



The Impact of Gender Difference on Major Selections of Chinese College Students

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Abstract. The choice of major has an important influence on one's future career development and life. However, according to the research findings, in China, there are significant differences in the major selection between genders, which is that males are more inclined to choose science. At the same time, females are more inclined to choose liberal arts. From the physiological and psychological perspectives, this paper systematically analyzes the causes of the gender gap in major selection caused by gender differences between men and women. Physiologically, male and female brains develop differently, so they excel in different fields and tend to choose different majors. Psychologically, due to gender stereotypes, males and females assume different family responsibilities and social division of labor. Thus, social pressure leads males and females to choose different professional fields. Besides analyzing the causes of the gender gap, this article puts forward some suggestions to narrow the gender gap and promote gender equality, including abolishing the policy of separating liberal arts and sciences from college entrance exams, strengthening the elimination of gender stereotypes by media, and prohibiting the gender preference of educators.

Keywords: Gender Difference, Major Selection, Gender Inequality

1 Introduction

Education is related to the social construction and development of a country, as well as to the growth and life of every family and individual. There are many factors that affect education, including national acts, family economic conditions, and school teaching. Among these factors, gender difference plays an important role. With the progress of human spiritual civilization, people began to pay attention to the gender difference in psychological and social levels between men and women. They found that gender difference is also an essential factor affecting education. It affects education from all aspects, such as the equity of education, the effect of schooling, and students' performance. Besides, it has a significant impact on students' major selections. The choice of major is closely related to a student's future career development, income, and even daily life. Therefore, it is of great significance to research the influence of gender difference on major selection and its reasons.

The influence of gender difference on major selection has aroused the interest of many scholars. Some researchers have studied the importance of major selection, the trend of the gender gap in major selection, and the reason for the gender gap. Sara Turner states that choice of school, choice of major, and academic performance coalesce to influence options available to students for further education and career development [1]. Differences in the college majors that men and women pursue account for 15%–25% of the gender wage gap [2]. However, Within the arts, sciences, and engineering fields, differences between men and women in choosing a college major have not lessened in the past two decades [1]. Furthermore, women's concentration in academic majors that prepare students for caregiving occupations is notable [3,4]. The difference in choice of college majors between males and females is quite dramatic; While males tend to choose majors related to science and engineering, females are more likely to choose majors in humanity and education. At the same time, more males are entering high-paying professions such as the Internet, engineering, and surgery or entering scientific and technical research fields. In contrast, females tend to take social service occupations. The segregation of women into certain occupations and men into others has been analysed as both a cause and a consequence of inequality between the sexes [5]. The reasons behind the serious gender difference and even inequality are worth pondering.

According to the above discussion, the relationship between major selection and the gender gap has been a meaningful topic to study. However, previous studies have not thoroughly analysed or presented a systemic conclusion of the specific reasons leading to such gender differences in subject selection.

In this article, the reasons for the gender gap on major selection fall into two categories. One is physiological differences, including differences in brain development and innate abilities. The other is psychological differences, such as personality, self-perception, and social stereotype on genders. This article will discuss the impact of gender differences on major selections of Chinese college students from two angles, the difference in the innate ability of men and women and the social stereotype of genders. In addition, besides analysing the causes of the gender gap, the article is to find some valuable methods to close the gender gap in major and occupation selections.

Therefore, the following article will mainly include three parts: physiological gender difference, psychological gender difference, and methods to bridge the gender gap.

2 The relationship between Gender Difference and Major Selection

2.1 Physiological Gender Difference

There are some differences in the brain development of males and females, which can be one of the reasons for gender differences in major selection. For decades, brain scientists have noticed that male brains tend to have slightly higher total brain volume than female ones on average, even when corrected for males' larger average body size [6].

