

GOV 1372 Final Project: Gender Bias in the QGuide

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The code below will clean the data by removing any observations where the course lecturer's gender is unknown. Additionally, we manually sort each department into a department type – Arts/Humanities, Social Sciences, Science/Engineering Languages, and Miscellaneous.

```
# Load the data
qguide <- read_csv('2025springQ.csv')

## Rows: 1567 Columns: 41
## -- Column specification -----
## Delimiter: ","
## chr (11): course_code, course_title, course_teacher, link, fas_code, unique...
## dbl (30): course_id, num_responded, num_students, course_score_mean, course...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.

# Clean the data
# Drop any observations without a teacher gender coded in or with any other NA variables
qguide_clean <- subset(qguide, course_teacher_sex != "unknown")
qguide_clean <- qguide_clean %>% drop_na(lecturer_score_mean, course_score_mean, sentiment_score_mean, ...)

# Drop any observations with a response rate lower than 60%
qguide_clean <- qguide_clean %>%
  mutate(
    response_rate = num_responded/num_students
  )

qguide_clean <- qguide_clean %>%
  filter(response_rate >= 0.6)

# Drop any observations where lecturer score mean is 0
qguide_clean <- qguide_clean %>%
  filter(lecturer_score_mean != 0)

# Label each course's department type based on its course code
arts_hum <- c("AFRAMER", "AFVS", "ANCSTD", "CELTIC", "ANCSTD", "CLASARCH", "CLASPHIL", "CLS", "MEDGREEK")
social_sci <- c("ANTHRO", "ECON", "GOV", "HLTHPOL", "GHHP", "ESPP", "HISTSCI", "PSY", "SOC", "SOCIOL", "SOCIOL")
science_eng <- c("APCOMP", "APMTH", "APPHY", "ASTRON", "BPH", "BE", "BIOPHYS", "BIOSTAT", "CPB", "CHEM")
lang <- c("GREEK", "LATIN", "AFRIKAAN", "CHAGATAY", "CHNSE", "JAPAN", "KOREAN", "VIETNAM", "GERMAN", "SOM")
misc <- c("EXPOS", "GENED", "FYSEMR", "CE")
```

```

qguide_clean <- qguide_clean %>%
  mutate(dept = str_extract(course_code, "^[A-Za-z]+"))

qguide_clean <- qguide_clean %>%
  mutate(
    dept_type = case_when(
      dept %in% arts_hum ~ "Arts/Humanities",
      dept %in% social_sci ~ "Social Sciences",
      dept %in% science_eng ~ "Science/Engineering",
      dept %in% lang ~ "Languages",
      dept %in% misc ~ "GenEds, Expos, and First-Year Seminars",
      TRUE ~ "Other" # or NA
    )
  )

```

The code below creates exploratory graphs and statistics of the data.

```

# Exploratory tables and graphs
# Count how many observations in cleaned dataset
qguide_clean %>%
  nrow()

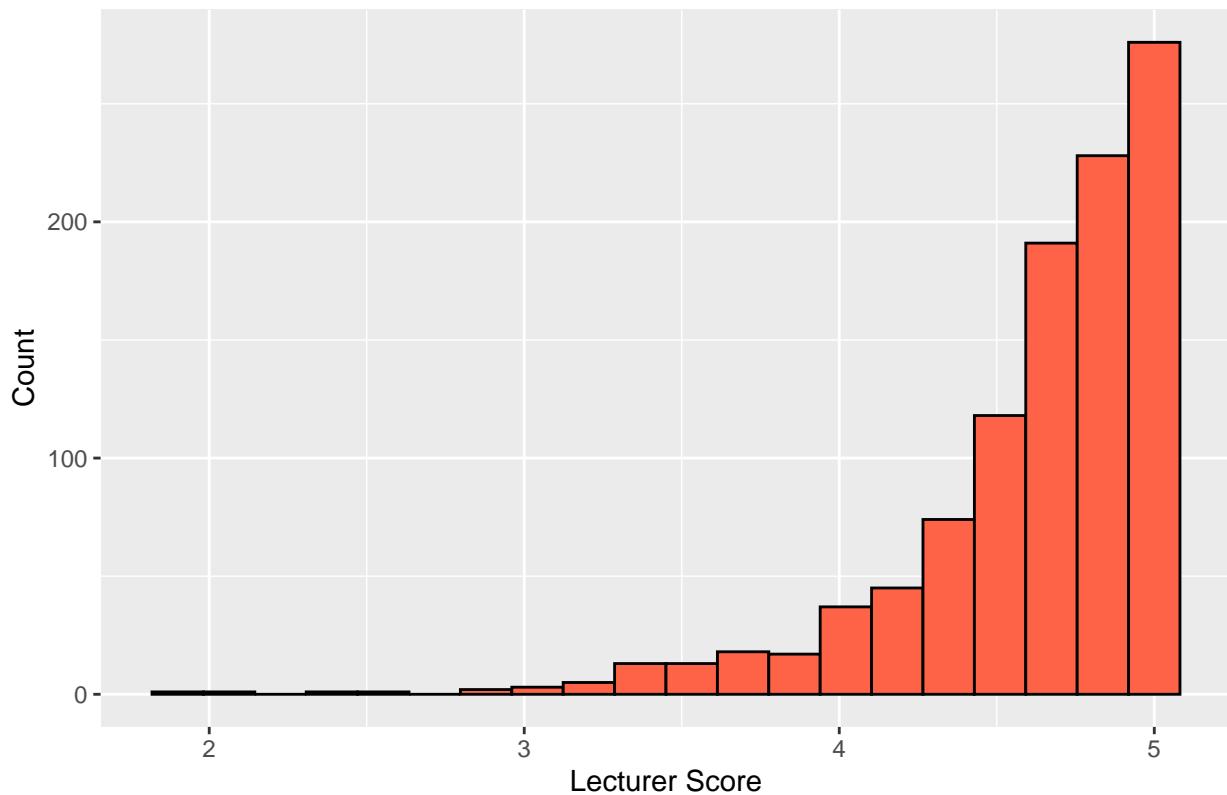
## [1] 1044

# Distribution of variables

# Distribution of lecturer scores
ggplot(qguide_clean, aes(x = lecturer_score_mean)) +
  geom_histogram(bins = 20, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Lecturer Scores",
    x = "Lecturer Score",
    y = "Count"
  )

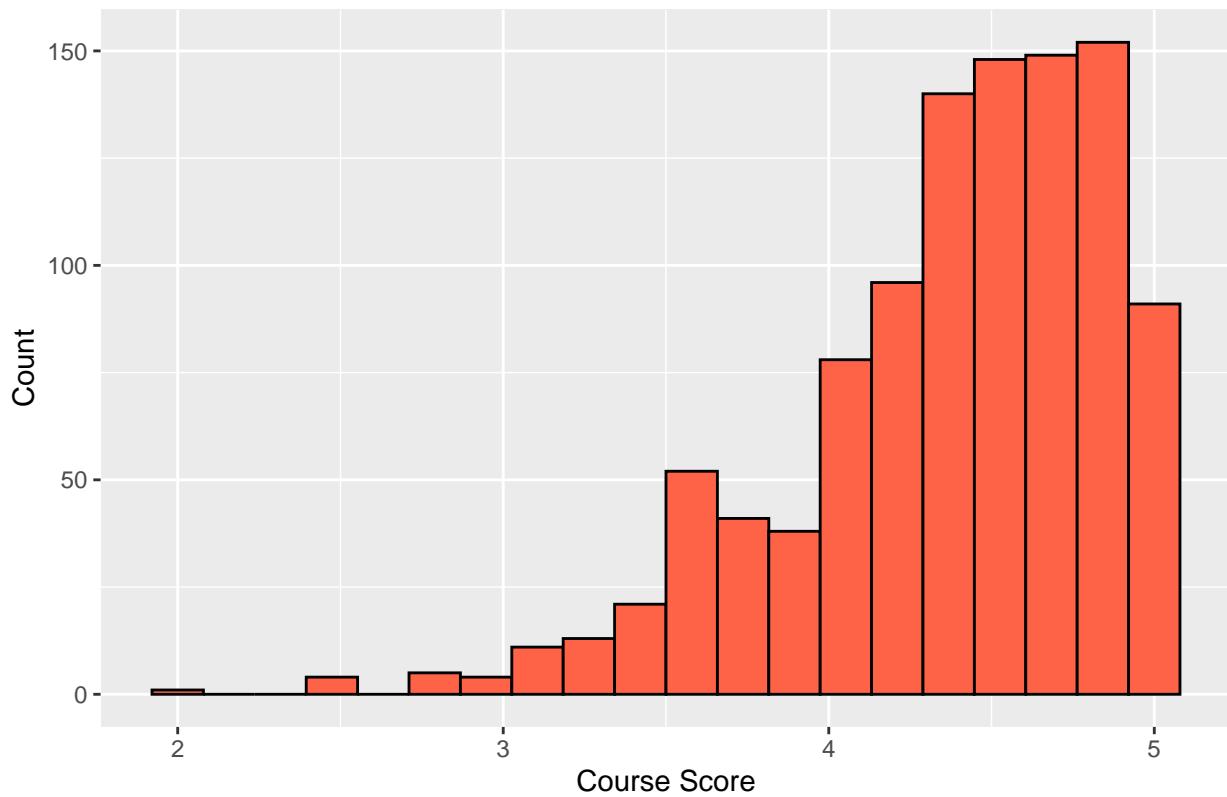
```

