Applying the social cognitive model of career self-management to career exploration and decision-making

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ABSTRACT

We present two studies applying the social cognitive model of career self-management (Lent & Brown, 2013) to career exploration and decision-making outcomes in college students. In the first study ($N = 180$ college students), we developed a new, brief measure of career exploration and decision-making self-efficacy for use in subsequent model testing. The measure yielded two factors, decisional self-efficacy and coping efficacy, with adequate internal consistency reliability estimates. The decisional self-efficacy factor related strongly to an established measure of career decision self-efficacy and produced theory consistent relations with measures of outcome expectations, social support, conscientiousness, exploration goals, prior engagement in career exploration, decisional anxiety, and level of career decidedness. In the second study ($N = 215$ college students), we re-examined the factor structure of the new self-efficacy measure and used it to assess the tenability of the self-management model in a path analysis predicting exploration goals, decisional anxiety, and career decidedness. The model fit the data well overall, though certain predictors were linked to the criterion variables only indirectly via mediated pathways. Implications of the findings for the social cognitive model as well as for future research and practice are considered.

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1. Introduction

As originally conceived, social cognitive career theory (SCCT) consisted of interconnected models of career and academic interest, choice, and performance (Lent, Brown, & Hackett, 1994, 2000). These models emphasized *content* aspects of career development, that is, the types of activity domains toward which people are drawn, and at which they are likely to succeed and persist, in educational and occupational settings. More recent SCCT models have complemented this content emphasis with an increasing focus on *process* aspects of career development, such as the means by which people help to regulate their affect, adapt to changing circumstances, and direct their own goal-relevant behavior at school and work. For example, the SCCT satisfaction model highlights the processes that promote well-being outcomes at work, regardless of the specific type of work they perform (Lent & Brown, 2006a, 2008).

The new SCCT model of career self-management (CSM) focuses on a wide array of adaptive career behaviors that people employ to adjust to and thrive within educational and work environments across the career lifespan (Lent & Brown, 2013). These behaviors are considered mechanisms of personal agency in that they allow individuals to take part in their own career development, adaptation, and renewal. Examples of such adaptive behaviors include career exploration, decision-making, job-searching, identity management, and navigation of normative (e.g., work entry, retirement) and unpredictable (e.g., job loss) transitions.

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Although the earlier SCCT models have attracted a good deal of inquiry (e.g., see Brown & Lent, in press; Lent, 2013; Sheu et al., 2010), few studies have been designed specifically to test the predictions of the self-management model given its recent formulation (Lim, Lent, & Penn, 2015; Tatum, Formica, & Brown, 2015).

1.1. CSM predictors of career exploration goals and decisional status

The primary goal of the present set of studies was to apply the CSM model to the process of career decision-making. As with previous SCCT models, the CSM model includes the core social cognitive variables of self-efficacy, outcome expectations, and goals; person inputs, such as personality traits; and contextual supports and barriers. Within this model, self-efficacy refers to beliefs about one's ability "to manage specific tasks necessary for career preparation, entry, adjustment, or change across diverse occupational paths" (Lent & Brown, 2013, p. 561). Outcome expectations involve the anticipated consequences of particular courses of action. These include positively or negatively valenced social (e.g., peer approval), material (e.g., monetary gain), and self-evaluative (e.g., pride) outcomes. Goals refer to people's intentions to perform particular adaptive career behaviors (e.g., to engage in career exploration).

Personality traits are assumed to "influence career adaptation by facilitating (or deterring) behavioral performances or by engaging emotional coping tendencies" (Lent & Brown, 2013, p. 563). The specific emotional traits or behavioral tendencies that are relevant to a particular application of the model depend on the behavior of interest. For instance, the Big Five trait of conscientiousness may be especially useful to career exploration and decision-making in that persons with relatively high levels of this trait may be inclined to take an organized and persistent approach to gathering and weighing career and self-information prior to arriving at career decisions. In addition, environmental supports (e.g., access to mentors) may aid, and barriers may inhibit, individuals' capabilities to engage in adaptive career behaviors.

Fig. 1 illustrates how the variables in the CSM are posited to interrelate in the context of career exploration and decision-making. Self-efficacy is hypothesized to contribute to goals and actions, both directly and via outcome expectations. For example, those with more confidence at engaging in career exploration and decisional behaviors are more likely to expect such behaviors to produce positive payoffs. Together, self-efficacy and positive outcome expectations promote goals to engage in exploration/decisional behaviors and, along with goals, motivate enactment of goal-relevant behaviors (e.g., follow-through at career exploration).

Conscientiousness may also facilitate goal-setting and implementation, with more conscientious persons being more likely to formulate and pursue goals related to career exploration and decision-making. Persons high in this trait may also be more likely to develop self-efficacy at career planning tasks because their organization and persistence tendencies have enabled them to successfully navigate prior life decisions. Environmental supports and barriers are assumed to play important roles in the exploration and decisional process, both directly and via self-efficacy and outcome expectations. For instance, those with greater access to career information resources may be likely to approach the exploration process with greater confidence and optimism about its outcomes.

The current test of the CSM model builds on prior research that has examined relations among model-relevant variables in the context of career exploration and decision-making. For example, Choi et al.'s (2012) meta-analysis found that career decision self-efficacy (CDSE) yields moderate to large bivariate correlations with outcome expectations, peer support, and career indecision. In a multivariate test, Betz and Voyten (1997) found that career outcome expectations, but not self-efficacy, explained significant variance in exploration intentions, or goals. However, self-efficacy alone accounted for significant variance in career indecision.

