett, G. (1986). Applications of self-efficacy theory to understanding career choice behavior. *Journal of Social and Clinical Psychology*, *4*, 279-289.

Betz, N. E., Harmon, L., & Borgen, F. (1996). The relationship of self-efficacy for the Holland themes to gender, occupational group membership, and vocational interests. *Journal of Counseling Psychology*, *43*, 90-98.

Betz, N. E., & Klein, K. (1996a). *Predicting career decision-making intentions using social cognitive career theory*. Manuscript submitted for publication.

Betz, N. E., & Klein, K. (1996b). Relationships among career self-efficacy, generalized self-efficacy, and global self-esteem. *Journal of Career Assessment*, *4*, 285-298.

Betz, N. E., Klein, K., & Taylor, K. M. (1996). Evaluation of a short form of the Career Decision-Making Self-Efficacy Scale. *Journal of Career Assessment*, *4*, 47-57.

Betz, N. E., & Serling, D. (1995). *Fear of commitment and career decision-making self-efficacy*. Unpublished manuscript, Department of Psychology, Ohio State University.

Blustein, D. L. (1989). The role of goal instability and career self-efficacy in the career exploration process. *Journal of Vocational Behavior*, *35*, 194-203.

Crites, J. O. (1978). *Career Maturity Inventory*. Monterey, CA: CTB/McGraw Hill.

Foltz, B. M. (1993). *The effect of a career counseling workshop on the career self-efficacy of nontraditional college students*. Unpublished doctoral dissertation, Clemson University, Clemson, SC.

Foss, C. J., & Slaney, R. B. (1986). Increasing nontraditional career choices in women: Relation of attitudes toward women and responses to a career intervention. *Journal of Vocational Behavior*, *28*, 191-202.

Fouad, N. A., & Smith, P. L. (1996). Test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology*, *43*, 338-346.

Fouad, N. A., Smith, P. L., & Enochs, L. (in press). Reliability and validity evidence for middle school self-efficacy scales. *Measurement and Evaluation in Counseling and Development*.

Fretz, B. R. (1981). Evaluating the effectiveness of career interventions. *Journal of Counseling Psychology*, *28*, 77-90.

Fukuyama, M. A., Probert, B. S., Neimeyer, G. J., Nevill, D. D., & Metzler, A. E. (1988). Effects of DISCOVER on career self-efficacy and decision-making of undergraduates. *Career Development Quarterly*, *37*, 56-62.

Fuqua, D. R., & Hartman, B. (1983). Differential diagnosis and treatment of career indecision. *Personnel and Guidance Journal*, *62*, 27-29.

Gati, I., Osipow, S. H., & Fassa, N. (1994). The scale structure of multi-item measures: Application of the split-scale method to the Task-Specific Occupational Self-Efficacy Scale and the Career Decision-Making Self-Efficacy Scale. *Journal of Career Assessment*, *2*, 384-397.

Hackett, G., & Betz, N. E. (1981). A self-efficacy approach to the career development of women. *Journal of Vocational Behavior*, *18*, 326-339.

Hackett, G., & Betz, N. E. (1992). Self-efficacy expectations in the career choices of college students. In D. Schunk & J. Meese (Eds.), *Student perceptions in the classroom: Causes and consequences* (pp. 229-246). Hillsdale, NJ: Erlbaum.

Holland, J. L., Daiger, D., & Power, P. G. (1980). *My Vocational Situation*. Odessa, FL: Psychological Assessment Resources.

Kobasa, S. C. (1985). *Personal views survey*. Chicago: Hardiness Institute.

Krumboltz, J. D., Mitchell, A. M., & Jones, G. B. (1976). A social learning theory of career selection. *The Counseling Psychologist*, *6*, 71-81.

Lenox, R. A., & Subich, L. M. (1994). The relationship between self-efficacy beliefs and inventoried vocational interests. *Career Development Quarterly*, *42*, 302-313.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, *45*, 79-122.

Luzzo, D. A. (1993a). Reliability and validity testing of the Career Decision-Making Self-Efficacy Scale. *Measurement and Evaluation in Counseling and Development*, *26*, 137-142.

Luzzo, D. A. (1993b). Value of career decision-making self-efficacy in predicting career decision making attitudes and skills. *Journal of Counseling Psychology*, *40*, 194-199.

Luzzo, D. A. (1995). The relative contributions of self-efficacy and locus of control to the prediction of career maturity. *Journal of College Student Development*, *36*, 61-66.

Luzzo, D. A. (1996). A psychometric evaluation of the Career Decision-Making Self-Efficacy Scale. *Journal of Counseling and Development*, *74*, 276-279.

Luzzo, D. A., Funk, D. P., & Strang, J. (1996). Attributional retraining increases career decision-making self-efficacy. *Career Development Quarterly*, *44*, 378-386.

Luzzo, D. A., & Taylor, M. (1994). Effects of verbal persuasion on the career self-efficacy of college freshmen. *California Association for Counseling and Development Journal*, *14*, 31-34.

Mathieu, P. S., Sowa, C. J., & Niles, S. (1993). Differences in career self-efficacy among women. *Journal of Career Development*, *19*, 187-196.

McAuliffe, G. J. (1991). Assessing and treating barriers to decision-making in career classes. *Career Development Quarterly*, *40*, 82-92.

McNeill, P. (1990). Impact of a problem-solving vocational intervention on career decision-making self-efficacy and career indecision (Doctoral dissertation, University of Florida, 1990). *Dissertation Abstracts International*, *52*, 852A.