Distribution of Lecturer Scores

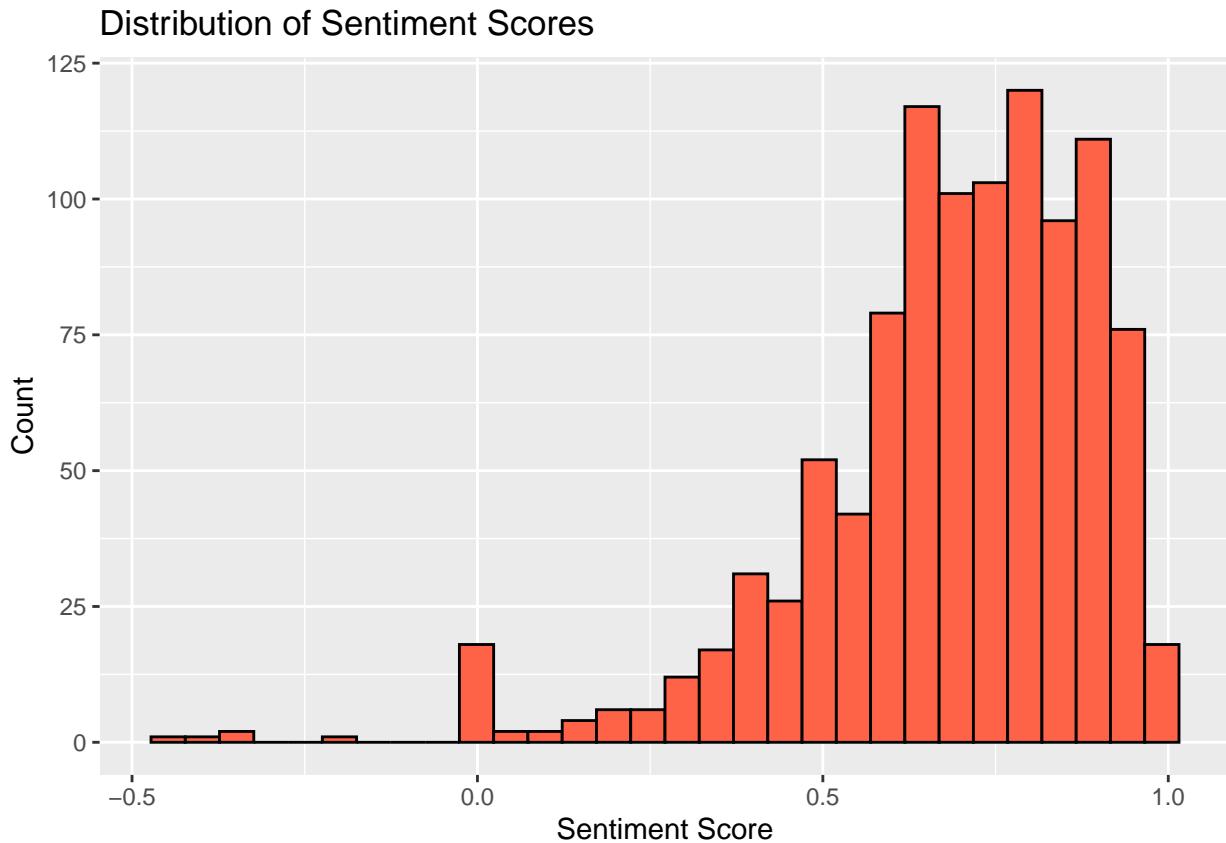


```
# Distribution of course scores
ggplot(qguide_clean, aes(x = course_score_mean)) +
  geom_histogram(bins = 20, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Course Scores",
    x = "Course Score",
    y = "Count"
  )
```

Distribution of Course Scores

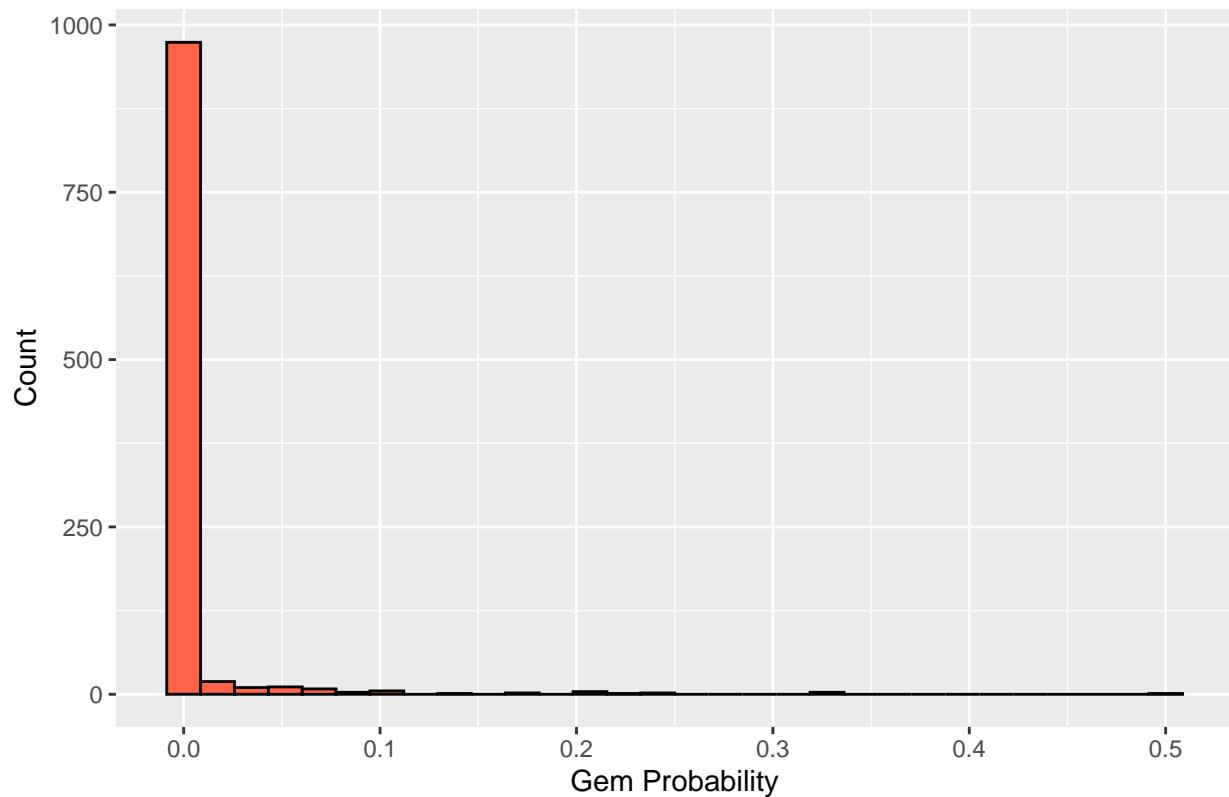


```
# Distribution of sentiment scores
ggplot(qguide_clean, aes(x = sentiment_score_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Sentiment Scores",
    x = "Sentiment Score",
    y = "Count"
  )
```



