Statistical Data Analysis of Student Goals

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1 Abstract

This should be a very brief explanation of your research paper (around 150 words). It normally includes information about the issue, why you are interested in that issue, your method/model, analysis results, discussions and conclusions.

This paper analyses the data gathered from surveying 625 undergraduate students. The authors of the survey tried to prove two hypothesis: 1) During students' junior years, they tend to primarily focus on getting good grades while during their senior years, the focus shifts towards a deep-understanding of the subject and 2) students' enjoyment and interest tends to deteriorate as they progress through their studies. It is not obvious why this might be the case and if the student's age, sex or studied subject has any bearing. This is why the survey has 15 questions and probes 7 assessment categories. Each category consists of 3 to 1 questions and because the order of the questions is randomised, the student should not know the categories nor notice any patterns.

The data manipulation was done using R and tidywerse packages (ggplot2, dplyr, tibble, readr, tidyr, purrr); a full analysis will be presented, including data: preparation, analysis, exploration and interpretation; calculation of confidence intervals, interpretation of the results using different kinds of graphs and an explanation of the methods used.

2 Introduction

This section should explain the topic, why it is important, and how you approach the issue

It is interesting how undergraduate students' goals change through-out their studies. A formal analysis started with an interpretion of the 7 categories based on the questions they consisted of, i.e., a single conclusion was drawn based on the categories' questions. Because the students were presented with the questions in a randomized order it was assumed that the collected data was put into a table in the randomized order as well. This would mean that, e.g., question 1 in the survey, is actaully question 6 in the `Performance avoidance` category; question 2 is question 12 from the `Mastery avoidance` category, etc. *Table 3* shows this mapping.

Table 1 presents the original categories with their numbered questions. *Table 2* presents the category, its interpretation (Based on the category's questions) and its matching numbering. *Table 3* maps the survey's question number with the question's original number and its category.

Category | Questions

Performance approach questions 1. It is important to me to be better than other students. 2. It is important to me to do well compared to others in my courses 3. My goal in my courses is to get a better grade than most of the other students. Performance avoidance questions 4. I just want to avoid doing poorly in my courses. 5. My fear of performing poorly is often what motivates me 6. My goal in this class is to avoid performing poorly Mastery-Approach 7. I want to learn as much as possible from all my courses 8. I desire to completely master the material presented in my courses. 9. It is important for me to understand the content of my courses as thoroughly as possible Mastery-Avoidance 10. I worry that I may not learn all that I possibly could in my classes 11. Sometimes I'm afraid that I may not understand the content of this course as thoroughly as I'd like 12. I am often concerned that I may not learn all there is to learn in this class Table:

Survey questions and their interpretation:

Table 1: caption

Category	Interpretation	Question	# of Questions
Performance approach	How important it is to students to do better than others?	1, 2, 3	3
Performance avoidance	How motivated are students by fear of performing poorly?	4, 5, 6	3
Mastery approach	Prevalence of mastery approach	7, 8, 9	3
Mastery avoidance	Student's fear of not mastering the course	10, 11, 12	3
Interest	Student's expectations whether the course will be interesting	13	1
Enjoyment	Student's expectations whether the course will be enjoyable	14	1
Importance focus	Student's importance focus on understanding and grades	15	1

The students answered on a 7-level scale; 1 meaning the student feels the statement asked in the quesion is 'Not true of him/her' and 7 meaning the student feels it is 'Very true of him/her'. See the table below for a graphical explanation:

Not true of me	1	2	3	4	5	6	7	Very true of me

Questions from 1 to 12 were ordered randomly.

Survey order	6	12	11	1	7	2	10	8	5	3	9
Actual question	1	2	3	4	5	6	7	8	9	10	11

Questions 13, 14 and 15 remain in the same order

3 Data

Explain your dataset and how the was data is collected – e.g. your sampling strategy or information given by the project information.

Around 625 students were surveyed. To conceal the existence of the 7 categories from students, they were presented with the questions in random order.

Because `Interest`, `Enjoyment` and `Importance focus` categories consisted only of 1 question, no further computation was required to interpret the data from these categories. For the remaining categories, which number of questions was equal to 3, a mean for each assessment category was computed, and saved for each individual student. This resulted in 4 extra columns added to the original data set. An example of these can be seen below:

m1	m2	m3	m4
4.666667	4.333333	6.000000	3.333333
2.333333	2.333333	5.000000	2.000000
3.666667	1.333333	5.666667	1.333333
3.666667	3.666667	6.000000	5.333333
3.333333	3.333333	7.000000	4.000000

3.1 Data Exploration

An exploratory data analysis using graphs was performed. Some of them are:

4 Methodology

This section explains the statistical methods and/or your model. It is also a common practice to present the statistical model structure (i.e. equation) here as well.

Confidence interval was used.

5 Results

Present both your informal and formal analyses.

