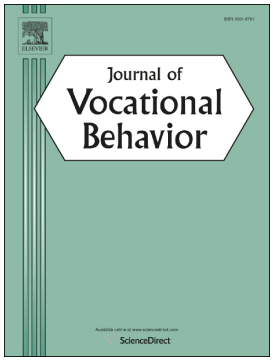

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Sources of Self-Efficacy and Outcome Expectations for Career Exploration and Decision-Making: A Test of the Social Cognitive Model of Career Self-Management

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Abstract

In an application of the social cognitive model of career self-management (Lent & Brown, 2013), we assessed the primary experiential sources of self-efficacy and outcome expectations relative

to career exploration and decision-making activities. These sources included personal mastery, verbal persuasion, vicarious learning, and affect (both positive and negative) experienced in relation to career exploration and decision-making. Participants were 324 college students, who completed an experiential sources measure along with domain-correspondent measures of self-efficacy, outcome expectations, goals, and level of career decidedness. A confirmatory factor analysis offered support for a 5-factor representation of the experiential sources, though the personal mastery and verbal persuasion sources were substantially interrelated. As a set, the source variables accounted for a larger portion of the variance in self-efficacy than outcome expectations, with much of their relation to outcome expectations being mediated by self-efficacy. Good support was also found for a path model including the source variables in the prediction of career exploration goals and level of career decidedness. Though the sources were generally linked to goals indirectly, mastery and positive affect both produced significant direct paths to level of decidedness. The findings are interpreted in light of social cognitive career theory and their implications for further research and practice are discussed.

Sources of Self-Efficacy and Outcome Expectations for Career Exploration and Decision-Making: A Test of the Social Cognitive Model of Career Self-Management

A social cognitive model of career self-management (CSM) was developed recently to help explain processes through which people contribute to their own educational and career development throughout the lifespan (Lent & Brown, 2013). Designed to complement earlier social cognitive models that focus on *content* aspects of career development (e.g., the type of fields people wish to pursue), the CSM model is aimed at *process* aspects of career behavior that transcend particular career fields – for instance, the mechanisms involved in exploring and deciding on career options, searching for work, balancing work and non-work roles, managing sexual identity in the workplace, and negotiating a variety of work transitions. A few recent studies have been designed specifically to test the model's predictions in the context of job searching (Lim, Lent, & Penn, 2016), multiple role planning (Roche, Daskalova, & Brown, in press), managing sexual identity (Tatum, Formica, & Brown, in press), and making career decisions (Lent, Ezeofor, Morrison, Penn, & Ireland, 2016).

The general goal of the present study was to expand examination of the CSM model in relation to career exploration and decision-making. Figure 1 displays the general classes of variables that are assumed to predict enactment of adaptive career behaviors and the positive outcomes that may result from them. These predictors include the social cognitive variables of self-efficacy, outcome expectations, and goals; person inputs, such as personality traits; and both distal and proximal contextual influences on adaptive career behaviors. Within this model, self-efficacy refers to individuals' perceived ability to perform specific tasks necessary for career preparation, entry, or adjustment (Lent & Brown, 2013). Outcome expectations refer to the anticipated (positive or negative) consequences of engaging in adaptive behaviors, and goals

involve people's intentions to perform these behaviors (e.g., to engage in career exploration).

In the context of career exploration and decision-making, self-efficacy is hypothesized to contribute to goals and actions, both directly and through outcome expectations. For example, those with stronger career decision-making self-efficacy are more likely to develop positive expectations about the outcomes of engaging in career planning. Together, self-efficacy and positive outcome expectations are seen as promoting goals to pursue career exploration and decision-making activities. These goals, in turn, motivate goal-consonant actions. In addition, both goal-setting and implementation are aided by favorable traits (e.g., conscientiousness) and environmental supports, such as the availability of necessary resources. Positive decisional outcomes (e.g., lessened decisional anxiety, increased decidedness) are seen as likely to result from active engagement in career exploration and decision-making, facilitative traits and environmental factors, and self-efficacy, which enhances the performance of adaptive career behavior (e.g., by helping to regulate skill use and promote persistence).

Many of the paths in Figure 1 have received prior study in the career development literature. Beginning with the research of Taylor and Betz (1983), career decision self-efficacy (CDSE), in particular, has been a popular topic, with much research focused on its measurement, correlates, and outcomes. Meta-analytic research has shown that CDSE produces theory-consistent bivariate relations with outcome expectations, peer support, and career indecision (Choi et al., 2012). In addition, several studies have found support for multivariate linkages between CDSE and other elements in the CSM model. For example, career exploration goals and actions have been predicted by combinations of CSM variables, such as self-efficacy and outcome expectations, facilitative personality traits, and contextual supports (e.g., Betz & Voyten, 1997; Lent, Ezeofor et al., 2016; Rogers, Creed, & Glendon, 2008).

Experiential Sources of Self-Efficacy and Outcome Expectations

One important gap in the literature on career exploration and decision-making (and on adaptive career behaviors, more generally) involves the theoretical antecedents of self-efficacy and outcome expectations. As shown in Figure 1, self-efficacy and outcome expectations are conceived as central cognitive motivators that enable the goal-action-outcome process, yet relatively little research has focused on the origins of these beliefs. Labeled as "learning experiences" in the figure (we will henceforth use the terms learning experiences and sources of efficacy interchangeably), these antecedents of self-efficacy and outcome expectations may be represented by the same four primary variables that are featured in general self-efficacy theory (Bandura, 1997): personal mastery experiences (e.g., successes and failures), verbal persuasion (e.g., social encouragement or discouragement), vicarious learning (i.e., observation of models), and physiological and affective states and reactions (e.g., positive and negative emotions associated with performance of particular tasks).

While Bandura had conceived of these four variables as the primary sources of self-efficacy beliefs, social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994) maintains that they also serve to inform outcome expectations, both directly and via self-efficacy. That is, favorable levels of all four source, or learning experience, variables (e.g., a preponderance of personal successes, verbal encouragement, access to relevant models, and low levels of negative affect) within a particular performance domain nurture stronger self-efficacy and more positive outcome expectations; self-efficacy also promotes positive outcome expectations because those who are more confident in their skills are likely to be optimistic about the prospect of obtaining the things they value. Note that Figure 1 also contains a feedback loop (at the rightmost part of the figure), whereby the favorable attainments that result from engaging in adaptive behaviors,

like decision-making, represent mastery experiences that subsequently confirm or revise self-efficacy beliefs and outcome expectations in continuous fashion.

