

# ***'Choosing this major because I am a girl?'***

## ***-Gender Differences of Major Preference***

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**Abstract:** The essay here is going to give a systematic summary of the potential reasons affecting the choice of college majors of the students, especially the formation of the disparity in scientific majors and humanistic majors. Moreover, the consequence of the disparity is also discussed here. Utilizing ecological theories and cognitivism, the reasons are divided into external factors such as social and family environment, gender stereotype and policies, and internal factors such as self-perception, future development and sense of qualification. A systematic review helps to emit outdated and false information and find out solutions for the problem. Also, revealing the dilemma of males and females, the society would give more freedom for them to choose their major out of their own willingness. In addition, as gender equity and education equity are always a heat topic in contemporary society, efforts should be put to fix the problem and contribute to the civilization of human.

**Keywords:** Gender gap, College majors, Education equality, Gender stereotype

### **1. Introduction**

The gender gap between different college majors, especially humanities and STEM (Science, Technology, Engineering, Mathematics) is still obvious even the gap of enrolment of females in higher education has alleviated or been overcome in some countries. Researchers found that there is low number of girls choosing science and technology as their major or future career [1, 2]. In addition, a survey showed that in the US economy, although women fill close to half of all jobs, they hold less than 25 per cent of STEM jobs. In Israel, more than 70 per cent of working women are employed in non-STEM occupations [2]. However, it is not the truth that girls are lack of the ability to perform well in such field. It is proved that young women outperform men academically at all levels of school and are more likely to obtain college degrees and enroll in graduate school [2]. Actually, in academic study, females perform better than males in math [3]. Moreover, girls tend to give up STEM even with interest [3]. There seems to be a paradox between the scientific result and real-world phenomenon. And there have been some studies accounting for this trend.

The existing papers have given some reliable factors for the gender gap between majors, however, some of them are contradicted to others and some are not well-rounded. In one hand, some researchers argue that family background and gender stereotype matter a lot in the choice making of the major [2-4]. Once the researchers believed that socio-economic status is one of the crucial factors of affecting their choice, but it was later proved false and what matters is family encouragement [3].

This is to say females would be influenced by the attitude toward their family. Therefore, socioculturalism should be applied in the analysis [1]. In addition, a survey revealed that girls are more anxious about the consequence of the major they chose because they are under the pressure from the society and family since they have chosen a major which was not “belonged” to them [4]. On the other hand, there are some personal factors which involved the theory of cognitivism. First of all, ethnic and race has been influential factors mentioned in these papers [5]. Also, the future development of the major works as one essential element in the choice of the students, which means if the aimed job market is not suitable for boys or girls, they tend to avoid it [5].

It is significant for us to have a systematic understanding of the underlying reasons of this phenomenon because its impact on gender and education equity and employment market. There is not an integral summary of the existing papers, so it is necessary to give a review on them. More importantly, benefits for the developing of labor market and higher education system will be brought, which will contribute to the development of the related countries [6].

In this work, the factors which hinder boys and girls from choosing majors will be summarized and analyzed, emitting false-proved and outdated information and giving inspiration for promoting gender equity, education equity, as well as labor market.

## **2. The Formation of Gender Gap**

In this section, we will delve into the underlying reasons behind the alarming gender gap observed in various college majors and explore why girls may be veering away from their initial college preferences. Broadly categorized, these reasons can be dissected into two main components: external factors and internal factors. Researchers have extensively employed ecological theories and cognitivism to elucidate the multifaceted dynamics contributing to these trends.

External factors encompass a range of influences originating from the external environment, including societal expectations, cultural norms, and institutional structures. Ecological theories provide a comprehensive framework for understanding how these external factors, such as family expectations, school environments, and societal stereotypes, shape individuals' decisions regarding their chosen majors. For instance, the reinforcement of gender stereotypes through successful role models or the perpetuation of certain biases in academic and professional settings can significantly impact girls' choices in college majors.

On the other hand, internal factors pertain to individual beliefs, perceptions, and motivations. Cognitivism proves instrumental in dissecting the cognitive processes and mental structures that influence how individuals, particularly girls, perceive their capabilities and envision their success in certain majors. By applying cognitivism, we can delve into the intricate thought patterns, self-perceptions, and learning strategies that guide girls in making decisions about their academic pursuits. Examining these internal factors sheds light on why some girls may deviate from their initial college choices and opt for majors that align with perceived societal expectations or stereotypes.

In essence, the synthesis of ecological theories and cognitivism provides a robust analytical framework to comprehensively interpret the gender gap in college majors. It allows us to explore the interplay between external and internal factors, offering insights that can inform targeted interventions and strategies to promote gender equity in educational and career pursuits.

