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Predicting the Math/Science Career Goals of Low-Income Prospective First-Generation College Students

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The present study used social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994) to predict the math/science goal intentions of a sample of low-income prospective first-generation college students (N = 305). Structural equation modeling was used to test a model depicting relationships between contextual (i.e., social class, learning experiences, proximal supports and barriers) and person-cognitive (i.e., self-efficacy, outcome expectations, interests, goals) variables as hypothesized in SCCT and based on previous literature on low-income first-generation college students. Results indicated that the hypothesized model provided the best representation of the data. All paths in the model were statistically significant, with the exceptions of paths from self-efficacy to goals, outcome expectations to interests, and perceived barriers to self-efficacy. Bootstrapping procedures revealed that the relationships between social class, self-efficacy, and outcome expectations were mediated through learning experiences. Furthermore, the relationship between social supports and goals was mediated by self-efficacy and interests and the relationships between self-efficacy, outcome expectations, and goals were mediated by interests. Contrary to hypotheses, the relationship between barriers and goals was not mediated by self-efficacy and interests. The hypothesis that proximal contextual supports and barriers would moderate the relationship between interests and goals was not supported. The final model explained 66% and 55% of the variance in math/science interests and goals, respectively. Implications for future research and practice are discussed.

Keywords: social cognitive career theory, social class, first-generation college students, math/science career goals, self-efficacy

Although career opportunities associated with science, technology, engineering, and math (STEM) fields are projected to experience sustained growth in the coming years (United States Bureau of Labor Statistics, 2007), there is growing concern regarding the availability of an adequately trained STEM workforce (National Science Board, 2010). A number of national studies suggest deficiencies in STEM preparation and achievement in the United States, particularly for underrepresented groups such as women, students of color, and first-generation college students (Choy, 2002; National Science Board, 2006, 2010; United States Department of Education, 2007b). Research devoted to theory-based model testing has been recommended to improve the development and implementation of STEM educational and career interventions for underrepresented students generally and prospective first-generation college students specifically (Gibbons & Shoffner, 2004; United States Department of Education, 2007a).

Social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994, 2000) has shown to be a useful framework from which to predict the math/science interests and goals of diverse groups of students (Fouad & Smith, 1996; Lent, Brown, Nota, & Soresi, 2003; Lent et al., 2005; Nauta & Epperson, 2003; Navarro, Flores, & Worthington, 2007). SCCT follows key propositions explicated in Bandura's (1986) social cognitive theory. Specifically, personal attributes, environmental factors, and overt behaviors are hypothesized to affect one another in a bidirectional manner and to take place within a specific domain (e.g., math and science). Learning experiences are environmental factors that shape self-efficacy and outcome expectations and include performance accomplishments, vicarious learning, verbal persuasion, and physiological arousal (Lent et al., 1994). SCCT asserts that learning experiences are indirectly related to career choice goals through other personal-cognitive variables such as self-efficacy and outcome expectations. That is, enhanced learning experiences (e.g., successful performance in high school math/science classes) are thought to predict higher levels of self-efficacy and outcome expectations (see Paths 2 and 3 in Figure 1). Self-efficacy is hypothesized to predict outcome expectations (Path 4) and, together with outcome expectations, to predict increased interest (Paths 5 and 6) and goal setting (Paths 7 and 8) in a specific career domain. Interest in a particular career is also hypothesized to predict enhanced goal

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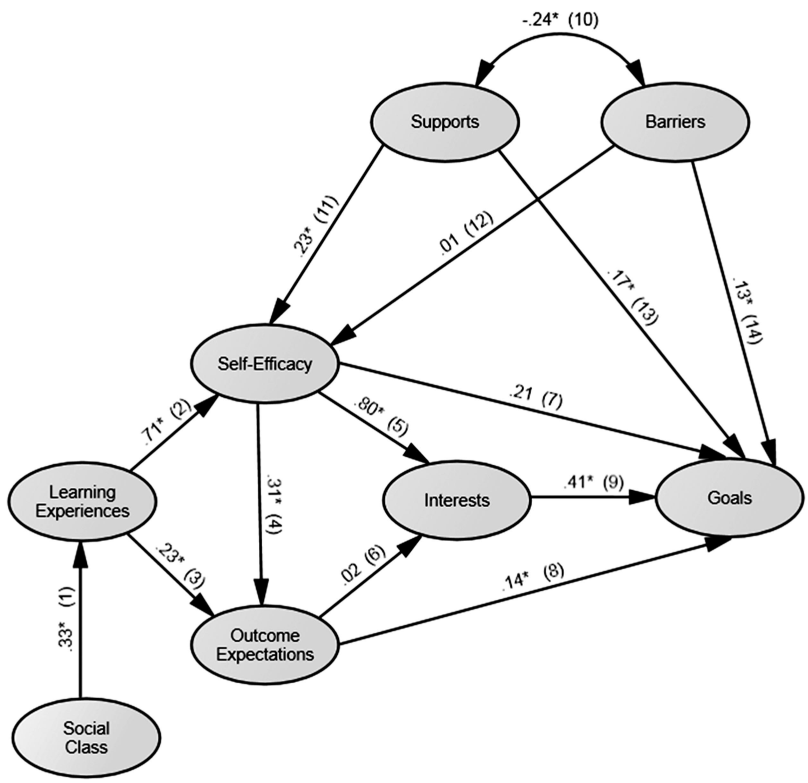

Figure 1. Final structural model (Model A). Numbers in parentheses represent hypothesized paths based on social cognitive career theory (Lent et al., 1994) and prior research (Lent et al., 2008). $^{*}p < .05$.

setting (Path 9) for that career. Finally, the relations between self-efficacy, outcome expectations, and goals are hypothesized to be mediated by interests (Lent et al., 1994). Prior research investigating the math/science interests and goals of students at various developmental stages has supported these hypotheses (Byars-Winston & Fouad, 2008; Lent, Brown, Schmidt, et al., 2003; Navarro et al., 2007).

