

## **Precursors of professionalism in college seniors: Influence of major, gender, and institution**

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### **ABSTRACT**

Professionalism is a desirable quality linked to the evolution of democratic society and values (Brint, 1996; Freidson, 2001; Millerson, 1964). Nearly 68% of senior-level undergraduate students are driven to enter the professional world and serve society in their respective areas of expertise such as nursing, engineering, education, and business (Colby, Ehrlich, Sullivan, & Dolle, 2011; National Center for Educational Statistics, 2010). This research using a cross-sectional study, explores the role that higher education may play in developing competencies of professionalism. These *precursors of professionalism* are estimated from survey responses of senior-level undergraduate students from the US across four dimensions: *autonomy of judgment, desire for expertise, self-concept, and social agency*. The data were collected by the Higher Education Research Institute (HERI) at the University of California, Los Angeles (UCLA) across two academic years and students were sampled to form a nationally representative sample. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) validate the model prior to testing for relationships between gender, institutional type, and academic major. Higher education training of this population is a critical element to their development as professionals. Recently higher education models have focused more on content area expertise when training students (Brint, 1996; Slaughter & Rhoades, 2004) rather than a holistic model incorporating all facets of professionalism. The study reveals differences in the *precursors of professionalism* between selected majors that provide an opportunity for educators internationally to interweave these elements of learning that may result in the improvement of students' professionalism.

**Keywords:** autonomy; confirmatory factor analysis; expertise; exploratory factor analysis; professionalism; social agency; self-concept

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## INTRODUCTION

Historically, colleges and universities developed as non-profit organizations that were highly dependent on state and federal funding (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004). They had high aims and aspirations for their institutional missions. However, when federal and state funding decreased, these institutions and the programs within it were restructured to depend on other sources of funding, such as private and industry funds. The construct of academic capitalism, as noted by Slaughter and Leslie (1997), was based on the premise that administrators of educational institutions had slowly separated their enterprises from state and federal government and became closer and more connected to the market. Knowledge became a commodity to be extracted, manufactured, and sold as a private good, and the original aim of making knowledge available to all was thwarted by market mechanisms (Brint, 1996; Freidson, 2001). This may have influenced the missions of educational institutions and the educational methods of training of professionals.

Since higher education has been chartered for important public purposes, the education of citizens for their participation in democracy becomes a key objective (Tierney, 1989). The considerable number of undergraduates who select professional fields of study and the even greater number who will be employed in professional fields their entire career require higher education to do more than just help students develop “expertise.” Advancing students’ expertise in their chosen field or discipline is an important goal, but educational institutions should do more to ensure that students grow in their autonomy and critical thinking skills, strengthen their self-concept, and understand their social influence on society as professionals. These pre-professionals should be able to connect their professional role to the larger society and world.

## THEORETICAL FRAMEWORKS

Nearly all of the definitions dealing with professionalism reference the key word “profession.” Moore and Rosenblum’s (1970) definition of professionalism encompasses several behavioral constructs (a) a full-time occupation; (b) a sense of calling or commitment to the field; (c) a formalized organization; (d) esoteric, useful knowledge and skills based upon specialized training or education of exceptional duration and difficulty; and (e) an autonomy restrained by responsibility. Scholars studying professions assume that common characteristics exist among professionals, including (a) expertise that all professionals develop through rigorous training in higher education; (b) a sense of duty to the public good, or the “social-trustee” element, that compels individuals to restrain from actions of self-interest or incentivize individuals to work on social issues where they act as representatives of their profession; and (c) autonomy in actions which stems from professional responsibility or the practice of independent judgment guided by special knowledge (Brint, 1996; Imse, 1962). Other scholars studying “professionals” added another construct to the professionalism framework that they called *self-concept* (Arthur, 1995; Freidson, 1985, 1994; Haywood-Farmer & Stuart, 1990). This category predicted readiness for carrying out the responsibilities of a professional role.

In addition to the identification of the components of professionalism described above, higher education scholars found a relationship between the industrial revolution, the birth of a market economy and higher education trends. Slaughter and Rhoades (2004) continuing with their work on “academic capitalism” explained how higher education institutions have morphed into agents encircled in a network that satisfy market’s needs. Slaughter and Rhoades also

identified economic and political pressures that influenced professionals to change from the ideal-type described by Brint (1996) and Freidson (1994). These influences incentivized selected elements of professionalism, such as *expertise*, that draw financial rewards from the marketplace at the expense of other elements of professionalism that lack substantive financial incentive. The emphasis on knowledge and expertise had stronger ties to employment than the *social-trustee* beliefs that compel professionals to practice their profession while working towards the good of the public (Brint, 1996; Freidson, 1994; Slaughter & Rhoades, 2004). Nevertheless, educational institutions and members of the profession are expected to provide the training and socialization in these norms of professional behavior to students who are new entrants to a profession (Damon, 2009; Kohlberg, 1975; Pascarella & Terenzini, 1991).

Furthermore, Brint (1996) explained the *social-trustee* duties of professionals as compelling members within the profession to view themselves as aggregates of socially significant functions that work on a single important sphere of social life, such as health, education, and business. Professionals in those spheres have responsibilities beyond technical expertise, since they operate as moral custodians of knowledge and function in how it serves the public (Brint, 1996; Millerson, 1964).

The previous dimensions of professionalism set the theoretical foundation for examining undergraduate students. Factors such as *autonomy of judgment* and *self-concept* are critical to enable professionals to perform at higher levels when serving their clients and society (Freidson, 2001). For example, professionals who have high *self-concept* will be more likely to defend their position in a situation of ethical conflict in the workplace. In addition, professionals who are able to exert their *autonomy of judgment* skills to express their professional opinions can avoid compromising external influences that are based on authority and power (Freidson, 1994; Hall, 1968). Strengthening all of the professionalism components is a necessary requirement to reach higher levels of performance and effectiveness for professionals (Brint, 1996; Hall, 1968; Imse, 1962). Conversely, neglecting certain components of professionalism such as *social agency* and *autonomy of judgment* may exacerbate societal problems such as unethical behaviors of some business professionals and political figures. In addition, if the goal of achieving professional status will only be the coveting of expertise driven by the financial remuneration that professionals attain, then the overarching goal of developing professionals to improve society and nurture community-minded ideals will recede (Brint, 1996; Damon, 2009; Lester, 1995).

