

The Barriers against Women Majoring in Science and Engineering

(NISTEP Report No. 44)

Yoshiko Yokoo, Researcher, First Research Group

1. Objective

The number of women majoring in science and engineering tends to increase recently. However, compared to the numbers of women majoring in other fields of study and those in foreign countries, the percentage is still small. Since it can be considered that there are factors to keep women away from majoring in science and engineering, the present survey has been conducted for the objective of revealing the factors relating to the selection of fields of study by women with attention paid to science and engineering, especially to engineering small in the percentage of women.

2. Method

Questionnairng was conducted for male and female students enrolled in the science and engineering departments of universities and female students enrolled in economics related departments, and the environmental factors (including the psychology affected by the environment) relating to the selection of fields of study by women were analyzed. The outline of the questionnairng was as follows.

<Outline of questionnairng>

- Time: October to December, 1994
- Questionnairng persons: Female students of science and engineering departments, male students of science and engineering departments and female students of economics related departments (only seniors of universities)
- Distribution and collection: 5,638 copies were distributed and 1,669 copies were collected (collection rate 30%) (Collected from 401 male students of science and engineering departments, 962 female students of science and engineering departments and 306 female students of economics related departments)

3. Results

(1) Selection of field of study and sex

The answerers were asked whether they wished to major in engineering if they were of the other sex. As for females, irrespective of whether they were students of science and engineering departments or economics related departments, the number of those who wished to major in engineering if they were males was larger than the number of those who wished to major in engineering since they were females (when they were allowed to re-select their fields). For example, among female students of natural science department, the percentages based on the respective assumptions were 28% and 17%, and among female students of economics related departments, the percentages were 21% and 7%. Among male students of science and engineering departments, relatively more students wished to major in cultural science or social science if they were females. For example, among the male students of engineering department, the percentages of those who wished to major in cultural science based on the respective assumptions were 23% and 6%, and the percentages of those wished to major in social science were 24% and 14% (see Fig. 1).

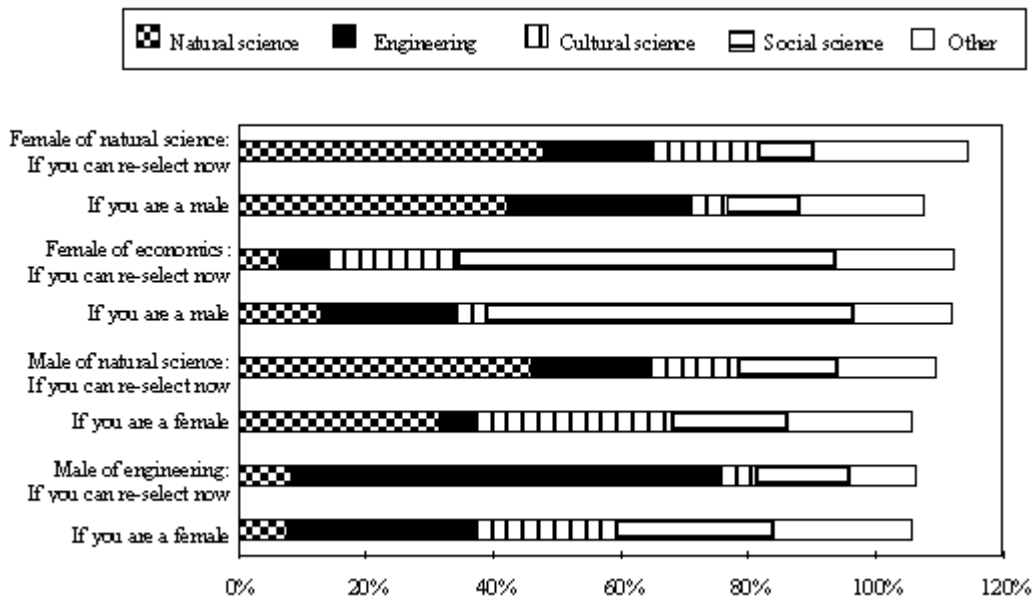


Fig. 1 If you can re-select your field, what are you going to study ?
If you are of the other sex, what are you going to study ?

(2) Selection of field of study and experience, favorite subject, employment

1) Experience which aroused interest or concern

Many of those who selected the science and engineering fields by the 4th to 6th years of primary schools were motivated by experiences in daily life such as "interest in living creatures or nature", "parent", "discovery or surprise in life", "book or program" and "tampering with machines" as well as "records at school" and "lessons or experiments at school". However, excluding "parent", less females were motivated by experiences in daily life than males.

2) Favorite subject

With regard to the relation between the majoring in engineering and the consciousness of being good at physical science, many of those who major in engineering are good at physical science. On the other hand, compared to males, females have consciousness of being weak in physical science.