The sources of self-efficacy (and, to a lesser degree, outcome expectations) have received some attention in research on SCCT's content models, particularly in the context of mathematics (e.g., Lent, Lopez, & Bieschke, 1991) as well as in other Holland theme domains (e.g., Schaub & Tokar, 2005). A recent meta-analysis has examined the four source variables within science, technology, engineering, and mathematics (STEM; Sheu, Lent, Miller, Truong, Penn, & Cusick, 2016) fields. However, there have been few studies of the sources of self-efficacy and outcome expectations regarding career process behaviors, such as decision-making. Such research may have been slowed by a dearth of instruments for assessing the source variables.

In one notable recent effort, Bike (2013) created a career decision learning experiences measure that was closely aligned with a popular measure of career decision self-efficacy (e.g., Betz, Klein, & Taylor, 1996; Taylor & Betz, 1983) and the model of career choice competencies around which it was structured (Crites, 1978). Among its useful features, Bike's scale divides the physiological/affective source into distinct positive and negative emotional arousal subscales. (Bandura's, 1997, theory allows for the possibility that self-efficacy can be informed by both positive and negative arousal states.) On the other hand, the total scale score of Bike's sources measure, reflecting the combination of the five individual sources, explained only a moderate amount of the variance in career decision self-efficacy; some of the source items seem less relevant to career exploration than to other aspects of career development (e.g., resume preparation); and the emotional arousal items were framed in the present tense rather than referencing past learning experiences. Finally, Bike did not examine the relation of her source measure to outcome expectations, a theoretically postulated link in SCCT.

A major purpose of the current study was to address the need for additional measures of the sources of career exploration and decision-making self-efficacy and outcome expectations. In particular, we sought to develop a set of decision-relevant source scales, to explore their dimensionality, and to examine their relation to relevant predictors and criterion variables in the CSM model. Consistent with Bike's (2013) approach, we constructed a measure designed to tap personal mastery, verbal persuasion, modeling, and physiological/affective experiences, sub-dividing the latter source into positive and negative affective states. In keeping with the SCCT framework and the CSM model, in particular, we assumed that the resulting measure (a) would contain five reliable underlying factors which, individually and collectively, (b) would predict self-efficacy, controlling for extent of prior involvement in career exploration activities. We also expected that the source factors would each (c) produce bivariate correlations with outcome expectations and (d) account for unique variation in outcome expectations beyond self-efficacy.

Additional Model-testing and Measure Refinement

In addition to these basic measure development and validation objectives, we sought to employ the new learning experience scales (assuming initial indications of their psychometric adequacy) within the context of testing a portion of the CSM model. As shown in Figure 1, the relation of the source variables to career exploration intentions are expected to be mediated by both self-efficacy and outcome expectations, and the relation of the source variables to level of career decidedness is expected to be mediated by self-efficacy alone. Prior research has found theory-consistent relations of self-efficacy and outcome expectations to career exploration intentions and of self-efficacy to indicators of career indecision or decidedness (e.g., Betz & Voyten, 1997; Lent, Ezeofor et al., 2016). However, fuller tests of the CSM model require examination of whether the source variables yield direct or only indirect relations, through self-

efficacy and outcome expectations, to exploration and decision-making intentions, actions, and outcomes. We, therefore, tested the tenability of a model hypothesizing that the source variables will yield largely indirect relations to career exploration intentions and career decidedness.

The present study was also designed to examine a few ancillary measurement issues in support of future research testing the CSM model. In particular, Lent, Ezeofor et al. (2016) had developed a brief measure of career exploration and decision-making (CEDSE-BD) intended for use in testing the CSM model. As part of the current study and as an aid to user-friendliness, we examined a version of this measure that contained a shorter response scale (5 vs. 10 scale points). Similar to the original measure development study, we employed the more established Career Decision Self-Efficacy-Short Form (CDSE-SF) to help validate the CEDSE-BD scale. We expected the modified CEDSE-BD to relate strongly to the CDSE-SF.

In addition, we had observed that the commonly used measures of outcome expectations and intentions in the career decision-making literature often produce modest internal consistency reliability coefficients. We, therefore, decided to design additional items that might enhance the reliability estimates of each scale, while potentially capturing a somewhat greater range of exploration and decisional behaviors. We expected the new items to load on the same factors as the original items and that the revised, slightly longer, scales would produce improved reliability estimates. The changes were also intended to create item content that more closely parallels that of the CEDSE-BD self-efficacy measure. Bandura (1997) has emphasized the value of ensuring that social cognitive predictors and dependent variables correspond appropriately with one another in terms of content.

In sum, the present study was designed primarily to extend application of the SCCT CSM model to career exploration and decision-making activities. Its focal point was the development

of a novel measure of career decision learning experiences that could be used in testing the CSM model. In addition to its theoretical relevance, such research could contribute to practice by clarifying how and to what extent the various types of experience inform self-efficacy and outcome expectations, with potential implications for the structuring of career exploration and decision-making interventions. The study was also designed to fine-tune existing measures of self-efficacy, outcome expectations, and intentions for use in further research on the CSM model.

Method

Participants

The participants were 324 undergraduates enrolled in psychology courses at a mid-Atlantic university. The sample ranged in age from 18 to 33 (M = 19.65, SD = 1.92) years and included 104 men (32%), 218 women (67%), and two students (1%) reporting other gender identities. In terms of class year, 88 (27%) were freshmen, 99 (31%) sophomores, 77 (24%) juniors, 55 (17%) seniors, and five (1%) reported other student statuses. The racial/ethnic composition of the sample included European American (n = 180, 56%), African American (36, 11%), Asian/Pacific Islander (59, 18%), Hispanic or Latino/a (24, 7%), and multiracial (16, 5%) groups; 9 students (3%) identified as members of other racial/ethnic groups. The majority (n = 193, 60%) rated themselves as moderately to very decided on a career direction, while 131 students (40%) ranged from completely undecided to slightly decided. Seventy-one percent (n = 230) also indicated that making or remaking a career decision was either moderately or very important to them at the present time.