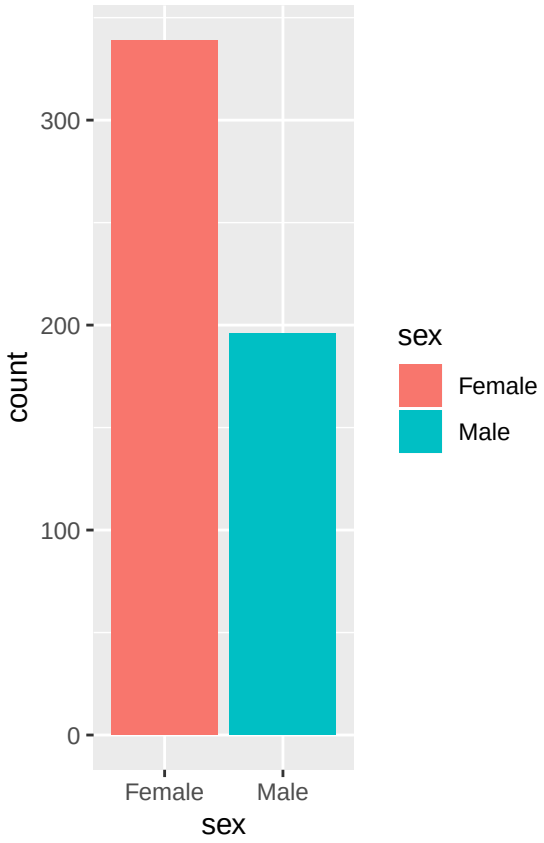
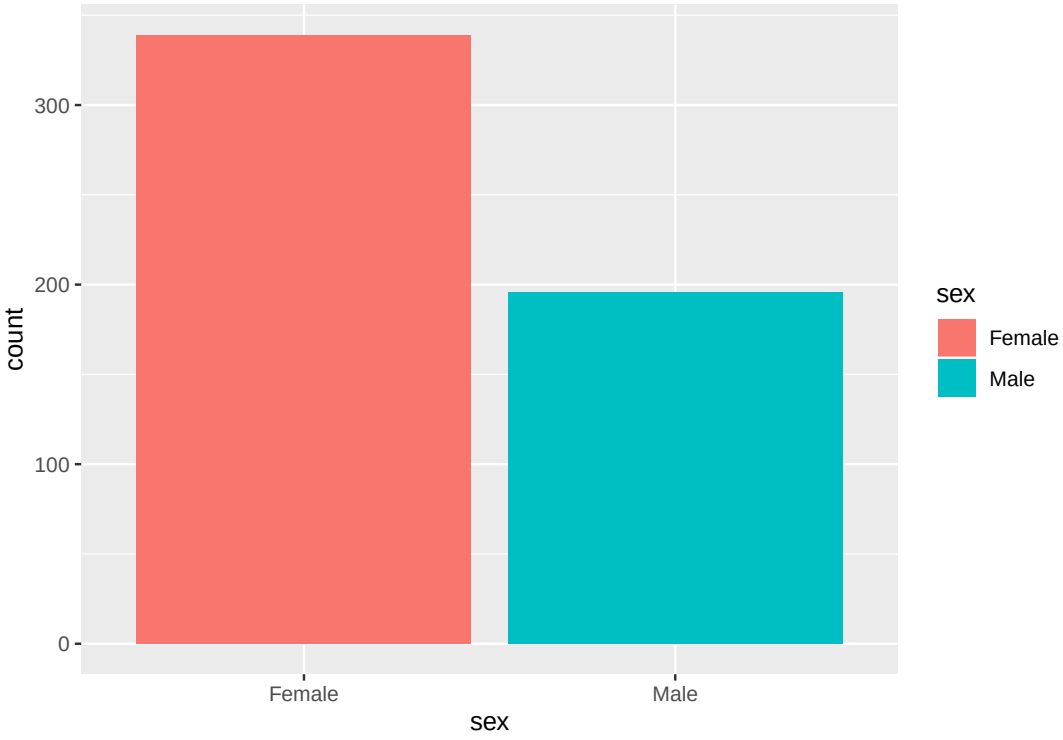
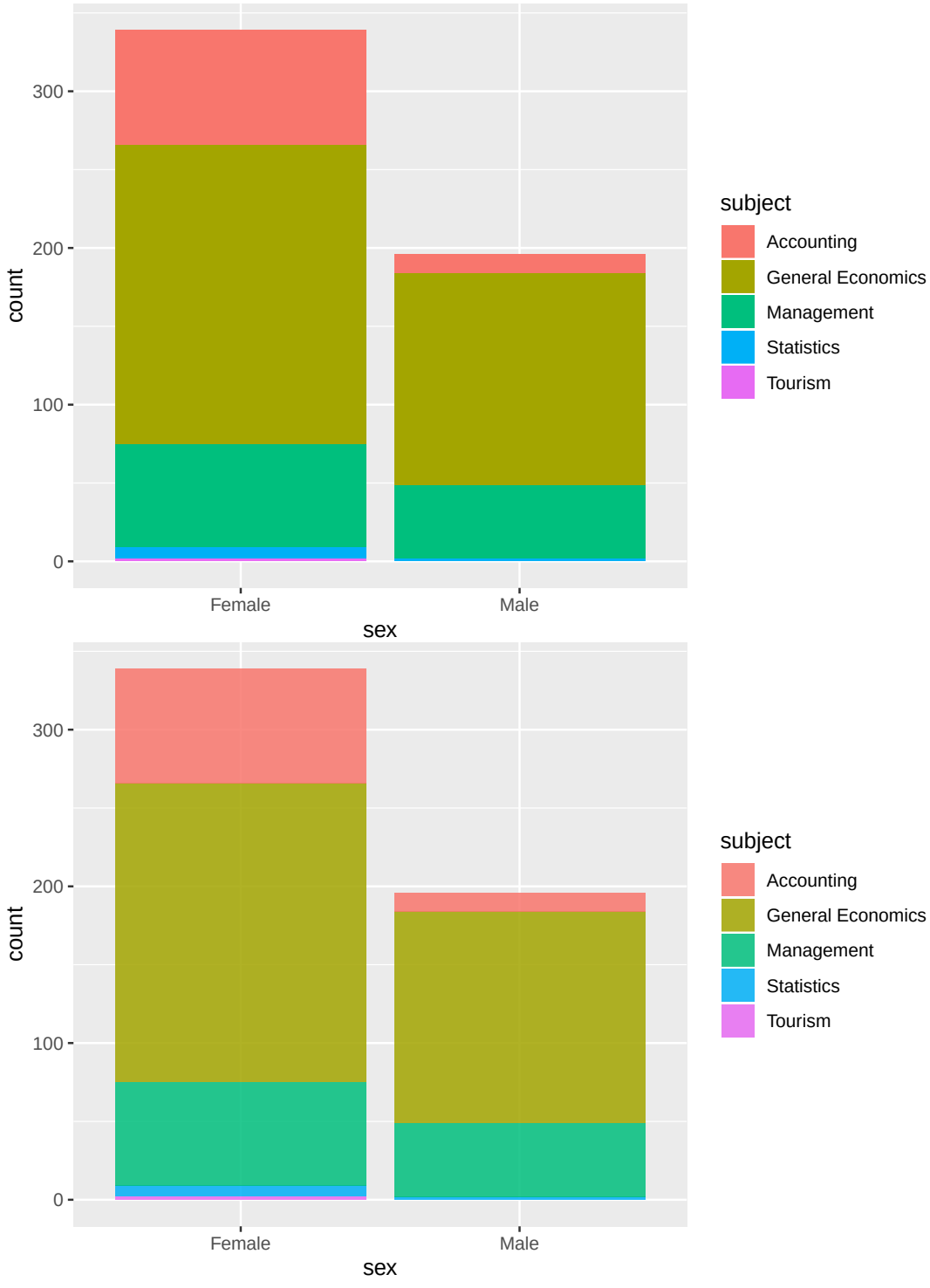


Figure 1: Number of sexes

6 Conclusion / Discussion

You need to conclude your project, discuss the results, discuss any reservations that you have about the study and list any future work.

