ECO483

FINAL REPORT

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How does gender affect the choice of mathematically inclined electives?

ABSTRACT

This study aims to explore the role of gender in shaping students' elective choices in college, specifically focusing on mathematically inclined subjects. The research will examine how societal and cultural norms differentially influence the academic decisions of male and female students, creating a gender disparity in the selection of mathematics-related electives.

The primary objective of this research is to analyse the extent to which gender influences students' decisions to choose math-intensive courses, considering other influential factors. Societal expectations, stereotypes, and parental attitudes towards gender roles contribute significantly to the formation of career preferences. For example, boys are often encouraged to pursue STEM (Science, Technology, Engineering, and Mathematics) fields, while girls might be directed toward less technical, more traditionally feminine fields. These ingrained cultural patterns influence career trajectories and, by extension, elective choices in college.

To test this hypothesis, a detailed questionnaire has been developed, targeting a broad range of variables that are expected to influence the choice of math-related electives. The survey covers demographic information (age, gender, family background), career aspirations, and self-reported experiences with societal pressures. It is designed to capture individual perceptions and experiences related to both intrinsic interests in mathematics and external influences, such as family expectations, peer pressure, and gender norms.

This study employs data analytics and econometrics to quantitatively assess the impact of these variables, with a particular focus on gender. By analysing the data through regression models and statistical tools, we aim to identify any significant correlations between gender and the likelihood of selecting mathematically inclined electives.

The expected results are that gender will indeed emerge as a significant determinant in elective choices, with male students being more likely to select math-related courses compared to female students, even when controlling for interest in mathematics and socioeconomic background. This finding would align with the existing literature, which

suggests that deep-rooted societal norms and stereotypes discourage girls from pursuing math-heavy subjects, even when they have the aptitude or interest to do so.

In addition to confirming the influence of gender, this study will aim to provide policy recommendations designed to bridge the gender gap in STEM fields. Potential strategies could include early interventions in education to challenge gender stereotypes, targeted mentorship programs for female students interested in math, and institutional policies that promote a more inclusive and supportive learning environment for women in STEM. By addressing these societal barriers, the goal is to empower more women to confidently pursue STEM careers and contribute to increasing female representation in mathematically intensive fields.

INTRODUCTION

The question at the heart of this study is: *How does gender impact the choice of mathematically inclined electives?* This is an important question, as there is a noticeable trend across universities globally, where certain academic disciplines are heavily skewed by gender. For example, social science majors such as English, History, and International Relations (IR) tend to have a higher concentration of female students, while fields requiring strong mathematical skills, such as Physics, Mathematics, and Engineering, are often male dominated. This clear gender division prompts a deeper exploration of the underlying reasons behind students' elective choices.

The natural question that arises is: *Why does this pattern exist?* Is this pattern the result of biological differences that make women more inclined toward social sciences, or is it purely coincidental? More plausibly, could societal factors such as gender roles, cultural norms, and sexist stereotypes be driving these choices? Research in the field of gender and education suggests that various social factors contribute to this phenomenon. For example, men may feel pressured to pursue more financially rewarding careers due to their traditional role as the primary breadwinners. On the other hand, women often face subtle gender biases and a lack of female role models in STEM fields, which can deter them from pursuing math-heavy careers.

Existing literature supports the idea that gender-based social conditioning plays a significant role in shaping academic and career paths. Studies indicate that societal expectations push male students toward disciplines considered more "lucrative," such as engineering or finance, where math is central. Conversely, gender stereotypes, casual sexism in schools, and a lack of female role models in STEM contribute to lower female participation in math-intensive fields. The goal of this study is to investigate these phenomena at the university level, focusing on the influence of gender on students' elective choices.

Objectives of the Study

The main objective of this study is to determine how gender influences the selection of mathematically inclined electives among university students. the research aims to:

1. **Identify Gender-Based Patterns in Elective Choices**: The study seeks to analyse the distribution of male and female students across elective courses, particularly in math-heavy subjects, to determine if a significant gender disparity exists.
2. **Examine Societal and Cultural Influences**: The study will investigate how societal norms, cultural expectations, and gender roles contribute to the academic decisions of students. This includes analysing whether male students are more likely to pursue mathematically intensive electives and whether female students are dissuaded from such electives.
3. **Assess the Role of Individual Experiences**: Through a questionnaire, this research will capture individual experiences of societal pressures, personal interests, and obstacles that students may have encountered when choosing electives.
4. **Evaluate the Impact of External Factors**: Beyond gender, the study will assess other key factors, such as parental income, current major, and self-reported interest in mathematics, to understand their collective influence on elective choices.
5. **Provide Policy Recommendations**: Based on the findings, the study will propose policy suggestions aimed at increasing female representation in STEM.

HYPOTHESIS AND MODEL

Keeping in mind the central problem statement of this study, we aim to test out the following hypothesis:

Null: $\beta 1 = 0$; Gender does not have an impact on choice of STEM electives.