Procedure and Instruments

Participant recruitment occurred through a web-based service in the university's psychology department. The website allows undergraduates to participate in research studies in

return for experimental credit. After completing an informed consent form, they were given measures of self-efficacy, outcome expectations, goals, past exploration activities, efficacy-relevant learning experiences, and current level of career decidedness. A set of demographic questions was also administered. All measures were completed online and in random order, and the interface required participants to complete each question before moving on to subsequent ones, though participants were informed that they could close their browsers if they did not wish to complete the entire survey. This procedure was used to prevent missing data. Scale scores for each measure were calculated by summing item responses and dividing by the number of items on the scale. Each of the scales produced adequate internal consistency reliability estimates (range of .81 to .93), as shown in Table 2. Scale scores were distributed reasonably normally (e.g., skew and kurtosis statistics were all under 1) and no extreme univariate outliers were detected.

Sources of self-efficacy and outcome expectations. Sources of self-efficacy and outcome expectations were assessed with the Career Exploration and Decision Learning Experiences (CEDLE) scales, which were developed for the present study based on a review of Bandura's (1997) conceptual definitions of the primary efficacy sources, examination of efficacy source measures used in career content domains (e.g., mathematics self-efficacy, Holland theme self-efficacy), and inspection of Bike's (2013) measure of career decision learning experiences. Items for the mastery experience (ME), verbal persuasion (VP), and vicarious learning (VL) scales were generated by the current research team. Items for the positive emotion (PE) and negative emotion (NE) scales were adapted from the international version of the Positive and Negative Affect Schedule-Short Form (Thompson, 2007) and placed in the specific context of career exploration and decision-making. All items were subsequently reviewed by the instructor

and students of a graduate-level psychological measurement course. After incorporating suggested editing changes, the instrument initially contained 34 items, with 8 items each on the ME, VP, and VL scales, and 5 items each on the PE and NE scales. The final set of items on each scale are shown in Table 1.

In the measure's instructions, participants were told that "the following questions ask about your past experiences in making decisions related to your career future. *Such decisions can include things like what career direction to pursue, what major to declare, or what college to attend.*" They were then asked to rate their agreement with each of the ME, VP, and VL item statements (e.g., "the way I have approached important career-related decisions has worked well for me in the past") on a 5-point scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The following statement was presented as a lead-in to the PE and NE items: "When you have approached career exploration and decision-making tasks over the past year, to what extent have you felt…" Participants were then presented with a set of positive and negative feeling states (e.g., "upset," "excited"), and asked to indicate the extent to which they had experienced each one along a 5-point scale, from 1 (*very slightly or not at all*) to 5 (*extremely*).

Two feeling statements, one each on the PE and NE scales, were changed to better capture the specific context of career decision-making (versus other domains or general life experiences). In particular, "overwhelmed" was used to replace "hostile" on the negative emotion scale, and "excited" was used to replace "alert" on the positive emotion scale. Higher scores on the ME, VP, VL, and PE items reflect more positive experiences related to career exploration and decision-making, whereas higher scores on the NE items connote unpleasant affect associated with these activities. Factor structure, reliability, and validity data for the CEDLE scales are reported in the Results section.

Self-efficacy. Self-efficacy was measured with the Career Exploration and Decision Self-Efficacy-Brief Decision (CEDSE-BD) Scale (Lent, Ezeofor et al., 2016). The scale contains 8 items assessing confidence in one's ability to perform various career exploration and decision-making activities, such as "figure out which career options could provide a good fit for your personality," and "learn more about careers you might enjoy." In two samples of college students, it was found to correlate substantially with an established measure of career decision self-efficacy and to yield adequate internal consistency reliability estimates (α = .94-.96). The CEDSE-BD also produced theory-consistent relations with measures of outcome expectations, goals, social support, conscientiousness, decision anxiety, and decision status regarding career options (Lent, Ezeofor et al., 2016). The present study modified the scale's original 10-point response format to 5-points, from no confidence at all (0) to complete confidence (4). (The survey software converted the scale to 1-5 for scoring purposes). Higher scores reflect stronger self-efficacy at career exploration and decision activities.

For validity estimation purposes, we also administered the Career Decision Self-Efficacy Scale-Short Form (CDSE-SF; Betz et al., 1996), a 25-item measure based on Crites' (1978) five career choice competencies. Self-efficacy ratings are made on a scale from *no confidence at all* (1) to c*omplete confidence* (5) (Betz, Hammond, & Multon, 2005). CDSE-SF total scale scores have produced internal consistency reliability estimates of .94 and above in undergraduate samples (Betz et al., 2005) and have been found to relate in theory-consistent ways with career decision outcome expectations, career indecision, and vocational identity (Choi et al., 2012).

Outcome expectations and goals. For reasons noted earlier (e.g., to enhance scale reliabilities and expand construct representation), we used revised versions of the career outcome expectations and intention scales developed by Betz and Voyten (1997). The former assesses

positive outcomes that may result from involvement in career exploration activities, while the latter measures goals to engage in career exploration activities. Betz and Voyten reported coefficient alphas of .79 and .73, respectively, for the original scales, and also found that they correlated, as expected, both with one another and with a measure of career decision self-efficacy. We added four new items to the outcome expectation scale's original four items. A sample original item is, "If I learn more about different careers, I will make a better career decision." A sample new item is, "If I learn more about which careers might best match my personality, I will make a better career choice." Five new items were added to the original 5-item intentions scale. A sample original item is, "I intend to spend more time learning about careers than I have been." A new item is, "I plan to spend more time thinking about which careers best match my interests and abilities." As in their original versions, both revised measures employed a 5-point rating scale, from s*trongly disagree* (1) to s*trongly agree* (5). Higher scores on the scales reflect, respectively, more positive outcome expectations and firmer goals regarding future involvement in career exploration activities.