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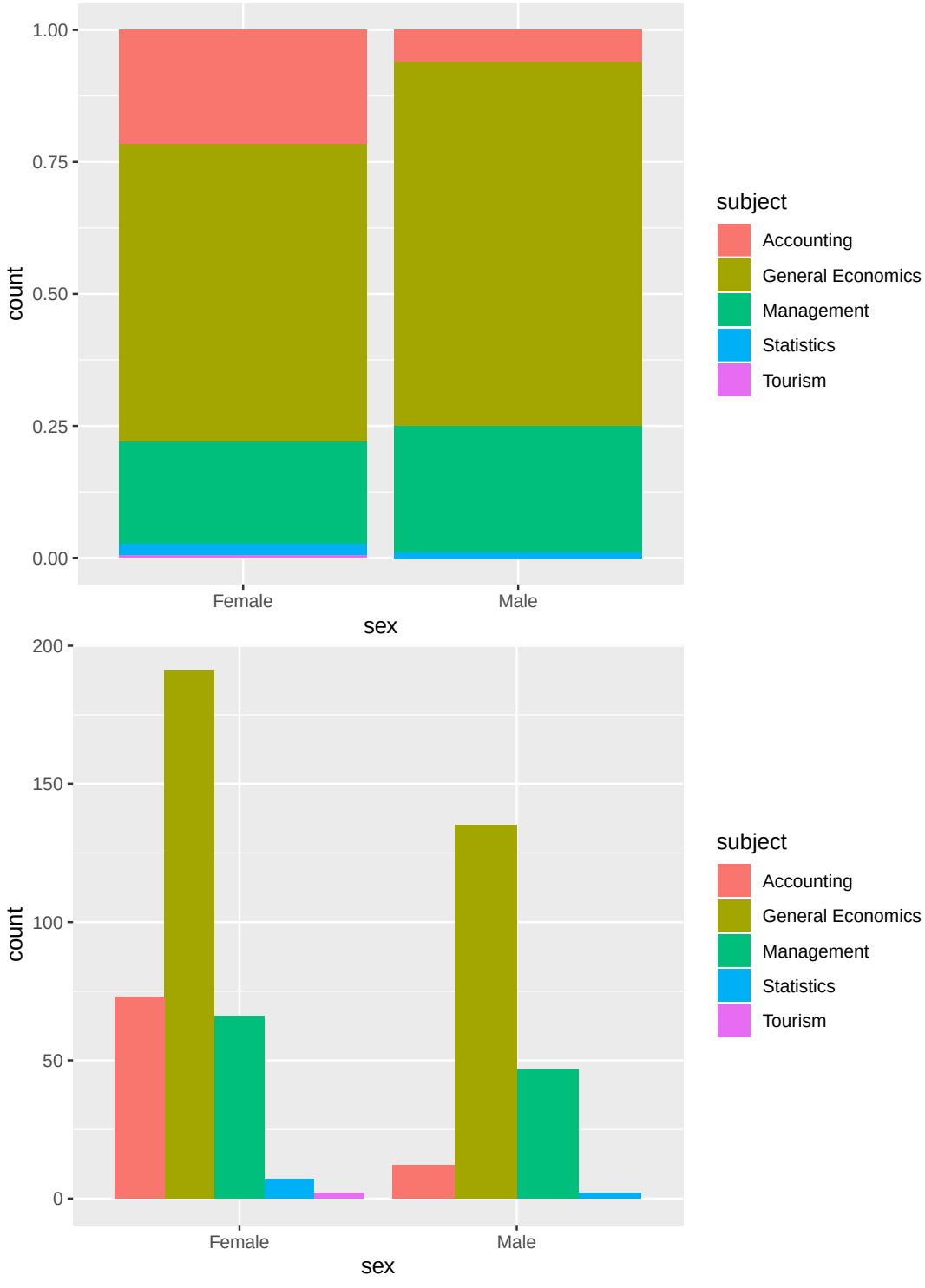
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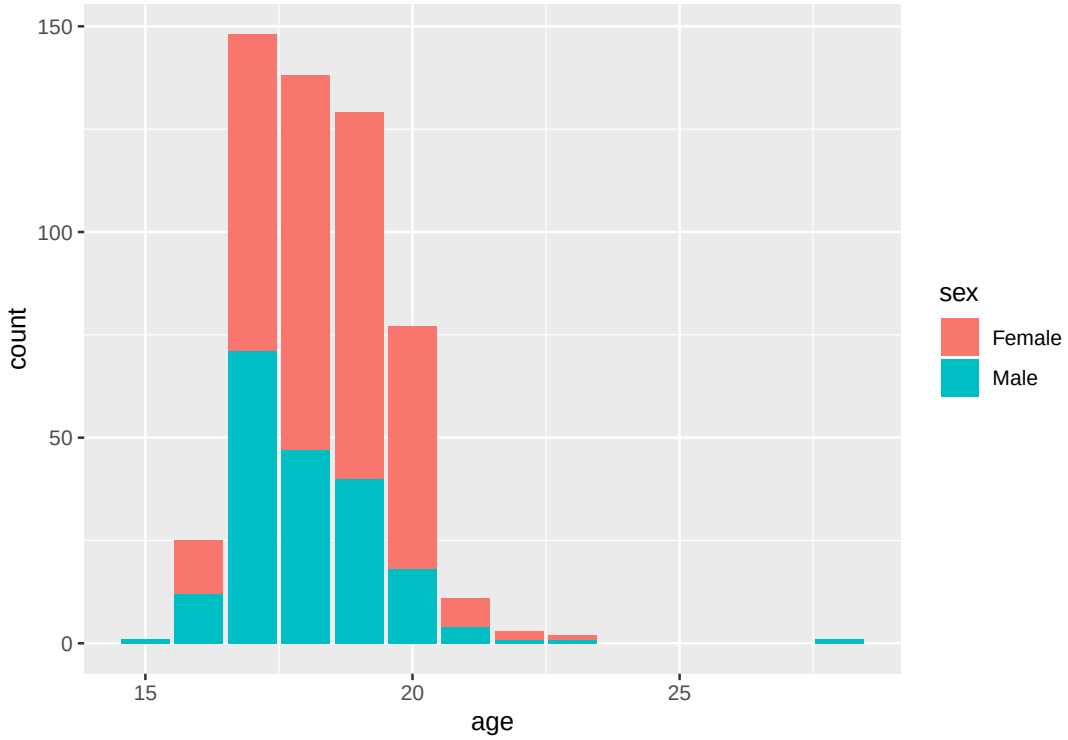
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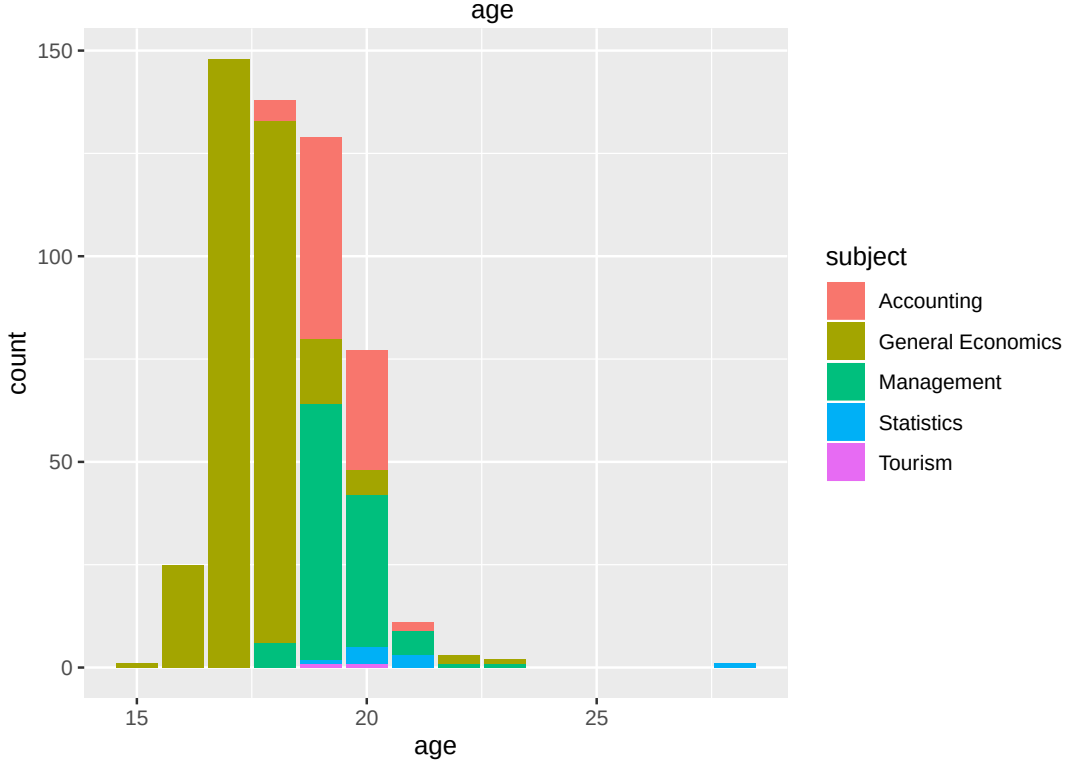
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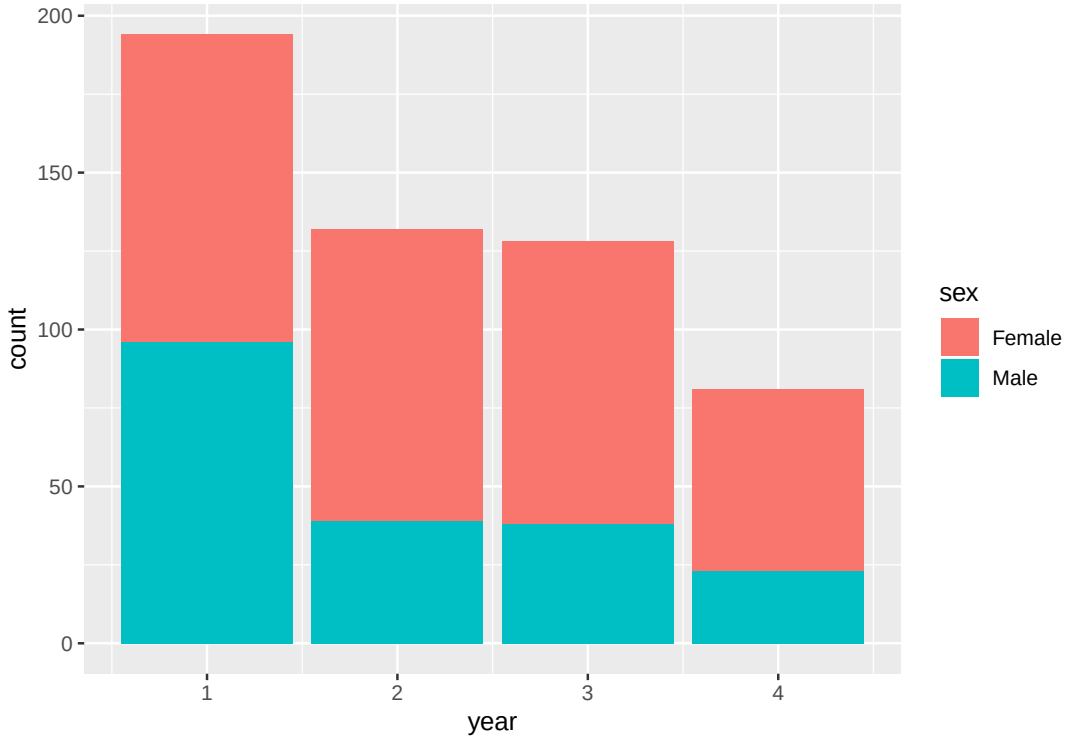