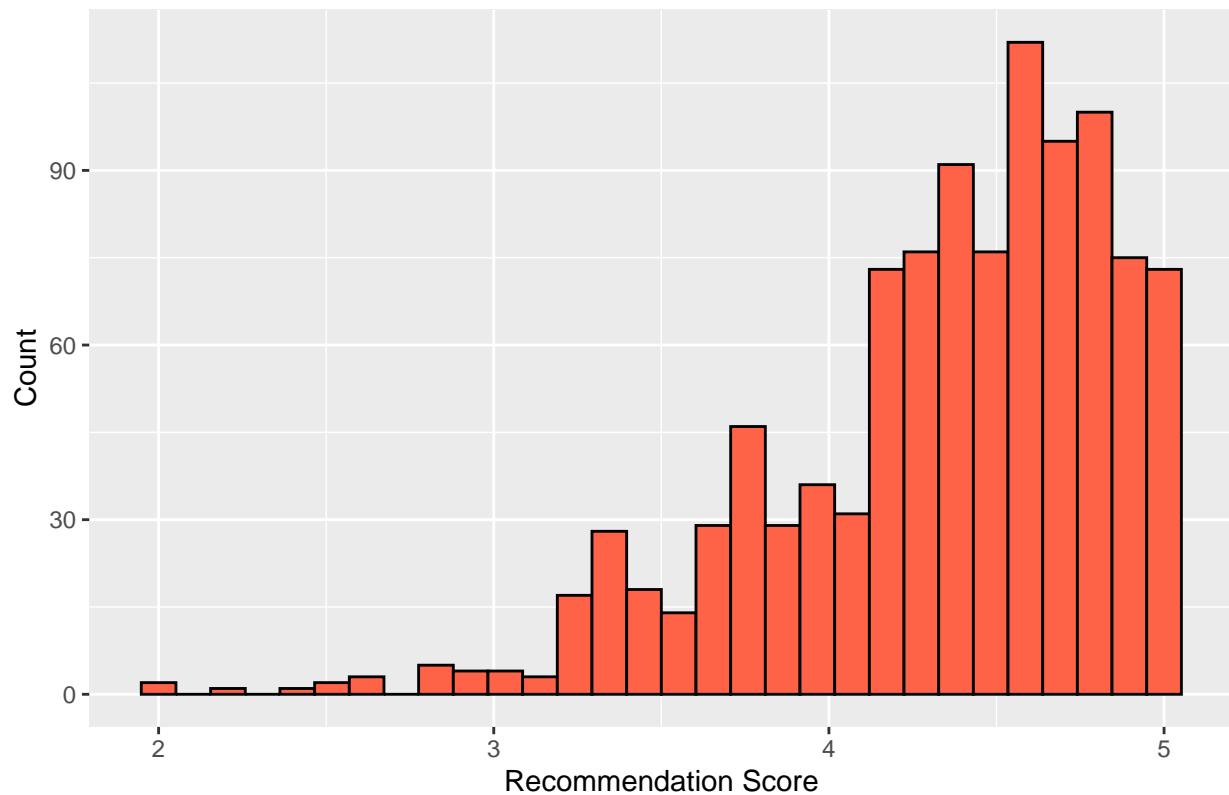
```
# Distribution of gem probability
ggplot(qguide_clean, aes(x = gem_probability_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Gem Probability",
    x = "Gem Probability",
    y = "Count"
  )
```

Distribution of Gem Probability



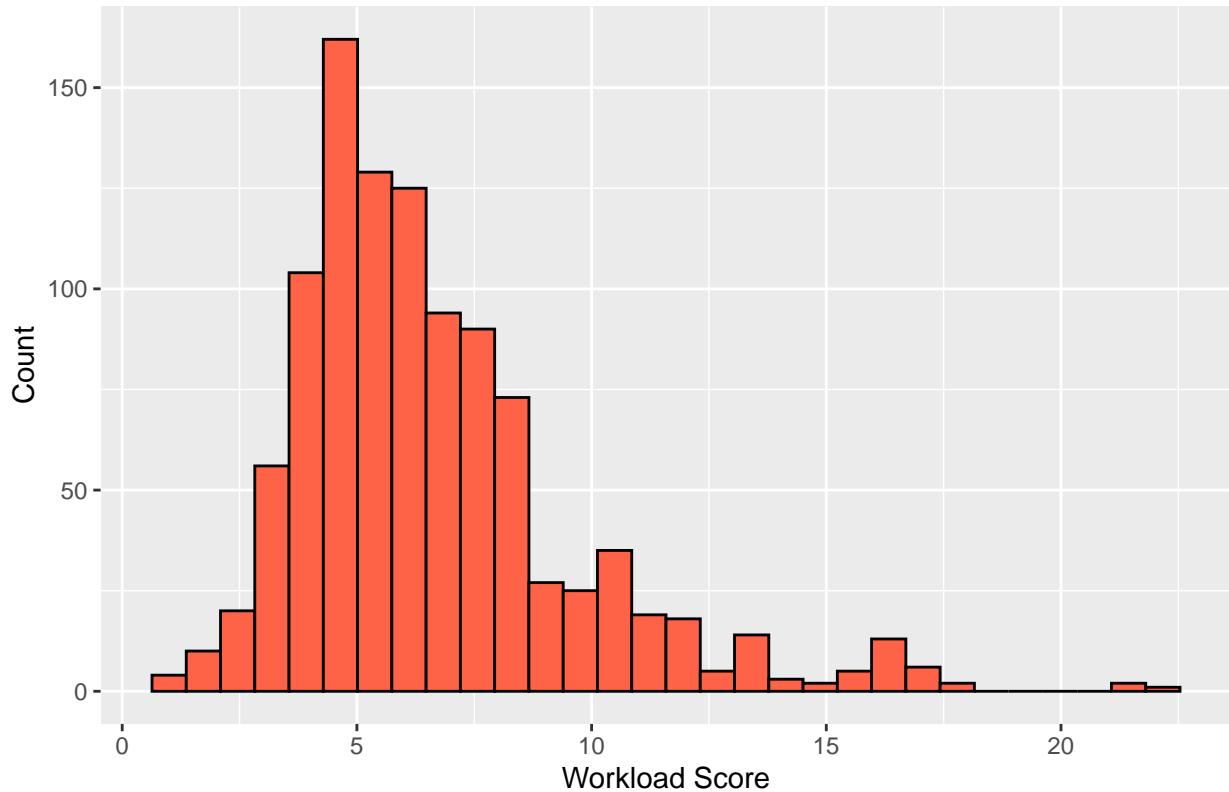
```
# Distribution of rec scores
ggplot(qguide_clean, aes(x = rec_score_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Recommendation Score",
    x = "Recommendation Score",
    y = "Count"
  )
```

Distribution of Recommendation Score



```
# Distribution of workload scores
ggplot(qguide_clean, aes(x = workload_score_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Workload Score",
    x = "Workload Score",
    y = "Count"
  )
```

Distribution of Workload Score



```
# Numerical calculation of proportions
qguide_clean %>%
  count(course_teacher_sex) %>%
  mutate(prop = n / sum(n))
```

```
## # A tibble: 2 x 3
##   course_teacher_sex     n   prop
##   <chr>             <int> <dbl>
## 1 female            388  0.372
## 2 male              656  0.628
```

```
qguide_clean %>%
  count(dept_type, course_teacher_sex) %>%
  group_by(dept_type) %>%
  mutate(prop = n / sum(n))
```

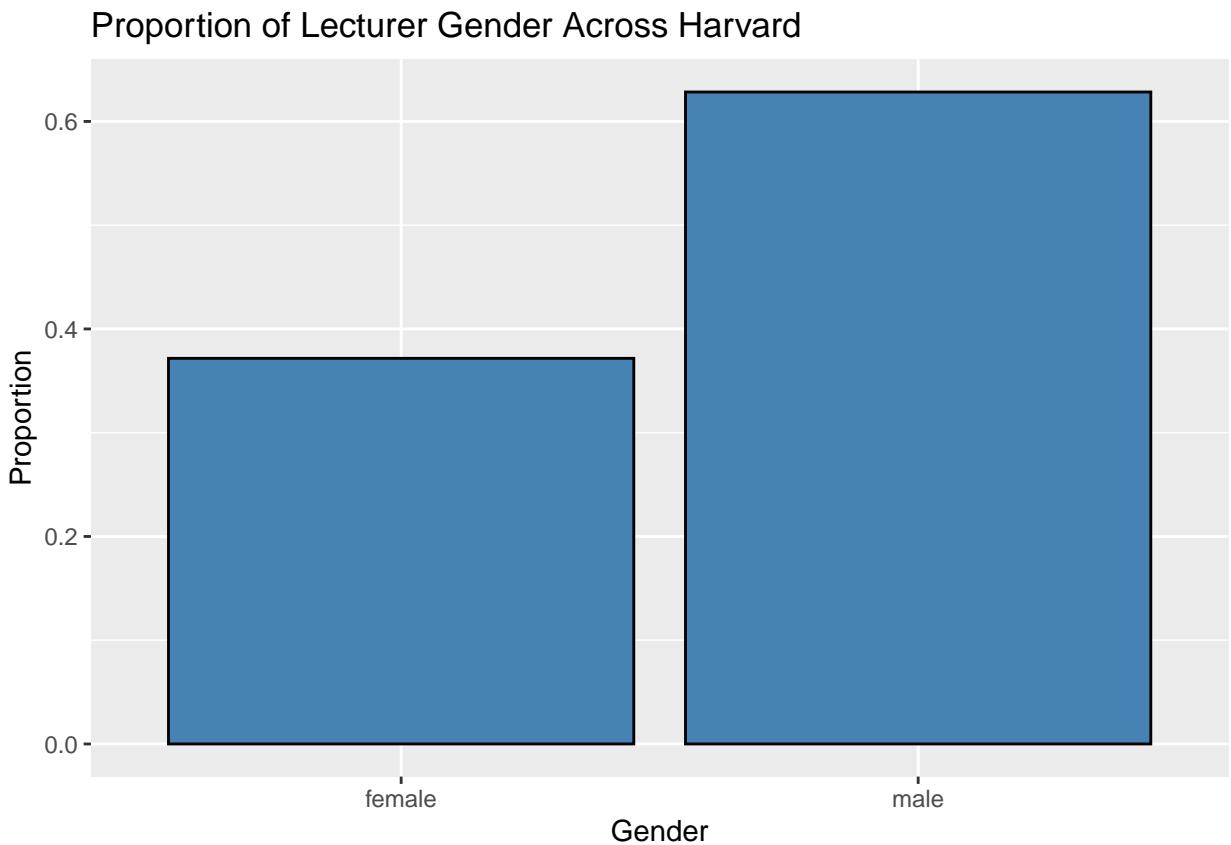
```
## # A tibble: 10 x 4
## # Groups: dept_type [5]
##   dept_type           course_teacher_sex     n   prop
##   <chr>             <chr>             <int> <dbl>
## 1 Arts/Humanities    female            124  0.453
## 2 Arts/Humanities    male              150  0.547
## 3 GenEds, Expos, and First-Year Seminars female  40  0.328
## 4 GenEds, Expos, and First-Year Seminars male   82  0.672
## 5 Languages          female            37  0.627
```

```

## 6 Languages                         male      22 0.373
## 7 Science/Engineering                female    112 0.309
## 8 Science/Engineering                male     250 0.691
## 9 Social Sciences                   female    75 0.330
## 10 Social Sciences                  male    152 0.670

# Bar plot of gender proportions
ggplot(qguide_clean, aes(x = course_teacher_sex)) +
  geom_bar(aes(y = after_stat(prop), group = 1), fill = "steelblue", color = "black") +
  labs(
    title = "Proportion of Lecturer Gender Across Harvard",
    x = "Gender",
    y = "Proportion"
  )