Contextual supports and barriers also play critical roles in SCCT. Specifically, proximal supports and barriers are hypothesized to covary (Path 10) and predict self-efficacy (Paths 11 and 12) and choice goals (Paths 13 and 14; Lent et al., 2000). While Lent et al. (1994) originally proposed a direct relationship between supports, barriers, and goals, later research has suggested an indirect relationship through self-efficacy (e.g., Lent, Brown, Schmidt, et al., 2003). Furthermore, contextual supports and barriers are hypothesized to moderate the relations between interests and choice goals (Lent et al., 2000). In the present study, *perceptions* of social supports and barriers were assessed to capture participants' subjective accounts of the degree to which they anticipated experiencing future supports and barriers should they pursue a degree in math or science. Prior research has found partial support for these hypotheses in STEM-related disciplines. Specifically, mixed support has been found for the indirect relationship between supports and barriers to goals through self-efficacy (Lent, Lopez, Lopez, & Sheu, 2008; Lent, Paixão, da Silva, & Leitão, 2010) and the moderating role of supports and barriers between interests and goals (Lent et al., 2001). Although existing SCCT studies have examined the effects of perceived supports and barriers in college students, few studies have investigated how high school students' perceptions of supports and barriers influence their pursuit of math and science careers. This is surprising given that many interventions to promote STEM career exploration are designed for high school students (United States Department of Education, 2007b). Furthermore, no studies have investigated the moderating roles of proximal supports and barriers among prospective first-generation college students despite the assertion that social support is critical to their academic persistence and success (Gibbons & Borders, 2010; Holley & Gardner, 2012).

The SCCT model also proposes that background contextual affordances predict one's learning experiences (Path 1). With regard to first-generation college students, social class is one background contextual affordance that may predict the extent and quality of meaningful academic learning experiences (e.g., taking advanced placement math and science courses in high school) and decreased access to role models who have attended college (Bloom, 2007; Engle & Tinto, 2008). Specific class-related issues that may impact low-income prospective first-generation college students include lower assistance with school-related tasks from parents due to lower education levels (Gibbons & Shoffner, 2004), limited access to household educational resources (Blair, Legazpi Blair, & Madamba, 1999), and restricted pursuit of educational or career opportunities due to lower perceived social status (Thompson & Subich, 2006). Thompson and Dahling (2012) found that perceived social status predicted learning experiences, which in turn predicted self-efficacy and outcome expectations for Investigative Holland-themed careers in a sample of college students. To date, no studies have examined the relationship between social class and math/science career goals among prospective first-generation college students despite its suggested importance in their career development (Engle & Tinto, 2008).

SCCT and Low-Income Prospective First-Generation College Students

Researchers have recommended SCCT as a viable framework with prospective first-generation college students given its focus on individual and contextual factors (Gibbons & Shoffner, 2004). This individual-contextual focus seems appropriate given the unique challenges these students face. For example, low-income first-generation college students have been shown to have fewer and lower quality learning experiences in math/science than their peers, experience less support for attending college, and report low confidence in academic performance (Bloom, 2007; Bui, 2002).

Gibbons and Borders (2010) used SCCT to examine college attendance expectations of a sample of middle school students who would be the first in their family to attend college. Results indicated first-generation students reported lower college-going self-efficacy, higher negative outcome expectations for college, and higher levels of perceived barriers for attending college than their non-first-generation peers. Findings also indicated that the SCCT model did not provide a good fit to the data for first-generation students. Instead, the authors found support for a model in which a path was added from contextual supports to outcome expectations. Given these findings, it is important for further research to examine the appropriateness of the SCCT model for prospective first-generation college students. This study expands on previous research by examining (a) specific career (math/science goals) in favor of general educational (college-going goals) goals, (b) the influence of learning experiences, and (c) SCCT's mediator and moderator hypotheses.

Study Purpose and Hypotheses

The present study examined the relations between distal (i.e., learning experiences) and proximal contextual factors (i.e., perceived supports and barriers) and person-cognitive variables (i.e., self-efficacy, outcome expectations, interests, goals) among low-income prospective first-generation college students. Relations between variables were modeled in accord with SCCT predictions and prior research (see Paths 1–14 in Figure 1). Math/science career goals were studied specifically given the job sector growth and social mobility opportunities offered by these careers. Specific hypotheses are as follows:

Hypothesis 1: The structural model would provide a good fit to the data and variables would relate as hypothesized by SCCT.

Hypothesis 2: The person-cognitive variables would mediate the relations between contextual variables and math/science goals.

Hypothesis 3: Perceived supports and barriers would moderate the relationship between interests and goals.

Method

Participants and Procedure

Participants were 341 high school students participating in federal TRIO programs (e.g., Upward Bound) for students underrepresented in higher education. To qualify for TRIO, a student must belong to a family whose annual income is 150% of the poverty line or below or be a prospective first-generation college student (i.e., neither parent has received a bachelor's degree). Only students meeting both eligibility criteria were included in the present study. A total of 10 TRIO programs serving students in urban and rural areas of the Midwestern United States served as sites for data collection.

The majority of participants were female (n = 219, 64.2%). In terms of race/ethnicity, 37.8% (n = 129) identified as White (non-Hispanic), 19.1% (n = 65) as African American, 15.8% (n = 54) as Mexican American, 15.5% (n = 53) as Asian American, 5.9% (n = 20) as biracial/multiracial, and the remaining participants (1.5%, n = 5) identified as "other." Fifteen participants (4.4%) did not provide this information. Among Asian Americans, the majority identified as "Hmong" (n = 30, 8.7% of the total sample). In terms of class rank, 29.9% (n = 102) were freshmen, 29.3% (n = 100) were sophomores, 23.5% (n = 80) were juniors, and 16.4% (n = 56) were seniors. All participants qualified for free or reduced lunch. Close to one third of participants (36%, n = 123) reported their female head of household's education as "high school graduate," followed by "less than seventh grade" (13.5%, n = 46). Male head of household's education levels were reported as "high school graduate" (34.8%, n = 119), followed by "less than seventh grade" (14.7%, n = 50). A majority of students (56%, n = 191) endorsed "graduate degree" as their highest educational goal, followed by "standard college graduate" (36.7%, n = 125) and "some college" (7.3%, n = 25).