Prior career exploration actions. Previous engagement in career exploration activities was assessed with the 6-item environmental exploration and 5-item self-exploration subscales of the Career Exploration Survey (Stumpf, Colarelli, & Hartman, 1983). These subscales examine, respectively, the extent to which an individual has explored occupational information and reflected on the self in relation to careers within the past 3 months. Ratings are made on a scale ranging from *little* (1) to *a great deal* (5) in relation to items such as "investigated career possibilities" (environmental exploration) and "understood a new relevance of past behavior for my future career" (self-exploration). Higher scores reflect greater participation in exploration activities. Stumpf et al. (1983) reported coefficient alphas of .88 and .87 for the environmental

and self-exploration scales, respectively, in a sample of undergraduates. They also found that each scale correlated moderately with corresponding measures of career search instrumentality (i.e., beliefs that exploring careers or the self will lead to attainment of one's career goals), which were conceptually similar to outcome expectations.

Career decision status. Level of career decidedness was assessed with a 3-item measure adapted by Penn and Lent (2016) from two prior measures of career decision status (Hacker, Carr, Abrams, & Brown, 2013; Jones, 1989). A sample item is, "how decided about your *overall* career direction are you at this point in time?" Participants respond to each item on a 6-point scale, with higher scores implying greater decidedness or choice certainty. Penn and Lent found that the measure yielded an internal consistency reliability estimate of .71 and theory-consistent relations with measures of career decision self-efficacy and decisional discomfort. It produced an internal consistency estimate of .84 in our sample.

Results

Factor Analysis of the CEDLE Items

The original 34 items of the CEDLE were subjected to principal axis factoring and oblimin oblique rotation (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Gorsuch, 1997). Factor structure was determined based on scree, parallel analysis, and factor interpretability criteria. The various criteria suggested the presence of between four and six latent factors, and we subsequently ran 4, 5, and 6 factor solutions. The 4-factor solution was most plausible and accounted for 55% of the total variance. The items generally loaded in theoretically consistent ways with the exception of the first factor, which included all of the mastery experience and verbal persuasion items. The remaining factors contained items exclusively reflecting negative emotions, positive emotions, and vicarious learning. We had planned to retain items that had

communalities ≥ .40, primary factor loadings on the pattern matrix ≥ .40, and cross-loadings < .15 on non-primary factors. Ten items (three mastery experience, four vicarious learning, one negative emotion, and two positive emotion items) failed to meet one or more of these criteria for item retention. To increase the likelihood of factor replicability, we elected to create factors of at least four items each. We, therefore, retained one item ("active") with a communality of just under .40 because it loaded strongly on the positive emotion factor and seemed to offer a reasonable conceptual fit to that factor.

Because all mastery experience and verbal persuasion items had loaded on a common factor, we decided to trim this factor by retaining only the top four loading items of each type (i.e., 4 mastery and 4 persuasion items), reasoning that it would be useful to preserve the conceptual flavor of Bandura's (1997) primary sources while achieving reasonably brief scales for future research purposes. We then re-examined the factor structure of the CEDLE measure using the confirmatory factor analysis procedures of Mplus 7.4 and MLM estimation (Muthén & Muthén, 1998-2015). In addition to the mastery and persuasion items, this analysis included 4 items each representing negative emotions, positive emotions, and vicarious learning (total of 20 items). Hu and Bentler (1999) have proposed that adequate model-data fit may be indexed by SRMR values ≤ .08 in combination with CFI values ≥ .95 or RMSEA values ≤ .06, though slightly more liberal fit criteria may also be used when evaluating model adequacy (e.g., CFI values ≥.90; Hoyle & Panter, 1995; RMSEA values ≤.08; Browne & Cudeck, 1992).

We first tested the fit of a 4-factor model, with mastery and persuasion items set to load on a common factor and negative emotions, positive emotions, and vicarious learning items representing the other three factors. All factors were allowed to correlate. This analysis produced indications of adequate model-data fit: SRMR = .06, CFI = .96, RMSEA = .05;

Satorra-Bentler (S-B) χ^2 (164, N = 324) = 292.22, p < .001. We next assessed the fit of a 5-factor model, representing mastery and persuasion as distinct but correlated learning experiences; as in the 4-factor model test, negative emotions, positive emotions, and vicarious learning comprised separate factors. The 5-factor model also fit the data well: SRMR = .06, CFI = .97, RMSEA = .04; Satorra-Bentler (S-B) χ^2 (160, N = 324) = 240.55, p < .001. Comparison of the two models indicated that the 5-factor model yielded significantly better fit, Δ S-B χ^2 (4) = 50.43, p < .001, even though the mastery and persuasion factors were, as might be expected from the initial exploratory factor analysis, highly interrelated. Table 1 presents the items and loadings of the 5-factor model.

Cronbach alpha values suggested that the resulting scales produced adequate internal consistency reliability estimates: Mastery Experience (ME), $\alpha = .82$; Verbal Persuasion (VP), $\alpha = .89$; Vicarious Learning (VL), $\alpha = .83$); Positive Emotional Arousal (PE), $\alpha = .81$); and Negative Emotional Arousal (NE), $\alpha = .82$. Scale scores were computed by summing item responses and dividing by 4 (the number of items on each scale), with a possible score range of 1-5. All correlations among the CEDLE scales were significant (p < .05; see Table 2), though the ME, VP, VL, and PE scales tended to correlate more highly with one another (range of .43 to .77) than they did with the NE scale (range of -.12 to -.32). The small, negative correlation between NE and PE (-.18) indicates that negative and positive affect associated with career exploration and decision-making were inversely but not substantially interrelated. In addition, the past involvement in career exploration variables produced significant relations with the ME,VP, VL, and PE scales (range = .27 to .49), though their relations with NE were relatively weak (self-exploration/NE, r = .14; environmental exploration/NE, r = -.07, p > .05). The positive correlation between self-exploration and negative affect may suggest that higher levels

of self-exploration can be linked to rumination.

Psychometric Properties of the Revised Self-Efficacy, Outcome Expectation, and Intention Scales

We next examined psychometric properties of the revised social cognitive measures. The CEDSE-BD had been developed by Lent, Ezeofor et al. (2016) to serve as a brief measure of self-efficacy expressly for use in testing the CSM model. In its initial form, the CEDSE-BD had been scaled from 0 (no confidence) to 9 (complete confidence). In this study, we examined whether a simplified 5-point scale, with the same verbal endpoints, would produce satisfactory psychometric estimates. Though career self-efficacy measures have traditionally featured 10-point scales, researchers have more recently often adopted somewhat briefer (e.g., 5 or 7-point), and presumably more reader-friendly, scaling options (Lent & Brown, 2006).