Studies found that a man's brain volume was between 8% and 13% larger than a woman's. It is generally believed that brain size positively correlates with IQ, implying that males have higher IQs than females. Developmental Theory states that boys and girls have about the same IQ up to the age of 15 years. However, from the age of 16, the average IQ of males becomes higher than that of females, with an advantage increasing to approximately 4 IQ points in adulthood [7]. This thesis has been supported by neurological studies showing that white matter in the brain continues to grow more in males than in females from mid-adolescence [8]. White matter essentially functions in affecting learning and brain functions, modulating the distribution of action potential, and coordinating communication between the different brain regions. Human brain imaging scans, specifically magnetic resonance imaging (MRI), have found structural changes in white matter after learning complex tasks [9]. After age 16, men on average have more white matter than women, meaning they are theoretically better able to handle complex tasks. Science and Engineering majors are interdisciplinary studies of math, science, and computer, which require the students to have high abilities to understand, identify, and solve complex problems. Thus, male brains are wired to be better at solving complex, rational problems, leading them to gravitate towards science and engineering.

Empathizing-systemizing (E-S) theory states that while the male brain is predominantly hard-wired for understanding and building systems, the female brain is predominantly hard-wired for empathy [10]. As opposed to men having more white matter, the relative grey-matter volumes were slightly larger in females, and so was the grey-matter density in a large number of cortical regions [11]. The presence of a large number of neurons in the grey matter enables it to process information and release new information through axonal signals found in the white matter. The grey matter throughout the central nervous system allows individuals to control movement, memory, and emotions. The researchers discovered that the degree to which a person was able to exhibit empathy was tied to the amount of grey matter in the brain [12]. In other words, a human with a higher volume and density of grey matter has a better ability to be empathetic and perceptive. As a result, females are better at empathizing with others and expressing their feelings. These abilities help women better appreciate the emotions displayed in art and literature, leading women to be more interested in Arts and Humanities. In addition, the empathizer intuitively figures out how people are feeling and how to treat people with care and sensitivity [10]. Those characteristics are required by social service occupations, such as nurse, teacher, and positions in assisting institutions. These occupations require workers to be sensitive to the feelings of others and to take care of others in a thoughtful and nuanced way, so women who are more empathetic compared to men are more advanced in these jobs. According to the above discussion, the development of females' brains enables women to be more empathetic and better at arts and humanities majors and works of social service.

2.2 Psychological gender difference

In China, it is widely believed that husbands should take on more family responsibilities and financial pressure in a family. In traditional China, wives took on all the housework,

and husbands were the major breadwinners. Although the role of women in Chinese society has changed dramatically in the past century and women's employment and wages keep rising, men are still more critical wage earners in their families [13]. Chinese men face tremendous pressure to marry and provide for their families due to the influence of traditional values and the imbalance of the sex ratio. According to the seventh national Census, there are 34.9 million more men than women in China. Among them, there are 17.52 million more men of marriageable age between 20 and 40 than women, with a sex ratio of 108.9 to 100. Due to the influence of the traditional family expenditure pattern and the gender imbalance of the population, women have higher financial requirements for choosing marriage partners. Interviews and surveys show that most women want their future partners to have a higher income than they do. This situation undoubtedly intensifies the economic pressure on men, leading them to tend to enter high-paying industries and choose relevant majors that will enable them to enter industries with high earnings in the future from their college days.