Alternate: $\beta 1 \neq 0$; Gender has an impact on choice of STEM electives.

We expect to reject the null hypothesis. Depending on the size of the beta coefficient we would like to conclude whether gender is a significant factor when it comes to choosing a career and provide further recommendations based on that.

We would also like to conduct some tests to check the relevance of independent variables.

1) Does parents' education impact student's choice of career?

Null: $\beta 1 = 0$; Parent's education does not have an impact on choice of STEM electives.

Alternate: $\beta 1 \neq 0$; Parent's education has an impact on choice of STEM electives.

We believe that parents' level of education directly impacts their income

that can influence students' access to resources that guide independent decision-making regarding career. So, null may ideally be rejected.

2) Does Self-reported interest in mathematics impact elective choice?

Null: $\beta_1 = 0$; Self- reported interest in mathematics does not have an impact on choice of STEM electives.

Alternate: $\beta_1 \neq 0$; Self- reported interest in mathematics has an impact on choice of STEM electives.

It is possible that students may find maths interesting but still choose not to pursue it given the fear surrounding the subject.

3) Do career aspirations influence choice of electives?

Null: $\beta_1 = 0$; Career aspirations do not have an impact on choice of STEM electives.

Alternate: $\beta_1 \neq 0$; Career aspirations have an impact on choice of STEM electives.

Students who prefer more lucrative careers may pursue a STEM career. Ideally, null may be rejected.

Regression Model

$P(\text{Math\_Elective} = 1) = \beta_0 + \beta_1\text{gender} + \beta_2\text{parents\_education} + \beta_3\text{self-reported interest in STEM} + \beta_4\text{career\_choice} + \beta_5\text{school} + \mu$

RESULTS AND SENSITIVITY ANALYSIS

We analyse this using the initial regression, final regression, and the correlation matrix, emphasizing the beta coefficients, statistical significance, and interactions between variables.

Logistic regression			
	Number of obs	=	131
	LR chi2(11)	=	158.70
	Prob > chi2	=	0.0000
Log likelihood = -10.592331	Pseudo R2	=	0.8822

Minor	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Gender	-5.548188	2.050972	-2.71	0.007	-9.568019	-1.528357
Major	.594158	1.464617	0.41	0.685	-2.276439	3.464755
SocietalPressure	-1.030228	.5779463	-1.78	0.075	-2.162982	.1025255
FathersQualifications	3.054663	1.561437	1.96	0.050	-.0056972	6.115024
MothersQualifications	.1861667	1.28835	0.14	0.885	-2.338953	2.711286
PerceivedFear	-2.73818	1.535169	-1.78	0.074	-5.747056	.2706967
Interest	-2.150987	1.702049	-1.26	0.206	-5.486941	1.184967
FamilyIncome	1.022546	1.427201	0.72	0.474	-1.774717	3.81981
RoleModels	1.387765	1.332925	1.04	0.298	-1.224719	4.00025
CareerGoals	1.8223	1.928242	0.95	0.345	-1.956986	5.601585
FinancialInclination	2.700797	1.810491	1.49	0.136	-.8476996	6.249293
_cons	1.471676	3.596241	0.41	0.682	-5.576828	8.52018

Initial Regression Analysis

1. **Gender**:
   - Coefficient: -5.548
   - $z=-2.71$
   - $P=0.007$: Statistically significant.
   - **Interpretation**:
     - The large negative coefficient indicates that females are significantly less likely to choose mathematically inclined electives.
     - This result suggests a gender disparity, potentially influenced by societal stereotypes or cultural norms.
2. **Fathers' Qualifications**:
   - Coefficient: 3.045
   - $z=1.96$
   - $P=0.050$: Significant.
   - **Interpretation**:
     - Higher paternal qualifications are associated with an increased likelihood of choosing mathematically inclined electives. This reflects the role of parental educational background in shaping academic preferences.
3. **Societal Pressure:**
   - Coefficient: -1.03
   - $z=-1.78$
   - $P=0.075$: Marginally significant.
   - **Interpretation**:
     - The negative coefficient indicates that higher societal pressure reduces the likelihood of choosing mathematically inclined electives.
     - Although not statistically significant at the conventional P<0.05P < 0.05P<0.05 level, the marginal significance highlights societal pressure as a potential barrier.
4. **Perceived fear:**
   - Coefficient: -2.73
   - $z=-1.78$

- P=0.074: Marginally significant.
- **Interpretation**:
  - The large negative coefficient indicates that higher levels of perceived fear are associated with a lower likelihood of selecting mathematically inclined electives.
  - The near significance in the final model suggests perceived fear plays a notable role. For example, individuals with lower confidence in their math abilities might shy away from such electives, even if they have the aptitude.

5. **Other Variables**:
   - Most other predictors, including **Major, Mothers' Qualifications**, and **Career Goals**, are not very statistically significant.
   - Thus, we drop Major, Role Models and Mothers' Qualifications while running the final regression.