We subjected the items of the CEDSE-BD, outcome expectations, and intention scales to a confirmatory factor analysis. As with the analysis of the CEDLE measure, this involved Mplus 7.4 and MLM estimation. In this case, the items of each scale were set to load on a single factor (corresponding to self-efficacy, outcome expectations, or intentions). The resulting 3-factor model produced adequate fit to the data, SRMR = .06, CFI = .94, RMSEA = .05; Satorra-Bentler (S-B) χ^2 (296, N = 324) = 533.64, $p < .001$. All items loaded significantly ($p < .001$) on their assigned factors (range = .40 to .86).

We found that that the simplified CEDSE-BD correlated substantially with the more established CDSE-SF scale (r = .78); this correlation compares favorably with that reported by Lent, Ezeofor et al. (2016) using the original version of the CEDSE-BD. In addition, the revised CEDSE-BD produced less skew (-.28) and kurtosis (-.02) than did its original version (e.g., in Lent, Ezeofor et al., 2016, Study 1: skew = -1.18, kurtosis = 1.90), and the internal consistency

estimate (.93) remained comparable to that of the original version (Lent, Ezeofor et al., 2016, Study 1, $\alpha = .96$). The 8-item version of the outcome expectation scale and the 10-item version of the intention scale each correlated strongly with their briefer, original versions ($r = .93$ for outcome expectations; .91 for intentions). Cronbach reliability estimates for the revised outcome expectation and intention scales ($\alpha = .90$ and .87, respectively) were somewhat higher than for their original versions (.83 and .75, respectively). The newer versions also correlated with the CEDSE-BD and CDSE-SF self-efficacy scales at moderate levels ($r = .37$ to .45) that were comparable to or slightly higher than their original versions ($r = .35$ to .42). Given their promising reliability, validity, and distributional properties, the revised scales were used in subsequent analyses.

Prediction of Exploration Intentions and Level of Career Decidedness

Table 2 contains the intercorrelations among the variables in the model, along with their means, standard deviations, and internal consistency reliability estimates. A path analysis with Mplus 7.4 (and MLM estimation) was performed to test the fit of the data to the model shown in Figure 2. The source variables were modeled as covarying predictors (Sheu et al., 2016) and the errors associated with exploration intentions and career decidedness were also allowed to covary (Lent et al., 2016). (Covariances are not shown in Figure 2 to avoid visual clutter.) A model in which the learning experience variables contribute only indirectly (via self-efficacy and outcome expectations) to the prediction of exploration intentions and level of career decidedness offered adequate fit on the SRMR index but less than optimal fit on the other two indices: SRMR = .04, CFI = .92, RMSEA = .11; Satorra-Bentler (S-B) χ^2 (11, $N = 324$) = 53.65, $p < .001$. We examined the modification indices in Mplus to determine whether fit could be improved further by modeling direct paths from any of the learning experience variables to either exploration

intentions or career decidedness. The indices suggested improved fit with the addition of direct paths from both mastery experiences and positive emotions to decidedness. Including these paths improved each of the fit indices: SRMR = .03, CFI = .98, RMSEA = .06; S-B χ^2 (9, N = 324) = 20.27, p = .02. Direct comparison of the original and revised models indicated that the latter resulted in significantly improved fit, Δ S-B χ^2 (2) = 34.56, $p < .001$. These additions seem reasonable at a conceptual level because having a greater fund of prior relevant successes and feeling positively about the career exploration process may prompt approach behavior and, potentially, quicker movement toward career decidedness.

The path coefficients for the revised model, shown in Figure 2, indicate that self-efficacy (β = .19) and outcome expectations (β = .46) each produced significant direct paths to intentions (R^2 = .31). In addition, self-efficacy (β = .21), mastery (β = .15), and positive emotions (β = .28) yielded direct paths to career decidedness (R^2 = .31). Together, the set of learning experience scales explained 54% of the variance in self-efficacy, and four of the five learning experiences accounted for significant unique variance ($p < .01$); the beta weights ranged from -.04 (persuasion) to .36 (mastery). Self-efficacy and the learning experience variables accounted for 20% of the variance in outcome expectations, though not all predictors performed as expected. Self-efficacy and vicarious learning contributed significantly and positively to the prediction of outcome expectations (β = .39 and .15, respectively), while negative emotions produced a significant positive beta weight (.18), which may reflect the effects of statistical suppression; the other three source variables yielded non-significant beta weights.

We tested the indirect effects posited by the model in Figure 2 by running 5000 bias-corrected bootstrap samples in Mplus. Nineteen of the 26 specific indirect pathways in the model were found to be statistically significant. Support was found for outcome expectations as

a mediator of the path from self-efficacy to intentions; self-efficacy as a mediator of the paths from most of the source variables to outcome expectations and career decidedness; and self-efficacy and outcome expectations as mediators of the paths from most of the source variables to intentions. However, the five indirect pathways from persuasion were each non-significant, as were the paths from mastery and positive emotion to intentions via outcome expectations. A table displaying the full set of indirect effects can be obtained from the first author.

Incremental Predictive Utility of the Source Variables

Finally, we performed two hierarchical regression analyses to assess the extent to which the learning experience variables account for unique variance in the prediction of self-efficacy and outcome expectations, beyond simple prior exposure to career and self-exploration activities. First, in predicting self-efficacy, we entered the environmental and self-exploration scales at the first step of the equation and the five learning experience scales at the second step. The results indicated that prior engagement in exploration activities accounted for 19% of the variance in self-efficacy, while the learning experience scales explained an additional 36% of the variance. Once the latter variables were added to the equation, neither career exploration exposure scale produced a significant beta weight. Second, the outcome expectations variable was regressed on the following predictors in successive steps (a) the two career activity scales, (b) self-efficacy, and (c) the set of learning experience scales. The environmental and self-exploration scales explained a small but significant (6%) amount of the variation at the first step of the equation, but they did not account for unique predictive variance once self-efficacy and the learning experience variables were added. The latter variables, together, explained an additional 15% of the variance in outcome expectations.