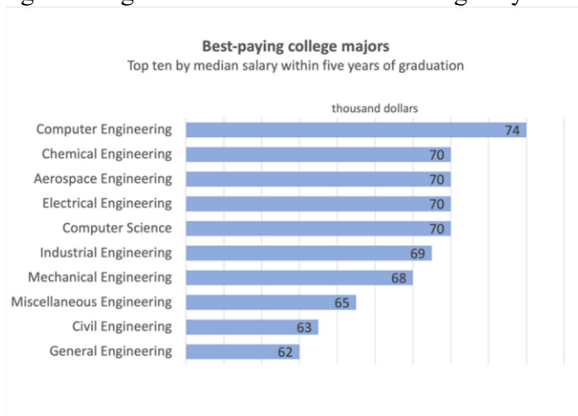


Fig. 1. Best-paying college majors

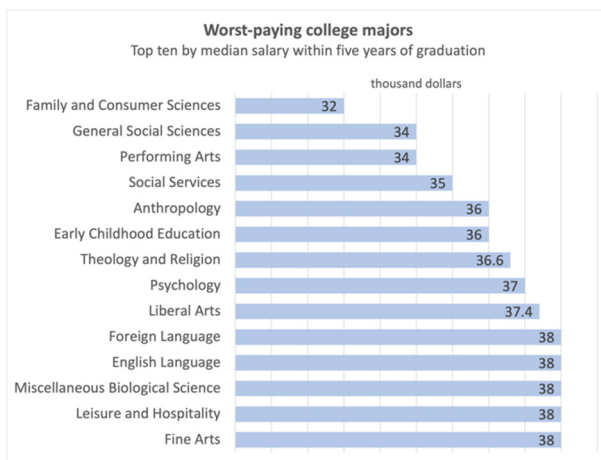


Fig. 2. Worst-paying college majors

Figure 1 above shows that the top 10 majors in which graduates ages 35 to 45 earn the most are almost all related to engineering, except for computer science, pharmacy, finance, and business analytics. The best-paying college majors are all subjects of science, engineering, and mathematics. In contrast, figure 2 shows that the lowest-paid majors in this cohort are mostly liberal arts or education majors, and most of them pay less than \$60,000 per year [14]. Thus, faced with the pressure of mate selection and household expenditure in the future, male students are more inclined to study subjects that are easy to get employed and have a high income in the future, such as computer science, engineering, and mathematics.

In addition to practical pressures, some inherent prejudices about different genders influence students' major selections. A worldwide gender stereotype emphasizes the conception that males are more competent in mathematics than females, which is proven to affect females' performance in math in many aspects. First, this gender stereotype undermines women's confidence in math and other science subjects, causing them to overestimate the difficulty of these subjects and devalue their actual math ability while also placing less value on math success [15]. Second, influenced by gender stereotypes, teachers tend to believe that boys are better at mathematics and attach more importance to boys' math learning. Some math and science teachers even prefer male students. As a result, girls receive less attention from teachers in math learning, and they gradually admit that their mathematical ability is not as good as boys, thus losing interest in math learning. In a subsequent study, Steffens and Jelenec used a Go/No-Go Association Task to assess the associations between math and language with male vs. female gender groups separately and found that 9th grade, and male college students systematically associated their own gender with both math and language, whereas girls associated the female gender with language only [15,16]. The gender stereotype of that females are weaker at mathematics than males reduces females' confidence and interest in learning science and even affects their performance in mathematics. Therefore, females tend to choose humanities majors over science majors.

Besides, influenced by traditional culture, Chinese parents often hope to cultivate their daughters with elegance and connotation, and expect their daughters to get stable jobs with more free time in the future. Therefore, due to the impact of parents, some girls tend to choose arts, humanities, and education majors. On the one hand, parents prefer to enroll their daughters in some graceful training courses, such as piano, ballet, and painting, when they are young. Hence, the extra training leads girls to be more interested in arts and choose art-related majors to be their professions in the future. On the other hand, to get a job with a stable income and allow them to pay more attention to family, women tend to choose careers in education, humanities, and social service, which makes them choose relative majors in college.

2.3 Methods to bridge the Gender Gap

Children's cognition of self-ability is constantly cultivated under the influence of parents and teachers, which implies that the education children receive can support them in getting involved in a field or prevent them from choosing a major. Therefore, in order to reduce the impact of gender stereotype and close the gender gap, the media should

strengthen the elimination of gender stereotype, leading parents to believe that whether their children are boys or girls, they have the same ability to learn a subject, so that they can encourage their children to choose their future majors according to their interests and passion. Moreover, schools should introduce policies to prohibit teachers' gender preference and train the teachers to treat boys and girls equally, giving equal attention to male and female students in all subjects.

