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## Development and Validation of the Factors Influencing Pursuit of Higher Education Questionnaire

Sandra M. Harris and Glennelle Halpin

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DEVELOPMENT AND VALIDATION OF THE  
FACTORS INFLUENCING PURSUIT OF HIGHER  
EDUCATION QUESTIONNAIRE

SANDRA M. HARRIS AND GLENNELLE HALPIN  
Auburn University

This article addresses the development and validation of the Factors Influencing Pursuit of Higher Education (FIPHE) Questionnaire, a 92-item self-report measure that investigates factors that influence individuals to pursue higher education. Reliability estimates for the nine FIPHE scale scores ranged from .66 to .90. An exploratory factor analysis was conducted on data from a sample ( $N = 509$ ) of college students enrolled in two southeastern universities. The data were subjected to principal components analysis with varimax rotation. Although the researchers hypothesized 10 scales for the questionnaire, the results revealed that a nine-factor solution produced the most interpretable factor patterns. The nine-factor solution accounted for 43% of the common variance. Limitations of the research and implications for future research are discussed.

In a recent meeting of the United Nation's Educational, Scientific, and Cultural Organization, educators from more than 180 countries agreed that "more people . . . will need post-secondary education to be professionally and technologically skilled" (Murray, 1999, p. 11) workers of the 21st century. Likewise, Drucker (1995) noted that "knowledge has become the key resource, for a nation's military strength as for its economic strength" (p. 37). As countries compete to move to the forefront of technological advancement, having a college-educated workforce will be an essential element for a country's success.

Failing to provide an adequate education for American youth can be a costly proposition. Consider the fact that across a life span, the average high

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Correspondence concerning this article should be addressed to Sandra M. Harris, Ph.D., Counseling, Education, and Psychology Department, Troy State University Montgomery, Building 136, P.O. Drawer 4419, Montgomery, AL 36103; e-mail: sharris@tsum.edu.

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school dropout loses approximately \$230,000 in income. That lost income equates to approximately \$69,000 in lost taxes (Eccles, 1997; Renchler, 1990). In addition, a college degree increases a person's earning potential by 18% to 45% per year. In turn, this increased personal income generates approximately \$12,420 to \$37,650 per year in potential income taxes (Pascarelli & Terenzini, 1991). With these numbers in mind, it is in America's best interest, financially, to increase its number of college graduates.

Before educators can increase the number of college graduates, they must first know and understand the factors that motivate a person to pursue higher education. The following topics have been identified as being some of those variables.

*Self-efficacy.* Bandura (1996) defined *self-efficacy* as one's expectations and beliefs about one's ability to perform specific behaviors. Self-efficacy has been found to be predictive of behaviors such as academic performance, academic persistence, achievement motivation, and the number of career options that a person considers (Brown, Lent, & Larkin, 1989; Lent, Larkin, & Brown, 1989; Multon, Brown, & Lent, 1991; Schunk, 1991).

*Locus of control.* "The locus of control concept refers to individually perceived sources of control over certain behaviors or events" (Chapman & Boersma, 1979, p. 250). There are two dimensions along the locus of control spectrum: internal and external. Research has shown that individuals who have a high degree of the internal locus of control variable are more likely to pursue a college degree (Gadzella, Williamson, & Ginther, 1985; Mickelson, 1990).

*Parental influence.* "Students at all grade levels do better academic work and have more positive school attitudes, higher aspirations, and other positive behaviors if they have parents who are aware, knowledgeable, and involved" (Epstein, 1992, p. 1141). Several researchers have postulated that college-educated parents are more aware of the demands of college and that students of such parents tend to be more successful in pursuing higher education (Windham, 1996; York-Anderson & Bowman, 1991).

*Family influence.* The positive effect of family support on student success has been well documented (Haveman & Wolfe, 1995; M. S. Thompson, Alexander, & Entwisle, 1988). However, obtaining family support may be problematic for first-generation college students (Renchler, 1990). In one study, first-generation college students reported that although family members initially encouraged and supported their desires to attend college, those same family members began pressuring them to become less active in school activities and more supportive of family events (Terenzini, et al., 1994).

*Peer influence.* In a study by Willet (1989), respondents revealed that their personal interactions with their friends increased their general knowledge about college. In another study, Terenzini and colleagues (1994) found that if entering freshmen students had high school friends who were attending the same college, those friends served as social buffers and helped ease the transition from high school to college. Conversely, non-college-bound high school friends served “as interpersonal anchors . . . hold[ing] the student in the network of friends and patterns of activities and interests of the precollege years” (p. 65).