Institutional Review Board approval was granted, and permission to recruit participants was obtained from individual TRIO program directors. Participants were recruited through announcements at scheduled program activities provided by TRIO program directors. Announcements included information regarding the aim and scope (e.g., "to understand factors that influence or lead to educational and career choices") of the study as well as potential risks, benefits, and information concerning privacy and confidentiality. Assent forms were also administered and collected at this time. Passive consent from parents was obtained for the study. Informational letters were provided to parents that detailed the purpose and nature of the study and parents were instructed to contact the primary investigator if they did not approve of their child's participation.

Students who met eligibility criteria for the study and signed assent forms were administered surveys by TRIO program directors. Surveys were later mailed back to the principal investigator. Surveys took approximately 30 min to complete and students were able to enter a raffle for five $25 gift cards as incentive for participation. A total of 683 surveys were distributed to 10 TRIO programs in six states (Missouri, Kansas, Ohio, Wisconsin, Iowa, and Minnesota) and 369 surveys were returned. Of those surveys returned, 341 were usable, resulting in a 49.99% return rate. This return rate exceeded suggested acceptable standards for accurate and reliable cross-sectional survey data (Kramer, Schmalenberg, Brewer, Verran, & Keller Unger, 2009).

Measures

Demographic questionnaire. A brief questionnaire assessed age, gender, race/ethnicity, class rank, parental education and occupations, previous coursework, and educational goals.

Learning experiences. Prior learning experiences were assessed with the Learning Experiences Questionnaire (LEQ; Schaub & Tokar, 2005). The LEQ is a 120-item self-report measure designed to assess learning experiences for each of Holland's (1997) RIASEC occupational themes. For the purposes of the present study, only the 20-item LEQ-Investigative scale was used. Items on the LEQ were developed to reflect Bandura's (1986) four proposed sources of self-efficacy (i.e., performance accomplishments, vicarious learning, verbal persuasion, and physiological arousal) and are rated on a Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Sample items include, "I performed well in biology classes in school" (performance accomplishments), "I have become nervous while solving math problems" (physiological arousal), "in school, I saw teachers whom I admired work on science projects" (vicarious learning), and "people whom I respect have encouraged me to work hard in math courses" (verbal persuasion). Subscale scores are obtained by averaging items.

Internal consistency estimates ranging from .71 to .77 have been reported for scores on the LEQ-Investigative scale (Williams & Subich, 2006). Validity for the scale has been established through observed relations to self-efficacy and outcome expectations for all Holland (1997) occupational themes (Schaub & Tokar, 2005) as well as confirmatory factor analyses of the LEQ's multidimensional structure (Tokar, Buchanan, Subich, Hall, & Williams, 2012). Coefficient alpha for subscale scores in the present study ranged from .74 (physiological arousal subscale) to .81 (vicarious learning subscale).

Math/science intentions and goals. The Math/Science Intentions and Goals Scale (MSIGS; Fouad & Smith, 1996) includes six items that assess students' intentions to pursue and persist in math and science-related activities. Items are rated on a Likert-type scale ranging from 1 (*very strongly disagree*) to 5 (*very strongly agree*) with high scores reflective of high levels of math/science intentions and goals. A sample item is "I intend to enter a career that will use science." Scores are computed by summing and averaging items. An alpha coefficient of .81 has been reported for scale scores on the MSIGS in prior studies (Fouad & Smith, 1996; Navarro et al., 2007). Furthermore, validity has been established through observed correlations with math/science interests ($r = .45$), self-efficacy ($r = .44$), and outcome expectations ($r = .54$; Fouad & Smith, 1996). Coefficient alpha for scale scores on the MSIGS in the present study was .90.

Math/science interests. The Math/Science Interest Scale (MSIS; Smith & Fouad, 1999) measured participants' interests in math/science activities. The MSIS includes 20 items rated on a Likert-type scale ranging from 1 (*very strongly dislike*) to 6 (*very strongly like*). A sample item is "solving math problems." Item responses are averaged with high scores indicative of strong math and science-related interests. Scale scores have demonstrated adequate internal consistency estimates, with Cronbach's alphas ranging from .90 to .91 in college and middle school samples, respectively (Navarro et al., 2007; Smith & Fouad, 1999). Validity for the MSIS has been established through observed relationships with math/science self-efficacy, outcome expectations, and goal intentions (Navarro et al., 2007; Smith & Fouad, 1999). Coefficient alpha for MSIS scores in the present study was .94.

Math/science self-efficacy. The Expanded Skills Confidence Inventory for High School Students (ESCI-HS; Betz & Wolfe, 2005) was used to measure math/science self-efficacy. The ESCI-HS is a 112-item revised version of the original ESCI (Betz et al., 2003) adapted for high school students and designed to measure 14 domains based on Holland themes (Holland, 1997). For the purpose of the present study, only two subscales were used: the eight-item Math subscale and the eight-item Science subscale. These subscales assess self-reported confidence in one's ability to perform an activity, task, or school subject associated with math or science. Items are rated on a 5-point Likert-type scale ranging from 1 (*no confidence*) to 5 (*complete confidence*) with high scores indicative of strong self-efficacy. Sample items include "calculate a shooting percentage in basketball" for the Math subscale and "study the way the human mind works" for the Science subscale. Scores are computed by averaging items.

The Math and Science subscale scores of the ESCI-HS have exhibited adequate internal consistency estimates ranging from .80 to .88 for the Math subscale and .79 to .90 for the Science subscale. Validity for ESCI-HS scores has been demonstrated through observations of item-total correlations as well as correlations with Holland theme scores of the Skills Confidence Inventory (Betz & Wolfe, 2005). Coefficient alpha for scale scores was .91 for the Math subscale and .93 for the Science subscale in the present study.

Outcome expectations. The 10-item math/science outcome expectations scale (Lent, Lopez, & Bieschke, 1991) assesses perceptions of the positive outcomes that could result from obtaining a degree in a math or science-related career. Items are rated on a Likert-type scale ranging from 0 (*strongly disagree*) to 9 (*strongly agree*). A sample item is "earn an attractive salary." Items are averaged with high scores indicative of high outcome expectations for math/science careers.

Prior studies using the scale in college student samples have yielded adequate internal consistency estimates with Cronbach's alphas ranging from .90 to .91 (Lent et al., 1991; Lent, Brown, Schmidt, et al., 2003). Validity for the scale has been established through observed correlations with math and science-related self-efficacy ($r = .54$), interests ($r = .61$), and intentions ($r = .46$; Lent, Lopez, & Bieschke, 1993). Coefficient alpha for scale scores on this measure in the present study was .93.