Model Summary:

- **LR Chi2 (11)**: 158.70, The model is highly significant overall.
- **Pseudo R²**: 0.88220, The predictors explain 88.22% of the variance in elective choice. This high value suggests a well-fitted model.

Final Regression Analysis

```
Logistic regression                             Number of obs     =        131
                                                LR chi2(8)        =     157.28
                                                Prob > chi2       =     0.0000
Log likelihood = -11.301991                     Pseudo R2         =     0.8743
```

Minor	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Gender	-5.91579	1.868263	-3.17	0.002	-9.577518	-2.254062
SocietalPressure	-1.037557	.5590052	-1.86	0.063	-2.133188	.0580726
FathersQualifications	2.81751	1.351163	2.09	0.037	.1692798	5.46574
PerceivedFear	-2.81678	1.441008	-1.95	0.051	-5.641104	.0075445
Interest	-2.119914	1.602317	-1.32	0.186	-5.260398	1.020569
FamilyIncome	1.278519	1.329768	0.96	0.336	-1.327779	3.884816
CareerGoals	2.641154	1.555409	1.70	0.089	-.407391	5.689699
FinancialInclination	2.403678	1.534533	1.57	0.117	-.6039515	5.411308
_cons	3.301284	2.177478	1.52	0.129	-.9664938	7.569062

After running multiple different regressions, some insignificant variables (Major, Role Models, and Mothers' Qualifications) were excluded for a more efficient economic model.

1. **Gender:**
    - Coefficient: −5.916
    - z=−3.17z
    - P=0.002: Statistically significant.
    - **Interpretation:**
        - Gender remains a strong, significant negative predictor, with an even larger effect size than in the initial model.
        - The consistency across both models highlights the robustness of gender as a predictor.
        - The strengthened significance suggests that gender's impact is not diminished by removing other variables, emphasizing its direct influence on elective choices.
2. **Fathers' Qualifications:**
    - Coefficient: 2.81
    - z=2.09
    - P=0.037: Statistically significant.
    - **Interpretation:**
        - This variable becomes more significant in the final model, reinforcing the role of paternal education in promoting mathematically inclined choices.
3. **Perceived Fear:**
    - Coefficient: −2.817
    - z=−1. 95
    - P=0.051: Significant.
    - **Interpretation:**
        - Higher perceived fear is associated with a reduced likelihood of choosing mathematically inclined electives. This highlights potential psychological barriers, particularly among underrepresented groups.
4. **Career Goals:**
    - Coefficient: 2.64
    - z=1.70
    - P=0.089: Marginally significant.

- **Interpretation:**
    - Aligning mathematical electives with career aspirations might encourage their selection.

5. **Financial Inclination:**
    - Coefficient: 2.40
    - z=1.57
    - P =0.117: Not significant but notable.
    - **Interpretation:**
        - A positive association suggests that students with financial aspirations might lean towards electives that complement these goals.

Model Summary:

- LR Chi2 (8): 157.28, Highly significant.
- Pseudo R^2: 0.8743, Highly robust.

Sensitivity Analysis

1. **Variable Removal:**

- In the initial regression model, several predictors were included, some of which had statistically insignificant effects on the outcome.
- By removing these less significant variables in the final regression, the model becomes more efficient, meaning it retains only the predictors that meaningfully contribute to explaining the dependent variable.
- The coefficient for Gender remained highly significant and increased slightly in magnitude after variable removal. This indicates that the effect of gender on mathematically inclined elective choice is robust and does not depend on the inclusion of the omitted variables.

2. **Model Fit:**

- The Pseudo R^2 values for both the initial and final models are exceptionally high for a logistic regression. This indicates that the models explain a substantial proportion of the variability in the likelihood of choosing mathematically inclined electives.
- The slight reduction in Pseudo R^2 in the final model is expected, given that fewer variables were included. However, the high value shows the retained predictors are sufficient to capture most of the variability in the outcome.

- The likelihood ratio test remains highly significant in both models, further confirming the strong explanatory power of the models.
    - The sensitivity analysis demonstrates that the impact of gender is a strong and consistent finding. Removing other variables, even those moderately correlated with gender or the outcome, does not diminish its statistical significance or effect size.
    - Simplifying the model (final regression) reduces the risk of overfitting while preserving the core findings, ensuring the results are generalizable.
    - The observed high model fit and stable coefficients across models underscore the robustness of the analysis and strengthen the validity of conclusions drawn from the regression.

DISCUSSION

This study investigates the determinants of college minor choices, focusing on gender, societal pressures, parental education, and other socio-economic factors. The results reveal the multifaceted impact of these variables on academic decisions, offering nuanced insights into the systemic and individual factors influencing students' educational trajectories.