*Relative functionalism.* Relative functionalism can be described as the way individuals perceive the function of education in comparison to other noneducational pursuits. Sue and Okazaki (1990) used this concept to explain the ascendance of Asian Americans to the top of the academic success ladder. When looking at other nonacademic opportunities for success, the salience of Asian Americans is rare. For example, in areas such as sports, entertainment, politics, and business, there are few images of highly successful Asian Americans (Sue & Okazaki, 1990). Consequently, Asian Americans may pursue higher education as a means of achieving personal success.

*Glass ceiling effect.* The glass ceiling effect occurs when a person, or groups of persons, perceives the opportunities for success in a particular job or jobs to be blocked (Mickelson, 1990). Researchers contend (Fordham & Ogbu, 1986; Steinberg, Dornbusch, & Brown, 1992) that the glass ceiling effect may engender certain minority groups with a sense of hopelessness and despair when it comes to competing for jobs traditionally held by Anglo-Americans. This concept may also be a factor that inhibits some minorities from pursuing higher education.

*Teacher-student interactions.* During the first 20 years of life, the average American child spends approximately 15,000 hours in an academic setting. “Thus schools represent a primary socializing influence that has enormous impact on the course of people’s lives and, in turn, on society” (Deci, Vallerand, Pelletier, & Ryan, 1991, p. 325). Because students tend to live up to the expectations of their teachers, teachers can be instrumental in encouraging youth to pursue higher education (Lumsden, 1997; Raffini, 1993).

*General preparation for college.* Without information on how to take college admissions tests, how to fill out college applications, how to follow procedures for filing applications, how to meet application deadlines, and how to obtain information on financial assistance, many students miss out on key information needed for enrolling in college (Howe, 1997). Because of their positions, secondary school counselors are in prime positions for influencing

the career choices of American youth, including the decision to pursue higher education (Hoganson, 1996).

*Financial aid.* In recent years, federal financial funding for higher education has been on a steady decline. Between 1980 and 1987, federal support of financial aid programs decreased by 11%. Yet, the number of students needing financial aid increased by 20% (Donnelley, 1987). Similarly, Carter and Wilson (1993) reported that the 1990-dollar value of the Pell Grant was one fifth of the value it held in 1975. They also reported that the availability of college work-study programs have decreased by 50% since 1971. In the absence of financial assistance, even the most motivated individuals may be circumvented from pursuing higher education.

Although educators are aware of the declining numbers of individuals graduating from the ranks of higher education, they still are not cognizant of what to do to stabilize, and ultimately increase, those numbers. More research needs to be conducted to gain an understanding of the factors that influence individuals to pursue higher education. Key in this research are measures that can be used to assess those motivational forces. The purpose of these studies was to develop such a measure. It is the researchers' intent to develop further a questionnaire that highlights the factors that motivate individuals to pursue higher education.

## Method

### *Item Selection*

A literature-based approach was taken in developing items for the Factors Influencing Pursuit of Higher Education (FIPHE) Questionnaire. The items gathered information on variables that other researchers have identified as having an impact on a person's decision to pursue higher education. The literature review presented in this article highlights those variables. To determine the face validity and content validity of the questionnaire, several administrators and college professors with experience in the areas of student recruiting, admissions, and retention were asked to review the items. The reviewing officials indicated that the items did address variables that, in their experience, reflect the domain of interest. Because face validity and content validity generally are not expressed in a quantitative fashion (Fink & Kosecoff, 1985), the judgment of the reviewing officials was considered evidence of the questionnaire's face and content validity. Construct validation of the questionnaire has occurred over the course of three studies.

### Study 1: Pilot Study

The purpose of this study was twofold. The first objective was to evaluate the mechanical aspects (grammar, form, content, readability, etc.) of the questionnaire. The second objective was to use Cronbach's alpha to establish indexes of internal consistency for the scales in the questionnaire.

#### *Participants*

Participants were enrolled in college classes at several southeastern universities. A total of 21 individuals participated in the pilot study. Most ( $n = 15$ ) were nontraditional college students whose age range was 36 to 40 years. The racial composition was 10 African Americans, 10 Caucasians, and 1 Hispanic. Eight participants were male and 13 were female.

#### *Procedures*

Participants were given a draft version of the questionnaire. They were instructed to complete the questionnaire and to write notes concerning items that were poorly worded, ambiguous, or confusing. As participants returned the questionnaires, each received a face-to-face interview regarding the content, appearance, and readability of items in the questionnaire.

#### *Instrument*

The original questionnaire consisted of two sections. Section 1 solicited demographic information. Items in this section were not part of the item count, nor were they included in any of the statistical analyses. These items were used to compare the observed versus expected frequencies in the demographic data. Section 2 consisted of 107 statements that were distributed across the following scales: Locus of Control, Parental Support, Family Support, Peer Influence, Relative Functionalism, Glass Ceiling Effect, Presence of Role Models and Mentors, Preparation for College, and Financial Aid Concerns. Participants used the following Likert-type scale to indicate their level of agreement or disagreement with each statement: *strongly agree*, *agree*, *disagree*, and *strongly disagree*.