Discussion

The current study examined learning experiences that, theoretically, inform both self-efficacy and outcome expectations regarding engagement in career exploration and decision-making activities (Lent & Brown, 2013). Following procedures similar to those used to assess the sources of self-efficacy in career-related content domains, such as mathematics (Lent et al., 1991), we constructed a measure designed to tap the primary source variables – personal mastery, verbal persuasion, modeling, and physiological/affective state. Although the latter variable had typically been assessed in relation only to negative emotional arousal (anxiety) in prior research, we followed Bike's (2013) lead in creating distinct measures of negative and positive affective states. We had, thus, assumed that our sources measure would contain five relatively distinct factors: mastery (success) experiences, verbal persuasion, vicarious learning, positive affective states, and negative affective states in relation to prior engagement in career exploration and decision-making activities.

Factor analyses produced somewhat mixed indications regarding the dimensionality of the sources measure. An initial exploratory factor analysis suggested the presence of four rather than five correlated factors. Consistent with expectations, vicarious learning and the two forms of affect each comprised distinct factors. However, the items designed to reflect mastery experiences and verbal persuasion loaded on a single dimension. After removing items with non-optimal characteristics and performing a confirmatory factor analysis on the shortened sources measure, we found that a 5-factor model fit the data better than did a 4-factor model. In this analysis, mastery and persuasion formed distinct though highly related factors.

One possibility is that the mastery and persuasion items we had written did not allow participants to distinguish clearly between these two types of learning experience. That is, their strong interrelation may have been an artifact of measurement. Another possibility is that,

because process domains like career exploration and decision-making do not necessarily offer objective benchmarks for successful performance, people may be likely to interpret the quality of their past efforts and future skill capabilities in part through discourse with significant others. For example, a student's parents may, intentionally or not, provide feedback that helps inform the student's impressions of his or her decision-making capabilities. This socially-distilled performance information may be particularly influential for young people who have had relatively limited personal experience at making major life decisions.

In the realm of career exploration and decision-making, it may be difficult to demarcate clearly between how people evaluate their prior efforts and how these efforts are interpreted through dialogue with significant others. For example, consider the two items "the way I have approached career-related decisions has worked well for me in the past" (presumed to denote mastery experiences) and "important others… have told me that I am good at making career-related decisions" (presumably an indicator of verbal persuasion). In the absence of independent or objective performance standards, people may naturally rely on feedback from influential others to determine how well they are doing. Personal mastery and verbal persuasion may, moreover, come to covary to such a degree over time that it may become difficult to disentangle them from one another. Indeed, even in the realm of STEM activities, mastery experiences and verbal persuasion often intercorrelate very highly (Sheu et al., 2016). This may occur because people are likely to receive social feedback that is consistent with their objective performance and because such feedback helps them to confirm and crystallize personal skill perceptions in situations where ambiguity exists about the basis for one's performance.

In subsequent analyses, the set of learning experience variables were strongly predictive of self-efficacy, collectively accounting for 54% of the variance in efficacy beliefs. Individually,

four of the five learning experience scales (all but persuasion) explained unique variation in self-efficacy, even after controlling for the amount of prior exposure to career exploration activities. Thus, simply recalling that one has engaged in career exploration in the past may shed some light on self-efficacy (Lent, Ezeofor et al., 2016), perhaps because greater activity exposure offers more opportunity for skill mastery. On the other hand, mere exposure may reveal less about one's efficacy than does the ways in which he or she encodes direct and vicarious performance experiences (e.g., the degree of success, stress, or positive affect recalled by the individual).

The findings regarding the prediction of outcome expectations did not conform as closely to hypotheses as was the case with self-efficacy. Four of the source variables did produce small to medium bivariate relations with outcome expectations; the correlation with negative emotions was, however, non-significant. In multivariate tests, both with and without the scales assessing simple exposure to career exploration, self-efficacy and the source variables collectively explained about 20% of the variance in outcome expectations. Self-efficacy accounted for most of the variance, though vicarious learning and negative emotions also produced significant beta weights. The contribution of mastery experience and positive emotions to outcome expectations was indirect only, via self-efficacy beliefs. Negative emotions produced a significant, positive (rather than negative) link to outcome expectations in the presence of the other predictors. It is possible that those who have faced career exploration with dread may see information-gathering as a necessary evil to arrive at a satisfying decision. However, this increase in the predictive contribution of negative emotions in the multivariate context may well have been due to the effects of statistical suppression.

Our path analysis indicated that the model predicting exploration goals and level of career decidedness from the combination of learning experiences, self-efficacy, and outcome

expectations offered adequate, though not optimal, fit to the data. In particular, consistent with the assumptions of the CSM model, self-efficacy and outcome expectations jointly predicted exploration goals, and self-efficacy was predictive of career decidedness. Model-data fit was improved by adding paths from mastery experience and positive emotion to decidedness, complementing the path from self-efficacy to decidedness. While these additional paths could have been spurious (i.e., due to the unique characteristics of our sample), it is also possible that those who enjoy, and see themselves as having been successful at, the decision-making process are more likely to engage in decisional activities and, consequently, may arrive at a career decision more quickly than those who view the process in less favorable terms.

Prior mastery may reflect decisional skills and positive affect regarding career exploration may serve a role similar to interests in the SCCT choice model; both variables may, along with self-efficacy, facilitate career decision-making. Apart from the direct paths from mastery and positive emotion to decidedness, we found that the paths from most of the source variables to goals and decidedness were, consistent with the CSM model, largely mediated by self-efficacy and/or outcome expectations. Verbal persuasion alone did not produce significant direct or indirect paths in model testing, perhaps owing to its overlap with mastery experiences. Indeed, when we replicated the path analyses using a composite of mastery and persuasion experiences, the model produced indications of adequate fit and the composite variable produced pathways that were similar to those involving mastery alone in the initial model tests.