```

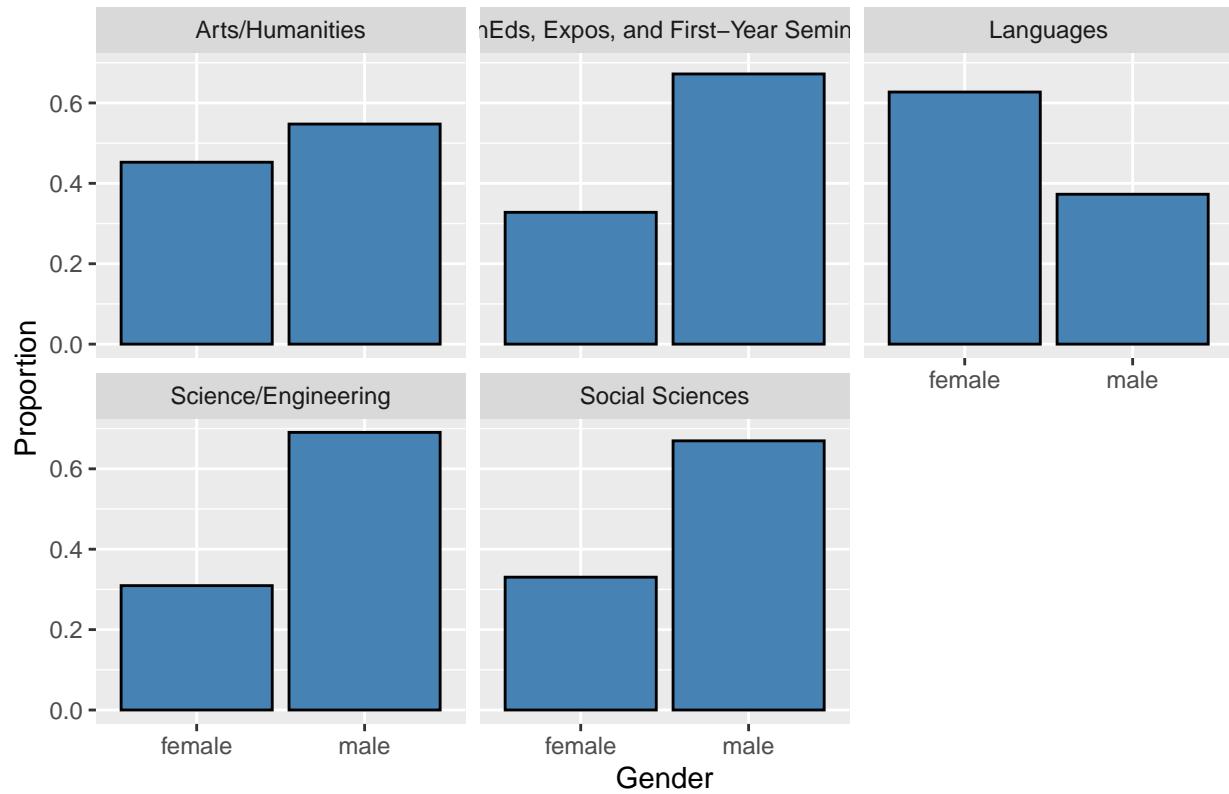


```

# Bar plot of gender proportions by department type
ggplot(qguide_clean, aes(x = course_teacher_sex)) +
  geom_bar(aes(y = after_stat(prop), group = 1), fill = "steelblue", color = "black") +
  facet_wrap(~ dept_type) +
  labs(
    title = "Proportion of Lecturer Gender by Department Type",
    x = "Gender",
    y = "Proportion"
  )

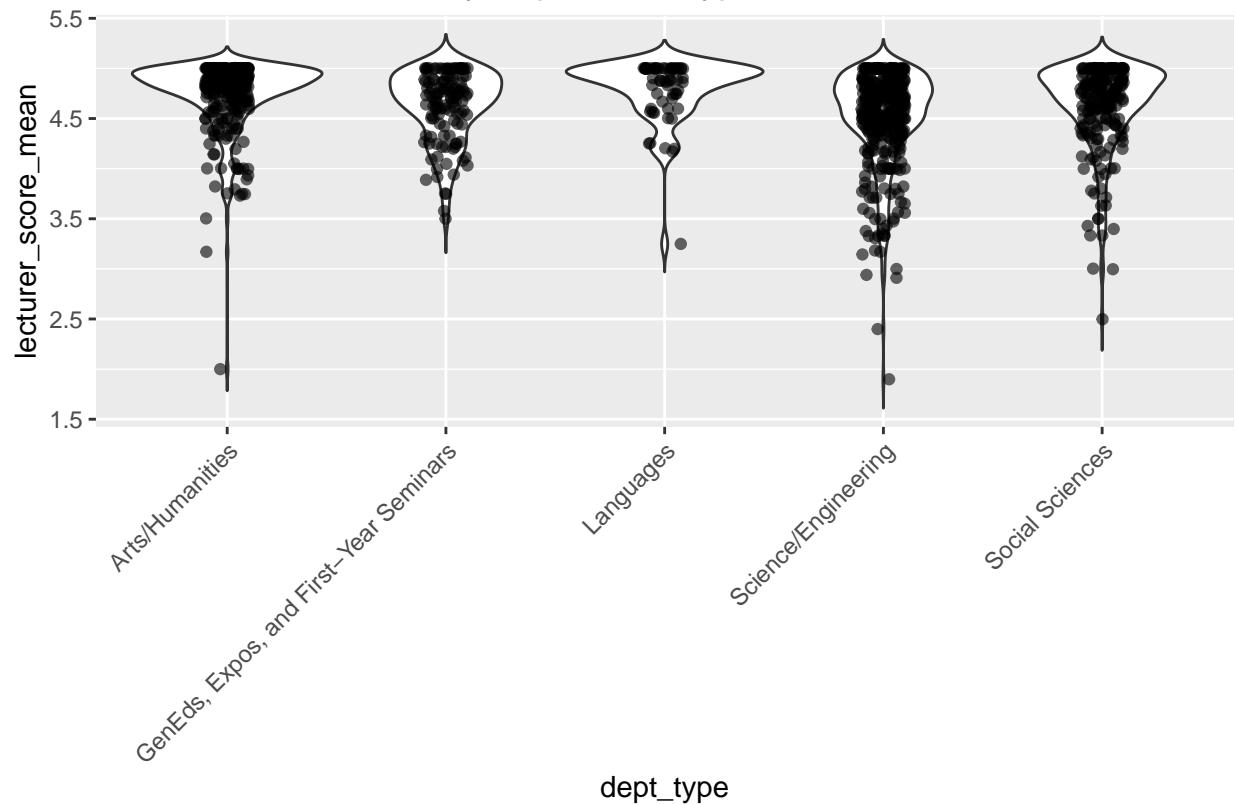
```