#### *Results and Discussion*

Results from the reliability analysis showed alpha coefficients ranging from moderate to high (.54 to .90) for the scale scores. Table 1 presents summary descriptive statistics and alpha coefficients for the scales. The reliabil-

Table 1  
*Summary of Descriptive Statistics and Alpha Coefficients From Results of Study 1*

Scale	<i>n</i>	<i>M</i> <sup>a</sup>	<i>SD</i> <sup>a</sup>	<i>M</i> <sup>b</sup>	<i>SD</i> <sup>b</sup>	$\alpha$
Locus of Control	13	5.76	0.78	74.90	8.53	.85
Parental Support	11	4.40	0.87	48.43	14.06	.90
Family Support	10	4.13	0.72	41.33	11.52	.84
Peer Influence	15	5.10	0.42	76.48	15.09	.90
Relative Functionalism	10	5.13	1.04	51.33	6.01	.62
Glass Ceiling Effect	4	3.88	1.08	15.52	2.96	.53
Presence of Role Models/Mentors <sup>c</sup>	16	4.63	0.88	74.00	15.19	.90
Preparation for College	19	3.81	1.06	72.43	14.41	.85
Financial Aid Concerns	9	3.94	1.21	35.43	6.71	.54

*Note.* *N* = 21 for all items. Statistics are not presented for the open-ended item in the questionnaire.

a. Descriptive statistics for item means.

b. Descriptive statistics for the scale.

c. Subsequent to the results obtained in this study, this scale was divided into the Presence of Role Models Scale (*n* = 7) and the Presence of Mentors Scale (*n* = 11).

ity analyses, along with results from item analyses, resulted in rewording or excluding poorly performing items (those with correlations of less than .25) from the questionnaire. The Presence of Role Models and Mentors Scale was separated into two scales. This action was taken because it is possible for a person to serve as a role model without necessarily being a mentor. Hence, the researchers felt it was more appropriate to investigate role models and mentors as separate variables.

In the face-to-face interviews, several participants indicated they had difficulty responding to some of the items in Section 2. A review of those items revealed that they were fact based and therefore inappropriate for attitude rating scales. A third section was created to house those items. Changes as a result of Study 1 resulted in a 117-item questionnaire that was divided into three sections. Section 1 gathered demographic data. Items in this section were not part of the item count. They were used to compare the observed versus the expected frequencies in the demographic data. Items in Section 1 also were not included in the statistical analyses. Section 2 contained 95 closed-ended statements. Section 3 consisted of 21 yes or no items and 1 open-ended item.

### Study 2: Validating the Questionnaire

The purpose of this study was to assess further the internal consistency of the scales contained in the questionnaire after the revision based on Study 1 described above. Results from a reliability analysis were used to identify items that needed to be reworded or deleted from the questionnaire.

### *Participants*

Participants were college students enrolled in general studies classes at two southeastern universities ( $N = 392$ ). Participants from College 1, a large, traditional, land-grant university, consisted of 296 undergraduate students enrolled in three sections of a social science course. Participants from College 2, a smaller, nontraditional college, were 96 undergraduate students enrolled in an introductory psychology course. Of the total number of participants, 59% were female and 41% were male. The most frequently occurring age was 20 years or less. The ethnic composition of the sample was 79% White, 16% African American, 2% Hispanic, 1% Asian, and 1% other.

### *Procedures*

Participants, who were recruited through the course instructors, completed the questionnaires at home. They were granted extra credit for returning completed questionnaires and given the opportunity to enter their names into a drawing for \$75.

### *Instrument*

As described above, the revised instrument has three sections, with the first section for collecting demographic data only but not included in any of the statistical analyses. Section 2 consisted of 95 items that were distributed among the following scales: Locus of Control, Parental Support, Family Support, Peer Influence, Relative Functionalism, Glass Ceiling Effect, Presence of Role Models, Presence of Mentors, Preparation for College, and Financial Aid Concerns. Participants used the following 4-option Likert-type scale to indicate their level of agreement or disagreement with each statement: *strongly agree*, *agree*, *disagree*, and *strongly disagree*. Section 3 contained 21 items to which the participants responded yes or no and 1 open-ended item respondents could use to provide additional comments.

### *Results and Discussion*

Results from the reliability analysis showed that the alpha coefficients ranged from moderate to high (.54 to .90). Table 2 presents summary descriptive statistics and alpha coefficients for the scales. These results were used to make further revisions to the questionnaire. One scale, the nine-item Self-Efficacy Scale that measured a person's perceived competence in a specific area (Bandura, 1996)—the respondent's college major—was added to the questionnaire. The decision to add this scale came through interviews with students and through roundtable discussions at a professional conference.