Perceived supports and barriers. Participants' perceptions of proximal supports and barriers were assessed using measures developed by Lent et al. (2001) and later modified by Lent, Brown, Nota, and Soresi (2003). The instrument has eight Likert-type items rated on a scale ranging from 1 (*not at all likely*) to 5 (*extremely likely*) and assesses perceived social supports (four items) and barriers (four items) for students' decisions to pursue math/science careers. Lent, Brown, Nota, and Soresi (2003) reported that social supports and barriers were more consistently related to measures of self-efficacy, outcome expectations, and goals compared to other forms of related, but distinct, supports and barriers. Given these methodological considerations as well as prior research demonstrating social supports and barriers are key determinants in first-generation college students' academic persistence and success (e.g., Gibbons & Borders, 2010; Holley & Gardner, 2012), only the social supports and social barriers items from the supports and barriers scales were used in the present study. Sample items include "feel support for this decision from important people in my life" for the supports scale and "feel that you don't fit in socially with other students in this major" for the barriers items. Items are averaged with high scores indicative of high perceived social supports and barriers for the decision to pursue a math/science career.

Cronbach's alphas for the scale scores have ranged from .81 to .88 with Italian and Portuguese high school students; scale scores correlated in expected directions with self-efficacy, interests, and goals for Investigative-themed careers (Lent, Brown, Nota, & Soresi, 2003; Lent, Paixão, et al., 2010). Coefficient alpha for scale scores in the present study was .90 for the supports scale and .76 for the barriers subscale.

Social class. Measurement of social class was informed by prior theory and research suggesting social class is composed of both subjective and objective indicators (Blair et al., 1999; Liu, Soleck, Hopps, Dunston, & Pickett, 2004). Participants reported their maternal and paternal parental figures' highest level of educational attainment with values ranging from 1 (*less than seventh-grade education*) to 7 (*graduate/professional degree*). These scores were summed and averaged to produce a single indicator. Four items assessing access to household educational resources (computer, encyclopedia, dictionary, atlas) were also included. Endorsement of each household resource was scored a 1 or 0 with high scores indicating access to household educational resources. Participants were also administered the Macarthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics, 2000) as a measure of subjective social class. Participants were given an image of a ladder with numbers ranging from 1 to 10 and were instructed to rate where they believed their family fell on the ladder in terms of social class. The Macarthur Scale has been used with adolescents in past research and demonstrated significant correlations with depression and physical health (Goodman et al., 2001). This procedure for measuring social class is consistent with past studies examining relations between social class and math/science career goals of adolescents (Navarro et al., 2007).

Plan of Analysis

Structural equation modeling was conducted using AMOS 19 (Arbuckle, 2010) statistical package and the maximum likelihood (ML) estimation method. Specific indices to be examined included the ratio of chi-square to degrees of freedom statistic (χ^2/df), comparative fit index (CFI), and root-mean-square error of approximation (RMSEA). Ratio of chi-square to degrees of freedom statistics ≤ 3, CFI values $\geq .95$ and RMSEA $\leq .05$ represent very close model-to-data fit while CFI values $\geq .90$ and RMSEA $\leq .08$ represent adequate model-to-data fit (Kline, 2005).

Latent variables were created for learning experiences, math/science self-efficacy, and social class. Items corresponding to past performance accomplishments, vicarious learning, verbal persuasion, and physiological arousal subscales on the LEQ were divided into four observed indicators to represent learning experiences. Items corresponding to the math and science subscales of the ESCI-HS served as two separate indicators for the math/science self-efficacy latent variable. The Macarthur Subjective Social Status scale, parental figures' highest level of education, and household educational resources served as three observed indicators for social class.

Following the recommendations of Russell, Kahn, Spoth, and Altmaier (1998), item parceling was conducted to establish observed indicators of latent variables for all unidimensional constructs. First, maximum-likelihood exploratory factor analysis (EFA) was conducted for each scale to ensure its unidimensional factor structure. For the outcome expectations, supports, barriers, interests, and intentions/goals scales, examination of scree plots, eigenvalues, and factor loadings all suggested unidimensional factor structures. Furthermore, prior research including these scales has used each measure to represent a unidimensional construct (Lent, Brown, Nota, & Soresi, 2003; Navarro et al., 2007; Smith & Fouad, 1999). Based on these prior studies, exploratory analyses in the present study, and recommendations from the literature (Little, Cunningham, Shahar, & Widaman, 2002) it was determined that items on the previously mentioned scales met sufficient criteria for item parceling.

Based on results of the EFAs, items with high, medium, and lower factor loadings were paired to balance loadings on each latent variable. Three parcels were created for the math/science intentions and goals and outcome expectations scales; two parcels were created for the social supports and barriers scales, and four parcels were created for the math/science interests scale. Second-order confirmatory factor analyses were conducted to ensure parcels adequately loaded onto their respective higher order factors (Hagtvet & Nasser, 2004).

Hypothesized and alternative structural models were tested. The hypothesized model (Model A) included indirect effects from supports and barriers to interests and goals through self-efficacy, as well as direct paths from supports and barriers to goals (i.e., a partially mediated model) based on results of past research (Lent et al., 2008). An alternative model (Model B) with direct paths from supports and barriers to outcome expectations was tested based on prior research using SCCT with prospective first-generation college students (Gibbons & Borders, 2010). In the second alternative model (Model C), the interaction between supports and interests and barriers and interests was modeled to test the hypothesis that supports and barriers moderated the relationship between interests and goals. Model C was tested as an alternative model given the mixed support for SCCT moderator hypotheses in prior research (e.g., Lent et al., 2001). Change in CFI values ($>.01$) were used to compare relative fit of structural models, as the chi-square difference test has been found to be sensitive to sample size and model complexity (Cheung & Rensvold, 2002).