1. Gender and College Minor Choices

The regression analysis reveals that men are significantly more likely to pursue math-heavy electives, whereas women gravitate toward social sciences. This finding aligns with the literature highlighting persistent gender gaps in STEM fields. Tang and Zhao (2023) argue that deeply entrenched gender social norms reinforce perceptions of men's natural aptitude in mathematics and women's relative suitability for humanities and social sciences. Similarly, Mejía-Rodríguez et al. (2021) identify global patterns of lower self-concept in mathematics among girls, stemming from both societal stereotypes and parental attitudes.

Women's preference for social sciences as "easier" aligns with the finding that societal pressures affect genders differently. For men, societal expectations emphasize lucrative career paths, reinforcing participation in math-heavy fields. In contrast, for women, stereotypes often discourage mathematical pursuits, framing them as unsuitable or too challenging (Eddy & Brownell, 2016). This dichotomy underscores how societal pressures reinforce traditional gender roles, steering men and women toward predefined academic and professional paths.

2. Societal Pressure and Gender Stereotypes

Both genders report feeling societal pressure, but the effects diverge. Women are pushed away from STEM fields due to expectations of failure or underperformance which links gender-based stereotypes to the persistent underrepresentation of women in quantitative disciplines. For men, societal pressure emphasizes financial success, channelling them into

STEM fields often perceived as pathways to high-paying careers. This aligns with Becker and Hall (2024), who argue that societal norms shape academic choices through both implicit and explicit messages about gendered abilities and responsibilities.

Societal pressure, as measured in the model, operates as a systemic force that not only reflects existing stereotypes but also perpetuates them. Interventions targeting societal norms and their reinforcement in schools, families, and media are critical to bridging these disparities.

3. Parental Education and Student Confidence

Parental education emerged as a significant variable, with children of highly educated parents displaying greater confidence in pursuing their interests. This supports Haataja et al. (2024), who emphasize that socioeconomically advantaged families foster environments conducive to academic risk-taking and interest-driven choices. Educated parents often challenge societal norms, encouraging children to prioritize personal interests over external pressures, as also noted by Anaya et al. (2021).

In this context, highly educated parents appear to act as buffers against societal pressures, empowering students to pursue less conventional choices with greater autonomy. This empowerment also mitigates the negative impact of gender stereotypes, allowing students, particularly daughters, to consider math-heavy disciplines without fear of judgment or failure.

4. The Role of Family Income

Family income, closely correlated with parental education, also reduces societal pressure. Families with higher incomes provide greater financial security, enabling children to make academic choices based on interest rather than necessity.

Students from lower-income families, conversely, may feel pressured to choose fields with clear economic returns, often reinforcing traditional pathways for both genders. Tang and Zhao (2023) highlight that economic constraints exacerbate the impact of societal norms, limiting the range of viable academic and career options for students.

5. Perceived Fear of Math and Career Goals

Women's higher levels of math anxiety and lower interest in math are consistent with global trends documented by Mejía-Rodríguez et al. (2021). Early socialization processes, including parental and teacher biases, contribute to girls internalizing the notion that math is inherently difficult. This perceived fear not only influences immediate academic choices but also shapes long-term career aspirations.

Career goals, particularly those requiring mathematical proficiency, strongly predict the pursuit of math-heavy minors. Students whose goals align with STEM fields demonstrate greater engagement with related disciplines, underscoring the importance of aligning educational content with professional aspirations. Eddy and Brownell (2016) highlight the role of mentorship and exposure to STEM careers in mitigating gender disparities, suggesting pathways to encourage greater participation among underrepresented groups.

CONCLUSION AND POLICY IMPLICATIONS

Policy Relevance

Our research aims to identify the factors influencing career choices among young individuals, particularly women, to determine which policies can most effectively encourage participation in STEM careers among 18–25-year-old women. Schools and higher education institutions play a critical role in shaping these choices, and targeted interventions can significantly increase female representation in STEM. Our findings highlight key issues faced by women pursuing STEM careers, such as lower recognition, fewer female role models, math-related anxiety, and casual sexism reinforcing gender-based stereotypes. Based on these insights, we present several policy recommendations to address these challenges.

1. Increasing Exposure to Female Role Models in STEM

One of the most impactful strategies is increasing exposure to female role models in STEM. Women need visible examples of success to challenge traditional stereotypes that frame STEM fields as male-dominated. Targeted mentorship programs can provide guidance, encouragement, and inspiration to female students, demonstrating that success in math-heavy fields is achievable regardless of gender. By facilitating interactions with successful women in STEM, young girls can build the confidence to pursue and persist in these disciplines. Institutions can organize guest lectures, workshops, and networking opportunities with female professionals to bridge this gap.

2. Reducing Math-Related Anxiety

Math anxiety is a significant barrier to women's participation in STEM. Many female students perceive mathematics as overly difficult, a belief shaped by stereotypes and early educational experiences. Curriculum reforms that make math more relevant and accessible can address this issue. For example, incorporating real-world applications of mathematics, such as its role in solving everyday problems or addressing societal challenges, can make the subject more engaging and relatable. Teachers should also focus on positive reinforcement, emphasizing progress and effort over innate ability, to build students' confidence in their mathematical skills.