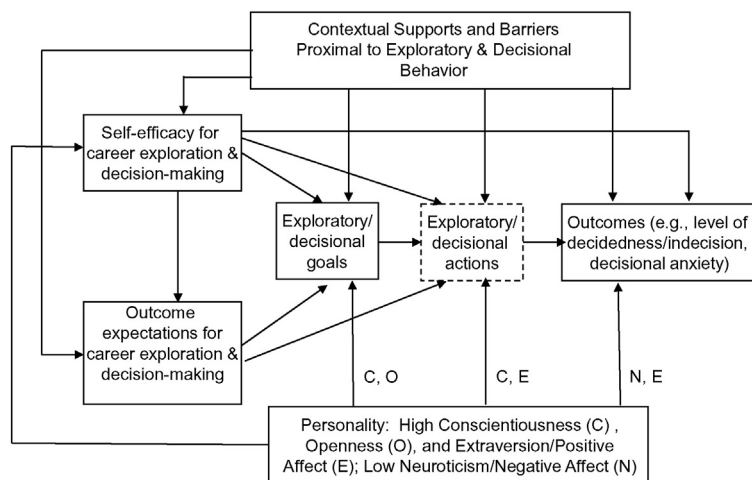**Fig. 1.** Model of career self-management as applied to career exploration and decision-making behavior. Adapted from Lent and Brown (2013) with permission. *Note.* Exploratory/decisional actions, openness, and neuroticism/negative affect were not included in the current studies.

Other research has found that both CDSE and outcome expectations contributed to the prediction of exploration goals (Huang & Hsieh, 2011; Jantzer, Stalides, & Rottinghaus, 2009).

Examining predictors of behavior (beyond goals alone), Rogers, Creed, and Glendon (2008) found that CDSE, goals, and two personality traits (conscientiousness and openness) each explained unique variance in career planning behavior. However, only goals and social support were uniquely predictive of career exploration behavior. In another relevant study, Rogers and Creed (2011) reported that CDSE and goals each explained unique variance in career planning, both cross-sectionally and over a 6-month period. CDSE also accounted for unique variance in exploration over time, while the predictive utility of outcome expectations, supports, and personality variables (e.g., neuroticism, extraversion) varied over time. Other researchers have also found relations of CDSE to engagement in exploration activities (e.g., Gushue, Clarke, Pantzer, & Scanlan, 2006), though CDSE was not found to predict change in career indecision over a two-year period in high school students (Creed, Patton, & Prideau, 2006). These prior findings form a foundation for the current effort to examine the ways in which variables aligned with the CSM model jointly predict career exploration goals and decisional outcomes.

1.2. A brief measure of self-efficacy for career exploration and decision activities

A secondary goal of the present studies was to design a new, relatively brief measure of self-efficacy that could be used in research applying the CSM model to career exploration and decision-making activities. Most prior research on this topic has employed one of two versions of the Career Decision Self-Efficacy, either the original 50-item scale (Taylor & Betz, 1983) or the 25-item short form (CDSE-SF; Betz, Klein, & Taylor, 1996). These scales may be considered "the gold standard" of career decision self-efficacy measurement in that they are based on relevant career development theory, demonstrate favorable psychometric properties, and have been reliably linked to relevant decisional outcomes, such as career indecision (Choi et al., 2012). Studies using the CDSE-SF often report only its total scale score, which tends to produce very high internal consistency values. We reasoned that a somewhat briefer measure of self-efficacy could be developed that might yield adequate reliability and validity estimates and, thereby, allow researchers to contain overall survey length — a practical consideration given that tests of the CSM model require measurement of multiple predictor and dependent variables.

Although career self-efficacy measures may vary in length and complexity depending on the criterion variables of interest and the research questions at hand, Lent and Brown (2006b) observed that "social cognitive constructs can often be assessed at satisfactory levels of internal consistency reliability with relatively brief scales" (p. 24). In fact, career and academic self-efficacy has often been assessed adequately with a dozen or fewer items (e.g., Lent et al., 2005) and measures of most other social cognitive career variables tend to be similarly brief. For example, Betz and Voyten's (1997) measures of career exploration outcome expectations and goals were 4–5 items in length. Our aim in the measure development phase of this project was, thus, to create a relatively brief self-efficacy measure capable of producing acceptable reliability estimates, convergent validity relative to the CDSE-SF total scale score, and predictive validity in relation to relevant criterion variables.

1.3. The present studies

Given the twin aims of this project, we conducted two related studies. In the first study, we developed a measure of self-efficacy and examined its psychometric potential for use in subsequent model testing. Specifically, we first assessed the measure's factor structure and then examined its relation to the CDSE-SF and to measures of other key variables in the CSM model. At the bivariate level, we expected the new self-efficacy measure to correlate strongly with the CDSE-SF, the more established measure of decisional self-efficacy; we also expected the new measure to correlate moderately to strongly with measures of outcome expectations, exploration goals, conscientiousness, social support, prior engagement in career exploration activities, and two decisional outcomes (decisional anxiety and career decision status). At the multivariate level, we examined the utility of the new self-efficacy measure in predicting exploration goals, in concert with outcome expectations, social support, and conscientiousness. We also examined whether, consistent with the CSM model, self-efficacy would itself be predicted by conscientiousness, social support, and prior involvement in career exploration behaviors. (The latter variable, while not shown in Fig. 1, was used as a rough index of prior performance, one of the primary sources of self-efficacy; Bandura, 1997).

The second study replicated and extended the first study by (a) cross-validating the new measure's factor structure, (b) assessing its relations to the CDSE-SF and to the other predictors and outcomes in the model, and (c) examining the fit of the CSM variables to the data in a path analysis predicting exploration goals, decisional anxiety, and career decidedness. Together, the two studies were intended to examine the reliability, validity, and factorial properties of the new self-efficacy measure as well as to employ the measure in a formal test of predictions derived from the CSM model in the context of career exploration and decision-making. We should note that, given the cross-sectional design of both studies, we did not test predictions involving future actions subsequent to exploration goals. Rather, we limited our focus to exploration goals and proximal decisional outcomes. In addition, we included only one index each of contextual factors (supports) and personality (conscientiousness). This decision was made for logistical and substantive reasons. In particular, we sought to contain the complexity of model testing while focusing on variables that may be relatively tractable within brief interventions and that have shown a well-established pattern of relations to self-efficacy (supports; Choi et al., 2012) and the career exploration process (conscientiousness; Brown & Hirschi, 2013) in prior research.