Six mediation hypotheses were also tested, including the proposed indirect effects of: social class on self-efficacy and outcome expectations through learning experiences, social supports and barriers on goals through self-efficacy and interests, and self-efficacy and outcome expectations on goals through interests. Mediation tests were conducted using the bootstrapping method. Specifically, 10,000 random samples were generated with 95% bias-corrected confidence intervals examined for statistical significance. Confidence intervals not including zero were indicative of a mediation effect (Mallinckrodt, Abraham, Wei, & Russell, 2006).

Furthermore, because SCCT asserts that proximal contextual influences may moderate the relations between interests and goals, tests were conducted to examine the moderating effects of social supports and barriers on the relationship between interests and goals. An orthoganilizing procedure was used, as this approach has been shown to outperform traditional grand mean centering methods used to test interaction effects between latent variables in SEM (Little, Bovaird, & Widaman, 2006). First, eight uncentered product terms were created for each item parcel representing supports, barriers, and interests.

Next, these product terms were regressed on untransformed, first-order effect variables to produce residual statistics. Residuals were then included as indicators for the interaction effect for both Supports × Interests and Barriers × Interests latent variables. Statistically significant paths from the latent variable interaction terms to goals were indicative of a moderation effect (Little et al., 2006).

Results

Preliminary Analyses

Missing data analysis. Data were first examined to assess the pattern of missingness. Specifically, the Missing Values Analysis function in SPSS 19.0 was used to determine if data were missing completely at random (MCAR). Little's MCAR test was not significant (χ^2 = 94.58, $p > .05$) suggesting the data were MCAR (Schlomer, Bauman, & Card, 2010). Examination of missing data patterns on individual variables revealed percentages of missing data ranging from 1.2% on social supports to 3.2% on math/science intentions and goals scale.

Next, a criterion of 20% missing data on study variables was used to determine case deletion. This criterion has been suggested for studies in which deletion of a large number of participants could adversely affect statistical power (Schlomer et al., 2010). A total of 30 cases were deleted due to excessive missing data on items used for parcels. The full information maximum likelihood method (FIML) procedure was used to address missing data values in primary analyses. The FIML is a model-based method that estimates parameters and implied values for missing data based on available complete data and has evidenced superior performance to other missing value imputations (Schlomer et al., 2010).

Data were next examined to ensure they met multivariate assumptions. Three cases exhibited *z*-scores above the critical value of 3.29 and were deleted as univariate outliers. Three additional cases had Mahalanobis distance values above the critical chi-square value of 35.17 and were deleted as multivariate outliers, leaving a final sample of N = 305. Follow-up tests indicated that data met assumptions of normality, linearity, and homeoscedasticity.

Measurement model. Fit statistics for the measurement model indicated adequate fit to the data (see Table 1), and all indicators significantly loaded onto their respective factors (see Table 2). For multidimensional constructs, factor loadings ranged from .27 for the physiological arousal subscale of the LEQ to .91 for the science self-efficacy subscale of the ESCI-HS. The parcels created for unidimensional constructs had loadings ranging from .63 for the first barriers parcel to .93 for the second barriers parcel. Loadings for indicators of the social class latent variable were relatively lower than other indicators in this study but were comparable to past research using similar indicators for social class (e.g., Navarro et al., 2007).

Primary analyses. Correlations among latent variables are included in Table 3. Because no demographic variables (i.e., age, grade level, race/ethnicity, sex) were significantly correlated with the main study variables, analyses were conducted on the sample as a whole. Fit statistics for Model A indicated the model fit the data reasonably well. The CFI value fell above the .90 cutoff recommended for "adequate" model fit (Kline, 2005). Furthermore, the χ^2/df statistic fell below the recommended value of three and the RMSEA statistic fell below the recommended value of .08, suggesting the structural model provided an acceptable representation of the data. All parameters, with the exception of parameters between outcome expectations and interests (β = .02), self-efficacy and goals (β = .21) and barriers and self-efficacy (β = .01) were statistically significant ($p < .05$). Model A explained 65% of the variance in interests and 54% of the variance in goals.

The first alternative model (Model B) included freely estimated parameters from supports and barriers to outcome expectations based on a prior SCCT study with prospective first-generation college students (Gibbons & Borders, 2010). Fit indices for this model suggested it also served as an adequate representation of the data. The added path from supports (β = .15, $p < .05$) but not barriers (β = –.11, p = .07), to outcome expectations was statistically significant. Model B explained 64% of the variance in interests and 53% of the variance in goals.

The fit indices for the second alternative model (Model C), which examined the moderating effects of supports and barriers on the relationship between interests and goals, indicated poor model fit; all fit indices fell outside the recommended acceptable range. Furthermore, the parameters from the orthogonalized interaction terms to goals were not significant, indicating neither supports nor barriers moderated the relationship between interests and goals.

Differences in fit between structural models were then evaluated. For Models A and B, although the chi-square difference test was statistically significant (χ^2 = 11.34, $p < .05$), the ΔCFI value did not represent a substantial change in model fit. The lower CFI value for Model C represented a substantial (>.01) change from Models A and B, and this model was therefore rejected as an adequate representation of the data. Because Model A was more parsimonious and consistent with SCCT, Model A was selected as the best representation of the data.

Table 1
Goodness-of-Fit Indicators for the Measurement and Structural Models

Model	χ^2	*df*	χ^2/df	CFI	RMSEA	90% CI for RMSEA	ΔCFI
Measurement	493.22	202	2.44	.93	.06	(0.06, 0.07)	—
A	**606.74**	**216**	**2.80**	**.91**	**.07**	**(0.07, 0.08)**	—
B	595.40	214	2.78	.91	.07	(0.06, 0.08)	.00
C	3,070.75	685	4.48	.75	.10	(0.10, 0.11)	.16

Note. CFI = comparative fit index; RMSEA = root-mean-squared error approximation; CI = confidence interval; Model A = the proposed hypothesized model; Model B = Model A with direct paths from proximal supports and barriers to outcome expectations added; Model C = included orthogonalized interaction terms for Supports × Interests and Barriers × Interests with added paths from interaction terms to goals. Bold indicates the best representation of the data. Dashes indicate no comparisons on the change in CFI were made for these models.