Table 2  
*Descriptive Statistics and Alpha Coefficients From Results of Study 2*

Scale	<i>n</i>	<i>M</i> <sup>a</sup>	<i>SD</i> <sup>a</sup>	<i>M</i> <sup>b</sup>	<i>SD</i> <sup>b</sup>	$\alpha$
Locus of Control	14	2.94	0.64	44.07	4.29	.81
Parental Support	14	3.71	0.14	40.46	5.64	.87
Family Support	12	3.20	0.17	38.34	4.97	.82
Peer Influence	12	3.25	0.14	38.96	4.79	.78
Relative Functionalism	13	3.13	0.46	40.66	4.62	.81
Glass Ceiling Effect	7	1.94	0.41	13.61	2.91	.69
Presence of Role Models <sup>c</sup>	7	2.17	0.41	15.20	1.50	.54
Presence of Mentors <sup>d</sup>	11	3.08	1.09	33.85	5.94	.90
Preparation for College	18	2.66	0.33	47.92	3.09	.63
Financial Aid Concerns	8	2.60	0.98	20.20	2.74	.64

*Note.* *N* = 392 for all items. Statistics are not presented for the open-ended item in the questionnaire.

a. Descriptive statistics for item means.

b. Descriptive statistics for the scale.

c. Consequent to the results of this study, this scale was deleted from the questionnaire.

d. Consequent to the results of this study, the name of this scale was changed to Secondary School Support.

Feedback from these sources highlighted the fact that self-efficacy is a construct that should be included in a questionnaire such as the FIPHE.

Several revisions were made to the items in Section 2. First, the reliability and item analyses resulted in poorly performing items being either reworded or deleted from their respective scales. Second, several items pertaining to parents were reworded to address mothers and fathers as separate variables. In addition, items that referred to siblings were separated to reflect brothers and sisters as separate variables. This action was taken because several participants indicated that the items would be easier to respond to if they reflected one variable rather than two.

The Presence of Role Models Scale was completely revised. Of the seven items contained in the scale, only two had item-total correlations greater than .25. Rather than delete the items, some were reworded and moved to the demographic section; others were reworded and included in the Presence of Mentors Scale. The name of the Presence of Mentors Scale was changed to Secondary School Support Scale because a visual review of the items in the scale revealed that all of them related to support and encouragement from secondary school personnel.

Several changes were made to the Preparation for College Scale. The reliability and item analyses originally resulted in 10 of 18 items being removed from the scale. Two of the items were reworded and retained in the revised scale. The remaining items were dropped from the questionnaire. Finally, several changes were made to Section 3. Several items were dropped because of poor item-total correlations. In addition, comments from the open-ended item indicated that instead of responding yes or no to the items in that section,

it would be easier to respond to them as true or false. These changes were incorporated as suggested.

Revisions made from the results of Study 2 resulted in a 113-item questionnaire that consisted of three sections. Section 1 solicited demographic information. Items in this section were not part of the item count, and they were not included in any statistical analyses. Section 2 consisted of 95 closed-ended statements. Section 3 consisted of 17 true/false statements and 1 open-ended item.

### Study 3: Exploring the Factor Structure of the Questionnaire

The purpose of this study was twofold. First, results from the reliability and item analyses were used to make further refinements to items in the questionnaire. The second purpose was to assess the degree to which the factor structure of the questionnaire, as determined by factor analysis, held consistent with the 10-factor, a priori structure proposed by the researchers.

#### *Participants*

Participants were college students enrolled in general studies classes at two southeastern universities ( $N = 509$ ). Participants from College 1, a large, traditional land-grant university, were 346 undergraduate students enrolled in three sections of a social science course. Participants from College 2, a smaller, nontraditional college, were 163 undergraduate students enrolled in an introductory psychology course. Results from a cross-tabulation procedure indicated significant differences in the observed and expected frequencies between the colleges on all of the demographic items, thus indicating a fairly heterogeneous sample. Some of the most notable differences are presented here. Regarding age, 94% of participants from College 1 versus 74% of participants from College 2 were 25 years of age or less. A smaller percentage of participants from College 1 were employed (44% vs. 81% for College 2). The ethnic composition for College 1 was predominantly Caucasian (96%). College 2 consisted of a more diverse group (50% Caucasian, 47% African American, and 3% other).

#### *Procedures*

Participants, who were recruited through the course instructors, completed the questionnaires at home. They were granted extra credit for returning completed questionnaires, and they were given the opportunity to enter their names into a drawing for \$75.