2. Study 1

2.1. Method

2.1.1. Participants

Participants were 180 undergraduates taking psychology courses at a mid-Atlantic university. The sample ranged in age from 18 to 35 ($M = 19.74$, $SD = 2.11$) years and included 73 men (41%), 106 women (59%), and one participant reporting their gender as "other." Most of the participants were either freshmen (37%) or sophomores (33%). Although the majority (82%) rated themselves as moderately to very decided in terms of academic major, 45% indicated that they were either undecided or slightly decided on a career direction. The majority of participants were European American ($n = 106$; 59%); 29 (16%) were African American, 26 (14%) were Asian/Pacific Islander, 5 (3%) were Hispanic, and 6 (3%) were multiracial; 8 (4%) identified as members of other racial/ethnic groups.

2.1.2. Procedure and instruments

All participants were recruited via a web-based service in the university's psychology department, which allows undergraduate students to access research studies for experimental credit. Participants completed a battery of measures assessing self-efficacy, outcome expectations, social support, goals, anxiety, past exploration activities, and current decisional status with respect to career decision-making. Participants also completed a measure of trait conscientiousness, a set of demographic questions, and four brief pilot measures for use in future research on career decision-making. The survey, which was conducted online, required that participants complete all questions before moving on to subsequent ones, thus preventing missing data (though participants were informed that they could close their browsers if they did not wish to complete the entire survey). Scale scores for each measure were calculated by summing item responses and dividing by the number of items on the scale.

Self-efficacy was measured with the Career Decision Self-Efficacy-Short Form scale (CDSE-SF; Betz et al., 1996) and the Career Exploration and Decision Self-Efficacy (CEDSE) scale, which was created for the present study. The 25-item CDSE-SF (Betz et al., 1996) was designed to reflect Crites'(1978) five career choice competencies: (a) accurate self-appraisal, (b) gathering occupational information, (c) goal selection, (d) planning for the future, and (e) problem-solving. Each competency is assessed with 5 items (e.g. "find information in the library about occupations you are interested in"). Self-efficacy ratings are made on a scale ranging from *no confidence at all* (1) to *complete confidence* (5) (Betz, Hammond, & Multon, 2005). The CDSE-SF has been found to correlate strongly and in theory-consistent directions with career decision outcome expectations, career indecision, and vocational identity (Choi et al., 2012). Alpha coefficients for CDSE-SF total scale scores have been reported as .94 and above in undergraduate samples (Betz et al., 2005). We found an internal consistency estimate of .94 in our sample.

In developing the CEDSE, our goal was to create a relatively brief measure with as simple a factor structure as possible because we assumed that the measure's total score would be of greatest interest to researchers. On the other hand, we sought to assure adequate construct representation and allow for the possibility that the measure would be multidimensional in nature by generating a larger initial pool of items. To provide a structure for item development, we reviewed the literature on career decision-making and adopted a conceptual scheme based on Parsons'(1909) three-step view of the decisional process, SCCT's partition of choice-making into goal setting and implementation phases, and Bandura's (1997) concept of coping efficacy. We then generated 29 items divided into the five conceptual clusters suggested by our review, with 4 to 8 items per cluster: perceived capability to (a) explore the self in relation to work, (b) explore possible career paths, (c) match one's self qualities to career options, (d) make and implement a career decision, and (e) cope with decisional obstacles and post-decisional regrets.

These categories overlapped somewhat conceptually with the Crites (1978) model on which the CDSE-SF was based. For example, both conceptual models include a focus on exploring the self and careers and managing decisional problems, though they also differed in some respects (e.g., the CDSE-SF provides a greater focus on future planning activities, while the CEDSE emphasizes the ability to match self attributes to occupational options. Items were generated by individual team members and then refined consensually. The instructions asked participants to rate their level of confidence on a 10-point scale, from 0 (*no confidence at all*) to 9 (*complete confidence*), in relation to such tasks as "identify careers that best match your interests." (The 0–9 scale metric presented to participants was converted to 1–10 by the online survey software that we used.) Higher scores on both the CDSE-SF and CEDSE reflect stronger beliefs regarding one's ability to engage in career exploration and decision-making activities. Factor structure, reliability, and validity data for the CEDSE are reported in the Results section.

Outcome expectations were measured with the career outcome expectations scale developed by Betz and Voyten (1997). The scale consists of four items reflecting positive outcomes that may attend involvement in career exploration activities. A sample item is, "If I learn more about different careers, I will make a better career decision." *Goals* to engage in career exploration activities were assessed with the 5-item exploration intentions scale, also developed by Betz and Voyten (1997; e.g., "I intend to spend more time learning about careers than I have been"). Items on both measures are rated on a 5-point scale, from *strongly disagree* (1) to *strongly agree* (5). Betz and Voyten (1997) reported coefficient alphas of .79 and .73, respectively, for the outcome expectations and goals measures. They also found, consistent with hypotheses, that outcome expectations and goals were strongly interrelated and both variables were moderately to strongly related to self-efficacy. Internal consistency reliability estimates for the outcome expectations and goal scales were, respectively, .88 and .80 in our sample.

Social support for career decision-making was measured with the support/guidance subscale of the Influence of Others on Academic and Career Decision Making Scale (Nauta & Kokaly, 2001). This subscale was designed to capture the advice, encouragement, and help that individuals receive in making decisions. Participants respond on a scale from *strongly disagree* (1) to *strongly agree* (5) to

the subscale's 8 items (e.g., "There is someone who supports me in the academic and career choices I make"). Higher scores indicate greater levels of perceived support in the decision-making process. The support/guidance subscale was found to correlate in expected directions with measures of occupational information, career indecision and certainty, and general social support; it also yielded internal consistency estimates of .89 to .94 (Nauta & Kokaly, 2001). Coefficient alpha in the current sample was .85.

Conscientiousness was assessed with the Big Five Inventory's (BFI; John & Srivastava, 1999) conscientiousness scale, which reflects trait tendencies to be goal-directed, planful, and self-disciplined — tendencies conceptualized as facilitating active involvement in the career exploration and decision-making process (Lent & Brown, 2013). The measure includes 9 statements with which participants rate their level of agreement on a scale from *disagree strongly* (1) to *agree strongly* (5). A sample item is "I see myself as someone who makes plans and follows through with them." John and Srivastava (1999) reported that the scale correlated highly with other measures of trait conscientiousness and yielded a coefficient alpha estimate of .82. We obtained a reliability coefficient of .79 in the current sample.