Previous professionalism studies tended to use small samples of participants or samples from a single area of professionalism, such as *social agency* or *self-concept* of professionals (Cowin & Hengstberger-Sims, 2006; Hall, 1968; Haywood-Farmer & Stuart, 1990). This body of research focused on EFA techniques to explore and validate the theoretical models advanced by previous authors. Unlike prior studies, however, this study uses a large nationally-representative sample of students from the College Senior Survey (CSS) database, cross-validated the theoretical framework across two independent samples (e.g., two distinct cohorts of undergraduate seniors), and tested differences in mean factor scores across academic majors while controlling for gender and type of institution.

As noted above, this present study focused on the *precursors of professionalism* for these senior-level students, since the attitudes and values that students hold at the beginning of their work-life will be likely to influence the type of professionals they become later in their careers (Nyström, 2009). The model provides a lens to examine the promise of educational training – as scholars in education and ethics (Damon, 2009; Kohlberg, 1976; Pascarella & Terenzini, 1991) intended it – by exploring the professional attitudes of senior-level undergraduate students.

The CSS dataset contains many survey items that serve as good manifestations of the four constructs that make up the *precursors of professionalism*. The constructs below are modeled in this study to validate their position in an overall framework of students' *precursors of professionalism* at the end of their undergraduate training, immediately before their entry into the profession. In order to explore professionalism notions in senior-level undergraduate students, it is important to define the *precursors of professionalism* and the elements used to represent them.

### **Autonomy of Judgment**

Survey items focusing on precursors such as critical thinking, analytical and problem solving abilities, general knowledge, and expertise in the discipline were identified as manifestations of the *autonomy of judgment* construct as shown in Table 3 (Appendix). Collectively, they provide an indication of students' ability to behave autonomously, once they developed expertise in their respective disciplines.

### **Desire for Expertise**

Students' self-identified desire to become an authority in their discipline, desire to be recognized by colleagues for expertise in their discipline, and goals to have administrative responsibility in their chosen field were used as manifestations of students' overall *desire for expertise* as shown in Table 3 (Appendix). To represent these concepts accurately, the term *desire for expertise* – rather than *expertise* – will be used throughout the paper.

### **Self-concept**

For this construct, the study measured precursors such as students' social and intellectual self-concept, leadership ability, public speaking ability, and self-understanding. These items were used as manifestations of students' overall *self-concept* as shown in Table 3 (Appendix). These notions provided indicators for students' superior feelings of themselves as they progress in their professionalism.

### **Social Agency**

For the *social-trustee* dimension, the study measured precursors such as students' desire to be a leader in their community, participate in political affairs, influence social values, participate in a community action program, promote racial understanding, or help others in difficulty. These items were used as manifestations of students' overall *social agency* as shown in Table 3 (Appendix). To represent these concepts accurately, the term *social agency* was used when referring to this element throughout the study; this is also consistent with the HERI's terminology for these items.

## **RESEARCH QUESTIONS**

After validating the model, regression models were used to test the predictive relationship of gender, institutional type, and academic major on standardized factor scores for each of the four constructs. Previous literature identified students' major field of study as an influential

subculture that dictates environmental factors, such as the people with whom students interact and the curriculum that they study (Renn & Arnold, 2003). It is likely that students who majored in business or engineering arrived at their institution of higher education (IHE) predisposed to a focus on developing expertise and little interest in contributing to their community and society. Additionally, students' choice of major and the norms within their departments might influence their natural tendencies, thereby increasing the likelihood that business and engineering students will achieve certain predictable results in their *precursors of professionalism*. Terenzini and Pascarella (2005) argue that academic environments can differentially reward and reinforce students' varying interests and abilities. Smart, Feldman, and Ethington (2000) provide the most convincing evidence that differences in students' initial characteristics can be observed across academic environments that reward and reinforce students' interests and abilities. Business and engineering students may select their major based on their initial interest and abilities in the subject matter, but the majors' academic environment can highlight these differences in students.

Though the results in the *precursors of professionalism* may have been due to individual students' characteristics and their innate talents, the academic environment and higher education training may have accentuated students' results in the various disciplines. As such, the following research questions guided the analysis in this study:

(1) Does an EFA support the theory that the *precursors of professionalism* is a multidimensional construct comprised of the four latent variables *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social-agency*?

(2) Does a CFA support the hypothesis that the *precursors of professionalism* is a multidimensional construct comprised of the four latent variables *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social-agency* in an independent sample of students?

(3) Do factor scores of the constructs *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social-agency* of senior-level undergraduate students vary by major, gender, and/or type of institution? If so, what are the significant differences?

## METHODOLOGY

EFA and CFA were used to estimate the dimensionality of the *precursors of professionalism* in senior-level undergraduate students. HERI provided data from two academic years of the CSS for secondary analysis. The first academic-year data were used for the EFA, and the second academic-year data were used for the CFA and regression models in order to provide accurate verification of the results of the EFA (Bentler & Bonett, 1980). The survey items included in the study were based on theory that explained professionalism in general concepts such as *autonomy of judgment*, *expertise*, *self-concept*, and *social agency* (Abbott, 1988; Brint, 1996; Cowin & Hengstberger-Sims, 2006; Freidson, 2001). Because these constructs cannot be measured directly, they were estimated as latent factors using multiple manifest variables that define the underlying construct (Hall, 1968; Haywood-Farmer & Stuart, 1990; Imse, 1962). The analysis tested the assumptions that the four subtypes of professionalism were the correct theoretical latent factors measured by the indicators collected from participants' survey responses (Abbott, 1988; Brint, 1996; Freidson, 1994; Krause, 1999).