Proportion of Lecturer Gender by Department Type



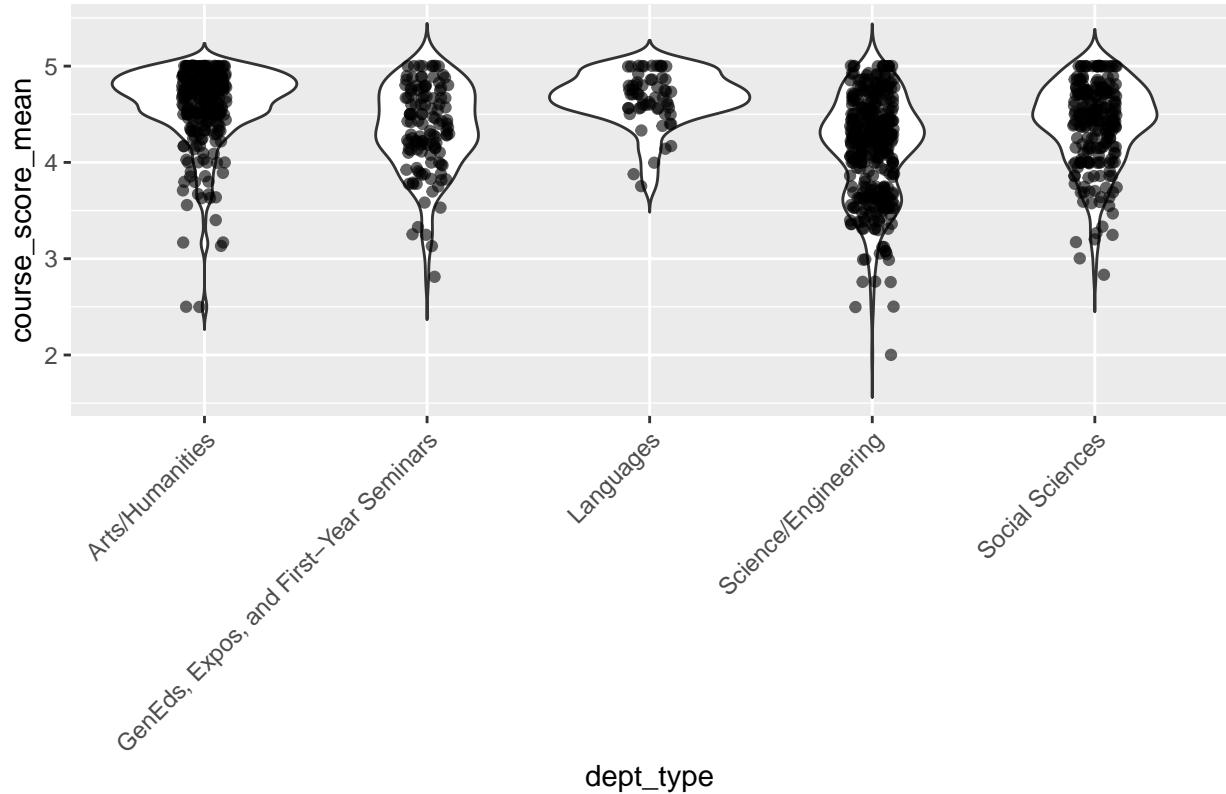
```
# Violin plot of lecturer score by department type
ggplot(qguide_clean, aes(x = dept_type, y = lecturer_score_mean)) +
  geom_violin(trim = FALSE) +
  geom_jitter(width = 0.1, alpha = 0.6) +
  labs(title = "Lecturer Mean Scores by Department Type") +
  theme(
    axis.text.x = element_text(angle = 45, hjust = 1, vjust = 1)
  )
```

Lecturer Mean Scores by Department Type



```
# Violin plot of course score by department type
ggplot(qguide_clean, aes(x = dept_type, y = course_score_mean)) +
  geom_violin(trim = FALSE) +
  geom_jitter(width = 0.1, alpha = 0.6) +
  labs(title = "Course Mean Scores by Department Type") +
  theme(
    axis.text.x = element_text(angle = 45, hjust = 1, vjust = 1)
  )
```

Course Mean Scores by Department Type



```
# Correlation matrix of all variables of interest
# Select the numeric variables of interest
corr_vars <- qguide_clean %>%
  select(
    workload_score_mean,
    course_score_mean,
    sentiment_score_mean,
    lecturer_score_mean,
    rec_score_mean
  )

# Compute correlation matrix
corr_mat <- cor(corr_vars, use = "pairwise.complete.obs")

# View numeric correlation matrix
corr_mat
```

| | workload_score_mean | course_score_mean | sentiment_score_mean |
|-------------------------|---------------------|-------------------|----------------------|
| ## workload_score_mean | 1.0000000 | -0.2018522 | -0.1725819 |
| ## course_score_mean | -0.2018522 | 1.0000000 | 0.4735197 |
| ## sentiment_score_mean | -0.1725819 | 0.4735197 | 1.0000000 |
| ## lecturer_score_mean | -0.1027224 | 0.6981786 | 0.3642038 |
| ## rec_score_mean | -0.2408130 | 0.9270342 | 0.4553551 |
| ## lecturer_score_mean | | | |
| ## workload_score_mean | -0.1027224 | -0.2408130 | |
| ## course_score_mean | 0.6981786 | 0.9270342 | |

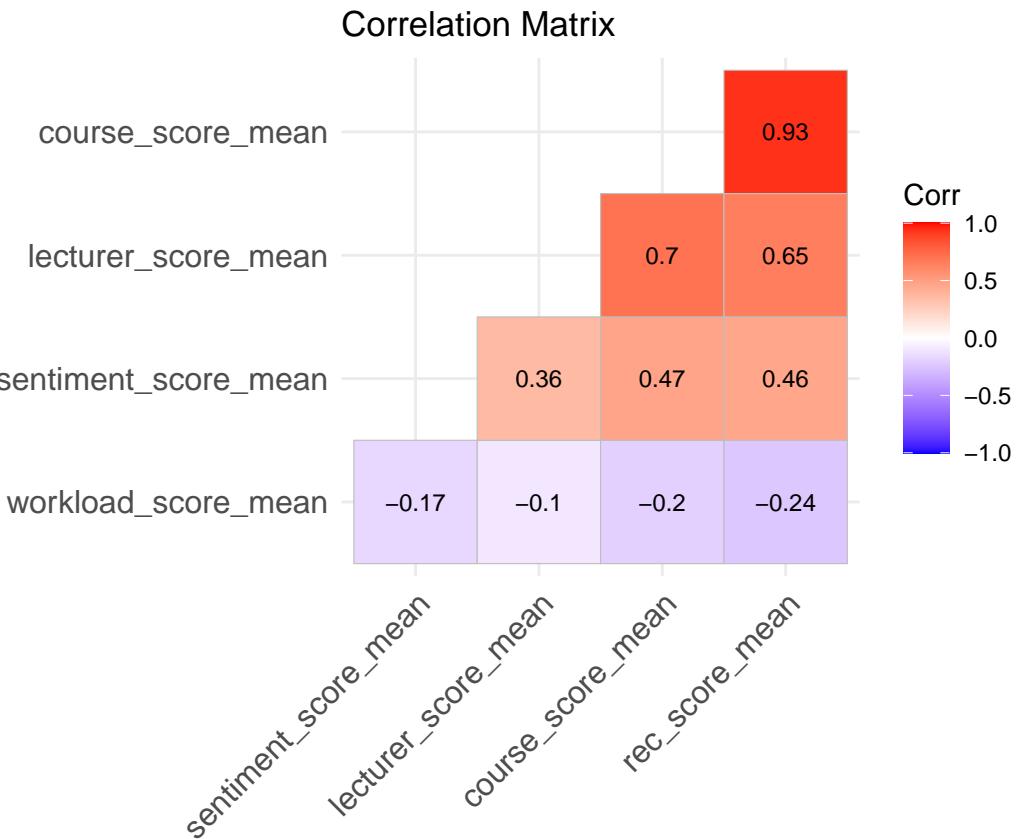
```

## sentiment_score_mean      0.3642038      0.4553551
## lecturer_score_mean       1.0000000      0.6491856
## rec_score_mean            0.6491856      1.0000000

# Plot correlation matrix
ggcorrplot(
  corr_mat,
  type = "lower",
  lab = TRUE,
  lab_size = 3,
  hc.order = TRUE
) +
  theme(
    axis.text.x = element_text(angle = 45, hjust = 1, vjust = 1)
  ) +
  ggtitle("Correlation Matrix")

## Warning: `aes_string()`' was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with `aes()`'.
## i See also `vignette("ggplot2-in-packages")`' for more information.
## i The deprecated feature was likely used in the ggcrrplot package.
##   Please report the issue at <https://github.com/kassambara/ggcrrplot/issues>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.