Decisional anxiety were assessed with items from the Career Indecision Profile (CIP-65; Hacker, Carr, Abrams, & Brown, 2013), and *level of career decidedness* was measured with an item used to help estimate the CIP-65's validity. The CIP-65 (Hacker et al., 2013) assesses four types of career choice difficulty: neuroticism/negative affectivity, choice/commitment anxiety, lack of readiness, and interpersonal conflicts. Hacker et al. found that the choice/commitment anxiety (CCA) scale correlated strongly with self-reported levels of career decidedness. The CCA reflects an inability to commit to a career as well as the presence of decision-related anxiety. S.D. Brown and A. Carr (personal communication, February 26, 2014) provided us with data on three items from the CCA that were specifically designed to tap anxiety and discouragement related to decision-making (e.g., "I often feel nervous when thinking about having to pick a career"). Participants respond by indicating the extent to which they agree with each statement on a 6-point scale, from *strongly disagree* (1) to *strongly agree* (6); higher scores reflect greater levels of decisional worry.

Brown and Carr reported that the 3-item measure demonstrated adequate internal consistency reliability ($\alpha = .82$) and correlated strongly with the 24-item CCA score ($r = .89$) and a single-item measure of career decidedness ("how decided about your career direction are you at this time?"; $r = -.65$), which is rated on a 6-point scale, from *completely undecided* (1) to *very decided* (6). The career decidedness item was also found to yield small to medium-sized correlations with the other sources of career indecision tapped by the CIP-65 (Hacker et al., 2013). Prior research has supported the use of similarly brief measures of decisional anxiety (e.g., Stumpf, Colarelli, & Hartman, 1983) and decidedness (e.g., Jones, 1989). The decisional anxiety measure produced a reliability estimate of .87 in our sample.

Previous *career exploration actions* were assessed with the Environmental Exploration (EE; 6 items) and Self-Exploration (SE; 5 items) subscales of the Career Exploration Survey (Stumpf et al., 1983). The EE and SE subscales focus, respectively, on the extent to which an individual has explored occupational information and reflected on the self in relation to careers within the past 3 months. Participants respond on a scale ranging from *little* (1) to *a great deal* (5) to such items as "investigated career possibilities" (EE) and "understood a new relevance of past behavior for my future career" (SE). Higher scores reflect greater participation in exploration activities. Stumpf et al. (1983) reported coefficient alphas of .88 (EE) and .87 (SE) for the two subscales. In the current sample, we found coefficients, respectively, of .90 and .85. Since we were interested in total levels of exploration activity performed, we combined both sets of items into a total scale score ($\alpha = .90$), consistent with procedures used in prior research (e.g., Blustein, Devenis, & Kidney, 1989).

2.2. Results and discussion

We first factor analyzed responses to the CEDSE items, and then calculated reliability estimates based on its factor-derived scales. Next, to examine the measure's potential validity, we examined its relations to the CDSE-SF, an existing measure of career decision self-efficacy, as well as a variety of other predictors and outcomes of career decision-making.

2.2.1. Factor analysis

We subjected the 29 items of the CEDSE to principal axis factoring and oblimin oblique rotation (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Gorsuch, 1997). Scree, parallel analysis, and factor interpretability criteria were used to determine the factor structure. Our initial plan was to retain items that yielded loadings above .50 on a primary factor and that cross-loaded minimally on other factors (i.e., where the difference in loadings between the primary and other factors was ≥.10) in the structure matrix. Once factor-derived scales were identified, we computed scale scores by summing over item responses and dividing by the number of items on a given scale, with a possible score range of 1–10.

Analysis of the CEDSE items indicated support for a 2-factor solution, accounting for 68% of the total variance. (Alternative factor solutions, such as a 5-factor model, were also examined but were deemed less tenable based on our factor structure criteria.) The two factors were labeled (a) decisional self-efficacy (25 items; 63% of the variance) and (b) decisional coping efficacy (4 items; 5% of the variance). The first factor encompassed four of the five conceptual categories used in item generation, including confidence at exploring career options, exploring the self in relation to work, assessing the fit between one's work personality and occupational options, and making career decisions. The second factor involved beliefs about being able to manage decisional obstacles and disappointments (e.g., "manage negative feelings if your first choice does not work out and you need to find another career choice"). However, one of the items with its highest loading on the second factor also cross-loaded on the first factor ("develop a good alternative plan if you find that your access to your most preferred option is blocked for some reason"). The two factors produced internal consistency reliability (Cronbach alpha) estimates of .98 and .86, respectively.

Because the first factor produced such a high reliability estimate and we were interested in developing a relatively brief measure of decisional self-efficacy, we decided to retain only the 8 items with the highest loadings (≥.84) on this factor. The resulting measure still yielded a high reliability coefficient ($\alpha = .96$) and correlated very strongly with the 25-item version ($r = .98$). Replication of the factor analysis with only the eight decisional self-efficacy and four coping efficacy items yielded less clear differentiation between the two factors (see Table 1). On the one hand, parallel analysis and scree criteria suggested the presence of two factors, which accounted, respectively, for 67% and 10% of the total variance. On the other hand, three of the four coping efficacy items loaded highly (.61–.74) on the first factor, with two of them failing to exceed our cross-loading criterion. Despite the ambiguous findings regarding the second factor, we decided to retain both sets of items in correlational analyses given the early stage of research on the CEDSE measure. We will subsequently abbreviate the CEDSE's brief decisional scale as CEDSE-BD and the coping efficacy scale as CEDSE-CE.

Relating the content of the eight retained decisional self-efficacy items to the five conceptual categories we had used to generate items, we observed that four of the items reflected the ability to match aspects of the self to career options (e.g., "identify careers that best match your interests"); two tapped career exploration capabilities (e.g., "learn more about careers you might enjoy"); and two referred to decision-making skills (e.g., "make a well-informed choice about which career path to pursue"). The only category not represented was self-exploration (e.g., "develop a clear understanding of your work-related skills"), though this capability might have been subsumed by the self-career matching items in that the ability to assess the fit of self to career options presupposes that one possesses adequate self-knowledge.