The first goal of the study was to test the validity of a model that included four distinct latent variables that represent the *precursors of professionalism*. Once the validity of these factors were established using an EFA, a following CFA was performed. The CFA was used to specify exactly how the indicators loaded on the four constructs of interest and tested the fit of

the model to the data. This process was used to confirm the hypothesized model for the *precursors of professionalism*. The second goal of the study was to make comparisons between students based on their academic disciplines such as social studies, science fields, and humanities as shown in Figure 1 (Appendix).

## Survey Data

The study used the CSS collected by HERI annually at the UCLA. HERI collects a nationally representative sample of graduating college seniors from over 100 baccalaureate universities annually. The survey measures students' values, attitudes and goals, assess post-college plans and aspirations, and study campus issues. The response formats for the survey items varied between scales of 1-4 and 1-5, with the most common type of responses ranges from "not important" to "essential." The survey was administered to college seniors during exit interviews, at the end of 2006-2007 and 2007-2008 academic years. The datasets for the first academic year had 19,141 respondents, of which 60% were females, 84% White/Caucasian, and 80% of the institutions participating were private. The dataset for the second academic year had 13,063 respondents, of which 62% were females, 83% White/Caucasian, and 81% of the institutions participating were private. Students who participated were from a variety of disciplines such as social sciences, humanities, sciences, and various professional fields. Students from 2-year colleges and religious institutions were not included in the study.

Once the 19 variables were selected from the CSS survey, descriptive statistics were computed. In addition, an examination of the distribution of responses was performed to assess whether the relationship between the variables was reflective of the theoretical associations. The variables that were associated with one another returned moderate- to high-correlations (e.g., .40 to .70) and variables that were not associated with one another yielded low correlation coefficients (e.g., .06 to .29). Descriptive statistics for the manifest variables are presented below in Table 1 (Appendix). Also, the tenability of the underlying assumptions of the models for the observed and latent variables was tested. With the exception of the variables used to measure the *autonomy of judgment* construct, all other variables met the assumptions of the factor models. However, the estimator used to fit the factor models is robust to violations of the normality assumption and is the preferred estimator when working with ordinal manifest variables for that reason (Muthen & Asparouhov, 2002). Because the variables used in this study were categorical, the Weighted Least Square estimator to derive the parameter estimates with mean- and variance-adjusted chi-square test statistics for the EFA and CFA in Mplus 6.11. The estimator WLSMV provides unbiased parameter estimates for models with categorical dependent variables and non-normal data (Muthen & Asparouhov, 2002). Because the properties of the estimator used when fitting the factor models is robust to the observed violations of the normality assumption, the results from the *autonomy of judgment* factor were retained but should still be interpreted cautiously.

The data was analyzed based on the survey items and the variables in question to determine the percentages of missing data. This provided information on the existence of unusual numbers of missing items in the data. Initial analysis of the two datasets (2006-2007, 2007-2008) did not show an unusual percentage of missing data, accounting for less than 3.5% in all of the used variables in the study. Allison (2001) suggests that for latent variable analysis, the Direct Maximum- Likelihood Method (ML) is the preferred method for addressing missing data. Therefore, ML was used in SPSS to replace missing values, grouping variables for each of the

four factors to perform the estimation, since variables within each factor are correlated and can be better estimators for missing values than using all the variables in the dataset.

## RESULTS

The exploratory factor analysis derived a solution that best explained the variance and covariance in the HERI data when no *a priori* path restrictions were imposed on the model. Four factors were statistically derived using exploratory factor analysis and additional tools of assessment, such as a scree plot, Kaiser-Gutman rule, and review of fit statistics. The EFA fit statistics are shown in Table 2 (Appendix). The four factors were labeled *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social agency* based on the relationship of the variables in the context of established theory reviewed earlier. Additionally, the hypothesis that a single higher-order latent variable affected the pattern of covariance in the observed data was tested. The final model included 19 items.

All latent variables were empirically identified; each factor was modeled by three, or more, manifest variables with a single path constrained to define the scale of the latent factor. All items had strong loadings on the higher-order professionalism factor. The final model supported the hypothesis that the latent factor *precursors of professionalism* has four underlying dimensions. The statistics in Table 3 (Appendix) show that the four-factor CFA model provided a cohesive model for the *precursors of professionalism*. The correlations for the latent factors in the study showed good discriminant validity between the four factors *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social agency*, since the correlations' residuals were sufficiently high indicating that the constructs represented distinct factors. These distinct factors are conceptually different, which supported the theoretical hypothesis. In addition, the results of the CFA model are shown in Table 3, Figure 2 (Appendix) suggested a strong convergence between the factors that they all described the same latent construct of the *precursors of professionalism*. The factor loadings and the  $R^2$  for all the survey items, which also support the model fit, are presented in Table 3 (Appendix).

### Influence of Students' Major on Professionalism Factor Scores

Following the validation of the theoretical model, standardized factor scores for each of the four factors were regressed on a vector of academic major indicators, as well as indicators for gender and institutional type. The disciplines in the HERI datasets were categorized as math, physical sciences, and other technical fields; English and humanities; education and other social sciences; biological and health sciences; engineering; history and political science; and the fine arts. Only findings (e.g., students' weaknesses in the precursors) significant at the .001 level are commented on in this study based on Table 4 and Figure 3 (Appendix).

#### *Autonomy of Judgment*

The *autonomy of judgment* precursor measured students' rating for independence in judgment guided by special expertise. The items surveyed in this test were students' reported change in critical thinking, analytical and problem solving, expertise in the discipline, general expertise, and readiness for employment. The results of comparisons between disciplines showed that selected undergraduate majors and type of institution were significant predictors for

the *autonomy* of judgment precursor as shown in Table 4 and Figure 3 (Appendix). Students enrolled in public schools reported significantly lower scores than students attending private schools. Private schools typically offer smaller classes, thereby providing increased opportunity for students to develop problem solving and critical thinking skills (Obermueller, 1993). This may explain why students attending public schools were estimated to have lower scores – on average – than students attending private schools adjusting for academic major and gender. However, although the estimator used to derive the factor scores can provide unbiased estimates of the factor means, the results from hypothesis tests with this factor should be interpreted with due caution.