Additionally, schools can provide dedicated support programs, such as math workshops and peer tutoring, to help students overcome anxiety. By creating a supportive environment where mistakes are seen as part of the learning process, educators can encourage students to approach math with curiosity rather than fear.

3. Promoting an Inclusive Academic and Workplace Culture

An inclusive environment in both education and the workforce is crucial for increasing female representation in STEM. Casual sexism and unconscious biases in classrooms and workplaces often discourage women from pursuing or advancing in math-heavy fields. Faculty and workplace training programs focused on recognizing and mitigating gender biases are essential for fostering more inclusive spaces. For example, faculty members should be trained to avoid gendered expectations about academic performance and career choices, ensuring that male and female students receive equal encouragement.

Workplace culture should also emphasize gender neutrality by addressing disparities in pay, promotions, and recognition. Providing structured career advancement opportunities and creating mentorship networks for women can improve retention rates in STEM careers. Academic institutions can complement this by promoting inclusive extracurricular activities and research opportunities that encourage women to explore STEM disciplines confidently.

4. Increasing Recognition for Women in STEM

Another major challenge is the under-recognition of women in STEM, which perpetuates the problem of fewer role models. Women in STEM often face biases that result in lower citation counts, fewer awards, and less visibility in their fields compared to their male counterparts. Addressing this disparity requires both institutional and cultural shifts.

Institutions can actively recognize and celebrate the achievements of female STEM professionals through awards, media coverage, and leadership roles. Encouraging women to share their research and accomplishments more widely can also help raise their profiles. Promoting public campaigns that highlight successful female scientists, engineers, and mathematicians can inspire the next generation of women to pursue STEM careers.

5. Providing Financial Support through Scholarships

Financial barriers often limit women's access to STEM education, especially for students from lower-income families. Scholarships targeted at women pursuing math-heavy fields can significantly reduce these obstacles and encourage more women to choose STEM disciplines. Financial incentives not only provide the resources needed for success but also signal societal investment in gender equity in education.

Such scholarships can be paired with mentorship and career development programs to ensure that recipients not only enter STEM fields but also thrive in them. This comprehensive approach addresses both financial and psychological barriers, creating a supportive ecosystem for women in STEM.

6. Empowering Students Through Career Exposure

Early exposure to diverse career opportunities can shape students' aspirations and choices. Schools should introduce career counseling programs that showcase the wide range of possibilities in STEM, from engineering to data science, and how these careers can align with students' interests and goals. By highlighting the real-world impact of STEM careers, such programs can motivate students, particularly women, to see these fields as accessible and rewarding.

Engaging students in hands-on STEM activities, such as coding workshops, science fairs, and robotics competitions, can also spark interest and build confidence. When combined with mentorship and financial support, these initiatives provide a robust framework for encouraging women to pursue STEM careers.

7. Fostering Autonomy Through Parental and Socioeconomic Support

Parents play a critical role in shaping students' academic choices. Educated and supportive parents are more likely to encourage their children to pursue interests confidently, regardless of societal pressures. Programs that engage parents, providing them with the tools and knowledge to support their daughters' STEM aspirations, can be particularly impactful. Schools and community organizations can organize workshops for parents to challenge stereotypes and emphasize the importance of math and science education.

Socioeconomic factors also influence career choices, with higher family incomes correlating with reduced societal pressure and greater autonomy in decision-making. Policies aimed at reducing income disparities, such as need-based financial aid, can complement scholarships in making STEM education accessible to all.

Conclusion

This study highlights the complex interplay of factors shaping students' academic and career choices, emphasizing the persistent influence of gendered social norms. Our findings reveal that societal pressure impacts men and women differently, steering women toward fields perceived as "easier" and men toward lucrative or prestigious options. These dynamics perpetuate stereotypes about gender-specific abilities and aspirations, constraining students' freedom to pursue their interests.

Parental education emerged as a key factor in mitigating societal pressure. Parents with higher education levels are more likely to support their children's autonomy in decision-making, enabling them to explore their true interests. Additionally, family income, which often correlates with parental education, provides a buffer against the immediate need for financial returns, allowing students greater flexibility in their choices.

A critical finding is the role of perceived ability and interest in academic decisions. Women are disproportionately affected by math-related anxiety, often a result of stereotypes that undermine their confidence in mathematical abilities. In contrast, men view mathematics as a gateway to financially rewarding careers, further reinforcing the gender disparity in STEM fields. These patterns are shaped by cultural messaging and educational practices that fail to nurture confidence in mathematical abilities equally across genders.

The implications of these findings are far-reaching. To break the cycle of gendered segregation in academics and careers, systemic changes are essential. Educational institutions must challenge stereotypes and foster inclusive environments. Families, too, play a critical role in empowering students to pursue diverse paths without societal constraints.