Item-level statistics revealed that the 12 CEDSE items did not depart substantially from univariate normality (i.e., all items produced skew < 3 and kurtosis < 10; Weston & Gore, 2006), though four of the eight decisional self-efficacy items had skew and kurtosis statistics between 1 and 2. The negative skew on these items suggests that participants tended to be relatively confident about their ability to perform certain career exploration and self-career matching tasks. This slight non-normality was also evident at the scale level; skew = −1.18, kurtosis = 1.90. The CDSE-SF scale score, by comparison, was distributed a bit more normally; skew = −.45, kurtosis = .82.

2.2.2. Convergent and criterion-related validity

Table 2 contains the intercorrelations, means, and standard deviations of the two CEDSE scales, along with the other predictors and criterion variables. The decisional self-efficacy scale correlated strongly with the CDSE-SF ($r = .74$) and moderately to strongly with each of the other measures. Thus, stronger decisional self-efficacy was associated with more optimistic outcome expectations, higher goals, greater support, more conscientiousness, greater prior involvement in exploration activities, less decisional anxiety, and higher levels of decidedness. The coping efficacy scale also correlated with the CDSE-SF ($r = .56$) and the other variables, but to a lesser degree than the decisional self-efficacy scale.

We next compared the predictive utility of the two CEDSE scales relative to three key criterion variables in the CSM model: career exploration goals, decisional anxiety, and career decidedness. These analyses were intended to determine whether the brief decisional self-efficacy scale might function as a sufficient indicator of self-efficacy in predictive equations. In separate regression equations, each criterion (exploration goals, decisional anxiety, career decidedness) was regressed on decisional self-efficacy and coping efficacy. Both efficacy measures produced significant beta weights in the regression predicting exploration goals ($\beta = .30$ and .22, $p < .05$), with decisional self-efficacy explaining slightly more unique variance than coping efficacy ($\Delta R^2 = .05$ vs.

Table 1

Career Exploration and Decision Self-Efficacy — Items and Factor Loadings in Study 1

Self-efficacy factor/item	Factor 1	Factor 2
1. Brief Decisional Self-Efficacy Factor (CEDSE-BD)[a]		
How much confidence do you have in your ability to:		
…figure out which career options could provide a good fit for your personality	**.84**	.56
…identify careers that best use your skills	**.90**	.50
…pick the best-fitting career option for you from a list of your ideal careers	**.85**	.52
…learn more about careers you might enjoy	**.84**	.48
…match your skills, values, and interests to relevant occupations	**.89**	.51
…make a well-informed choice about which career path to pursue	**.86**	.53
…learn more about jobs that could offer things that are important to you	**.89**	.62
…identify careers that best match your interests	**.92**	.55
2. Decisional Coping Efficacy Factor (CEDSE-CE)		
How much confidence do you have in your ability to:		
…cope with the disappointment if your first choice does not work out	.39	**.75**
…manage negative feelings if your first choice does not work out and you need to find another career choice	.61	**.89**
…create a good back-up plan if you discover that you don't have enough financial support to pursue your preferred career option[b]	.64	**.69**
…develop a good alternative plan if you find that your access to your most preferred option is blocked for some reason[b]	.74	**.74**

Note. Factor loadings were obtained with the structure matrix of the oblique solution in Study 1 ($N = 180$). The first and second factors accounted, respectively, for 67% and 10% of the total variance. Values in bold type indicate the primary factor on which a given item loaded.
[a] Top eight loading items out of the original 25 decisional self-efficacy items.
[b] Cross-loading items (<.10 difference in loadings on the two factors).

Table 2
Correlations, Means, Standard Deviations, and Internal Consistency Estimates for Study 1

Variables	1	2	3	4	5	6	7	8	9	M	SD	α
1. Decisional SE	–									7.50	1.73	.96
2. Coping efficacy	.69	–								6.51	1.72	.86
3. CDSE-SF	.74	.56	–							3.63	.70	.94
4. Outcome expec	.61	.41	.59	–						4.24	.68	.88
5. Social support	.48	.25	.35	.49	–					4.04	.71	.85
6. Conscientious	.31	.13	.31	.40	.29	–				3.86	.66	.79
7. Goals	.47	.44	.51	.67	.35	.38	–			4.05	.66	.80
8. Past exploration	.32	.19	.52	.21	.09	.24	.32	–		3.06	.86	.90
9. Decisional anx	−.30	−.16	−.26	−.01	−.09	−.18	.03	−.05	–	3.42	1.42	.87
10. Decidedness	.41	.21	.41	.05	.03	.14	.02	.35	−.46	4.29	1.57	–

Note. $N = 180$; correlations ≥ .16 are significant, $p < .05$. SE = Self-efficacy (CEDSE-BD); Coping efficacy = CEDSE-CE; CDSE-SF = Career Decision Self-Efficacy-Short Form; expec = expectations; Conscientious = conscientiousness; anx = anxiety.

.03). Decisional self-efficacy alone accounted for significant unique variance in predicting decisional anxiety (β = −.37 vs. .09) and career decidedness (β = .50 vs. −.14). We, therefore, employed the 8-item decisional self-efficacy (CEDSE-BD) scale as the sole CEDSE predictor in our subsequent regression analyses.

As an initial test of the predictive utility of decisional self-efficacy relative to the other predictors in the career self-management model, we regressed career exploration goals on the CEDSE-BD, outcome expectations, social support, and conscientiousness. The set of predictors accounted for 47% of the variation in exploration goals. Outcome expectations produced the largest beta weight (.57, $p < .001$) and conscientiousness also accounted for significant unique variance (β = .14, $p < .05$). Neither self-efficacy nor social support produced significant beta weights (β = .09 and −.01, respectively). However, the latter two variables were found to relate to exploration goals indirectly; self-efficacy via outcome expectations ($B = .11$, $SE = .025$, 95% CI [.06, .16]) and support via outcome expectations ($B = .14$, $SE = .05$, 95% CI [.04, .26]) and the self-efficacy/outcome expectations pathway ($B = .11$, $SE = .04$, 95% CI [.05, .21]). (Indirect effects, aligned with the sequence of relationships in Fig. 2, were tested with 5000 bias-corrected bootstrap samples using Mplus 7.4; Muthén & Muthén, 1998–2015.)