### **2.1. External Factors**

External factors can also be divided into two parts: social and family environment and gender stereotype. To be specific, the policies, social media and discrimination all contribute to girls hindering from STEM majors and boy avoiding language majors [4]. Applying ecological theories to analyze learning motivation involves considering the various environmental, social, and cultural

factors that interact to shape an individual's motivation to learn. In the first part, examining the physical learning environment, including resources, facilities, and the overall atmosphere and considering how these factors influence an individual's motivation to engage in learning activities play a significant role in analyzing why the girls are the minority in STEM majors. By applying ecological theories to the analysis of learning motivation, educators and researchers can gain a comprehensive understanding of the complex interplay between environmental, social, and cultural elements that influence an individual's motivation to learn.

### 2.1.1. Social and Family Environment

Living in the society, the students cannot avoid the impact of different policies and combining with the ecological theories, researchers describe how influences including the school culture, teaching practices and the home and wider societal environment may affect boys in a different manner to girls and thus promote gender differences in children's educational disposition and attainment [3]. At the high school level, young women often limit their opportunities to learn mathematics by completing only the minimal mathematics courses required for graduation [5]. Which is to say in school, females do not have the same accessibility to get a full understanding of the features of math, though it is their own choice not to continue study math, the regulations of the school do contribute to this phenomenon. Assessing the feedback mechanisms within the learning environment, timely and constructive feedback can positively impact motivation by providing guidance for improvement and fostering a sense of competence. For example, students score in the subjects of sciences always decided by qualified exams, which means if they once made a mistake or amiss, their final score would not be nice. Women rely on high qualifications more than men when applying to selective and male-dominated fields of study [7]. Therefore, they would be less competitive in applying for their ideal universities.

Moreover, the image of science and language promoted by social media or family members also hinder students from choosing the specific major which they are really interested in [1]. The reason why women's involvement in STEM is decreasing could point to traditional perspectives of political tendencies raised in some countries (e.g., the "new far right" in Europe). That would mean that women would have to fall back on traditionally more feminine roles, rather than engaged in STEM fields [1]. The image of science is forbidding, once the women do not get involved in untraditional majors such as language and education, they will be redeemed as trying to violate the control of authority. In other words, it is a contempt to the patriarchal society that females are trying to get away from family, underlining the control of fathers and family [8]. In addition, parents always have a bias that a prominent and ambitious girl is not welcomed, they should be meek and have themselves prepared for taking care of the whole family.

Surprisingly, the status of a country and national economy also occupy some area in this phenomenon [9]. Taking into account the cultural background of the learner, ecological theories suggest that cultural factors significantly shape motivation, as individuals may be more motivated when learning experiences align with their cultural values and norms. If the society is unstable or people are facing with some living trouble, students tend to stay in the comfortable zone instead of risk to set foot in some scientific majors which cannot bring instant profit or advantages.

### 2.1.2. Gender Stereotype

Another impressive factor is gender stereotype, and it definitely has a profound and indelible influence on the major choice of the students. There is a misunderstanding that males are superior to girls in math abilities, but it is proved false in many papers [1, 2]. Women outperform men in all stage of learning, while they give up STEM majors even if they are interested in [2]. However, LeStourgeon,

S.M., & Phelps, D. claimed that stereotype threat refers to the threat people feel when they are at risk of confirming a negative stereotype targeted at their group [10]. Therefore, the investigation on the stereotype which take the gender itself as the sample may be inaccurate.

According to the ecological theories, we can find that the pressure and discrimination from the family, school and social media always has a great impact on the formation of the students. The stereotype that females are bad at math but good at humanities is strengthening by promoting successful example of male scientists or brilliant female teachers [1]. The character of different genders has been inveterate in people's mind. Also, in such a world where information is immediate and with out restrictions, what the medias like is only exposure that they do not care about the truth [2]. Personal intelligence is then another factor worried by the students as they are holding the view that effort can hardly beat talent. As a result, in order to escape from outrageous and fierce competition of the job market, they would rather choose what they said to be talent at.

## 2.2. Internal Factors

When delving into internal factors, the self-perception of individuals belonging to different genders emerges as a crucial element. The way individuals perceive their personal abilities and envision future success plays a pivotal role in determining the majors they choose and whether they persist in those choices as long-term careers. Examining these aspects through the lens of cognitivism allows for a deeper analysis of learning motivation and outcomes.