### ***Desire for Expertise***

The *desire for expertise* precursor measured students' aspiration to develop expertise in their discipline. The items measured on the survey related to students' desire to become an authority in their special field, students' aspiration to obtain recognition from their colleagues for their contribution in their field, and students' desire to have administrative responsibility for the work of others. The results of comparisons between disciplines showed that selected undergraduate majors, gender, and type of institution are significant predictors for the *desire for expertise* precursor as indicated in Table 4 and Figure 3 (Appendix).

Results showed significantly lower scores for math, physical sciences, and other technical students, who may be very interested in their disciplines, but may shy to aspire to become an authority in their special field, or be recognized for contribution to their special disciplines as the survey questions and responses indicate. Students' responses for this group suggest that students may not feel that the goals in this precursor are achievable. This is supported by previous studies of education in math and physical sciences, which reported that students in these fields often find their disciplines too challenging (Seymour, 2002).

Students in English, humanities, education, and other social sciences have significantly lower results in this precursor indicating that these students do not report higher scores than other disciplines for the *desire for expertise* factor. These fields generally do not have high financial rewards for developing expertise in this discipline, and generally students do not enroll in this major for developing professional expertise, which may explain students survey responses and their lower scores (Kipliner, 2012).

In order to put the weaknesses mentioned above in perspective, it is important to note that the results show that business students ( $\beta=0.171$ ;  $SE=0.04$ ) have significantly higher scores than their peers on the *desire for expertise* precursor. This finding suggests that business students are highly motivated to develop the business expertise necessary to enter their profession. The business profession has high financial rewards for managers and executives working for corporations that are highly profitable (Crainer & Dearlove, 1999). This may explain business students' high scores in this factor as compared to students in other disciplines.

### ***Self-concept***

The *self-concept* precursor measured students' overall confidence and leadership ability. The items surveyed in this test were students' rating of their self-confidence (social), leadership ability, self-confidence (intellectual), public speaking ability, and self-understanding. The results



of comparisons between disciplines showed that selected undergraduate majors and gender are significant predictors for the *self-concept* precursor as stated in Table 4 and Figure 3 (Appendix). The estimated marginal means show that history and political science students had significantly higher scores than all other majors in college, holding the relationships between gender and institutional type constant at their respective means. This is reflective of the history and political science disciplines and their emphasis on leadership and public speaking engagements as a learning outcome associated with their course offerings (Kelly & Klunk, 2003). This significant difference in mean factor scores may suggest that these students' training as well as their initial characteristics may influence their professional *self-concept* as measured in this study. Conversely, students in math, physical sciences, other technical, education, other social sciences, biological sciences, engineering, as well as fine arts report significantly lower scores in *self-concept* than other students in college. These disciplines offer less exposure to leadership activities and public speaking opportunities that are naturally integrated in disciplines such as history and political science (Kelly & Klunk, 2003). Therefore, educators' awareness of this weakness may stimulate the inclusion of these components in the curriculum.

### ***Social Agency***

The *social agency* precursor measured students' values and attitudes in terms of their duty to society. *Social agency* is a person's belief that it is important to take action to improve society and work for social justice (Laird, 2005). The items surveyed in this test were students' rating of their goals, such as the goal of becoming a community leader, the goal of participating in a community action program, the goal of influencing social values, the goal of promoting social values, the goal of keeping up-to-date with political affairs, and the goal of helping others in difficulty.

The results of comparisons between disciplines showed that selected undergraduate majors were significant predictors of the *social agency* precursor as stated in Table 4 and Figure 3 (Appendix). Students in business, math, physical sciences, and engineering reported significantly lower scores in *social agency* than other majors. This suggests that these students' graduate and enter their selected profession with lower interest in becoming social agents in society. Astin & Sax (1998) studied predictors of scores in *social agency* and found that when students participate in volunteer work, work at non-profit organization, or community service that their scores on *social agency* measures increases significantly (Astin & Sax, 1998). Therefore, in these disciplines with lower scores, there is an opportunity for college educators to integrate community related work to improve social agency students' scores.

Disciplines such business, math, physical sciences, engineering, and other technical fields may not provide the same opportunity for meaningful participation in leadership activities and community engagement compared to other disciplines. Moreover, these students are rewarded for this experiential training with high corporate salaries and lucrative managerial positions; therefore, students have higher incentive to focus on technical subjects that lead them into their professional tracks (Crainer & Dearlove, 1999). Education, other social sciences, history, and political science students all reported significant higher scores in *social agency* compared to other majors. This is not surprising considering the emphasis of these disciplines on societal and political issues and the development of students' skills in leadership and public speaking (Kelly & Klunk, 2003) which allows students to become skilled social agents.

## Differences by Gender and Institutional Type

Following the validation of the theoretical model, standardized factor scores for each of the four factors were regressed on a vector of academic major indicators, as well as indicators for gender and institutional type. The following paragraphs examined differences in the marginal means of academic majors by gender and institutional type.

### *Gender*

Additional testing for differences in mean factor score for *autonomy of judgment* failed to show significant differences by gender as stated in Table 4 (Appendix). This is confirmed by prior studies such as Myers and Dyer (2006) who reported no difference in scores of critical thinking skills by gender. Although Pascarella and Terenzini (1991) reported that college education does have a positive influence on students' critical thinking skills, they did not report significant differences between scores of males and females.

On average, female students scored significantly lower than male students did in the *self-concept* factor. Pascarella, Smart, Ethington, and Nettles (1987) carried out a longitudinal study on the influences of college education on students' *self-concept*, and found that academic and social experiences during college have a direct effect on students' *self-concept*, thus it is important for educators to pay attention to female students' development of *self-concept* during college years.

Finally, mean factor scores for *social agency* by gender were significantly different for males and females. On average, male students scored significantly lower than female students in the *social agency* precursor. Eyer (2001) reported that female faculty scored substantially higher than male faculty on measures of community service, engaging with social problems, and developing students' civic responsibility, which may explain why female students report higher scores even in their undergraduate college years. A growing body of research suggests that exposure to diversity via curricular offerings, interaction with diverse peers, and positive diversity interactions can yield higher *social agency* in college students (Laird, 2005). Although no prior studies have attempted to explore reasons for gender differences in *social agency*, the evidence in this study can serve as a baseline for future investigation.