Table 2
Means, Standard Deviations, and Factor Loadings of Observed Variables

Variable	*M*	*SD*	Score range	Factor loading
Social Class				
Parent Education	3.81	1.64	1–7	.62
Subjective Social Class	5.29	1.42	1–10	.38
Household Resources	2.48	1.37	1–4	.31
Learning Experiences				
Performance Accomplishments	4.05	0.99	1–6	.69
Vicarious Learning	3.59	1.13	1–6	.85
Verbal Persuasion	3.77	1.13	1–6	.87
Physiological/Emotional Arousal	3.07	1.00	1–6	.27
Math/Science Self-Efficacy				
Math Self-Efficacy	3.45	0.90	1–5	.67
Science Self-Efficacy	3.29	0.92	1–5	.91
Outcome Expectations				
Parcel 1	6.81	1.76	0–9	.90
Parcel 2	6.93	1.84	0–9	.87
Parcel 3	7.31	1.49	0–9	.85
Interests				
Parcel 1	3.85	1.23	1–6	.89
Parcel 2	3.39	1.21	1–6	.86
Parcel 3	3.84	1.16	1–6	.91
Parcel 4	3.55	1.22	1–6	.77
Goals				
Parcel 1	4.34	1.24	1–6	.89
Parcel 2	3.94	1.32	1–6	.89
Parcel 3	4.24	1.24	1–6	.90
Supports				
Parcel 1	3.58	0.89	1–5	.88
Parcel 2	3.77	0.92	1–5	.85
Barriers				
Parcel 1	2.14	0.89	1–5	.93
Parcel 2	2.18	0.93	1–5	.63

Note. All factor loadings are statistically significant at the $p < .01$ level.

Bootstrapping was conducted to examine mediation hypotheses. Results showed that the bias-corrected 95% confidence intervals (CIs) for the indirect effects of contextual factors (i.e., social class, supports) on self-efficacy, outcome expectations, and goals as well as self-efficacy and outcome expectations on goals were statistically significant and did not include zero, indicating a mediation effect (see Table 4). The indirect effect of barriers on goals through self-efficacy and interests, however, was not statistically significant.

Discussion

The present study is the first to use SCCT to examine the math/science career goals of a sample of low-income prospective first-generation college students. Results generally supported that the proposed model provided an adequate fit to the data. The model in the present study was relatively more complex than those tested in similar prior studies and the quality of model-to-data fit was comparable to past SCCT research that predicted interests and choice goals of racially/ethnically diverse college students in STEM fields (Lent et al., 2008). However, the amount of explained variance in interests and goals in the present study was greater than that documented in prior studies (e.g., Lent et al., 2008).

Support for the first hypothesis was found via significant relationships among most variables as proposed by SCCT. However, contrary to expectations, paths from barriers to self-efficacy, outcome expectations to interests, and self-efficacy to goals were not significant. The nonsignificant relationship between outcome expectations and interests is consistent with some prior research (Lent et al., 2008) and the magnitude of the relationship between barriers and self-efficacy in prior studies has been consistently smaller compared to that of supports to self-efficacy (Lent et al., 2008; Lent, Brown, Nota, & Soresi, 2003; Lent, Sheu, Gloster, & Wilkins, 2010), suggesting supports may be of relatively greater importance than perceptions of barriers in the SCCT model. This is the first math/science domain SCCT study in which the path from self-efficacy to goals was observed to be nonsignificant ($p = .06$). This result may be statistical artifact given the magnitude of the relationship between self-efficacy and goals was similar to that observed in prior research (Lent, Sheu, et al., 2010). The relatively lower standard deviation for self-efficacy in this study suggests that a restricted range of scores on this variable could have led to a nonsignificant relationship with goals. Furthermore, the strong relationship between self-efficacy and interests may have restricted the ability of self-efficacy to account for unique variance in goals. However, it is also possible that self-efficacy for math and science does not necessarily lead to goal-setting in this domain for low-income prospective first-generation college students. For example, while a student may have strong self-efficacy for math and science activities, lower goal-setting could result from restricted knowledge of math and science majors and careers. It is also notable that while the correlation between barriers and goals was observed to be negative, the path coefficient from barriers to goals was positive in this study. A suppressor effect resulting from the relationship between barriers and other variables may explain this unexpected finding.

Hypothesis two was also partially supported. Specifically, all indirect effects tested with the exception of barriers to goals through self-efficacy were statistically significant. The finding that the path from supports, but not barriers, to goals was mediated by self-efficacy replicates prior research (Lent, Sheu, et al., 2010). However, this finding has not been consistent across studies (e.g., Lent et al., 2008). It is possible that confining measurement of supports and barriers to the social context in this study in favor of capturing other environmental factors (e.g., finances) may have influenced relationships between variables. Future research should examine supports and barriers and their indirect effects on goals to further delineate what explains these relationships among prospective first-generation college students. Given the inconsistency of results for this hypothesis in SCCT studies, tests of moderated mediation might be appropriate. For example, investigators may examine whether the ability of self-

Table 3
Correlations Among Latent Variables

Variable	1	2	3	4	5	6	7	8
1. Learning Experiences	—	.68	.67	.66	.49	.34	.50	.00
2. Interests		—	.70	.74	.43	.15	.44	−.04
3. Goals			—	.59	.46	.23	.48	−.25
4. Self-Efficacy				—	.42	.22	.43	.01
5. Outcome Expectations					—	.20	.40	−.13
6. Social Class						—	.30	−.06
7. Supports							—	−.25
8. Barriers								—

Note. All correlations above |.20| are significant at the .05 level.

Table 4
Summary of Indirect Effects

Path/effect	Bootstrap estimates Mean *B*	Mean *SE*	95% CI
Social Class→Learning Experiences→Goals	.06	.03	.021, .089*
Social Class→Learning Experiences→Outcome Expectations	.09	.02	.032, .143**
Supports→Self-Efficacy→Goals	.10	.04	.025, .176*
Barriers→Self-Efficacy→Goals	−.04	.02	−.105, .022
Self-Efficacy→Interests→Goals	.48	.04	.343, .626**
Outcome Expectations→Interests→Goals	.06	.02	.021, .103*

Note. CI = confidence interval. Estimates of indirect effects are based on standardized coefficients.
* $p < .01$. ** $p < .001$.

efficacy to mediate the relationship between supports, barriers, and goals is moderated by coping self-efficacy.