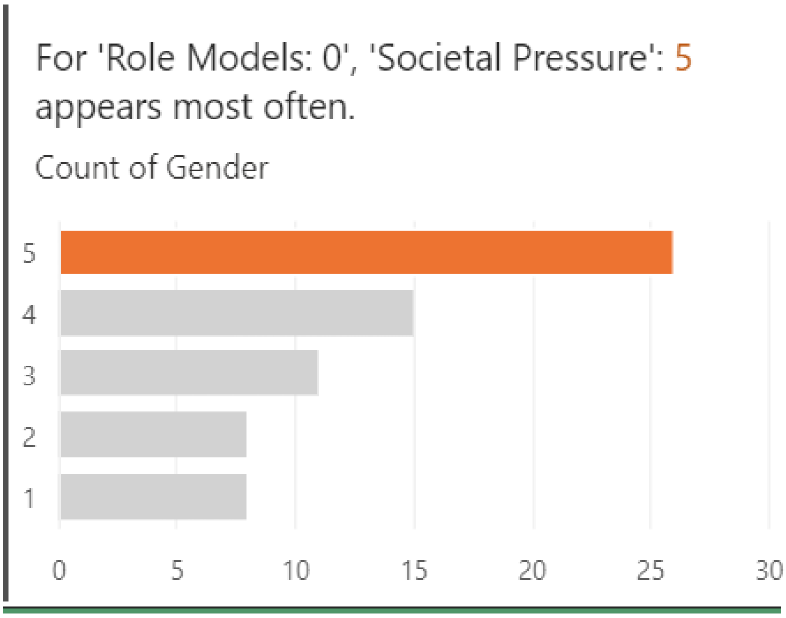
In conclusion, addressing the gendered barriers in education and career choices is imperative for creating a more equitable system. By empowering individuals to pursue their passions free from stereotypes and systemic inequities, we not only promote fairness but also enrich the workforce with diverse talents and perspectives. This transformation is vital for building an innovative and inclusive society equipped to tackle future challenges.

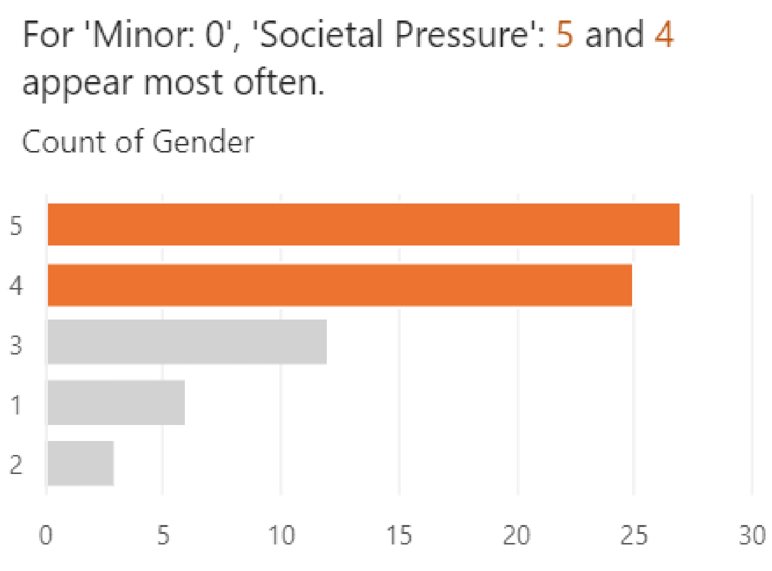
APPENDIX

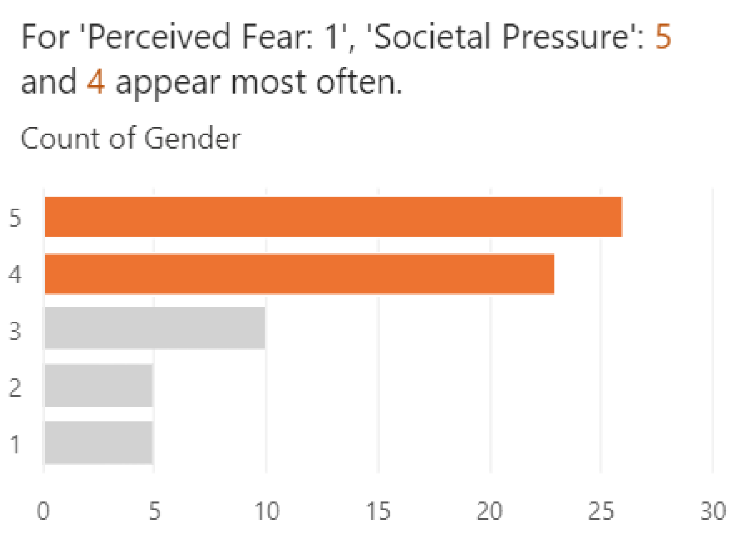
Data

https://docs.google.com/spreadsheets/d/16R1EztuJe8P_z7irqNLNswkmpT5qAxMr0Lw6yFYoIwg/edit?usp=sharing