### *Type of Institution*

The effect of institutional type in the model of the *autonomy of judgment* factor score indicated significant differences between students who attended private or public institutions as shown in Table 4 (Appendix). Students who attended private institutions scored significantly higher on their *autonomy of judgment* than their peers who attended public institutions. Private, and especially liberal arts, institutions may use more interdisciplinary courses in their business curriculum than public institution (Obermueller, 1993). These courses allow for connections between disciplines such as sociology and business, or psychology and business, and therefore this training allows more opportunity for students to practice critical thinking skills (Obermueller, 1993).

In addition, the mean factor score for *desire for expertise* differed significantly between private and public colleges. Students from public colleges, on average, scored significantly higher than students from private institutions did on the *desire for expertise* factor. There were no prior studies addressing *desire for expertise* type of institution differences; however, liberal

arts colleges have less of an emphasis on vocational and professional training, which may explain the difference in the type of students that enroll in public as compared to private colleges (Colby, Ehrlich, Sullivan, & Dolle, 2011). Students in public colleges may select public institutions in pursuit of practical or experiential knowledge, which explains their higher scores in specific expertise.

## IMPLICATIONS

This study has identified the *precursors of professionalism* for senior-level undergraduate students via EFA and CFA. This model will assist the higher education community in understanding the individual dimensions vital for developing and nurturing future professionals composing 68% of college graduates (Colby et al., 2011). Additionally, the study highlights differences in students' professionalism profiles that exist across undergraduate majors, gender, and types of institutions. These differences may help educators emphasize components (e.g., public speaking, leadership ability, service learning, and community engagement) in students' education that would allow them become better participants in a democratic society. The results for the business students in this study provide a good example of this.

These students' professional profiles show that their survey responses are significantly positively correlated with *autonomy of judgment* and *desire for expertise* precursors and significantly negatively correlated with *social agency*. This professional profile describes students who start their career with sufficient autonomy, high desire to develop expertise in their profession, but low interest in the farewell of society guided by their special expertise. Deficiencies in the area of *social agency* and strength in *desire for expertise* may pose a problem when these students become future professionals responsible for conducting business in society with lack of interest in societal goals in the first place. Adler (2002), Brint (1996), and Trank and Rynes (2003) stated that as business students graduate and become managers, their role surpasses the traditional technical business expert roles. They emphasized that business schools should be concerned about training their students as citizens of their polity and as members of their communities, not just as technical experts for business practices (Adler, 2002; Brint, 1996; Trank & Rynes, 2003).

Professionalism is an important goal in all fields of professional study internationally. A high percentage of tracks that undergraduates select for their future careers are considered professional majors, such as business, engineering, nursing, education, agriculture and others (Colby et al., 2011; National Center for Educational Statistics, 2010). This highlights the importance of this research since it sets the foundation that facilitates the assessment, identification of strengths and weaknesses, and a structured and intentional method for implementing improvements in professionalism for undergraduate students in the various disciplines.

### Implications for Future Research

A reasonable next step resulting from this research is to apply this model to other cross-sectional and/or longitudinal datasets with stratified-random samples. Studies using longitudinal datasets may explain changes in the *precursors of professionalism* during college years. Comparisons of the *precursors of professionalism* between majors are yet another promising area for future research. Although all of the subjects in this study were senior-level undergraduate

students, testing these models with samples of graduate students may help explain change in professionalism scores after several years of experience in the labor force and additional educational training. Longitudinal studies could be conducted using the *Your First College Year Survey* (YFCY)—also developed and administered by HERI—to test whether students' scores vary significantly over time, test whether external forces explain any of the variance (e.g., economic recession or financial scandals for example), and to determine how each of the precursors develops over time. The results in this study, as well as the proposed research avenues, will provide educators an incentive to apply interventions that may improve students' professionalism levels.

Fertile, as well, for future studies is an examination of the effects of omitted variable bias on the factor loadings and predicted scores. Additional predictors of the *precursors of professionalism* such as students' involvement in extracurricular activities, additional courses or professional certificates in ethics, internships and volunteer work in organizations, and study-abroad programs, could help to explain more of the variance in the data, while refining our understanding of the manifestations of these latent factors. Controlling for the omitted variables would also help to obtain unbiased – or less-biased – estimates of the population parameters. Although the final model of this study explained 58% of the variance of the *precursors of professionalism*, controlling for omitted variables in the specification of each of the four factors, *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social agency*, could help to explain the developmental pathways related to professionalism.

## LIMITATIONS

The first limitation of the findings of this study is related to the use of a secondary dataset and how that affects the relationship between the data and the conceptual framework brought to the data. Because the survey was designed to meet the needs of HERI, the CSS dataset imposed theoretical restrictions on modeling the latent factors of interest. For example, only three manifest variables were available to estimate the *desire for expertise* factor, while more items would have yielded a more robust estimate of the latent variable. The second limitation was the potential bias of self-reported measurements, since respondents may exaggerate or underreport their responses to specific items (Creswell, 2009); therefore, the use of self-reported data is noted as a limitation of this study. The third limitation was that manifest variables for *autonomy of judgment* factor did not meet the assumption of normality, but the factor was retained because the WLSMV estimator is robust to normality violations. Future studies can improve on data collection techniques for that factor. Lastly, the study used a large sample of a considerable size that over-represented students attending private and/or four-year institutions, women, and White students. Therefore, the findings have limited generalizability to public institutions, males, lower socioeconomic status (SES), and ethnic groups. Future researchers conducting similar studies on this topic should attempt to over sample such groups.