### *Instrument*

The revised FIPHE Questionnaire consisted of three sections. Section 1 was for demographic data collection. Items in this section were not part of the item count, and were not included in the statistical analyses. Section 2 consisted of 95 items that were distributed among the following 10 scales: Self-Efficacy, Locus of Control, Parental Support, Family Support, Peer Influence, Relative Functionalism, Glass Ceiling Effect, Secondary School Support, Preparation for College, and Financial Aid Concerns. The items in Section 2 were coded 4 = *strongly agree*, 3 = *agree*, 2 = *disagree*, and 1 = *strongly disagree*. The 17 items in Section 3 were coded 4 = true and 3 = false. Negatively worded items were reversed coded before scale scores were computed. Instructions for the FIPHE Questionnaire stated that if an item did not apply to a respondent, the respondent was to leave it blank. Blank items were coded as missing data. This approach was taken because some of the items may not pertain to all respondents. For instance, some of the participants may not have sisters or brothers. In such cases, the respondent could not be expected to respond to items that pertain to sisters or brothers.

Missing data were handled through the means imputation procedure. Item means were inserted for items that had missing data. The strategy of replacing missing data with a constant is supported by Cohen and Cohen (1983). They advocated that the practice of filling in missing data with a constant, the mean of an item or a scale, results in losing the smallest amount of information and statistical power. The mean imputation procedure is a conservative approach to handling the occurrence of missing data (Allison & Gorman, 1993).

### *Results*

Results from the reliability analysis generated alpha coefficients that ranged from .66 to .89. Data from the reliability analysis resulted in 12 items being excluded from the factor analysis due to negative or poor correlations with the respective scales. Table 3 presents summary descriptive statistics along with the alpha coefficients for the scales.

An exploratory factor analysis (EFA) was performed to determine the degree to which the data conformed to the a priori, literature-based factors. Five methodological issues were considered in reaching the decision to use EFA (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Regarding the issue of appropriateness, the Bartlett Test of Sphericity ( $df = 4,851$ ,  $N = 509$ ,  $p < .01$ ) and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy of .84 both indicated that the degree of intercorrelations among the items was suitable for EFA procedures (Ary, Jacobs, & Razavieh, 1996).

The adequacy of the number of variables to factors ratio ( $p:r$ ) was based on research that has shown that highly overdetermined factors (factors repre-

Table 3  
*Descriptive Statistics and Alpha Coefficients From Results of Study 3*

Scale	<i>n</i>	<i>M</i> <sup>a</sup>	<i>SD</i> <sup>a</sup>	<i>M</i> <sup>b</sup>	<i>SD</i> <sup>b</sup>	$\alpha$
Self-Efficacy	9	3.27	0.57	29.42	3.17	.79
Locus of Control	13	3.23	0.52	42.05	4.67	.79
Parental Support	20	3.26	0.44	65.23	9.12	.88
Family Support	11	3.23	0.33	35.55	4.60	.75
Peer Influence	11	3.23	0.58	35.53	4.08	.77
Relative Functionalism	10	3.38	0.42	33.82	4.35	.87
Glass Ceiling Effect	6	1.73	0.22	8.64	2.58	.66
Secondary School Support	11	2.83	0.53	31.10	6.38	.89
Preparation for College	12	3.23	0.32	38.79	2.65	.67
Financial Aid Concerns	9	2.72	0.58	24.48	4.12	.66

Note. *N* = 509 for all scales. Statistics are not presented for the open-ended item in the questionnaire.

a. Denotes descriptive statistics for item means.

b. Denotes descriptive statistics for the scale.

sented by three to five variables) produce the most stable factor patterns (Fabrigar et al., 1999; MacCallum, Widaman, Zhang, & Hong, 1999). Conventional practice has also recommended that *p*:*r* be at least 3 to 1 (Fabrigar et al., 1999; MacCallum et al., 1999). Because the variable to factor ratio of 11 to 1 for the hypothesized scales exceeded conventional recommendations, the researchers concluded that the number of variables included in the present study were adequate for performing EFA procedures. Judgment regarding the adequacy of the sample size (*N* = 509) was based on findings that, cumulatively, suggest a measure of flexibility in determining the number of subjects required for conducting EFA (Ardinell & van der Ende, 1985; Kass & Tinsley, 1979; MacCallum et al., 1999).

The decision of how many factors to extract was based on the eigenvalues greater than 1 rule, the scree plot (Ary et al., 1996), and a visual inspection of several trial solutions. The initial analysis was run without specifying how many factors to retain. This procedure resulted in 25 factors with eigenvalues greater than 1. However, a visual inspection of the scree plot indicated a sudden drop in the scree beginning with the 14th factor. The final determination of how many factors to retain was made after comparing solutions extracting 14, 11, and 9 factors. The 9-factor solution produced the most interpretable factor patterns. The data were subjected to principal components analysis and principal axis factoring using both varimax and oblique rotations. Principal components analysis with varimax rotation provided the most interpretable factor patterns. The 9-factor solution accounted for 43% of the total variance. Results from the rotated matrix are presented in the appendix.