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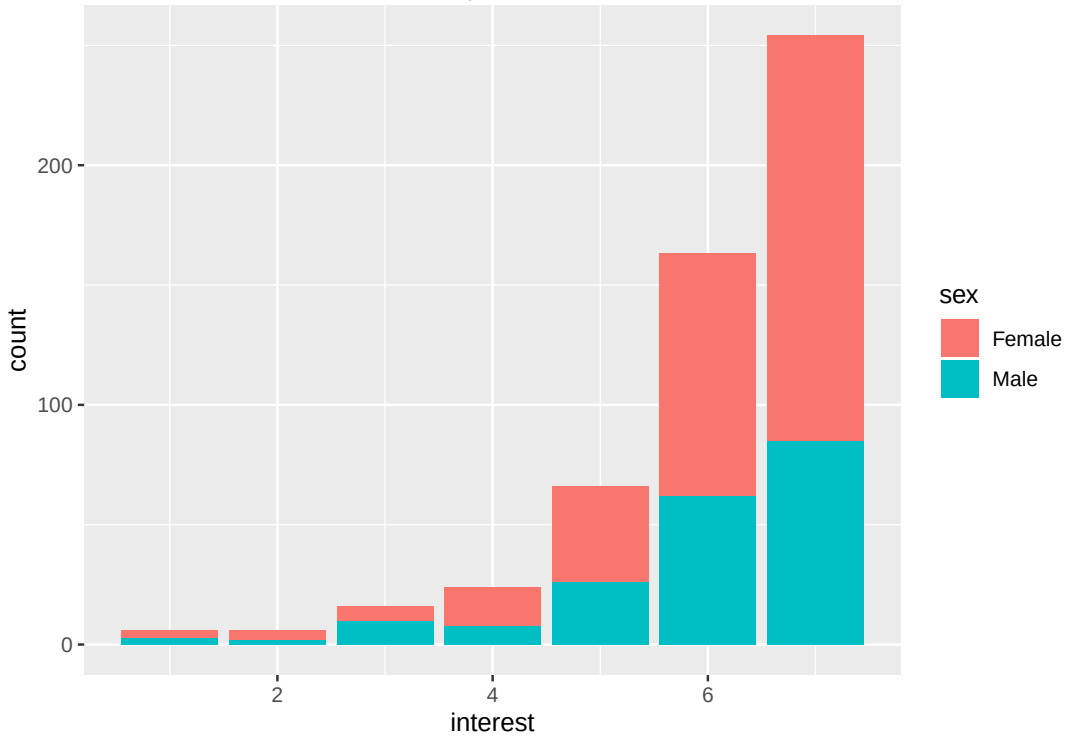
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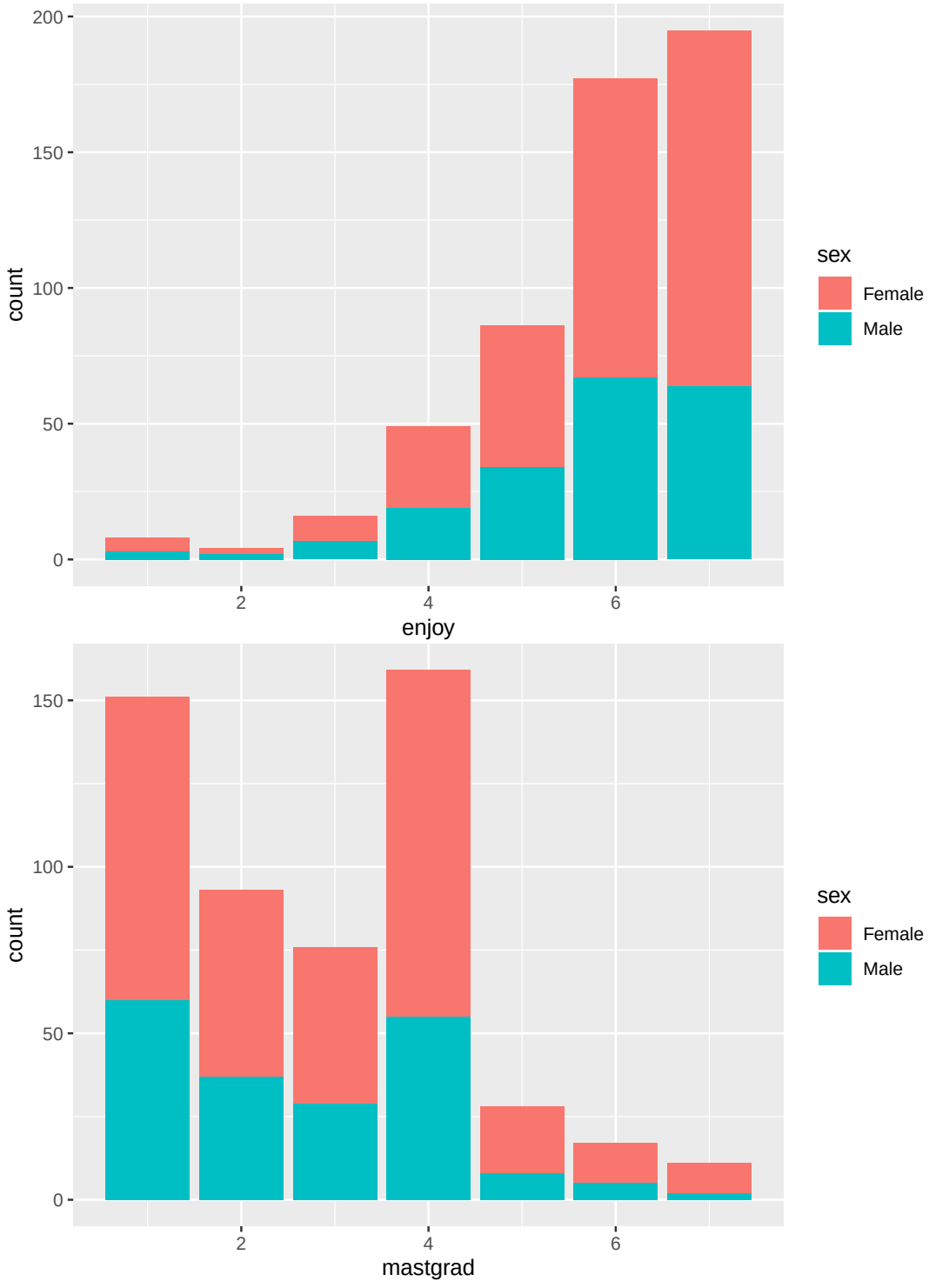
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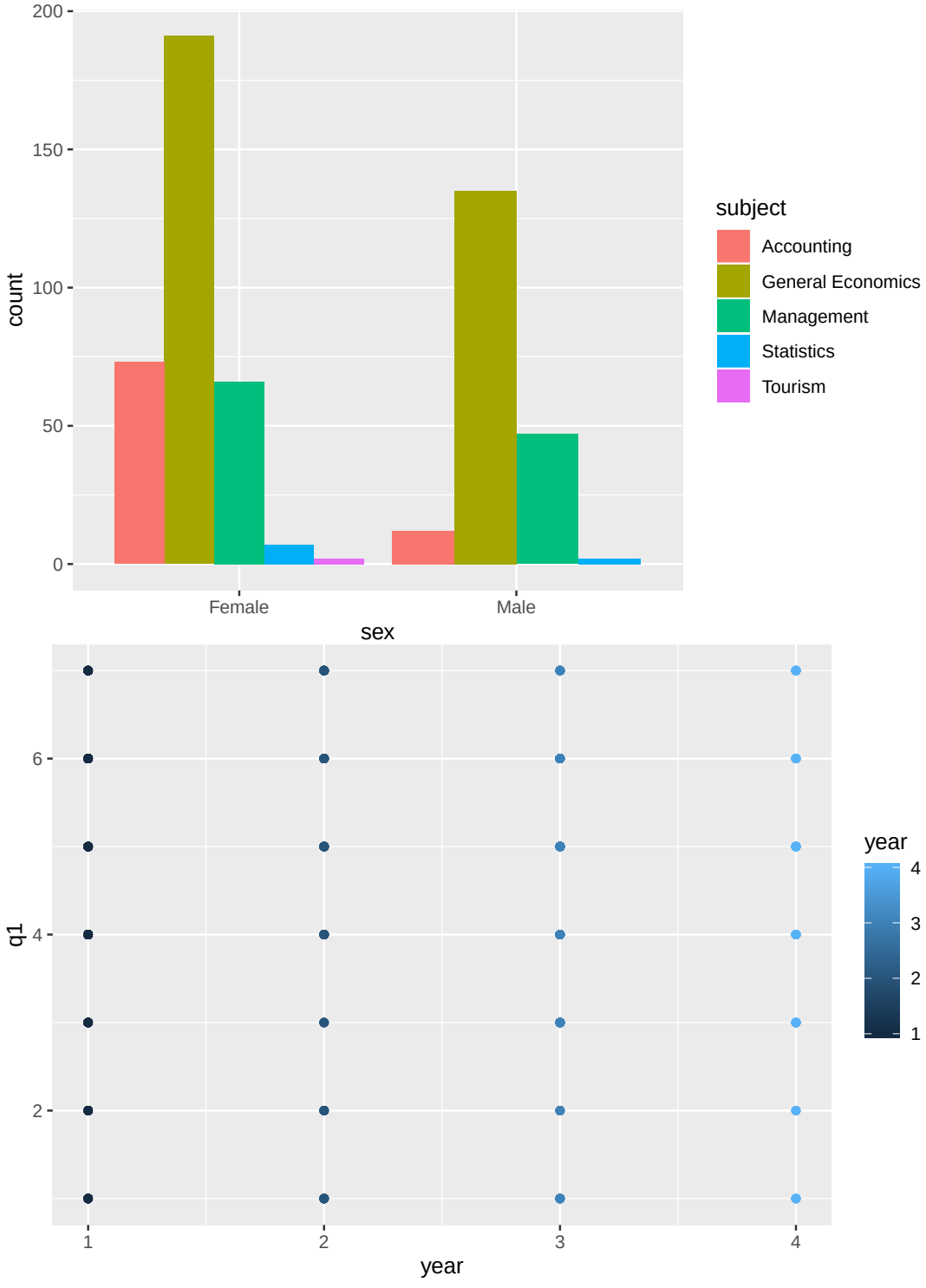
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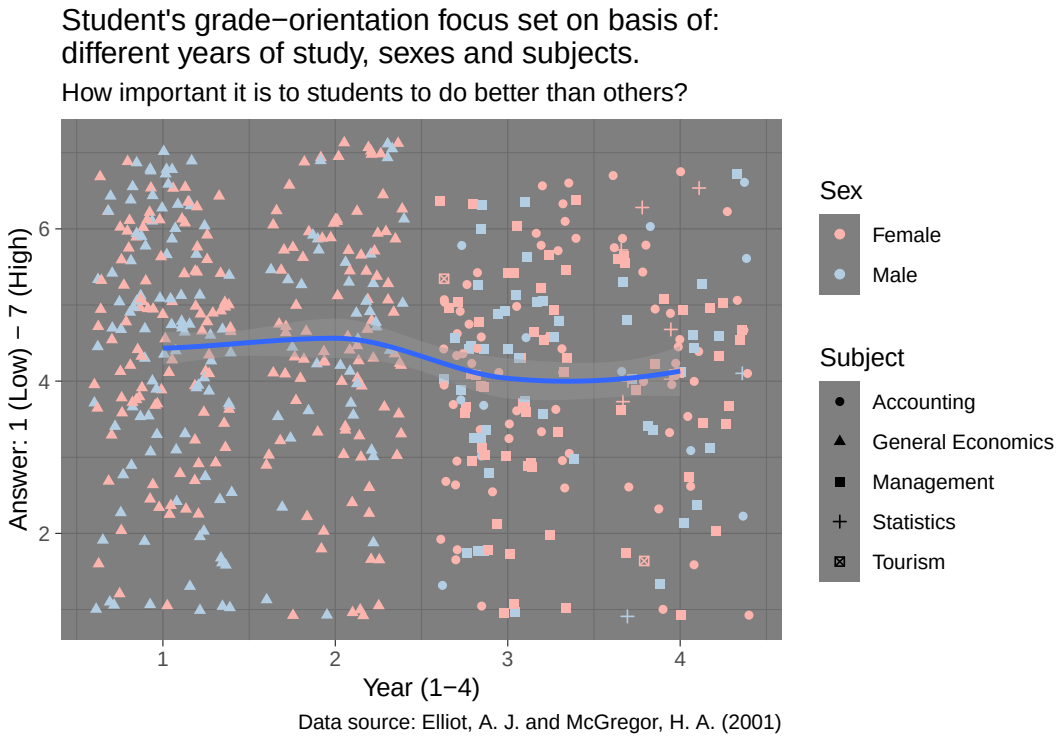