## FINAL COMMENTS

This study developed a model for the *precursors of professionalism* for undergraduate senior-level students. The resulting model validated the factors *autonomy of judgment*, *desire for expertise*, *self-concept*, and *social agency* as appropriate constructs for the latent variable *precursors of professionalism*. This model will assist scholars and educators who are concerned

about attributes of professionalism in graduating students to explore specific constructs or samples of students more effectively. Additionally scholars and educators can look for variables that may result in an improvement in the identification and estimation of the four dimensions of the *precursors of professionalism* especially in areas such of *autonomy of judgment* and *social agency*. This is particularly important since increasing factor scores in these dimensions may raise professionals' sense of duty to society and their ability to engage in the activism needed to work on urgent social issues.

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**APPENDIX**

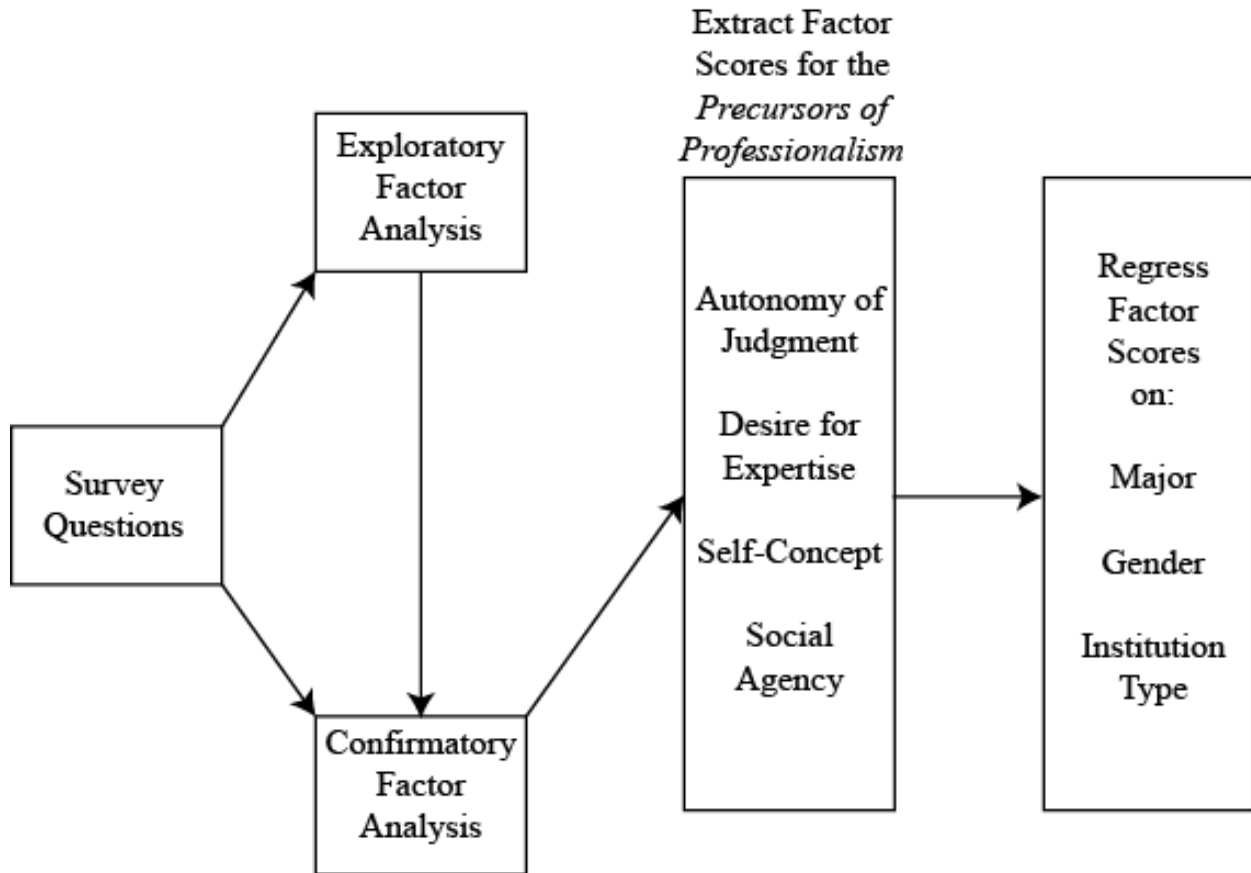


Figure 1. Conceptual graph of the study.