Factor 1 (eigenvalue = 7.67) accounted for 8.43% of the common variance. This factor was named Family Support. It consisted of a combination of items from the a priori Parental Support and Family Influence Scales. All but

3 of the 28 items for these two scales loaded on this factor. Factor 2 (eigenvalue = 6.00) accounted for 6.58% of the common variance. This factor was named Secondary School Support. All but one item for the original scale and two additional items loaded on this factor. Factor 3 (eigenvalue = 5.94) accounted for 6.42% of the common variance. This factor was named Self-Appraisal. Two of the a priori scales converged on this factor. All items from the Locus of Control Scale and all but one item from the Self-Efficacy Scale merged on this factor.

Factor 4 (eigenvalue = 5.11) accounted for 5.61% of the common variance. All items from the original scale loaded on this factor. This factor was named Relative Functionalism. Factor 5 (eigenvalue = 3.38) accounted for 3.71% of the common variance. Of the 10 items entered into the factor analysis, 6 loaded on this factor; it was named Peer Influence. Factor 6 (eigenvalue = 2.89) accounted for 3.71% of the common variance. This factor was not identified in the original questionnaire; it emerged as a result of the factor analytic procedure. Three items were included in this factor; it was named Sister's Influence. The 3 items that loaded on Factor 6 were initially included in the Family Influence Scale. Factor 7 (eigenvalue = 2.76) accounted for 3.04% of the common variance. All items entered into the factor analysis loaded on this factor; it was named Preparation for College. Factor 8 (eigenvalue = 2.27) accounted for 2.99% of the common variance. All items entered into the factor analysis loaded significantly on this scale; it was named Financial Aid Concerns. Factor 9 (eigenvalue = 2.40) accounted for 2.63% of the common variance and was named Glass Ceiling Effect. All items entered into the factor analysis loaded on this factor.

Results from the reliability analysis and from the factor analysis were used to make refinements to the questionnaire. Both procedures resulted in several poorly performing items being deleted. The reliability analysis resulted in 15 items being removed, and the factor analysis resulted in 6 additional items being removed from the questionnaire. Results from this study generated a 92-item questionnaire that contains three sections. Section 1 gathers demographic data. Items in this section are not part of the item count. They are used to compare the observed versus expected frequencies in the demographic data. Items in Section 1 also are not included in the statistical analyses. Section 2 consists of 83 items to which participants responded using a Likert-type scale. Section 3 consists of 8 true or false items and 1 open-ended item. Details regarding the specific revisions made during each of the three studies can be found in Harris (1999). Table 4 presents summary descriptive statistics and alpha coefficients for the refined scales.

## Discussion

With a few exceptions, results of the exploratory factory analysis support the a priori, researcher-hypothesized structure of the FIPHE Questionnaire.

Table 4  
*Descriptive Statistics and Alpha Coefficients of Refined Scales From Results of Study 3*

Scale	<i>n</i>	<i>M</i> <sup>a</sup>	<i>SD</i> <sup>a</sup>	<i>M</i> <sup>b</sup>	<i>SD</i> <sup>b</sup>	$\alpha$
Family Influence Scale	25	3.29	0.39	82.15	10.84	.90
Secondary School Support Scale	12	3.06	0.37	36.68	6.72	.89
Self-Appraisal Scale	18	3.43	0.20	61.72	6.50	.86
Relative Functionalism Scale	9	3.50	0.20	31.54	4.50	.87
Peer Influence Scale	6	3.48	0.22	20.85	2.79	.77
Sister's Influence Scale	3	3.22	0.17	9.65	2.00	.81
Preparation for College Scale	6	3.14	0.03	18.82	1.35	.68
Financial Aid Concern Scale	7	2.65	0.56	18.56	3.87	.66
Glass Ceiling Effect Scale	5	1.73	0.22	8.64	2.58	.66

*Note.* *N* = 509 for all scales. Statistics are not presented for the open-ended item in the questionnaire.

a. Descriptive statistics for item means.

b. Descriptive statistics for the scale.

Although the researchers hypothesized a 10-factor solution, the factor analysis revealed that a 9-factor solution produced the most interpretable pattern of factor scores, accounting for 43% of the common variance in the data set. The scale scores yielded reliability estimates that ranged from .66 to .90.