Student's grade−orientation focus set on basis of:
different years of study, sexes and subjects.
How important it is to students to do better than others?
Answer: 1 (Low) − 7 (High)
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Year (1−4)
Data source: Elliot, A. J. and McGregor, H. A. (2001)
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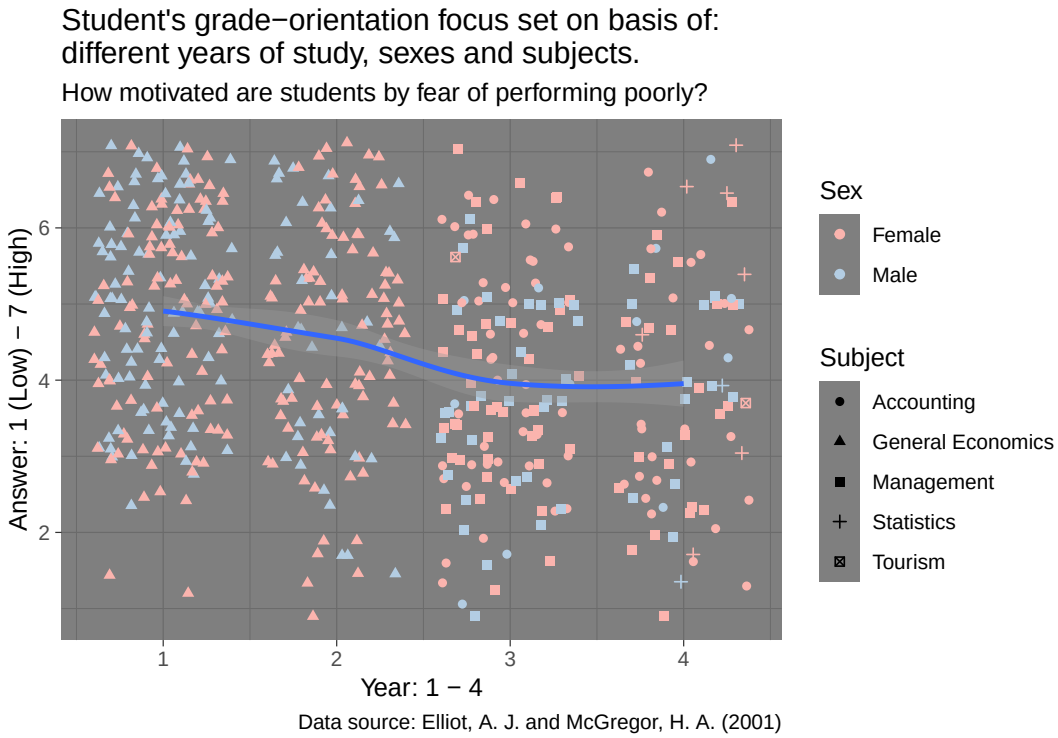
Statistics
Tourism