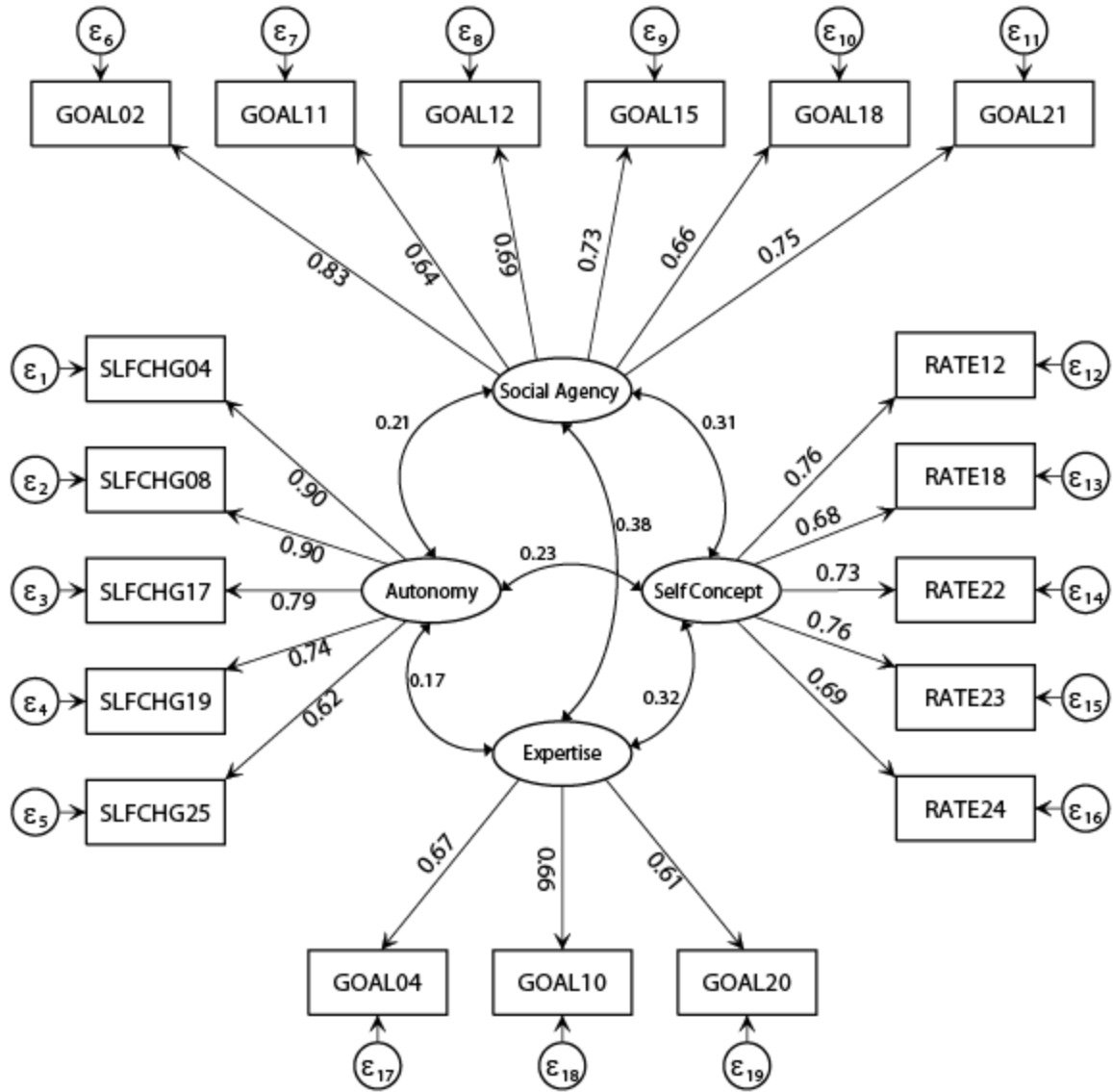


Figure 2. CFA factor loadings and factor correlations.



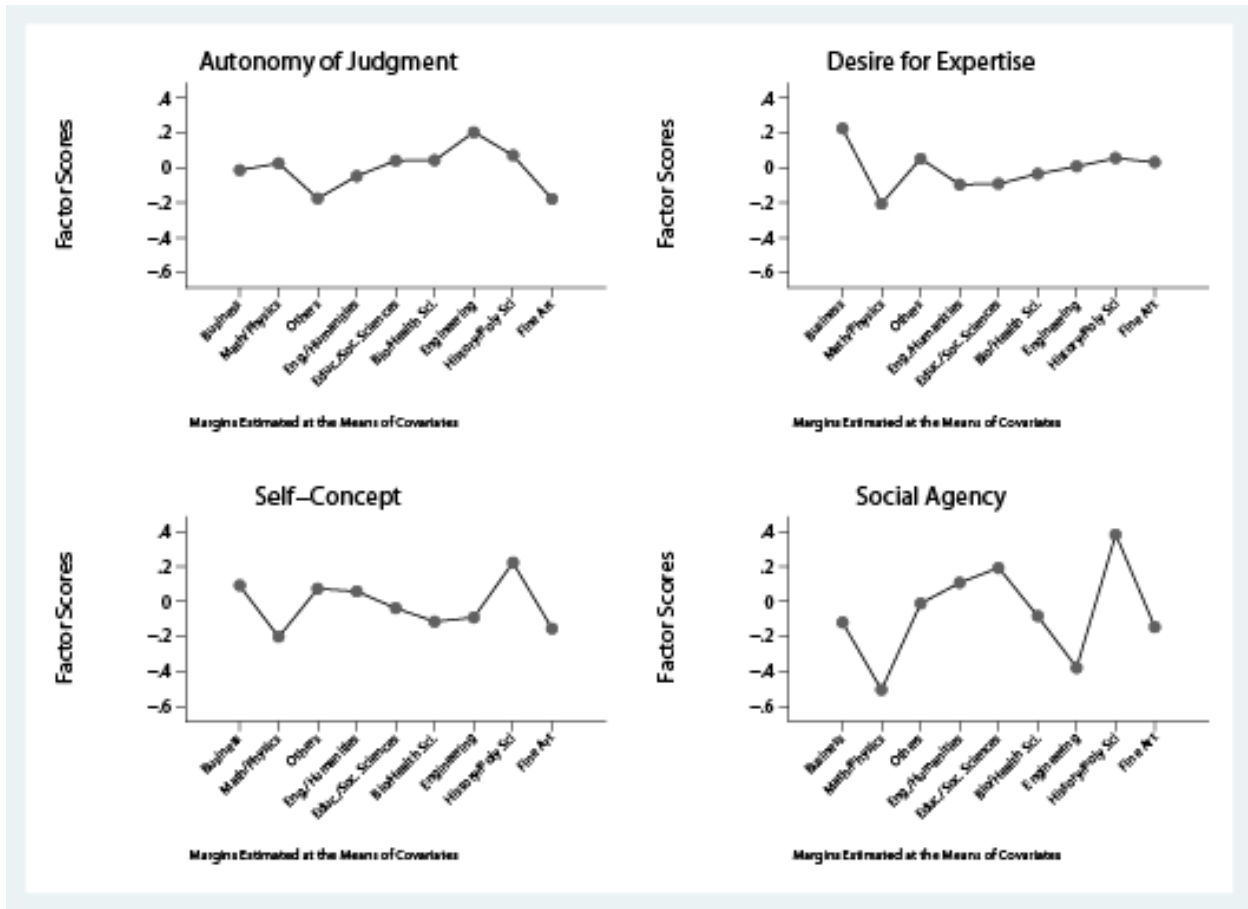


Figure 3. Marginal means of factor scores by major.