Some of the a priori, hypothesized scales in the questionnaire merged to create single factors. Two such scales were the Parental and Family Support Scales. Although it is theoretically sound to study the variables assigned to these scales as a unitary construct, namely family influence, it is also plausible to separate the variables into subscales. If a researcher is interested in understanding how various family members contribute to a person's decision to pursue higher education, the researchers advocate the use of subscales. Two such subscales are the Mother's and Father's Influence subscales. Using these subscales would be more practical when studying individuals who come from single-parent homes. In such cases, use of the Parental Influence Scale instead of the two subscales might obscure the results. A second instance of two scales merging onto one factor was the collapsing of the Self-Efficacy and Locus of Control Scales. Again, because both constructs are forms of self-appraisal, it is not surprising that the scales merged into the Self-Appraisal factor.

Although the subscales for the Family Influence and the Self-Appraisal Scales did not emerge from the factor analysis as separate scales, each measures a unitary construct as evidenced by alpha coefficients that ranged from .71 to .85. Because EFA procedures are known to produce "factor structures without consideration of the theoretical expectations of the researcher" (B. Thompson & Daniel, 1996, p. 198), the researchers propose that each subscale represents a variable THAT previous researchers have identified as having a significant impact on a person's decision to pursue higher education; therefore, each subscale could possibly be studied as a separate variable.

For instance, if subsequent research were to identify significant differences between groups on either of the two scales, using the subscale scores might be useful in determining the nature of those differences. In this regard, the researchers propose that additional research is needed to assess the utility of the scale and subscale scores.

A surprising outcome of the factor analysis was the emergence of the Sister's Influence factor. The three items in this factor achieved somewhat moderate factor pattern/structure coefficients (.67, .69, .71). A post hoc reliability analysis also revealed a moderately high alpha coefficient (.81) for the scale. It is possible that this may be the result of method variance (all items are related to "sister"), rather than any meaningful trait variance. Future research is called for to verify this unanticipated result.

### Limitations and Future Research

Results from the factor analysis must be interpreted with caution. The demographic data from this study reveals the limited extent of the study's external validity. It is possible that if the questionnaire were administered to a different population of students, say traditional students at an institution in which the students were predominantly of Hispanic or Asian descent, the factor patterns might vary. Additional research is needed to further evaluate the structure of the scales and subscales of the questionnaire through confirmatory factor analysis, to assess the discriminant and predictive validity of the questionnaire, and to further evaluate the emergence of the Sister's Influence Scale.

### Appendix

#### Abbreviated Item Statements and Rotated Factor/Structure Coefficients

Item and Statement	Factor								
	I	II	III	IV	V	VI	VII	VIII	IX
My father encouraged me	<b>.76</b>	.13						-.13	
My father was a good role	<b>.70</b>	.17		.11	.13	-.12		-.22	.11
My mother encouraged me	<b>.68</b>	.19				.12			
My father stressed importance	<b>.64</b>	.18				-.11	-.12	-.16	
My mother is excited about me	<b>.64</b>	.17				.18			
My father is excited about me	<b>.63</b>								
I can talk to my father about	<b>.57</b>				.21	-.11			
My mother was a good role	<b>.57</b>	.15		.11		.33			
My father expects me to earn	<b>.57</b>	.15		.11		.33			
My father <i>did not</i> tell me	<b>.57</b>	.21			.13			-.19	.13
My mother <i>did not</i> stress	<b>.56</b>					.15			
I <i>cannot</i> talk to my father	<b>.55</b>				.29				
My mother expects me to earn	<b>.50</b>		.19		-.14	.18			