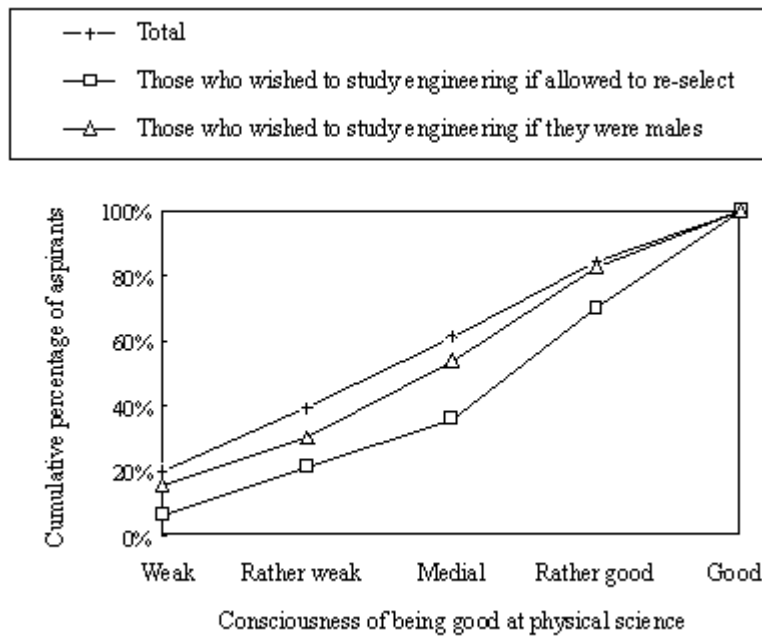


Fig. 2 Consciousness of being good at physical science and wish to study engineering, of female students of natural science

Both females and males think that females who are going to study engineering must be better at physical science than males are. For females as good as males at physical science, being a female brakes the wish to select engineering (see Fig. 2).

3) Employment

With regard to the consciousness as to how advantageous the majoring in engineering is for employment, males think engineering is most advantageous, but females do not think so much as males do.

For employment, females consider matters for continuing their jobs as equally as males, such as freedom from any difference in job and treatment because of sex, and reliable childcare system. Females think that the preparedness such as reliable childcare system is an issue for both them and their spouses, but males who will be colleagues at jobsites in future do not think the issue concerned with home and job is theirs (see Fig. 3).

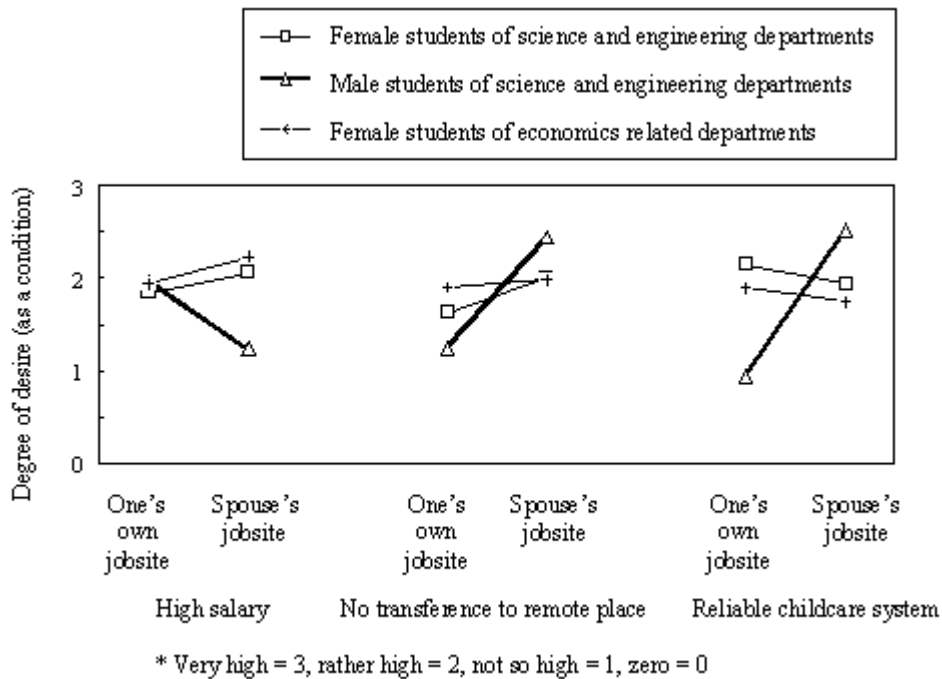


Fig. 3 What is desired for one's own jobsite (as a condition for being employed) and what is desired for spouse's jobsite

4) Satisfactoriness of university student life

In view of student life, female students of engineering department are low in satisfactoriness in facilities such as dressing room, resting room and toilet and the number of friends to talk with.

5) Opinions of parents, etc.

The consenting degree of parents for the females majoring in machinery and electricity is lower than that for males. Less parents, respectively both of whom graduated from departments of liberal arts, consent to the selection of science and engineering departments by females, than the other parents.

4. Conclusion

In order that males and females can select science and engineering departments freely on the same standpoint, it is important to take measures for lessening the negative factors peculiar to women in the selection of fields of study as far as possible. The following measures can be considered.

- 1) Measures for making the relation between females and engineering commonly accepted
- 2) Measures for letting females increasingly experience science and engineering in daily life
- 3) Measures for revealing problems of education on physical science
- 4) Measures for allowing female students of science and engineering departments to design their future life more easily