Figure 2: ...


Student's grade−orientation focus set on basis of:
different years of study, sexes and subjects.
How motivated are students by fear of performing poorly?
Answer: 1 (Low) − 7 (High)
6
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Year: 1 − 4
Data source: Elliot, A. J. and McGregor, H. A. (2001)
Sex
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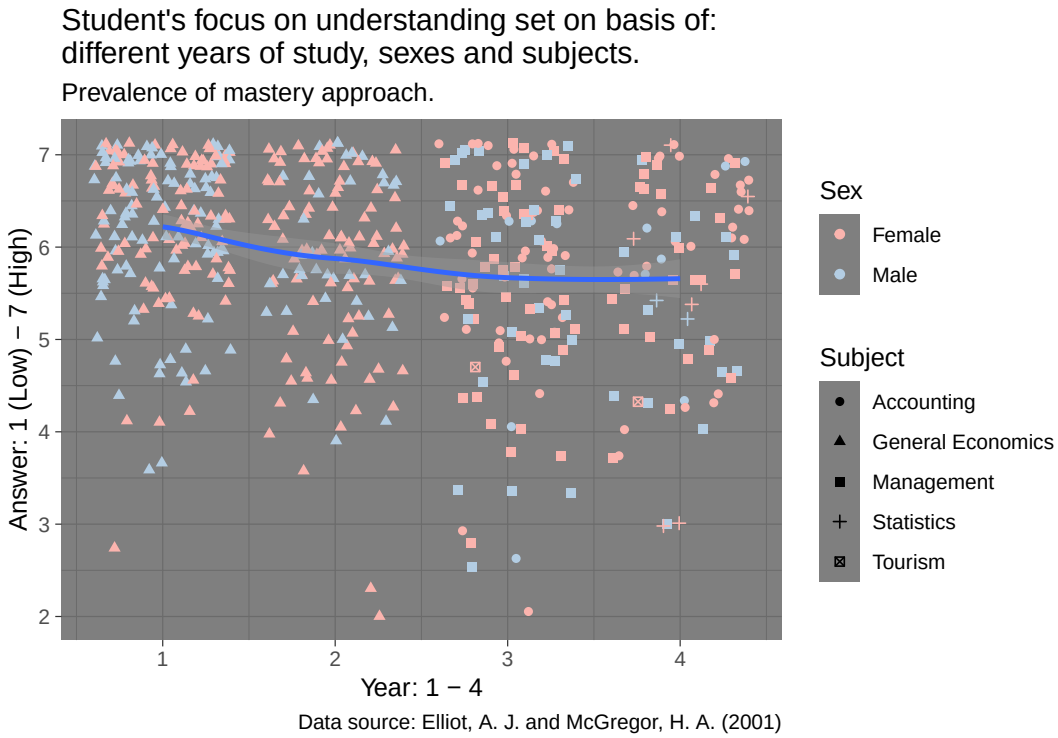
Tourism