## Appendix continued

Item and Statement	Factor								
	I	II	III	IV	V	VI	VII	VIII	IX
My mother told me about	<b>.50</b>	.28		.12		.23	.12		
My other relatives stressed	<b>.48</b>	.21	.11	.18		.21			-.21
I can talk to my mother about career	<b>.43</b>		.12	.14	.10	.20	.16		-.19
My brother is excited	<b>.42</b>					.18			
I can talk to my mother about college	<b>.38</b>	.13		.12		.23	.12		
My grandparents aware of demands	<b>.38</b>	.32		.13	.19	.22		.15	
I can talk to my grandparents	<b>.36</b>	.24			.24	.20			-.13
My relatives <i>are not</i> aware	<b>.34</b>	.28			.16	.21	.21		-.11
My father influenced my	<b>.34</b>			.12		-.18			.23
My grandparents tried to	<b>.32</b>				.17				
My mother encouraged me	<b>.32</b>	.14		.20		.11			
My brother is aware of demands	<b>.26</b>				.20	.24			
My junior high school teachers		<b>.74</b>				.16			
My junior high guidance		<b>.73</b>				.14		.12	
My high school guidance	.18	<b>.71</b>							-.10
My junior high guidance	.11	<b>.69</b>			.12	.12			
My junior high counselor	.00	<b>.69</b>			.13				
My high school teachers talked	.21	<b>.65</b>	.13	.11		.15			
My senior high counselor <i>did not</i>	.24	<b>.62</b>	.11		.21				-.13
High school teachers	.25	<b>.62</b>	.19	.13					-.20
My junior high teachers <i>did not</i>	.21	<b>.58</b>			.20		-.19	-.11	
My senior high teachers <i>did not</i>	.23	<b>.58</b>	.18		.20				
My high school held briefings	.10	<b>.50</b>				-.10	.26	-.18	
I attended briefings on college	.10	<b>.49</b>					.23		
I believe I will be successful	.13		<b>.66</b>			.18	-.14		
I have the power to achieve	.10		<b>.66</b>	.20					-.14
If I become unhappy with life			<b>.63</b>	.10	.11				-.15
I feel that I will be successful			<b>.61</b>	.13	.16	.13			
Good things that happen		.12	<b>.59</b>	.17			.11	.11	-.13
Each person has the power			<b>.54</b>	.11			.16		-.25
I can make the best of the			<b>.57</b>		.16				
I am a good student	.15		<b>.52</b>		.14	.16	-.10		.11
I picked my major because		.10	<b>.52</b>	.28		.24			.17
I chose my major because			<b>.50</b>	.26	.15	.30		.11	
Each person controls			<b>.50</b>	.10	-.19	-.13	.13	.20	-.16
I can be successful in any			<b>.46</b>					.18	-.27
I chose my major because the			<b>.46</b>	.19		.25		.18	
I chose my major because I am	.18	.15	<b>.44</b>	.25		.16			.12
No matter how hard I work, I			<b>.44</b>		.23				-.14
I have no control of my future			<b>.43</b>					-.13	-.15
I chose my major because I		.13	<b>.42</b>	.20		.25		-.11	
I can major in any college			<b>.39</b>					.16	-.32
A college degree will make me	.13			<b>.75</b>					
A college degree will improve				.12	<b>.74</b>				

(Appendix continues)



## Appendix continued

Item and Statement	Factor								
	I	II	III	IV	V	VI	VII	VIII	IX
A degree will improve my self-	.10			<b>.73</b>					
I can meet professional people		.12	.17	<b>.71</b>					-.12
A degree is important for job	.13		.21	<b>.66</b>					-.16
College graduates get the best jobs	.14			<b>.65</b>	.15	-.10			
I can gain a lot of knowledge			.17	<b>.64</b>					-.12
Degree will get me a better job	.12	.12		<b>.60</b>		.11			-.11
Degree will improve my social		.18		<b>.54</b>					.14
I <i>cannot</i> talk to my friends about	.24	.12	.13		<b>.75</b>				
I <i>cannot</i> talk . . . friends about	.22		.17		<b>.73</b>				-.10
I <i>do not</i> have a college student	.20	.14	.13		<b>.68</b>				
I <i>have not</i> met new friends			.14		<b>.56</b>	.14	-.16	-.15	
My friends <i>don't</i> understand the	.11	.28			<b>.49</b>	.17			
I find it easy to make friends		.10	.21	.21	<b>.42</b>	.13		-.11	.12
My sister is aware of demands	.10					<b>.71</b>			
My sister(s) encouraged me	.15	.12	.14			<b>.69</b>		-.12	
My sister is excited about me	.14		.12			<b>.67</b>			
Remedial courses in senior high							<b>.78</b>		
Remedial courses in junior high							<b>.78</b>		-.12
Remedial courses as freshman							<b>.65</b>		
Regular study group in junior high			.11		.14		<b>.44</b>	.13	.34
Regular study group in senior high			.14		.13		<b>.43</b>		.30
I used tutors in junior high	.14						<b>.38</b>		-.16
I worry about paying my	-.12	-.16						<b>.67</b>	
Availability of financial aid	-.10	-.16	.14		-.19			<b>.66</b>	
Knowledgeable of the types			.16			-.13		<b>.58</b>	
I <i>am not</i> likely to need financial	-.22							<b>.48</b>	
My parents worry about tuition	.19		-.14					<b>.47</b>	.20
I know where to find information			.10				-.17	<b>.44</b>	
Without financial aid, I can	-.13	-.17						<b>.38</b>	
My professors <i>cannot</i> limit			-.22					-.12	<b>.57</b>
My gender <i>does not</i> limit			-.14	-.22					<b>.57</b>
Society limits my choice				-.11	-.25				<b>.48</b>
Race <i>does not</i> limit my	-.12		-.24	-.35	-.11			.14	<b>.46</b>
University administrators <i>cannot</i>		-.13	-.27				-.13		<b>.39</b>

Note. Bold face indicates the factor to which the item was assigned.

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