Table 1  
*Descriptive data for manifest variables and covariates*

Observed variable	Description	<i>M</i>	<i>SD</i>
SLFCHG04	Change: Ability to think critically	4.38	0.65
SLFCHG08	Change: Analytical and problem-solving skills	4.34	0.64
SLFCHG17	Change: General knowledge	4.34	0.60
SLFCHG19	Change: Knowledge of a particular field or discipline	4.66	0.54
SLFCHG25	Change: Preparedness for employment after college	4.20	0.74
GOAL04	Goal: Become an authority in my field	2.72	0.86
GOAL10	Goal: Having administrative responsibility for the work of others	2.58	0.85
GOAL20	Goal: Obtain recognition from colleagues for contributing to my special field	2.33	0.90
RATE23	Self-rating: Self-confidence (social)	3.59	0.91
RATE12	Self-rating: Leadership ability	3.87	0.82
RATE22	Self-rating: Self-confidence (intellectual)	3.86	0.81
RATE18	Self-rating: Public speaking ability	3.51	0.94
RATE24	Self-rating: Self-understanding	3.89	0.79
GOAL02	Goal: Becoming a community leader	2.29	0.93
GOAL21	Goal: Participating in a community action program	2.23	0.90
GOAL15	Goal: Influencing social values	2.51	0.89
GOAL12	Goal: Helping to promote racial understanding	2.26	0.93
GOAL18	Goal: Keeping up to date with political affairs	2.45	0.91
GOAL11	Goal: Helping others in difficulty	3.05	0.78
SEX	Gender of Student	1.62	-
TYPE	Type of Institution	0.31	-

Table 2  
Model fit statistics for EFA and CFA

Model	$\chi^2$	Df	CFI	RMSEA	C.I.	SRMR
3-factor EFA	40598.436***	117	0.849	0.134	.133-.136	0.064
4-factor EFA	10644.937***	101	0.961	0.074	.073-.075	0.028
5-factor EFA	4777.084***	86	0.982	0.053	.052-.055	0.019
CFA	6065.650***	143	0.966	0.056	.055-.058	--

Note: C.I. = Confidence Interval for RMSEA; \*\*\*  $p < 0.001$

Table 3  
Standardized factor loadings and  $R^2$  values for final CFA

Latent Factor	Observed Variables	Description	Factor Loadings	$R^2$
Autonomy of judgment	SLFCHG04	Change: Ability to think critically	0.9	0.8
	SLFCHG08	Change: Analytical and problem-solving skills	0.9	0.82
	SLFCHG17	Change: General knowledge	0.79	0.62
	SLFCHG19	Change: Knowledge of a particular field or discipline	0.74	0.55
	SLFCHG25	Change: Preparedness for employment after college	0.62	0.39
Desire for expertise	GOAL04	Goal: Become an authority in my field	0.67	0.45
	GOAL20	Goal: Obtain recognition from colleagues for contributing to my special field	0.61	0.37
	GOAL10	Goal: Having administrative responsibility for the work of others	0.66	0.44
Self-concept	RATE23	Self-rating: Self-confidence (social)	0.76	0.58
	RATE12	Self-rating: Leadership ability	0.76	0.57
	RATE22	Self-rating: Self-confidence (intellectual)	0.73	0.53
	RATE18	Self-rating: Public speaking ability	0.68	0.46
	RATE24	Self-rating: Self-understanding	0.69	0.48
Social agency	GOAL02	Goal: Becoming a community leader	0.83	0.69
	GOAL21	Goal: Participating in a community action program	0.75	0.57
	GOAL15	Goal: Influencing social values	0.73	0.54
	GOAL12	Goal: Helping to promote racial understanding	0.69	0.47
	GOAL18	Goal: Keeping up to date with political affairs	0.66	0.44
	GOAL11	Goal: Helping others in difficulty	0.64	0.41

\* All factors loadings significant at  $p < 0.001$

Table 4  
Model results

	Autonomy of Judgment	Desire for Expertise	Self Concept	Social Agency
Business	0.162 <sup>***</sup> (0.036)	0.171 <sup>***</sup> (0.036)	0.0178 (0.035)	-0.108 <sup>**</sup> (0.035)
Math, Phys. Sciences, Other	0.202 <sup>***</sup> (0.046)	-0.258 <sup>***</sup> (0.046)	-0.276 <sup>***</sup> (0.046)	-0.494 <sup>***</sup> (0.046)
English & Humanities	0.128 <sup>***</sup> (0.037)	-0.148 <sup>***</sup> (0.037)	-0.015 (0.037)	0.118 <sup>**</sup> (0.037)
Educ. & Other Social Science	0.217 <sup>***</sup> (0.034)	-0.144 <sup>***</sup> (0.034)	-0.111 <sup>***</sup> (0.034)	0.205 <sup>***</sup> (0.034)
Biological Sciences & Health	0.218 <sup>***</sup> (0.038)	-0.087 <sup>*</sup> (0.038)	-0.188 <sup>***</sup> (0.037)	-0.072 (0.037)
Engineering	0.380 <sup>***</sup> (0.048)	-0.045 (0.047)	-0.164 <sup>***</sup> (0.047)	-0.366 <sup>***</sup> (0.047)
History/Political Science	0.247 <sup>***</sup> (0.042)	0.002 (0.042)	0.150 <sup>***</sup> (0.041)	0.395 <sup>***</sup> (0.041)
Fine Arts	-0.001 (0.047)	-0.021 (0.047)	-0.226 <sup>***</sup> (0.047)	-0.133 <sup>**</sup> (0.046)
Female	0.028 (0.019)	-0.113 <sup>***</sup> (0.019)	-0.342 <sup>***</sup> (0.018)	0.065 <sup>***</sup> (0.018)
Public School	-0.141 <sup>***</sup> (0.019)	0.067 <sup>***</sup> (0.019)	-0.017 (0.019)	-0.026 (0.019)
Constant	-0.150 <sup>***</sup> (0.033)	0.102 <sup>**</sup> (0.032)	0.292 <sup>***</sup> (0.032)	-0.0433 (0.032)
$R^2$	0.012	0.020	0.042	0.053
adj. $R^2$	0.011	0.019	0.041	0.052
$N$	13063	13063	13063	13063

\*\*Coefficients are significant at  $p < 0.005$  \*\*\*Coefficients are significant at  $p < 0.001$