```



After conducting initial data exploration, the below portion runs the relevant regression analysis.

```

# Regression 1: Gender on Lecturer Score
fullmodel1 <- lm(lecturer_score_mean ~ course_teacher_sex +
                  dept_type +
                  sentiment_score_mean +
                  course_score_mean +
                  workload_score_mean,
                  data = qguide_clean)

summary(fullmodel1)

## 
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex + dept_type +
##     sentiment_score_mean + course_score_mean + workload_score_mean,
##     data = qguide_clean)
##
## Residuals:
##      Min        1Q    Median        3Q       Max
## -2.27093 -0.09388  0.01875  0.13038  1.05333
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.903665  0.103713 18.355
## course_teacher_sexmale     -0.032609  0.019826 -1.645
## dept_typeGenEds, Expos, and First-Year Seminars  0.039668  0.033831  1.173
## dept_typeLanguages          -0.017329  0.044078 -0.393
## dept_typeScience/Engineering 0.023351  0.026944  0.867
## dept_typeSocial Sciences    0.014131  0.027719  0.510
## sentiment_score_mean        0.086301  0.051616  1.672
## course_score_mean           0.601071  0.023531 25.544
## workload_score_mean         0.005901  0.003400  1.735
## 
## Pr(>|t|)
## (Intercept) <2e-16 ***
## course_teacher_sexmale 0.1003
## dept_typeGenEds, Expos, and First-Year Seminars 0.2413
## dept_typeLanguages 0.6943
## dept_typeScience/Engineering 0.3863
## dept_typeSocial Sciences 0.6103
## sentiment_score_mean 0.0948 .
## course_score_mean <2e-16 ***
## workload_score_mean 0.0830 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3035 on 1035 degrees of freedom
## Multiple R-squared:  0.4928, Adjusted R-squared:  0.4889
## F-statistic: 125.7 on 8 and 1035 DF,  p-value: < 2.2e-16

# Regression 2: Gender on Course Score
fullmodel2 <- lm(course_score_mean ~ course_teacher_sex +
                  sentiment_score_mean +
                  dept_type +
                  workload_score_mean +

```

```

        lecturer_score_mean,
      data = qguide_clean)

summary(fullmodel2)

##
## Call:
## lm(formula = course_score_mean ~ course_teacher_sex + sentiment_score_mean +
##     dept_type + workload_score_mean + lecturer_score_mean, data = qguide_clean)
##
## Residuals:
##    Min      1Q  Median      3Q      Max
## -1.2175 -0.1548  0.0201  0.1852  1.8138
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.198858  0.117773 10.179
## course_teacher_sexmale      0.012589  0.020534  0.613
## sentiment_score_mean        0.565117  0.050502 11.190
## dept_typeGenEds, Expos, and First-Year Seminars -0.192530  0.034507 -5.579
## dept_typeLanguages          0.039609  0.045586  0.869
## dept_typeScience/Engineering -0.237113  0.026892 -8.817
## dept_typeSocial Sciences   -0.122831  0.028424 -4.321
## workload_score_mean         -0.010132  0.003509 -2.888
## lecturer_score_mean          0.643286  0.025184 25.544
##
## Pr(>|t|)
## (Intercept) < 2e-16 ***
## course_teacher_sexmale      0.53996
## sentiment_score_mean        < 2e-16 ***
## dept_typeGenEds, Expos, and First-Year Seminars 3.08e-08 ***
## dept_typeLanguages          0.38512
## dept_typeScience/Engineering < 2e-16 ***
## dept_typeSocial Sciences    1.70e-05 ***
## workload_score_mean          0.00396 **
## lecturer_score_mean          < 2e-16 ***
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3139 on 1035 degrees of freedom
## Multiple R-squared:  0.5921, Adjusted R-squared:  0.589
## F-statistic: 187.8 on 8 and 1035 DF,  p-value: < 2.2e-16

```

```

# Regression 3:
fullmodel3 <- lm(lecturer_score_mean ~ course_teacher_sex * dept_type +
                  workload_score_mean +
                  course_score_mean +
                  sentiment_score_mean,
                  data = qguide_clean)

summary(fullmodel3)

```

```

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##     workload_score_mean +
##     course_score_mean +
##     sentiment_score_mean, data = qguide_clean)

```

```

## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##     workload_score_mean + course_score_mean + sentiment_score_mean,
##     data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.25641 -0.09346  0.02003  0.13218  1.06325
##
## Coefficients:
##                               Estimate
## (Intercept)                1.921869
## course_teacher_sexmale      -0.060199
## dept_typeGenEds, Expos, and First-Year Seminars 0.006200
## dept_typeLanguages          -0.078301
## dept_typeScience/Engineering 0.033597
## dept_typeSocial Sciences    -0.030105
## workload_score_mean         0.005558
## course_score_mean            0.600516
## sentiment_score_mean         0.088366
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.054245
## course_teacher_sexmale:dept_typeLanguages                      0.151919
## course_teacher_sexmale:dept_typeScience/Engineering           -0.008268
## course_teacher_sexmale:dept_typeSocial Sciences                 0.071110
##
## Std. Error
## (Intercept)               0.104602
## course_teacher_sexmale      0.036904
## dept_typeGenEds, Expos, and First-Year Seminars 0.055360
## dept_typeLanguages          0.057113
## dept_typeScience/Engineering 0.040861
## dept_typeSocial Sciences    0.044563
## workload_score_mean         0.003408
## course_score_mean            0.023566
## sentiment_score_mean         0.051630
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.069204
## course_teacher_sexmale:dept_typeLanguages                      0.089580
## course_teacher_sexmale:dept_typeScience/Engineering           0.050498
## course_teacher_sexmale:dept_typeSocial Sciences                 0.056589
##
## t value
## (Intercept)                18.373
## course_teacher_sexmale      -1.631
## dept_typeGenEds, Expos, and First-Year Seminars 0.112
## dept_typeLanguages          -1.371
## dept_typeScience/Engineering 0.822
## dept_typeSocial Sciences    -0.676
## workload_score_mean         1.631
## course_score_mean             25.482
## sentiment_score_mean          1.712
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.784
## course_teacher_sexmale:dept_typeLanguages                      1.696
## course_teacher_sexmale:dept_typeScience/Engineering           -0.164
## course_teacher_sexmale:dept_typeSocial Sciences                 1.257
##
## Pr(>|t| )
## (Intercept) <2e-16
## course_teacher_sexmale          0.1031

```

```

## dept_typeGenEds, Expos, and First-Year Seminars          0.9109
## dept_typeLanguages                                     0.1707
## dept_typeScience/Engineering                         0.4111
## dept_typeSocial Sciences                           0.4995
## workload_score_mean                                0.1033
## course_score_mean                                    <2e-16
## sentiment_score_mean                               0.0873
## course_teacher.sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.4333
## course_teacher.sexmale:dept_typeLanguages           0.0902
## course_teacher.sexmale:dept_typeScience/Engineering 0.8700
## course_teacher.sexmale:dept_typeSocial Sciences     0.2092
##
## (Intercept)                                         ***
## course_teacher.sexmale
## dept_typeGenEds, Expos, and First-Year Seminars
## dept_typeLanguages
## dept_typeScience/Engineering
## dept_typeSocial Sciences
## workload_score_mean
## course_score_mean                                     ***
## sentiment_score_mean
## course_teacher.sexmale:dept_typeGenEds, Expos, and First-Year Seminars .
## course_teacher.sexmale:dept_typeLanguages             .
## course_teacher.sexmale:dept_typeScience/Engineering .
## course_teacher.sexmale:dept_typeSocial Sciences       .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3033 on 1031 degrees of freedom
## Multiple R-squared:  0.4954, Adjusted R-squared:  0.4895
## F-statistic: 84.34 on 12 and 1031 DF,  p-value: < 2.2e-16

# Output all three regressions using stargazer
stargazer(fullmodel1, fullmodel2, fullmodel3,
           type = "text",
           title = "Regression Results",
           column.labels = c("Lecturer Score", "Course Score", "Lecturer Score by Department"))

##
## Regression Results
## =====
##
## -----
## lecturer_score_mean
## Lecturer Score
## (1)
## -----
## course_teacher.sexmale                                -0.033
## (0.020)
## -----
## dept_typeGenEds, Expos, and First-Year Seminars      0.040
## (0.034)
## -----
## dept_typeLanguages                                  -0.017