Figure 3: ...


Student's focus on understanding set on basis of:
different years of study, sexes and subjects.
Prevalence of mastery approach.
Answer: 1 (Low) – 7 (High)
7
6
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Year: 1 – 4
Data source: Elliot, A. J. and McGregor, H. A. (2001)
Sex
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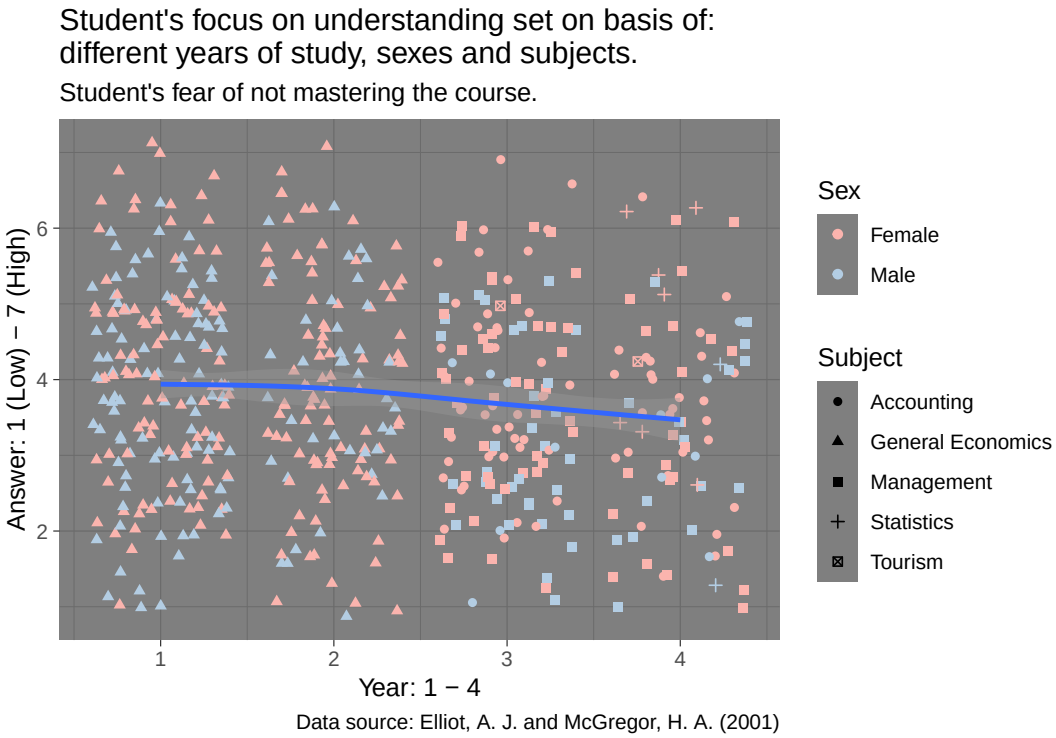
Figure 4: ...


Student's focus on understanding set on basis of:
different years of study, sexes and subjects.
Student's fear of not mastering the course.
Answer: 1 (Low) – 7 (High)
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Year: 1 − 4
Data source: Elliot, A. J. and McGregor, H. A. (2001)
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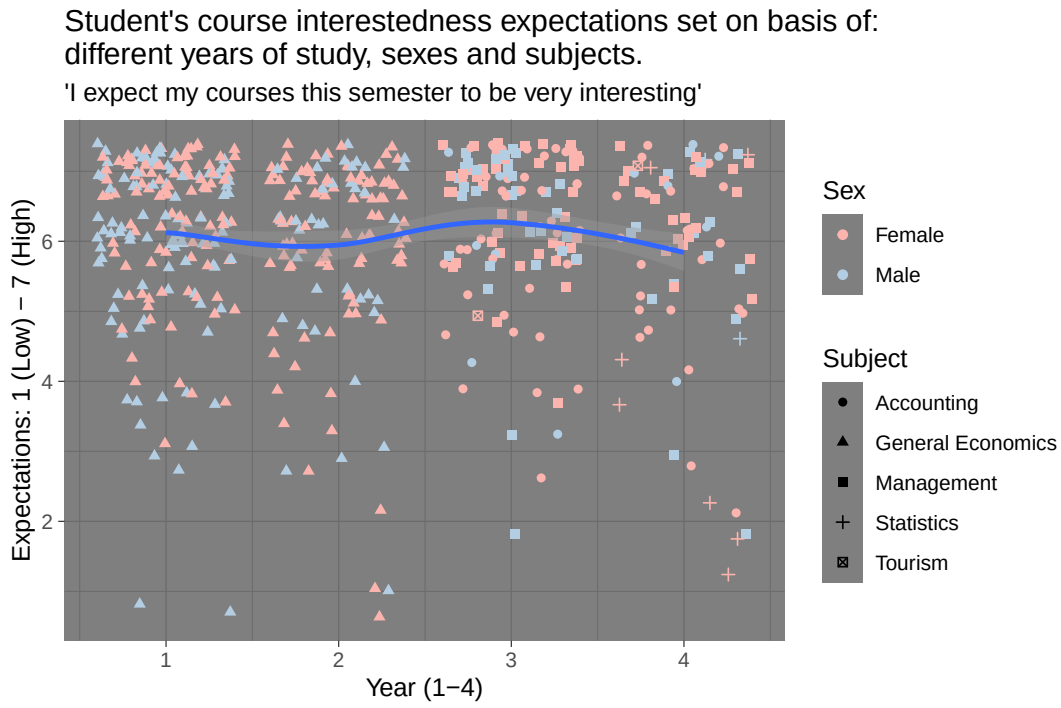
Figure 5: ...