We next performed a set of hierarchical regression equations to assess the adequacy of the CEDSE-BD scale as a stand-in for the CDSE-SF in predicting exploration goals. Specifically, we entered decisional self-efficacy and the other predictors at step one of each equation, and CDSE-SF at step two. We then reversed the entry order of the two self-efficacy predictors (i.e., entering the CDSE-SF at step one and CEDSE-BD at step two). It was found that neither self-efficacy scale produced a significant change in R^2 above and beyond the other. Thus, the CEDSE-BD appeared to perform similarly to the CDSE-SF in predicting exploration goals.

Finally, to test assumptions about the precursors of decisional self-efficacy, we regressed the CEDSE-BD on conscientiousness, social support, and previous engagement in career exploration activities. All three predictors yielded significant positive beta weights, accounting collectively for 29% of the variation in decisional self-efficacy. Consistent with expectations, participants reporting higher levels of conscientiousness (β = .14), social support (β = .39), and prior involvement in career exploration (β = .23) were more likely to see themselves as efficacious at career exploration and decision-making activities.

On balance, the findings suggest that the decisional self-efficacy scale of the CEDSE measure shows potential as a brief indicator of confidence at career exploration and decision-making tasks. In particular, it achieved a high internal consistency reliability estimate despite its relative brevity, correlated highly with an established measure of career decision self-efficacy, and related in expected directions to other social cognitive and decisional outcome variables. It also functioned comparably to the CDSE-SF in predicting exploration goals, despite showing slightly elevated levels of skew and kurtosis. We, therefore, sought to further explore the psychometric properties and factor structure of the CEDSE in Study 2. Assuming additional, promising estimates of the measure's reliability and validity, we also planned to use it in a path analysis of the CSM model.

3. Study 2

3.1. Method

3.1.1. Participants

Participants were 215 undergraduates enrolled in psychology courses at a mid-Atlantic university. Their mean age was 19.17 ($SD = 1.32$, range of 18–28) years. Twenty-four percent ($n = 52$) were men and 76% ($n = 163$) were women, and the majority of participants were either freshmen (37%) or sophomores (34%). As in the first study, most participants (77%) indicated that they were moderately to very decided on an academic major, but about half (49%) described themselves as either undecided or slightly decided on a career direction. In terms of race/ethnicity, most participants were European American ($n = 129$; 60%); 29 (14%) were African American, 36 (17%) were Asian/Pacific Islander, 10 (5%) were Hispanic, and 6 (3%) were multiracial; 4 (2%) identified as members of other racial/ethnic groups.

3.1.2. Procedure and instruments

Participant recruitment and web-based measurement procedures mirrored those of Study 1, though we did not include prior exploration in our model testing in Study 2 because it was conceptualized as a source of efficacy beliefs rather than a direct predictor of the outcome variables in this set of studies. The multi-item measures produced reliability estimates ranging between .78 and .94 (see Table 2).

3.2. Results and discussion

We began by assessing the stability of the CEDSE's factor structure. We then examined the relation of the resulting factors to the other social cognitive variables and performed a path analysis predicting exploration goals, decisional anxiety, and decidedness.

3.2.1. Factor analysis

The same eight decisional self-efficacy items and four coping efficacy items that had loaded most highly on the first and second factors in Study 1 were subjected to confirmatory factor analysis with the Study 2 data and MLM estimation using Mplus 7.4. Hu and Bentler (1999) suggested use of a 2-index method for assessing model-data fit in which adequate fit is reflected by SRMR values ≤ .08 in combination with CFI values ≥.95 or RMSEA values ≤.06. Others have suggested slightly more liberal fit criteria (e.g., CFI values ≥.90; Hoyle & Panter, 1995; RMSEA values ≤.08; Browne & Cudeck, 1992).

We compared the fit of one and two factor representations of the data. The one factor model, in which all 12 CEDSE items were set to load on a common factor, produced poor fit to the data, SRMR = .09, CFI = .83, RMSEA = .15, Satorra–Bentler (S–B) χ^2 (54, N = 215) = 327.31, p < .001. The two factor model produced significantly better fit, SRMR = .05, CFI = .92, RMSEA = .10, Satorra–Bentler χ^2 (53, N = 215) = 174.60, p < .001; ΔS–B χ^2(1) = 201.88, p < .001, though the modification indices suggested that fit could be improved further by allowing an error covariance between two coping efficacy items with similar content (both referred to managing the consequences of an unsatisfying decision). With the addition of this covariance, the fit indices were SRMR = .04, CFI = .96, RMSEA = .08, S–B χ^2 (52, N = 215) = 122.90, p < .001. All items loaded on their respective factors (range = .72 to .93) and the two factors were highly interrelated (.72). Given the early stage of research employing the CEDSE, we retained both factors in the correlation analyses, below.

The decisional self-efficacy (CEDSE-BD) scale produced a Cronbach alpha value of .94, which was comparable to its .96 estimate in Study 1. Correlations, shown in Table 3, indicated that the CEDSE-BD related significantly to each of the other predictor and criterion variables, with most effect sizes in the medium to large range. As in Study 1, stronger decisional self-efficacy beliefs were associated with more positive outcome expectations, stronger social support for career decision-making, greater conscientiousness, firmer career exploration goals, less decisional anxiety, and more career decidedness. Relative to the coping efficacy scale, the CEDSE-BD scale produced a pattern of consistently larger correlations with the other variables (including the CDSE-SF: .77 vs. .51). We, therefore, used the CEDSE-BD alone in the model testing analyses.