Data Visualisation

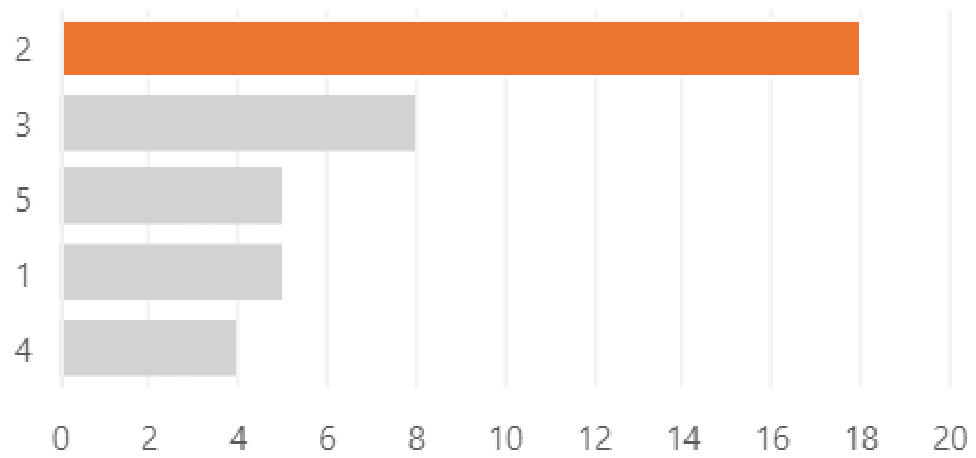






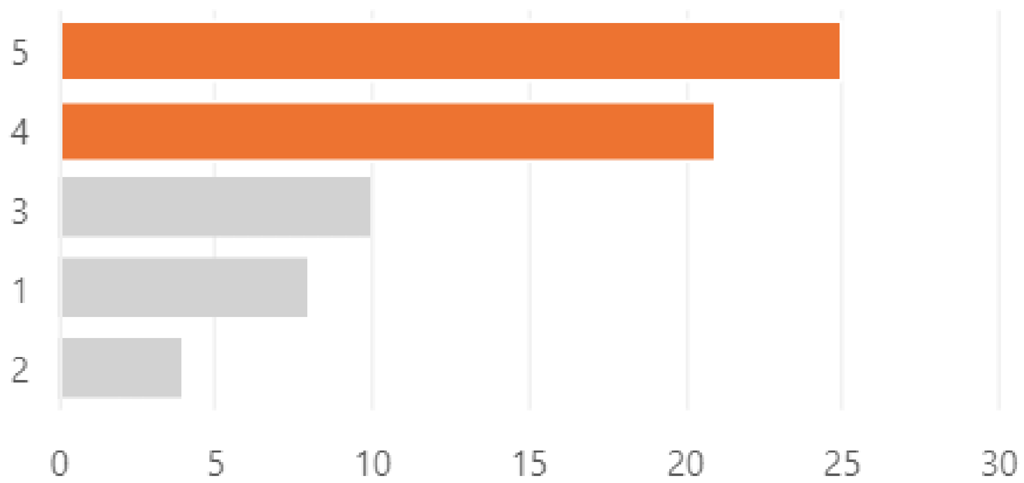
For 'Major: 3', 'Societal Pressure': 2 appears most often.

Count of Gender



For 'Gender: 1', 'Societal Pressure': 5 and 4 appear most often.

Count of Gender



Descriptive Statistics Table

Variable	Obs	Mean	Std. Dev.	Min	Max
Gender	131	.5114504	.5017878	0	1
Minor	131	.4427481	.4986182	0	1
Major	131	1.992366	.789315	1	3
SocietalPr~e	131	3.381679	1.321177	1	5
FathersQua~s	131	.5343511	.5007335	0	1
MothersQua~s	131	.5114504	.5017878	0	1
PerceivedF~r	131	.5267176	.5012023	0	1
Interest	131	.6030534	.4911429	0	1
FamilyIncome	131	.5038168	.5019048	0	1
RoleModels	131	.480916	.5015537	0	1
CareerGoals	131	.4503817	.4994418	0	1
FinancialI~n	131	.5114504	.5017878	0	1

The summary statistics reveal how participants are distributed across these factors, highlighting trends in gender representation, academic interests, family background, and societal influences.