Student's course interestedness expectations set on basis of:
different years of study, sexes and subjects.
'I expect my courses this semester to be very interesting'
Expectations: 1 (Low) – 7 (High)
6
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Year (1−4)
Sex
Female
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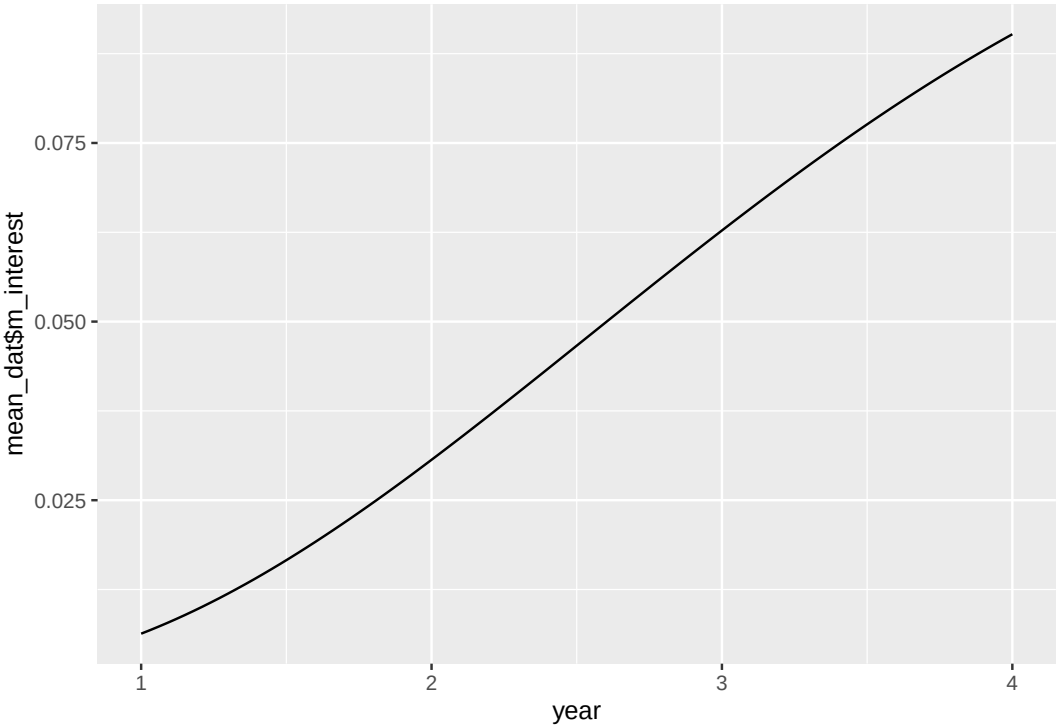
Data source: Elliot, A. J. and McGregor, H. A. (2001)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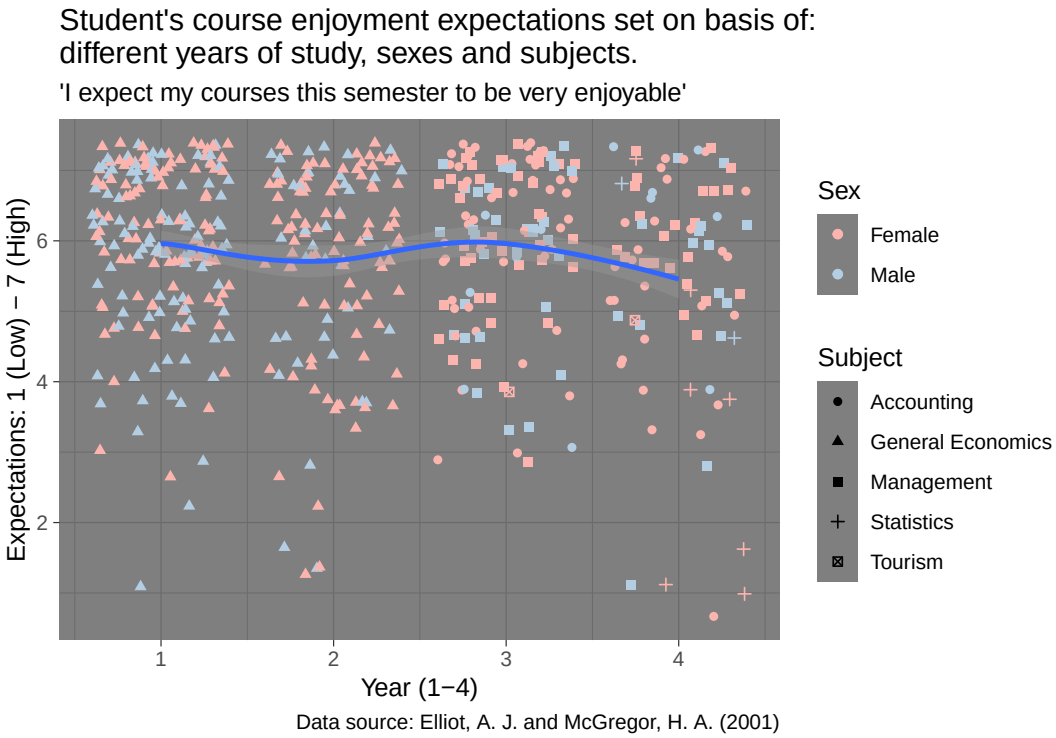
Student's course enjoyment expectations set on basis of:
different years of study, sexes and subjects.
'I expect my courses this semester to be very enjoyable'
Expectations: 1 (Low) – 7 (High)
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Year (1−4)
Data source: Elliot, A. J. and McGregor, H. A. (2001)
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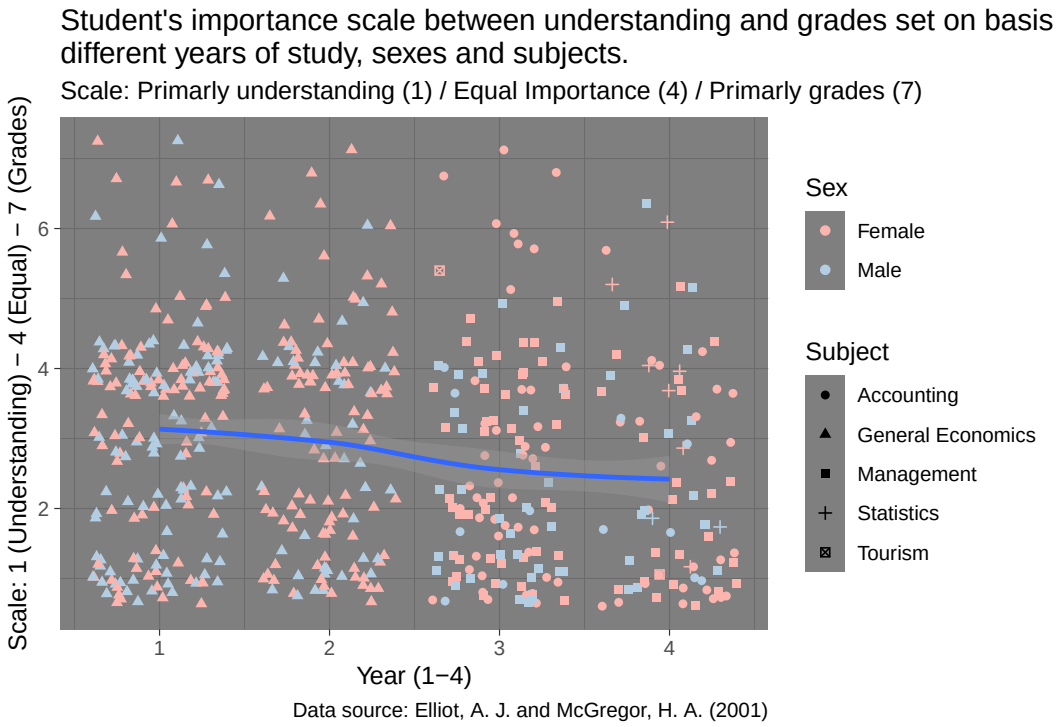
Figure 6: ...


Student's importance scale between understanding and grades set on basis different years of study, sexes and subjects.
Scale: Primarly understanding (1) / Equal Importance (4) / Primarly grades (7)
Scale: 1 (Understanding) – 4 (Equal) – 7 (Grades)
6
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1
2
3
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Year (1−4)
Data source: Elliot, A. J. and McGregor, H. A. (2001)
Sex
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Subject
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Statistics
Tourism

Figure 7: ...