3.2.2. Model testing

We analyzed the fit of the data to the path model shown in Fig. 2 using the MLM estimation procedures of Mplus 7.4. Conscientiousness and social support were modeled as covarying antecedents of self-efficacy, and the errors associated with decisional goals, decisional anxiety, and decidedness were also allowed to covary. We did not model a direct path from goals to the decisional outcomes because the CSM model posits that goal-outcome relations are mediated by future exploratory actions (see Fig. 1), which were not included in this study given its cross-sectional design.

The path analysis yielded indications of good model-data fit, as judged by the pairing of SRMR = .03 and CFI = .99; RMSEA = .07, χ^2 (5, N = 215) = 10.13, p > .05. Path coefficients are displayed in Fig. 2. Consistent with SCCT, conscientiousness and social support each produced significant paths to self-efficacy (R^2 = .34); support and self-efficacy were jointly predictive of outcome expectations (R^2 = .33); and self-efficacy, outcome expectations, and social support each produced significant paths to exploration goals (R^2 = .37). In addition, self-efficacy yielded a significant, negative path to decisional anxiety (R^2 = .28) and a positive path to career decidedness (R^2 = .43). That is, stronger self-efficacy was associated with less anxiety and greater career decidedness. However, contrary to expectations, conscientiousness was not linked directly to exploration goals, and social support did not yield significant direct paths to anxiety or decidedness. Although not shown in Fig. 2 to avoid visual clutter, support and conscientiousness covaried significantly (.35), as did the anxiety-decidedness, goal-anxiety, and goal-decidedness error terms (respectively, −.51, .20, and −.12).

The indirect effects posited by the model were tested with 5000 bootstrap samples. Each set of specific indirect effects were found to be significant. For example, conscientiousness was related to exploration goals via self-efficacy and the self-efficacy/ outcome expectations pathway (respectively, B = .07, SE = .04, 95% CI [.01, .15]; B = .06, SE = .02, 95% CI [.03, .10]), and social support was related to decisional anxiety and decidedness via self-efficacy (respectively, B = −.26, SE = .09, 95% CI [−.43, −.10]; B = .25, SE = .09, 95% CI [.09, .45]). A table containing the full set of indirect effects can be obtained from the first author.

We also replicated the path analysis of the career self-management model using the CDSE-SF in place of the CEDSE-BD to represent self-efficacy. The results were similar to those involving the CEDSE-BD, though the RMSEA value was slightly less optimal; SRMR = .04, CFI = .98, RMSEA = .10, χ^2 (5, N = 215) = 14.76, p < .01. These findings suggest that model-data fit was consistent across the two alternative measures of self-efficacy and provides additional support for the validity of the new CEDSE-BD scale. The path coefficients for the model involving the CDSE-SF are included in parentheses in Fig. 2.
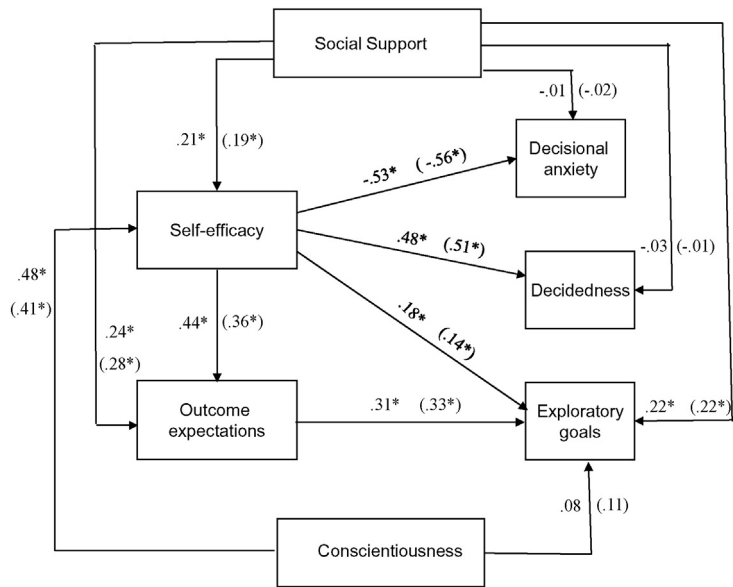
Fig. 2. Model of career self-management as applied to career exploration and decision-making. *Note.* The first coefficient on each path is for the CEDSE-BD; the second path, in parenthesis, is for the CDSE-SF. *$p < .05$, 1-tailed.

In sum, the findings of Study 2 replicated and extended the findings of the first study in several ways. First, Study 2 confirmed the 2-factor structure of the CEDSE items. In addition, a path analysis testing the CSM model with the new measure of decisional self-efficacy yielded adequate fit to the data, and similar results were found using the more established CDSE-SF to represent self-efficacy in model testing. Tests of indirect effects were also consistent with the path sequences posited by the model.

4. General discussion

Together, the two studies provided preliminary support for the new, brief measure of decisional self-efficacy, as well as for the career self-management model (Lent & Brown, 2013). We will comment first on the CEDSE scale and then on the model tests. It was interesting that, despite our effort to generate items reflecting conceptually disparate aspects of the career exploration and decisional process, the CEDSE demonstrated a relatively simple two-factor structure in both studies. Some studies of the CDSE-SF have also found evidence of fewer than the expected five factors (cf. Miller, Roy, Brown, Thomas, & McDaniel, 2009). It may be that college students perceive the career decision-making process in less complex terms than do career theorists and counselors.