Merwin, G. A. (1993). The relationship between self-efficacy, interest congruence, career satisfaction, and career decisiveness (Doctoral dissertation, North Carolina State University, 1993). *Dissertation Abstracts International*, *54*, 428A.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A metaanalytic investigation. *Journal of Counseling Psychology*, *38*, 30-38.

Neimeyer, G. J., & Metzler, A. E. (1987). The development of vocational structures. *Journal of Vocational Behavior*, *30*, 26-32.

Nevill, D. D., Neimeyer, G. J., Probert, B. P., & Fukuyama, M. A. (1986). Cognitive structures in vocational information processing and decision making. *Journal of Vocational Behavior*, *28*, 110-122.

Nevill, D. D., & Schlecker, D. I. (1988). The relation of self-efficacy and assertiveness to willingness to engage in traditional/nontraditional career activities. *Psychology of Women Quarterly*, *12*, 91-98.

Niles, S., & Sowa, C. (1992). Mapping the nomological network of career self-efficacy. *Career Development Quarterly*, *41*, 13-21.

Oreshnick, C. A. (1991). Enhancing career decision-making self-efficacy via a university career course intervention (Doctoral dissertation, Iowa State University, 1991). *Dissertation Abstracts International*, *53*, 1072B.

Osipow, S. H. (1987). *The Career Decision Scale* (3rd ed.). Odessa, FL: Psychological Assessment Resources.

Osipow, S. H., & Rooney, R. A. (1989). *The Task-Specific Occupational Self-Efficacy Scale.* Columbus, OH: Author.

Osipow, S. H., Temple, R. D., & Rooney, R. A. (1993). The Short Form of the Task-Specific Occupational Self-Efficacy Scale. *Journal of Career Assessment*, *1*, 13-20.

Peterson, S. L. (1993a). Career decision-making self-efficacy and institutional integration of underprepared college students. *Research in Higher Education*, *34*, 659-683.

Peterson, S. L. (1993b). Career decision-making self-efficacy and social and academic integration of underprepared college students: Variations based on background characteristics. *Journal of Vocational Education Research*, *18*, 77-115.

Peterson, S. L., & del Mas, P. M. (1994). *The component structure of career decision-making self-efficacy for underprepared students.* Unpublished manuscript, University of Minnesota, Minneapolis.

Rayman, J. R., & Bowlsbey, J. H. (1977). DISCOVER: A model for a systematic career guidance program. *Vocational Guidance Quarterly*, *26*, 3-12.

Robbins, S. B. (1985). Validity estimates for the Career Decision-Making Self-Efficacy Scale. *Measurement and Evaluation in Counseling and Development*, July, 64-71.

Rooney, R. A., & Osipow, S. H. (1992). Task-Specific Occupational Self-Efficacy Scale: The development and validation of a prototype. *Journal of Vocational Behavior, 40*, 14-32.

Schoon, F. D. (1991). A review of the construct and concurrent validity of the Career Decision-Making Self-Efficacy Scale adapted (Doctoral dissertation, University of Illinois at Urbana-Champaign, 1991). *Dissertation Abstracts International*, *52*, 6097B.

Serling, D., & Betz, N. (1990). Development and evaluation of a measure of fear of commitment. *Journal of Counseling Psychology*, *37*, 91-97.

Shaw, T. D. (1988). The effects of a career counseling/intervention program on student-athletes' career decision-making self-efficacy expectations and their vocational identity (Doctoral dissertation, Southern Illinois University at Carbondale, 1988). *Dissertation Abstracts International*, *51*, 461A.

Taylor, K. M., & Betz, N. E. (1983). Applications of self-efficacy theory to the understanding and treatment of career indecision. *Journal of Vocational Behavior*, *22*, 63-81.

Taylor, K. M., & Popma, J. (1990). Construct validity of the Career Decision-Making Self-Efficacy Scale and the relationship of CDMSE to vocational indecision. *Journal of Vocational Behavior*, *37*, 17-31.

Tyler, L. E. (1969). *The work of the counselor* (2nd ed.). New York: Appleton-Century-Crofts.

Walsh, W. B., & Betz, N. E. (1995). *Tests and assessment* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Appendix
Other Research Using the CDMSE but not Cited

Blustein, D. L., Wallbridge, M. M. , Friedlander, M. L., & Palladino, D. E. (1991). Contributions of psychological separation and parental attachment to the career development process. *Journal of Counseling Psychology*, *38*, 39-50.

Gianakos, I. (1995). The relation of sex role identity to career decision-making self-efficacy. *Journal of Vocational Behavior*, *46*, 131-143.

Luzzo, D. A., & Ward, B. E. (1995). The relative contributions of self-efficacy and locus of control to the prediction of vocational congruence. *Journal of Career Development*, *21*, 307-317.

Place, A. W. (1996). *Career choice of education: Minorities and self-efficacy*. Paper presented at the annual meeting of the American Educational Research Association, New York.

Solon, P. T. (1993). Vicarious learning (daughters' perceptions of their mothers' influence) and women's career self-efficacy expectations (Doctoral dissertation, University of Minnesota, 1993). *Dissertation Abstracts International*, *54*, 1737A.

Urakamai, M. (1993). Career decision-making self-efficacy and career maturity. *Japanese Journal of Educational Psychology*, *41*, 358-364.