Although this research focuses on discussing the gender gap in major selection in Chinese colleges, the gender gap actually starts in high school. The education system in China requires the students to select one major from liberal arts and natural science in the second year of high school. This choice of arts and science is often not contemporary but affects their major selection in university and future careers. At the young age in 10th grade, teenagers have not developed completely, and most do not have a comprehensive understanding of themselves or know what they are genuinely interested in. At a time when they have no plan for their academic development or career direction, they are making choices that will have a significant impact on their future work and life. Moreover, the choices they make are often heavily influenced by their parents, who have a stereotype of males perform more advanced in science majors and females are better at arts and a traditional belief that males should take the responsibility of raising families while females should do more accessible work and devote most of their time and energy to taking care of families.

Because of the situation, the sex ratio of students in liberal arts classes in Chinese high school is about 1 male to 2.5 females. The gender difference in major selection has been dramatic in high school and even more enormous in the university. For the sake of closing the gender gap and increasing gender equality, the government can change the policy and remove the system of the separation of arts and science majors in high school, which will support the students in choosing their major when they learn about different disciplines and careers and are able to take responsibility for their own choices.

3 Conclusion

In the progress of studying the relationship between gender difference and major selection, various evidence, and data show that Gender differences in different aspects affect major choice from many angles. Physiological gender difference results that male and female brains are developing differently. Men and women have different parts of the brain that are more developed, and different parts of the brain are closely associated with different abilities, such as the hippocampus, which controls memory, and the cerebellum, which controls motor function. Compared to women, men have more white matter in their brains that help them solve complex tasks, which makes them better at solving complex science and engineering problems and easier to achieve in these fields. Thus, more male students tend to choose subjects of science and engineering as their majors and keep choosing careers related to the fields. In contrast, females have more grey matter in their brains, which leads them to be more sensitive and empathetic than

males. Therefore, women are better in the fields of literature, arts, and humanities, and they prefer to choose these majors.

In addition to the physiological gender differences, the psychological gender differences significantly affect the different major selection tendencies of men and women simultaneously. Firstly, men face greater economic pressure, leading them to choose majors that can lead to high-paying careers. Influenced by Traditional Chinese culture, it is generally believed that men should take more responsibility for raising the family and most of the family expenses, which leads to men's tendency to choose high-paying jobs. Besides, Due to the gender imbalance in China's population, men face fiercer competition for marriage. Women, on the other hand, tend to prefer men with better financial ability. As a result, men face tremendous marital and economic pressure. Therefore, when choosing a major, most men will consider their future career plans and choose majors that can help them earn higher salaries in the future. According to statistics, the top 10 highest-paid careers are mainly in the fields of engineering, business, and science, so most men tend to choose majors in these fields. Secondly, gender stereotype plays an important role in major selection. There is a common gender stereotype that men are better at learning science than women; over time, some people have come to believe this to be the case. This severely hit some women's confidence in science learning and even led to science teachers favoring male students. These factors made some female students feel psychological pressure when learning science, gradually denying their actual ability, and thinking that they were not good at this field. Nevertheless, girls often hear parents encourage them to study subjects like art and literature, and people always praise their talent and ability to study languages and the humanities. As a result, women are more confident in learning these subjects and tend to choose arts majors.

In China's education system, students will determine their major direction in the teenage stage. Their brains are not mature at this stage, and they do not have a social experience, so most of their choices are guided by the media, teachers, and parents. Therefore, the media and teachers should break the gender stereotype and social pressure on students and encourage them to choose majors based on their interests and passions, because the majors and careers that accompany them throughout their life need constant enthusiasm to support their continuous progress. In addition, the government should consider eliminating liberal arts and sciences from high school, allowing students to make choices that will considerably impact their lives until they have the ability to think independently.

This article discusses the impact of gender differences on major selections of Chinese college students and analyzes the reasons for the effects from both physiological and psychological perspectives. However, the number of differences between men and women is vast, and the consequences of these differences on their behavior and choices are so varied that they cannot be exhaustively described in a single article. The topic of gender difference and subject choice still needs more scholars to study and discuss. Based on this article, scholars can explore more differences in male and female brain development and give a better comprehensive explanation of their differences in thought, behavior, and fields of expertise. More social causes of gender gaps in the workplace, as well as gender inequalities, also deserve more exploration.

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