```

```

## (0.044)
## 
## dept_typeScience/Engineering 0.023
## (0.027)
## 
## dept_typeSocial Sciences 0.014
## (0.028)
## 
## sentiment_score_mean 0.086*
## (0.052)
## 
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars
## 
## course_teacher_sexmale:dept_typeLanguages
## 
## course_teacher_sexmale:dept_typeScience/Engineering
## 
## course_teacher_sexmale:dept_typeSocial Sciences
## 
## course_score_mean 0.601***
## (0.024)
## 
## workload_score_mean 0.006*
## (0.003)
## 
## lecturer_score_mean
## 
## Constant 1.904***
## (0.104)
## -----
## Observations 1,044
## R2 0.493
## Adjusted R2 0.489
## Residual Std. Error 0.303 (df = 1035)
## F Statistic 125.715*** (df = 8; 1035) 187
## =====
## Note:

```

```

# Regression 1, progressive controls analysis

# Model 1a: Gender only (no controls)
model1a <- lm(lecturer_score_mean ~ course_teacher_sex,
               data = qguide_clean)

# Model 1b: Gender + Dept Type
model1b <- lm(lecturer_score_mean ~ course_teacher_sex +
               dept_type,
               data = qguide_clean)

```

```

# Model 1c: Gender + Dept Type + Sentiment Score
model1c <- lm(lecturer_score_mean ~ course_teacher_sex +
               dept_type +
               sentiment_score_mean,
               data = qguide_clean)

# Model 1d: Gender + Dept Type + Sentiment Score + Course Score
model1d <- lm(lecturer_score_mean ~ course_teacher_sex +
               dept_type +
               sentiment_score_mean +
               course_score_mean,
               data = qguide_clean)

# View all Model 1 specifications
summary(model1a)

```

```

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex, data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.6945 -0.1445  0.1246  0.3155  0.4055
##
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)             4.67642    0.02147 217.859 < 2e-16 ***
## course_teacher_sexmale -0.08195    0.02708 -3.026  0.00254 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4228 on 1042 degrees of freedom
## Multiple R-squared:  0.008713, Adjusted R-squared:  0.007762
## F-statistic: 9.159 on 1 and 1042 DF, p-value: 0.002536

```

```
summary(model1b)
```

```

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex + dept_type,
##      data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.7138 -0.1325  0.1114  0.2699  0.5103
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)             4.76659    0.02897 164.539
## course_teacher_sexmale -0.05283    0.02688 -1.965
## dept_typeGenEds, Expos, and First-Year Seminars -0.10354    0.04508 -2.297
## dept_typeLanguages        0.03955    0.05947  0.665

```

```

## dept_typeScience/Engineering      -0.22408   0.03330  -6.729
## dept_typeSocial Sciences        -0.09614   0.03722  -2.583
##
## (Intercept)                      Pr(>|t|)
## course_teacher_sexmale           < 2e-16 ***
## dept_typeGenEds, Expos, and First-Year Seminars  0.02184 *
## dept_typeLanguages                0.50612
## dept_typeScience/Engineering     2.81e-11 ***
## dept_typeSocial Sciences          0.00992 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4131 on 1038 degrees of freedom
## Multiple R-squared:  0.05759,    Adjusted R-squared:  0.05305
## F-statistic: 12.69 on 5 and 1038 DF,  p-value: 5.513e-12

```

```
summary(model1c)
```

```

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex + dept_type +
##       sentiment_score_mean, data = qguide_clean)
##
## Residuals:
##   Min     1Q Median     3Q    Max
## -2.3054 -0.1419  0.0674  0.2387  1.0354
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                  4.27636   0.04895 87.357
## course_teacher_sexmale      -0.04069   0.02521 -1.614
## dept_typeGenEds, Expos, and First-Year Seminars -0.12380   0.04228 -2.928
## dept_typeLanguages            0.01007   0.05579  0.181
## dept_typeScience/Engineering -0.19495   0.03130 -6.228
## dept_typeSocial Sciences     -0.09745   0.03488 -2.794
## sentiment_score_mean         0.69514   0.05776 12.035
## Pr(>|t|)                      Estimate Std. Error t value
## (Intercept)                  < 2e-16 ***
## course_teacher_sexmale       0.10685
## dept_typeGenEds, Expos, and First-Year Seminars  0.00349 **
## dept_typeLanguages            0.85676
## dept_typeScience/Engineering 6.84e-10 ***
## dept_typeSocial Sciences      0.00530 **
## sentiment_score_mean          < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3871 on 1037 degrees of freedom
## Multiple R-squared:  0.1731, Adjusted R-squared:  0.1683
## F-statistic: 36.18 on 6 and 1037 DF,  p-value: < 2.2e-16

```

```
summary(model1d)
```

```

## 
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex + dept_type +
##      sentiment_score_mean + course_score_mean, data = qguide_clean)
##
## Residuals:
##    Min      1Q   Median      3Q      Max
## -2.28160 -0.09389  0.01708  0.13578  1.02935
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.958958  0.098794 19.829
## course_teacher_sexmale     -0.035314  0.019784 -1.785
## dept_typeGenEds, Expos, and First-Year Seminars  0.035076  0.033760  1.039
## dept_typeLanguages          -0.007837  0.043779 -0.179
## dept_typeScience/Engineering 0.034695  0.026164  1.326
## dept_typeSocial Sciences    0.015866  0.027728  0.572
## sentiment_score_mean        0.077382  0.051409  1.505
## course_score_mean           0.598152  0.023494 25.460
## 
## Pr(>|t|)                    Estimate Std. Error t value
## (Intercept) <2e-16 ***
## course_teacher_sexmale 0.0746 .
## dept_typeGenEds, Expos, and First-Year Seminars 0.2991
## dept_typeLanguages 0.8580
## dept_typeScience/Engineering 0.1851
## dept_typeSocial Sciences 0.5673
## sentiment_score_mean 0.1326
## course_score_mean <2e-16 ***
## 
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3038 on 1036 degrees of freedom
## Multiple R-squared:  0.4913, Adjusted R-squared:  0.4879
## F-statistic: 143 on 7 and 1036 DF, p-value: < 2.2e-16

```

```
summary(fullmodel1)
```

```

## 
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex + dept_type +
##      sentiment_score_mean + course_score_mean + workload_score_mean,
##      data = qguide_clean)
##
## Residuals:
##    Min      1Q   Median      3Q      Max
## -2.27093 -0.09388  0.01875  0.13038  1.05333
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.903665  0.103713 18.355
## course_teacher_sexmale     -0.032609  0.019826 -1.645
## dept_typeGenEds, Expos, and First-Year Seminars  0.039668  0.033831  1.173
## dept_typeLanguages          -0.017329  0.044078 -0.393
## dept_typeScience/Engineering 0.023351  0.026944  0.867

```

```

## dept_typeSocial Sciences          0.014131  0.027719  0.510
## sentiment_score_mean            0.086301  0.051616  1.672
## course_score_mean                0.601071  0.023531 25.544
## workload_score_mean             0.005901  0.003400  1.735
##                                         Pr(>|t|)
## (Intercept)                         <2e-16 ***
## course_teacher_sexmale              0.1003
## dept_typeGenEds, Expos, and First-Year Seminars 0.2413
## dept_typeLanguages                  0.6943
## dept_typeScience/Engineering        0.3863
## dept_typeSocial Sciences            0.6103
## sentiment_score_mean                0.0948 .
## course_score_mean                  <2e-16 ***
## workload_score_mean                 0.0830 .

## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3035 on 1035 degrees of freedom
## Multiple R-squared:  0.4928, Adjusted R-squared:  0.4889
## F-statistic: 125.7 on 8 and 1035 DF,  p-value: < 2.2e-16

# Compare all Lecturer Score models
stargazer(model1a, model1b, model1c, model1d, fullmodel1,
           type = "text",
           title = "Lecturer Score Regressions: Progressive Controls",
           column.labels = c("No Controls", "+Department", "+Sentiment Score", "+Course Score", "Full"),
           keep.stat = c("n", "rsq"))

## 
## Lecturer Score Regressions: Progressive Controls
## =====
##                                         Dependent variable:
##                                         lecturer_score_mean
##                                         No Controls +Department +Sentiment Score +Course Score
##                                         (1)      (2)      (3)      (4)
## 
## course_teacher_sexmale               -0.082***   -0.053**    -0.041    -0.035*
##                                         (0.027)    (0.027)    (0.025)    (0.020)
## 
## dept_typeGenEds, Expos, and First-Year Seminars   -0.104**   -0.124***    0.035    (0.034)
##                                         (0.045)    (0.042)
## 
## dept_typeLanguages                   0.040       0.010    -0.008    (0.044)
##                                         (0.059)    (0.056)
## 
## dept_typeScience/Engineering        -0.224***   -0.195***    0.035    (0.026)
##                                         (0.033)    (0.031)
## 
## dept_typeSocial Sciences            -0.096***   -0.097***    0.016    (0.028)
##                                         (0.037)    (0.035)
## 
## sentiment_score_mean                 0.695***   0.077     (0.058)    (0.051)