- Gender: The dataset has a nearly equal distribution of males and females, as indicated by a mean of 0.511 for the Gender variable.
- Minor: A significant portion of the sample chose non-math-heavy minors, with a mean of 0.442 for the Minor variable.
- Major: Most students pursue moderately challenging majors, with a mean of 1.99 for Major, which ranges from humanities to moderately difficult fields like economics and chemistry.
- SocietalPressure: The average value of 3.38 indicates moderate to high societal pressure related to gender-based expectations.
- Parents' Qualifications: The dataset shows an almost balanced representation of parental education levels, with a mean of 0.534 for the FathersQualifications variable.
- FamilyIncome: Approximately half of the participants belong to higher-income families, reflected by the mean of 0.503 for FamilyIncome.
- PerceivedFear, Interest, RoleModels: These variables show varied responses, with means near 0.5, indicating diverse levels of fear, interest in math, and the presence of role models.
- CareerGoals and FinancialInclination: These two variables are similarly distributed, suggesting that students have different motivations for their career goals, with a mix of financial and intrinsic inclinations.

Codes

cd

import excel "C:\Users\kaash\OneDrive\Desktop\Book1.xlsx", sheet("Sheet2") firstrow logit Minor Gender Major SocietalPressure FathersQualifications MothersQualifications PerceivedFear Interest FamilyIncome RoleModels CareerGoals FinancialInclination

logit Minor Gender SocietalPressure FathersQualifications PerceivedFear Interest FamilyIncome CareerGoals FinancialInclination

corr

Data Cleaning

1. Missing Values:
   - All rows containing missing values were removed to ensure the dataset was complete and free of gaps that could skew the analysis.
2. Binary Variables:
   - Gender Column:
     - Used the "Find and Replace" function in Excel to convert categorical entries:
       - "Male" to 0
       - "Female" to 1
   - Interest Column:
     - Converted "Yes" to 1 and "No" to 0 using the same method.
     - This binary format allowed for easier interpretation and analysis of preferences.
3. Grouping and Categorizing Majors:
   - The Major column was grouped into categories based on difficulty:
     - 3 for extremely math-heavy majors (e.g., Mathematics, Physics, Engineering).
     - 2 for moderately math-related majors (e.g., Management Studies, Economics, Chemistry).
     - 1 for humanities majors (e.g., English, History, International Relations).
   - This categorization simplified comparisons across different academic disciplines.
4. Converting Parental Qualifications:
   - Parental qualifications were categorized into binary values:

        - 1 for "master’s and above" qualifications.
        - 0 for "bachelor’s and below."
    - This transformation highlighted the influence of advanced education on decision-making.
5. Transforming Family Income:
    - The family income variable was converted to a binary format:
        - 1 for annual income greater than ₹15 lacs.
        - 0 for annual income ₹15 lacs or less.
    - This binary classification facilitated the analysis of income's effect on career choices.
6. Categorizing Societal Pressure:
    - The Societal Pressure column was categorized into a 5-point scale:
        - 1 for no pressure or gender-based stereotypes.
        - 5 for extreme pressure or reinforcement of gender-based stereotypes.
    - This scale provided nuanced insights into societal influences on individual decisions.

Correlation Matrix

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. corr
(obs=131)
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	Gender	Minor	Major	Societ~e	Father~s	Mother~s	Percei~r	Interest	Family~e	RoleMo~s	Career~s	Financ~n
Gender	1.0000											
Minor	-0.8030	1.0000										
Major	-0.6894	0.7318	1.0000									
SocietalPr~e	0.2907	-0.4220	-0.3734	1.0000								
FathersQua~s	-0.3778	0.4932	0.3997	-0.2990	1.0000							
MothersQua~s	0.0373	-0.0204	-0.0095	0.0514	-0.0245	1.0000						
PerceivedF~r	0.6482	-0.7249	-0.5925	0.3911	-0.3638	-0.0089	1.0000					
Interest	-0.4686	0.4719	0.4683	-0.3337	0.3999	-0.1063	-0.5816	1.0000				
FamilyIncome	-0.4663	0.6079	0.4758	-0.3038	0.3591	-0.1147	-0.6043	0.5055	1.0000			
RoleModels	-0.4190	0.5569	0.4757	-0.1979	0.3472	-0.0985	-0.4340	0.3750	0.3441	1.0000		
CareerGoals	-0.6334	0.7685	0.6917	-0.3325	0.4144	-0.0361	-0.6169	0.5776	0.5915	0.6334	1.0000	
FinancialI~n	-0.2683	0.4100	0.4178	-0.0531	0.2816	-0.0693	-0.2841	0.1434	0.2824	0.2683	0.4243	1.0000

 Gender and Minor:

- Strong negative correlation: Indicates that gender has a significant association with the choice of mathematically inclined electives.
- This supports the regression finding that gender influences elective selection.

 Gender and Perceived Fear:

- Moderate positive correlation: Suggests that fear may mediate the relationship between gender and elective choice.

 Gender and Interest:

- Moderate negative correlation: Indicates that gender differences influence interest in mathematical subjects.

 Predictor Interactions:

- Moderate correlations between some predictors suggest possible indirect effects, but no extreme values indicate multicollinearity issues.

None of the predictors exhibit extremely high correlations (|r|>0.8|r| > 0.8|r|>0.8) aside from Gender and Minor, indicating that multicollinearity is not a significant issue in the regression models.

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