By applying cognitivism to the examination of learning motivation and outcomes, we gain insight into the intricate internal cognitive processes that shape how individuals' approach, engage with, and ultimately succeed in learning activities. This approach allows us to explore the underlying thought patterns, self-efficacy beliefs, and cognitive strategies that influence individuals' choices in academic and career paths. Understanding these cognitive processes is essential for devising interventions and strategies that promote equitable learning opportunities and career paths for individuals of all genders. In essence, cognitivism provides a valuable framework for unraveling the intricate interplay between self-perception, cognitive processes, and the academic and career choices made by individuals based on their gender.

### 2.2.1. Self-perception

Due to the personal perception of their strengths and weakness in study in different majors, researchers find that even girls performed better in STEM majors, they have low confidence in continuing their study or taking it as a future career [11]. Even though females appear to be more motivated and use more strategies [11], females are restricted by themselves under the influence of their learning ecology. Considering how learners process and organize information, cognitivism emphasizes the mental activities that occur between stimulus and response, highlighting the importance of understanding how individuals encode, store, and retrieve information. As a result, the perception about the future development and life quality matter influence the choice of the students.

One of the most distinct elements of choosing different is anxiety as many of the females are reported to be anxious about the consequence and process of stepping into a challenging area [5]. Teacher reflection on their works or answers would give rise to their anxious and worry of getting a decent score. Their worry of failure impose danger to the majors, and thus the girls would stop the possibility at the beginning [11]. In addition, the motivations of female to choose STEM majors are rare because it will lead them to the harder way to find a good job, let alone earning considerable wage [12]. Educational motivations and conceptions of life and career plans consist of the values the students [13]. In middle school, compared to boys, girls revealed little interest and perceived value of mathematics majors [14]. They have relatively high levels of performance anxiety and little

confidence in their personal abilities, and they attribute their success to luck, rather than to their own efforts and abilities [5]. These differences in self-efficacy beliefs and Ability Self-Concepts (ASC), interest, and perceived utility value also explain in part gender differences in entry into STEM courses and fields [14].

Also, their plan for future life is an important factor, especially whether they would have children in the future because female tend to take the responsibility to take care of the kids as a precaution [14]. In consideration of taking care of the family and under the discipline of the convention, females tend to lose freedom in choosing their truly interested subjects. As mentioned in 2.1, the influence of teacher shapes their perception of STEM or non-STEM majors. It's vital for the teacher to have a proper attitude in teaching that the students can then have a right judge on the major.

Another reason stopping girls from choosing scientific majors is their feeling not enough safety and their goals of being successful in the career they practice. In America, although female take up about 50% jobs in markets, lower than 25% have a work associated with science [8]. The environment filled with man and no friends will some kind damage the psychology of the worker and therefore, anxiety has again been exerted to the students. Therefore, the understanding of their work condition discouraged then from facing with difficulties.

### 3. Discussion

In light of the aforementioned observations, it becomes evident that internal factors are not immune to the influence of external environments. Consequently, there is a pressing need for the transformation of conventions and stereotypes to create an environment conducive to improved studying and working conditions for females. The societal requirements and constraints, to some extent, act as deterrents for both females and males, hindering them from fulfilling their expectations.

Recent trends indicate a mitigating impact on the factors influencing students' choices, primarily driven by an increasing awareness of personal values. As the country progresses, citizens are becoming more educated, fostering an environment where stereotypes are expected to gradually diminish over time. Nevertheless, achieving substantial progress requires the implementation of solutions and methodologies devised by professional scholars based on theories such as ecological theories and cognitivism. Without these informed approaches, accomplishments may be constrained, and the time required for change could be protracted. It is only through a concerted effort to address the problem that gender equity, educational equity, and improvements in labor resources can be ensured.

Moreover, it is essential to consider the perspectives offered by cognitivism and ecological theories in tackling these issues. From a cognitivist standpoint, interventions should focus on reshaping individuals' cognitive processes, fostering critical thinking, and promoting reflection to challenge and modify gender stereotypes. Ecological theories emphasize the broader context, advocating for comprehensive societal changes, policy adjustments, and cultural shifts to create an environment that supports gender equity and educational equality.

### 4. Conclusion

In conclusion, it is crucial to acknowledge that some interviews or research findings may be influenced by personal biases or interpretations, introducing deviations from the truth. Therefore, strategies to minimize or eliminate such biases warrant further discussion and experimentation, integrating insights from both cognitivism and ecological theories to develop effective methodologies for unbiased research and analysis. After realizing the dilemma of both males and females, especially the restrictions on females, the society are supposed to find ways to help them and most importantly, the bias on gender and the stereotype should be erased eventually. Using proper method of education,



the self-perception and social civilization would be improved, therefore, a more equal and prosperous society.

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