Following Parsons'(1909) time-honored tradition, we incorporated the notion that self-exploration, career exploration, and "true reasoning" (i.e., efforts to reconcile or match self and career attributes) constitute relatively distinct aspects of the decisional process. We assumed that choice implementation and coping with decisional obstacles would represent other, somewhat unique efficacy elements. Our participants did not, however, appear to share this differentiated view of the decisional process. One

Table 3
Correlations, Means, Standard Deviations, and Internal Consistency Estimates for Study 2

Variables	1	2	3	4	5	6	7	8	M	SD	α
1. Decisional SE	–								7.48	1.45	.94
2. Coping efficacy	.61	–							6.37	1.70	.87
3. CDSE-SF	.77	.51	–						3.60	.60	.94
4. Outcome expec	.53	.29	.45	–					4.29	.56	.81
5. Social support	.38	.18	.34	.40	–				4.16	.63	.82
6. Conscientious	.55	.28	.48	.35	.35	–			3.88	.69	.84
7. Goals	.47	.29	.42	.53	.44	.34	–		4.08	.59	.78
8. Decisional anx	−.53	−.25	−.56	−.23	−.20	−.43	−.11	–	3.61	1.49	.89
9. Decidedness	.48	.19	.50	.20	.16	.37	.13	−.63	4.02	1.55	–

Note. $N = 215$; correlations ≥ .16 are significant, $p < .05$. SE = self-efficacy (CEDSE-BD); Coping efficacy = CEDSE-CE; CDSE-SF = career decision self-efficacy-short form; expec = expectations; anx = anxiety.

possibility is that many students may engage in a truncated decision-making process in which intentional exploration activities are either bypassed or limited to a very few salient choice options. In some cases, this may represent a response to decisional anxiety, environmental presses (e.g., social or financial pressures), or other choice constraints.

A second possibility is that the matching, or reconciling, of self and career information is not necessarily a distinctive step that students wait to perform until after they have separately gathered self and career information. Rather, career information is likely to be weighed on the fly in relation to views of the self (e.g., interests, values, abilities), with options being retained or eliminated based on ongoing assessments of fit. In this respect, it should be noted that several of the highest loading items on the CEDSE-BD implied joint consideration of self and career information or referred explicitly to fit or matching (e.g., "identify careers that best match your interests").

The obtained factor structure of the CEDSE could also be linked to developmental considerations. Our participants were, for the most part, late adolescents and young adults who were relatively inexperienced at career decision-making. Perhaps employed adults come to view the decisional process in more complex, differentiated terms, especially as they gain added self and career knowledge and anticipate the challenges posed by occupational changes. It is also possible that decisional coping efficacy becomes increasingly distinctive and consequential as a form of self-efficacy if and when people experience post-decisional regret or encounter obstacles to pursuing their preferred choice options. In such cases, those who are confident in their ability to cope with the disappointment and to engage in back-up planning may have an advantage in adjusting to decisional set-backs. Such possibilities warrant future research.

Turning to the tenability of the CSM model, the regression results in Study 1 and the path analytic findings in Study 2 both indicated that the predictors explained substantial amounts of variance in exploration goals. In addition, Study 2 provided support for the fit of the CSM model to the data in predicting goals, decisional anxiety, and level of decidedness. Although these findings were generally consistent with theoretical expectations, there were instances in which the findings from the two studies varied from one another or did not conform to specific theoretical predictions. For example, though the decisional self-efficacy scale yielded indirect relations to goals, via outcome expectations, in both studies, its direct relation to goals was significant only in Study 2. Prior research has similarly found support for either an indirect path model (Betz & Voyten, 1997) or for both direct and indirect paths from self-efficacy to exploration goals (Huang & Hsieh, 2011; Jantzer et al., 2009). Future research might clarify the primary means through which self-efficacy contributes to the career exploration process as well as the conditions that may moderate its relation to exploration goals and behaviors.

It would also be useful to devote greater study to the sources of decisional self-efficacy, particularly in situations where persons have had little, if any, prior experience with career exploration or decision-making. The results of Study 1 suggest that decisional self-efficacy may be partly informed by prior engagement in career exploration activities, availability of support for decision-making, and trait conscientiousness. It is possible that, in the absence of prior career decision-making experience, students also base such self-efficacy beliefs in part on recollections of how they have made other important life decisions (e.g., whether and where to attend college, what to major in, whether to pursue a particular romantic relationship) and on how satisfied they have been with these decisions. That is, it is possible that perceptions of career decision self-efficacy, and its experiential sources, are partly generalized from other life contexts and, thus, are not entirely domain-specific.

Interpretation of the current findings should be mindful of the studies' limitations. In particular, the CEDSE is a new measure and, as such, requires further psychometric scrutiny. Moreover, both studies employed cross-sectional designs. As a result, we could not test the full temporal sequence implied by the model, such as whether stronger exploratory goals are associated with later engagement in exploratory actions (e.g., career information-gathering) which, in turn, predict beneficial changes in decidedness or choice commitment among initially undecided or tentatively decided persons.

Implications for research and practice must be offered tentatively, given the early stage of research on the brief CEDSE scales and the CSM model in the context of career decision-making. Regarding the measure, our findings suggest that the CEDSE-BD may be useful as a research tool where scale brevity needs to be considered and where researchers are interested in obtaining only a total scale score. Though the CEDSE-BD is only about one-third the length of the more established CDSE-SF, it functioned similarly in predictive equations. It should be noted, however, that the CEDSE-BD was not designed for clinical applications. The CDSE-SF, with its five conceptually based sub-scales, may be a more useful tool for practitioners who are interested in assessing self-efficacy in relation to theoretically different aspects of the career decision-making process.

Regarding other variables in the CSM model, the findings suggest the potential value of focusing on conscientiousness and decisional support as targets of career choice counseling. For example, conscientiousness can be broken into its behavioral components, such as setting aside time to engage in career exploration activities and to reflect on obtained information. Brown and Ryan Krane (2000) have reported that involvement in written exercises is a critical ingredient of career choice interventions, and it is reasonable to assume that conscientious individuals are more likely to schedule the time necessary for written reflection and planning. Provision of decisional support, another of Brown and Ryan Krane's (2000) critical ingredients, may be furthered by assisting clients to identify persons in their natural support systems or in potential mentor pools (e.g., college alumni networks) who can provide added assistance with career information-gathering or decision-making.

In sum, the present set of studies offer preliminary support for both the CEDSE-BD scale, a new measure of self-efficacy, and the CSM model as applied to the career decision-making process. Both the measure and the model warrant additional inquiry. The CSM model has, to this point, been formally tested in relation to only a few other adaptive career behaviors (e.g., job-finding, Lim et al., 2015; sexual identity management, Tatum et al., 2015). Future research is needed to extend the model to other types of adaptive behavior (cf. Lent & Brown, 2013) and to explore its range of applicability across gender, race/ethnicity, socioeconomic conditions, sexual orientation, age, and disability/health status.

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