As part of our study, we had also revised and examined the psychometric properties of previously developed measures of self-efficacy, outcome expectations, and goals. The CEDSE-BD self-efficacy measure was presented with an abbreviated 5-point scaling format. This new version retained positive features of the original 10-point format (e.g., strong correlation with an

established measure of career decision self-efficacy and excellent internal reliability), while demonstrating more normally distributed scores. We also added additional items to the original versions of the outcome expectation and goal measures in an effort to extend their range of construct representation, better match the item content of these scales to one another and to self-efficacy, and improve their internal consistency. Findings indicated that the new items load on the same latent dimensions as do the older items and that the new scales correlate highly with their previous versions and demonstrate somewhat improved reliability estimates. All three revised measures performed adequately in model testing and, thus, may merit use in future research. The effort to better align their content is responsive to recommendations that social cognitive predictors and dependent variables be designed to correspond appropriately with one (Bandura, 1997).

Limitations and Implications for Future Research and Practice

Our findings should be interpreted in view of the study's limitations. In particular, the design was cross-sectional in nature and the sample consisted of college students from a single university, with many of them having a limited range of occupational experience. It would be valuable, therefore, for future research on the CSM model to employ longitudinal designs that can examine issues of temporal precedence and better test hypothesized mediational relationships. It would also be useful to study samples that are more diverse with respect to levels of career development, culture, and socioeconomic status.

Several additional directions for future research might be noted. First, in view of the findings that our mastery experience and verbal persuasion dimensions were substantially interrelated, it would be useful to further explore the factor structure of the CEDLE scales, for example, to see if the 5-factor structure is replicable in other samples and whether alternative

verbal persuasion items might enable better differentiation from mastery experiences. Second, the nature of the relation between negative emotions and outcome expectations regarding career exploration bears further scrutiny. We had assumed that the positive relation between the two scales in our study was due to a statistical suppression effect, but future research is needed to determine whether this relation is replicable and, if it is, whether it is due to methodological or substantive considerations.

Third, given that our predictors explained much more variance in self-efficacy than in outcome expectations, it would be useful to examine additional experiential bases for outcome expectations. Fourth, the role of mastery experiences and positive affect deserve further attention as predictors of career decidedness. Finally, it would be useful to pursue experimental or intervention studies that test the effects of systematic exposure to particular learning experiences on self-efficacy and outcome expectations (e.g., Sullivan & Mahalik, 2000).

Implications of our findings for career counseling practice need to be offered tentatively given the early stage of research on the CSM model and, especially, the sources of self-efficacy and outcome expectations. Pending further research replicating and extending our findings, it may be that efforts to promote career exploration and decision-making self-efficacy beliefs and outcome expectations will profit from a focus on exposure to role models (e.g., testimonials from peers regarding the usefulness of engaging in career and academic major exploration activities early in college) and on the development of information-gathering and self-exploration exercises that are likely to be experienced as fun and engaging (and, thus, stimulate positive affect). For example, visually appealing computer activities that provide occupational exposure may imbue the exploration process with more interest and, thereby, help to sustain behavioral engagement in it. It may also be useful to reinforce such engagement with verbal encouragement and to frame it

in terms of success at developing decisional skills.

In sum, the present findings suggest that the CEDLE scales represent promising measures of efficacy-relevant learning experiences, though further study of their dimensionality is needed. We also found that the revised measures of self-efficacy, outcome expectations, and goals produced adequate psychometric estimates. Moreover, a CSM-based model including the social cognitive predictor and outcome variables largely conformed to theoretical expectations, though two additional paths (from exploration-based mastery experiences and positive affect to career decidedness) further improved model fit. On balance, the findings suggest the value of future research on the CSM model in the context of career exploration as well as in other career process domains.

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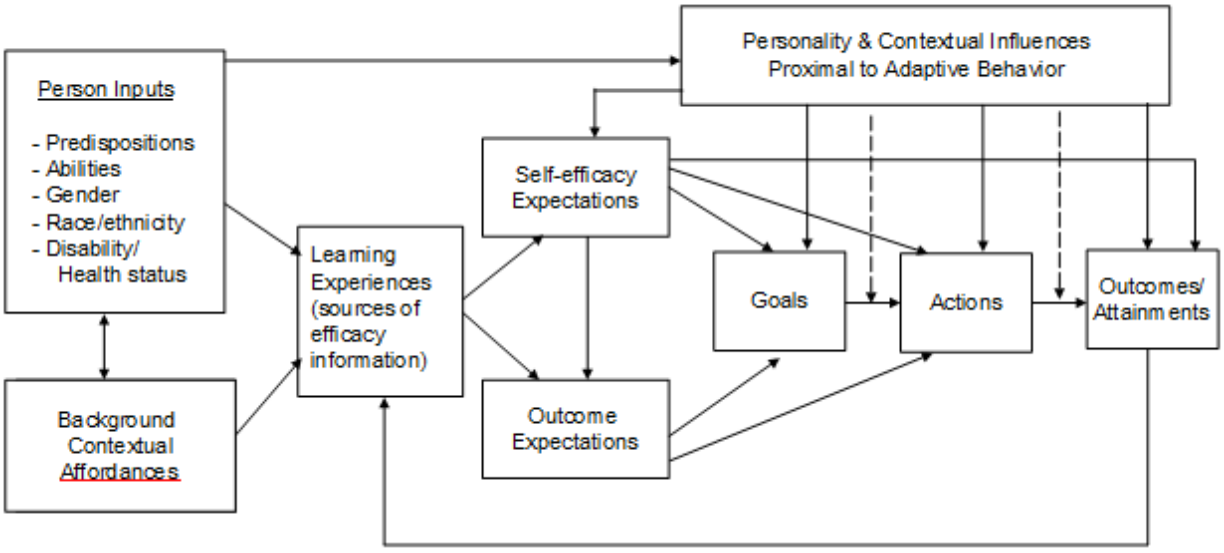

Figure 1. Model of career self-management. Adapted from "Toward a unifying social cognitive theory of career and academic interest, choice, and performance," by R.W. Lent, S.D. Brown, & G. Hackett, 1994, *Journal of Vocational Behavior, 45*, p. 93. Copyright 1993 by R.W. Lent, S.D. Brown, & G. Hackett. Reprinted with permission.

