Gender-Specific Career Outcome Expectations In College vs. Interest In Pursuing Science And Engineering Careers

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Introduction:

The goal of this study is to identify gender-specific patterns in college students' career outcome expectations, and the manner these expectations are associated with their interest in pursuing science and engineering careers.

Background

Context: female underrepresentation in physics and engineering

Possible reasons:

- Stereotypes about females in sciences
- Females' focus on communal behavior and helping others

Scientific competences:

- Can be used as a vehicle for achieving altruistic ambitions
- Are difficult to develop in male-dominated fields

Question: what do males and females expect from scientific careers?

Sample and Items

The study is based on the responses to the PRiSE survey national sample (N=7505) of college students enrolled in introductory English courses.

Variables of interest:

- **Student gender (1=male, 0=female)**
- **Student interest in physical science, life science, and engineering: 6-point anchored scales**
- **Student career outcome expectations: 6-point scales (Table I)**

Techniques

First, the dataset was treated for missing data, the resulting imputed dataset was used for the rest of the analyses.

Career outcome expectations:

- **Exploratory factor analysis using promax rotation method**
- **Extraction of main factors (Figure 1)**
- **Identify association of resulting factors with individual outcome expectation items**
- **Investigate associations between resulting factors and student interest in sciences and engineering**
- **Find career outcome expectation factors typical for male and for female students**

TABLE I. The set of 15 survey questions items relating to career outcome expectations. The items are measured on a 6-point anchored scale

Importance of item for career choice
Money
Fame
Helping others
Leading others
Work security
Working with people
Inventing
Development of new knowledge
Time for family
Time for self
Making own decisions
Having an easy job
Having an exciting job
Using one's own talent
Having job opportunities

FIGURE 1. Scree plot for the number of extracted factors

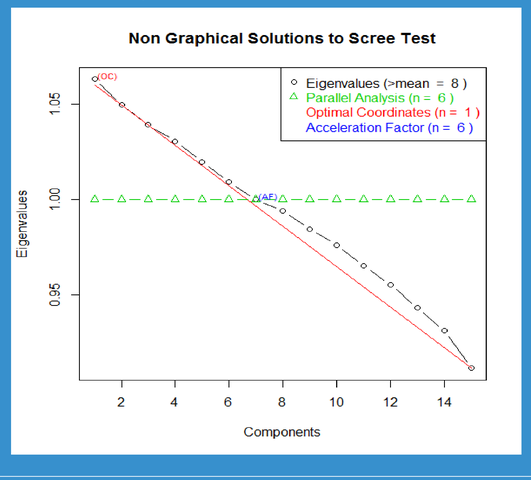

TABLE II. The eight factors extracted from career outcome expectations

Factor, variance	Correlation with initial career outcome items and with the other factors
Factor 1: 10%	Using one's own talent (r=0.92), Having an exciting job (r=0.57) Factor 6 (r=0.59), Factor 2 (r=0.45), Factor 8 (r=-0.42),Factor 5 (r=0.41)
Factor 2: 9%	Having time for self (r=0.90), Having time for family (r=0.52) Factor 6 (r=0.62), Factor 5 (r=0.54), Factor 4 (r=0.47), Factor 1 (r=0.45), Factor 7 (r=0.44)
Factor 3: 8%	Work security (r=0.74), Money (r=0.46), Having job opportunities (r=0.44)
Factor 4: 8%	Helping others (r=0.88), Working with people (0.51) Factor 2 (r=0.47), Factor 7 (r=0.45)
Factor 5: 7%	Fame (r=0.70), Leading others (r=0.51) Factor 6 (r=0.56), Factor 2 (r=0.54), Factor 1 (r=0.41)
Factor 6: 5%	Inventing (r=0.81), Developing new knowledge (r=0.34) Factor 2 (r=0.62), Factor 1 (r=0.59), Factor 5 (r=0.56), Factor 7 (r=0.48)
Factor 7: 3%	Having an easy job (r=0.63) Factor 4 and Factor 6 (r=0.48), Factor 8 (r=-0.48)
Factor 8: 3%	Money (0.62) Factor 7 (r=-0.48)

Results

The scree plot indicates a number of about eight factors

These factors each correlate with certain career outcome expectations from Table I and among themselves, as indicated in Table II

These correlations allowed us to interpret the factors as shown in Table III.

Correlations between these factors and gender are also shown in Table III. Typical male and female career outcome expectation factors are identified

Finally, from correlations between the eight factors and career interests in science and engineering we obtain information about what attracts and what drives away students to/from pursuing careers in specific fields (Table IV)

TABLE III. Interpretation of the eight factors extracted and their correlations with gender status. A negative correlation coefficient means female students consider the factor as more important, in comparison to male students

Factor	Correlation with gender
1. Enthusiasm for work	-0.03
2. Career as means to pursue personal interests	0.00
3. Career offering a secure position ensuring prosperity	-0.03
4. Communal values	-0.25
5. Career as a means to social recognition	0.11
6. Innovator	0.23
7. Socializer	0.02
8. Making money by working hard	-0.01

TABLE IV. Spearman correlation coefficients between science career interests and career outcome expectation factors, and gender (bi-serial correlation coefficient)

Factor/ science career interest	Physical sciences	Life sciences	Engineering
1. Enthusiasm for work	-0.06	-0.05	-0.08
2. Career as means to pursue personal interests	-0.07	-0.06	-0.04
3. Career offering a secure position ensuring prosperity	0.06	0.05	0.08
4. Communal values	0.05	0.17	-0.17
5. Career as a means to social recognition	-0.05	-0.06	0.02
6. Innovator	0.21	0.08	0.37
7. Socializer	-0.04	-0.03	-0.01
8. Making money by working hard	0.04	0.04	0.05
Gender	0.05	-0.14	0.37

Factors correlated with career interests

- **Physical science: Innovator (+)**
- **Life sciences: Communal values (+), also gender (♀)**
- **Engineering (gender - ♂):**
  - **Communal values (-)**
  - **Innovator (+)**

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