Hypothesis three was not supported in the present study. This is not the first study that has failed to find support for SCCT's moderation hypotheses. Specifically Lent et al. (2001) found that only barriers moderated the relationship between interests and goals. Surprisingly, no other studies have tested the hypothesis that proximal supports and barriers as measured in the present study serve as moderating variables in the SCCT framework. Given the minimal research and relative dearth of support for SCCT's moderator hypotheses, future research in this area is warranted.

Limitations

Several limitations of this study should be noted. First, participants were recruited from TRIO programs that serve underrepresented student populations in higher education with the goal of increasing their college enrollment and retention. Participants' exposure to these programs could have led to some response bias given their involvement in programmatic activities designed to increase self-efficacy and goal-setting for college. For example, almost all students in this study indicated their intention to complete a 4-year college degree and over half reported they intended to complete a graduate degree. These figures may not be representative of low-income first-generation college students and decrease the present investigation's external validity. Future research that includes students not participating in extracurricular programming could help determine if results in the present study are generalizable. Additionally, although our sample was racially/ethnically diverse, White/European American students were overrepresented among participants. Including more students of color may have increased power to detect potential differences on variables of interest among racial/ethnic groups in the present study. This study's design was also cross-sectional and findings are not indicative of causality or temporal relationships. Experimental and longitudinal research could enhance understanding of how proximal supports lead to changes in self-efficacy or how background contextual affordances such as social class predict learning experiences, self-efficacy, and interests over time.

Implications

These results suggest SCCT may be a useful framework for designing interventions targeting low-income first-generation college students. The link between social class and learning experiences may be a focus for future study and intervention efforts given its indirect link with self-efficacy and outcome expectations in the current study. School-based activities and extracurricular programming could focus on providing students from less privileged social class backgrounds with targeted learning experiences designed to enhance self-efficacy and outcome expectations for math/science-oriented careers. Similarly, proximal contextual supports and barriers may be a focus in programmatic activities for this student population given supports' relationship to self-efficacy and goals and barriers' relationship to goals in this study. Mentoring and shadowing programs, family-based interventions, and peer-focused programming are examples of activities that may enhance the participation of low-income first-generation college students in math/science fields. Some existing intervention programs, which have been shown to have promising effects on prospective first-generation college students' academic achievement have included these components (United States Department of Education, 2007b).

Given that the alternative model with paths from supports and barriers to outcome expectations fit the data reasonably well in this study, future research should attempt to confirm this finding. It would also be helpful for future research to focus on the relative contributions of various forms of learning experiences in the development of math/science interests and goals among low-income first-generation students. Although considered a core contextual variable in the SCCT framework, learning experiences have not received the same attention as have other constructs associated with SCCT's choice model (Tokar et al., 2012). This research could inform pedagogy directed toward enhancing students' interests in math and science. Studies addressing more specific fields within the STEM disciplines, such as engineering and computer science, with secondary school students would also add to the literature. Finally, component studies examining the relative contributions of various forms of proximal supports might inform how supports might be most effectively implemented for underrepresented students in math and science.

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy White women. *Health Psychology, 19,* 586–592. doi:10.1037/0278-6133.19.6.586

Arbuckle, J. (2010). Amos (Version 19.0) [Computer Program]. Chicago, IL: SPSS.

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

Betz, N. E., Borgen, F. H., Rottinghaus, P., Paulsen, A., Halper, C. R., & Harmon, L. W. (2003). The Expanded Skills Confidence Inventory: Measuring basic dimensions of vocational activity. *Journal of Vocational Behavior, 62,* 76–100. doi:10.1016/S0001-8791(02)00034-9

Betz, N. E., & Wolfe, J. B. (2005). Measuring confidence for basic domains of vocational activity in high school students. *Journal of Career Assessment, 13,* 251–270. doi:10.1177/1069072705274951

Blair, S. L., Legazpi Blair, M. C., & Madamba, A. B. (1999). Racial/ethnic differences in high school students' academic performance: Understanding the interweave of social class and ethnicity in the family context. *Journal of Comparative Family Studies, 30,* 539–555. doi:10.1016/S1537-4661(03)09005-6

Bloom, J. (2007). Misreading social class in the journey towards college: Youth development in urban America. *Teachers College Record, 109,* 343–368.

Bui, K. V. T. (2002). First-generation college students at a four-year university: Background characteristics, reasons for pursuing higher education, and the first-year experience. *College Student Journal, 36,* 3–11.

Byars-Winston, A. M., & Fouad, N. A. (2008). Math and science social cognitive variables in college students: Contributions of contextual factors in predicting goals. *Journal of Career Assessment, 16,* 425–440. doi:10.1177/1069072708318901

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9,* 233–255. doi:10.1207/S15328007SEM0902_5

Choy, S. P. (2002). *Nontraditional undergraduates* (NCES 2002–012). Washington, DC: National Center for Education Statistics.

Engle, J., & Tinto, V. (2008). *Beyond access: College success for low-income, first-generation students*. Washington, DC: Pell Institute.

Fouad, N. A., & Smith, P. L. (1996). A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology, 43,* 338–346. doi:10.1037/0022-0167.43.3.338

Gibbons, M. M., & Borders, L. D. (2010). Prospective first-generation college students: A social-cognitive perspective. *The Career Development Quarterly, 58,* 194–208. doi:10.1002/j.2161-0045.2010.tb00186.x

Gibbons, M. M., & Shoffner, M. F. (2004). Prospective first-generation college students: Meeting their needs through social cognitive career theory. *Professional School Counseling, 8,* 91–97.

Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: Development and evaluation of a new indicator. *Pediatrics, 108*(2), E31. Retrieved from http://www.pediatrics.aapublications.org/

Hagtvet, K. A., & Nasser, F. M. (2004). How well do item parcels represent conceptually defined latent constructs? A two-facet approach. *Structural Equation Modeling, 11,* 168–193. doi:10.1207/s15328007sem1102_2

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd. ed.). Odessa, FL: Psychological Assessment Resources.