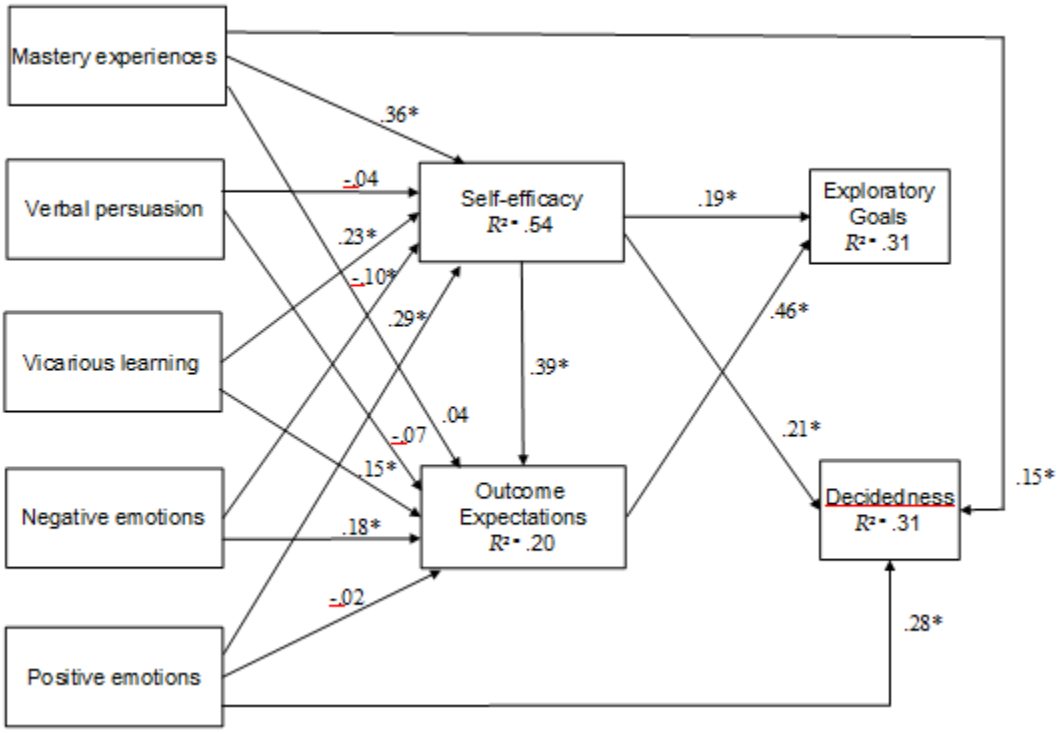

Figure 2. Sources of efficacy information in relation to self-efficacy, outcome expectations, goals, and level of decidedness in career exploration and decision-making. * $p < .05$.

Table 1

Career Exploration and Decision Learning Experiences – Items and Standardized Factor Loadings

Learning Experience Item	Factor				
	Personal Mastery	Verbal Persuasion	Vicarious Learning	Positive Emotion	Negative Emotion
The way I have approached important career-related decisions has worked well for me in the past	.73				
I have done a good job of weighing the positives and negatives of different options when I have had to make career-related decisions	.73				
I have been good at putting my career-related decisions into action	.78				
I have been resourceful at gathering the information I need to make career-related decisions	.70				
Important others have let me know that I am resourceful when it comes to gathering information needed to make career-related decisions		.84			
Important others have let me know I do a good job of considering the positives and negatives of different choice options when making career-related decisions		.85			
Important others have let me know that I have been good at evaluating the choice options that would best meet my needs in making career-related decisions		.80			
Important others have let me know that I am good at managing challenges that arise when making career-related decisions		.76			
I have role models who are good at making important career decisions			.83		
I have observed people I admire who are resourceful at gathering the information they need to make career-related decisions			.66		
I have role models who are knowledgeable about how their interests and abilities fit different career options			.83		
I have role models who have explained to me how they chose an academic major or career path			.67		
Determined				.77	

Inspired	.80	
Active	.61	
Excited	.73	
Upset		.57
Nervous		.77
Afraid		.84
Overwhelmed		.75

Note. Copyright 2016 by G.W. Ireland and R.W. Lent. Positive and negative emotion items were preceded by the stem, "When you have approached career exploration and decision-making tasks over the past year, to what extent have you felt…".

Table 2

Correlations, Means, Standard Deviations, and Internal Consistency Estimates

Variables	1	2	3	4	5	6	7	8	9	10	11	*M*	*SD*	α
1. Decisional SE	--											3.66	.74	.93
2. CDSE-SF	.78	--										3.59	.62	.94
3. Outcome Expec	.39	.40	--									4.17	.58	.90
4. Goals	.37	.45	.52	--								4.00	.57	.87
5. Decidedness	.48	.50	.28	.12	--							4.61	1.15	.84
6. Envir Explor	.41	.43	.14	.25	.22	--						2.69	1.02	.89
7. Self-Explor	.35	.39	.24	.34	.22	.50	--					3.45	.96	.88
8. Mastery	.67	.67	.25	.25	.46	.49	.38	--				3.51	.76	.82
9. Persuasion	.55	.59	.20	.26	.32	.45	.37	.77	--			3.43	.81	.89
10. Vicar										--		3.78	.79	.83

Variables	1	2	3	4	5	6	7	8	9	10	11	*M*	*SD*	α
Learn	.54	.55	.31	.34	.24	.30	.27	.54	.59					
11. Positive											--	3.59	.79	.81
Emot	.61	.63	.23	.30	.49	.40	.35	.62	.53	.43				
12. Negative	-	-			-	-		-	-	-	-	3.17	.95	.82
Emot	.29	.30	.06	.03	.14	.07	.14	.32	.26	.12	.18			

Table 2 (Continued)

Note. $N = 324$; correlations $\geq |.12|$ are significant, $p < .05$. SE = Self-Efficacy (CEDSE-BD); Expec = Expectations; CDSE-SF = Career Decision Self-Efficacy-Short Form; Envir Explor = Environmental Exploration; Self-Explor = Self-Exploration; Vicar Learn = Vicarious Learning; Emot = Emotion.

Highlights

- Extended a social cognitive model to career exploration and decision-making
- Developed a measure of the sources of self-efficacy and outcome expectations
- The measure produced adequate reliability and validity estimates
- Used the measure in a test of the social cognitive model of career self-management
- The self-management model fit the data well, especially with slight modification