Holley, K. A., & Gardner, S. (2012). Navigating the pipeline: How sociocultural influences impact first-generation doctoral students. *Journal of Diversity in Higher Education, 5,* 112–121. doi:10.1037/a0026840

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

Kramer, M., Schmalenberg, C., Brewer, B. B., Verran, J. A., & Keller Unger, J. (2009). Accurate assessment of clinical nurses' work environments: Response rate needed. *Research in Nursing & Health, 32,* 229–240. doi:10.1002/nur.20315

Lent, R. W., Brown, S. D., Brenner, B., Chopra, B., Davis, T., Talleyrand, R., & Suthakaran, V. (2001). The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology, 48,* 474–483. doi:10.1037/0022-0167.48.4.474

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45,* 79–122. doi:10.1006/jvbe.1994.1027

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology, 47,* 36–49. doi:10.1037/0022-0167.47.1.36

Lent, R. W., Brown, S. D., Nota, L., & Soresi, S. (2003). Testing social cognitive interest and choice hypotheses across Holland types in Italian high school students. *Journal of Vocational Behavior, 62,* 101–118. doi:10.1016/S0001-8791(02)00057-X

Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. (2003). Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology, 50,* 458–465. doi:10.1037/0022-0167.50.4.458

Lent, R. W., Brown, S. D., Sheu, H.-B., Schmidt, J., Brenner, B. R., Gloster, C. S., . . . Treistman, D. (2005). Social cognitive predictors of academic interests and goals in engineering: Utility for women and students at historically Black universities. *Journal of Counseling Psychology, 52,* 84–92. doi:10.1037/0022-0167.52.1.84

Lent, R. W., Lopez, A. M., Lopez, F. G., & Sheu, H.-B. (2008). Social cognitive career theory and the prediction of interests and choice goals in the computing disciplines. *Journal of Vocational Behavior, 73,* 52–62. doi:10.1016/j.jvb.2008.01.002

Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1991). Mathematics self-efficacy: Sources and relation to science-based career choice. *Journal of Counseling Psychology, 38,* 424–430. doi:10.1037/0022-0167.38.4.424

Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expanded social cognitive model. *Journal of Vocational Behavior, 42,* 223–236. doi:10.1006/jvbe.1993.1016

Lent, R. W., Paixão, M. P., da Silva, J. T., & Leitão, L. M. (2010). Predicting occupational interests and choice aspirations in Portuguese high school students: A test of social cognitive career theory. *Journal of Vocational Behavior, 76,* 244–251. doi:10.1016/j.jvb.2009.10.001

Lent, R. W., Sheu, H.-B., Gloster, C. S., & Wilkins, G. (2010). Longitudinal test of the social cognitive model of choice in engineering students at historically Black universities. *Journal of Vocational Behavior, 76,* 387–394. doi:10.1016/j.jvb.2009.09.002

Little, T. D., Bovaird, J. A., & Widaman, K. F. (2006). On the merits of orthoganalizing powered and product terms: Implications for modeling interactions among latent variables. *Structural Equation Modeling, 13,* 497–519. doi:10.1207/s15328007sem1304_1

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9,* 151–173. doi:10.1207/S15328007SEM0902_1

Liu, W. M., Soleck, G., Hopps, J., Dunston, K., & Pickett, T. (2004). A new framework to understand social class in counseling: The social class worldview model and modern classism theory. *Journal of Multicultural Counseling and Development, 32,* 95–122. doi:10.1002/j.2161-1912.2004.tb00364.x

Mallinckrodt, B., Abraham, W. T., Wei, M., & Russell, D. W. (2006). Advances in testing the statistical significance of mediation effects. *Journal of Counseling Psychology, 53,* 372–378. doi:10.1037/0022-0167.53.3.372

National Science Board. (2006). *America's pressing challenge: Building a stronger foundation*. Washington, DC: Author.

National Science Board. (2010). *Globalization of science and engineering research*. Washington, DC: Author.

Nauta, M. M., & Epperson, D. L. (2003). A longitudinal examination of the social-cognitive model applied to high school girls' choices of nontraditional college majors and aspirations. *Journal of Counseling Psychology, 50,* 448–457. doi:10.1037/0022-0167.50.4.448

Navarro, R. L., Flores, L. Y., & Worthington, R. L. (2007). Mexican American middle school students' goal intentions in mathematics and science: A test of social cognitive career theory. *Journal of Counseling Psychology, 54,* 320–335. doi:10.1037/0022-0167.54.3.320

Russell, D. W., Kahn, J. H., Spoth, R., & Altmaier, E. M. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology, 45,* 18–29. doi:10.1037/0022-0167.45.1.18

Schaub, M., & Tokar, D. M. (2005). The role of personality and learning experiences in social cognitive career theory. *Journal of Vocational Behavior, 66,* 304–325. doi:10.1016/j.jvb.2004.09.005

Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57,* 1–10. doi:10.1037/a0018082

Smith, P. L., & Fouad, N. A. (1999). Subject-matter specificity of self-efficacy, outcome expectancies, interests, and goals: Implications for the social-cognitive model. *Journal of Counseling Psychology, 46,* 461–471. doi:10.1037/0022-0167.46.4.461

Thompson, M. N., & Dahling, J. J. (2012). Perceived social status and learning experiences in social cognitive career theory. *Journal of Vocational Behavior, 80,* 351–361. doi:10.1016/j.jvb.2011.10.001

Thompson, M. N., & Subich, L. M. (2006). The relation of social status to the career decision-making process. *Journal of Vocational Behavior, 69,* 289–301. doi:10.1016/j.jvb.2006.04.008

Tokar, D. M., Buchanan, T. S., Subich, L. M., Hall, R. J., & Williams, C. M. (2012). A structuralexamination of the Learning Experiences Questionnaire. *Journal of Vocational Behavior, 80,* 50–66. doi:101016/j.jbv2011.08.003

United States Bureau of Labor Statistics. (2007). *Occupational employment statistics*. Washington, DC: Author.

United States Department of Education. (2007a). *Report of the Academic Competitiveness Council*. Washington, DC: Author.

United States Department of Education. (2007b). *Upward bound math-science: Program description and interim impact estimates*. Washington, DC: Author.

Williams, C. M., & Subich, L. M. (2006). The gendered nature of career related learning experiences: A social cognitive career theory perspective. *Journal of Vocational Behavior, 69,* 262–275. doi:10.1016/j.jvb.2006.02.007

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