```

```

##                                     0.598***  

## course_score_mean                  (0.023)  

##  

## workload_score_mean  

##  

## Constant                         4.676***   4.767***   4.276***   1.959***  

##                                         (0.021)     (0.029)     (0.049)     (0.099)  

##  

## -----  

## Observations                      1,044      1,044      1,044      1,044  

## R2                                0.009      0.058      0.173      0.491  

## ======  

## Note:                                         *p<0.1; **p<0.05  

# Regression 2, progressive controls analysis  

# Model 2a: Gender only (no controls)  

model2a <- lm(course_score_mean ~ course_teacher_sex,  

               data = qguide_clean)  

# Model 2b: Gender + Lecturer Score  

model2b <- lm(course_score_mean ~ course_teacher_sex +  

                lecturer_score_mean,  

               data = qguide_clean)  

# Model 2c: Gender + Lecturer Score + Sentiment Score  

model2c <- lm(course_score_mean ~ course_teacher_sex +  

                lecturer_score_mean +  

                sentiment_score_mean,  

               data = qguide_clean)  

# Model 2d: Gender + Lecturer Score + Sentiment Score + Department  

model2d <- lm(course_score_mean ~ course_teacher_sex +  

                lecturer_score_mean +  

                sentiment_score_mean +  

                dept_type,  

               data = qguide_clean)  

# View all Model 2 specifications  

summary(model2a)

##  

## Call:  

## lm(formula = course_score_mean ~ course_teacher_sex, data = qguide_clean)  

##  

## Residuals:  

##       Min        1Q    Median        3Q       Max  

## -2.34236 -0.25322  0.08764  0.36764  0.65764  

##  

## Coefficients:  

## (Intercept)  Estimate Std. Error t value Pr(>|t|)  

##             4.42580    0.02479 178.554 < 2e-16 ***

```

```

## course_teacher_sexmale -0.08344    0.03127  -2.668  0.00774 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4882 on 1042 degrees of freedom
## Multiple R-squared:  0.006786,  Adjusted R-squared:  0.005833
## F-statistic:  7.12 on 1 and 1042 DF,  p-value: 0.007742

```

```
summary(model2b)
```

```

##
## Call:
## lm(formula = course_score_mean ~ course_teacher_sex + lecturer_score_mean,
##      data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.47082 -0.15830  0.06177  0.22654  1.74245
##
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)             0.66801   0.12151   5.498 4.84e-08 ***
## course_teacher_sexmale -0.01758   0.02257  -0.779   0.436
## lecturer_score_mean     0.80356   0.02570  31.264 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3508 on 1041 degrees of freedom
## Multiple R-squared:  0.4878,  Adjusted R-squared:  0.4868
## F-statistic: 495.6 on 2 and 1041 DF,  p-value: < 2.2e-16

```

```
summary(model2c)
```

```

##
## Call:
## lm(formula = course_score_mean ~ course_teacher_sex + lecturer_score_mean +
##      sentiment_score_mean, data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.22277 -0.16592  0.02736  0.21255  2.13231
##
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)             0.74832   0.11504   6.505 1.21e-10 ***
## course_teacher_sexmale -0.01252   0.02133  -0.587   0.557
## lecturer_score_mean     0.69802   0.02605  26.798 < 2e-16 ***
## sentiment_score_mean    0.58993   0.05260  11.215 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3315 on 1040 degrees of freedom
## Multiple R-squared:  0.543,  Adjusted R-squared:  0.5417
## F-statistic: 411.9 on 3 and 1040 DF,  p-value: < 2.2e-16

```

```

summary(model2d)

##
## Call:
## lm(formula = course_score_mean ~ course_teacher_sex + lecturer_score_mean +
##     sentiment_score_mean + dept_type, data = qguide_clean)
##
## Residuals:
##      Min      1Q   Median      3Q      Max 
## -1.19329 -0.16233  0.02246  0.18018  1.83541 
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.12265   0.11518  9.747
## course_teacher_sexmale      0.01719   0.02054  0.837
## lecturer_score_mean         0.64345   0.02527 25.460
## sentiment_score_mean        0.58550   0.05018 11.667
## dept_typeGenEds, Expos, and First-Year Seminars -0.18596   0.03455 -5.382
## dept_typeLanguages          0.02346   0.04540  0.517
## dept_typeScience/Engineering -0.25848   0.02595 -9.962
## dept_typeSocial Sciences    -0.12674   0.02849 -4.448
##
## Pr(>|t|) 
## (Intercept) < 2e-16 ***
## course_teacher_sexmale      0.403
## lecturer_score_mean         < 2e-16 ***
## sentiment_score_mean        < 2e-16 ***
## dept_typeGenEds, Expos, and First-Year Seminars 9.13e-08 ***
## dept_typeLanguages          0.605
## dept_typeScience/Engineering < 2e-16 ***
## dept_typeSocial Sciences    9.59e-06 ***
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.315 on 1036 degrees of freedom
## Multiple R-squared:  0.5889, Adjusted R-squared:  0.5861
## F-statistic:  212 on 7 and 1036 DF,  p-value: < 2.2e-16

```

```

summary(fullmodel2)

##
## Call:
## lm(formula = course_score_mean ~ course_teacher_sex + sentiment_score_mean +
##     dept_type + workload_score_mean + lecturer_score_mean, data = qguide_clean)
##
## Residuals:
##      Min      1Q   Median      3Q      Max 
## -1.2175 -0.1548  0.0201  0.1852  1.8138 
##
## Coefficients:
##                               Estimate Std. Error t value
## (Intercept)                1.198858   0.117773 10.179
## course_teacher_sexmale      0.012589   0.020534  0.613

```

```

## sentiment_score_mean          0.565117  0.050502 11.190
## dept_typeGenEds, Expos, and First-Year Seminars -0.192530  0.034507 -5.579
## dept_typeLanguages           0.039609  0.045586  0.869
## dept_typeScience/Engineering -0.237113  0.026892 -8.817
## dept_typeSocial Sciences    -0.122831  0.028424 -4.321
## workload_score_mean         -0.010132  0.003509 -2.888
## lecturer_score_mean         0.643286  0.025184 25.544
##
Pr(>|t|)

## (Intercept)                  < 2e-16 ***
## course_teacher_sexmale       0.53996
## sentiment_score_mean         < 2e-16 ***
## dept_typeGenEds, Expos, and First-Year Seminars 3.08e-08 ***
## dept_typeLanguages           0.38512
## dept_typeScience/Engineering < 2e-16 ***
## dept_typeSocial Sciences    1.70e-05 ***
## workload_score_mean          0.00396 **
## lecturer_score_mean          < 2e-16 ***

## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ',' 1
##
## Residual standard error: 0.3139 on 1035 degrees of freedom
## Multiple R-squared:  0.5921, Adjusted R-squared:  0.589
## F-statistic: 187.8 on 8 and 1035 DF,  p-value: < 2.2e-16

stargazer(model2a, model2b, model2c, model2d, fullmodel2,
           type = "text",
           title = "Course Score Regressions: Progressive Controls",
           column.labels = c("No Controls", "+Lecturer Score", "+Sentiment", "+Department", "Full"),
           keep.stat = c("n", "rsq"))

```

```

##
## Course Score Regressions: Progressive Controls
## =====
##                                         Dependent variable:
##                                         -----
##                                         course_score_mean
##                                         No Controls +Lecturer Score +Sentiment +Department
##                                         (1)      (2)      (3)      (4)
## -----
## course_teacher_sexmale             -0.083***   -0.018     -0.013     0.017
##                                         (0.031)    (0.023)    (0.021)    (0.021)
## 
## lecturer_score_mean               0.804***   0.698***  0.643***  0
##                                         (0.026)    (0.026)    (0.025)    (0.025)
## 
## sentiment_score_mean              0.590***  0.585***  0.585***  0
##                                         (0.053)    (0.050)    (0.050)    (0.050)
## 
## dept_typeGenEds, Expos, and First-Year Seminars                -0.186***  -
##                                         (0.035)
## 
## dept_typeLanguages                           0.023
##                                         (0.045)
## 
```

```

## dept_typeScience/Engineering -0.258*** -0
## (0.026)
## -0.127*** -0
## (0.028)
## -0
## workload_score_mean
## -
## Constant 4.426*** 0.668*** 0.748*** 1.123*** 1
## (0.025) (0.122) (0.115) (0.115)
## -
## Observations 1,044 1,044 1,044 1,044
## R2 0.007 0.488 0.543 0.589
## -----
## Note: *p<0.1; **p<0.05; ***p<0.01

# Regression 3, progressive controls analysis

# Model 3a: Gender only (no controls)
model3a <- lm(lecturer_score_mean ~ course_teacher_sex * dept_type,
               data = qguide_clean)

# Model 3b: Gender + Course Score
model3b <- lm(lecturer_score_mean ~ course_teacher_sex * dept_type +
               course_score_mean,
               data = qguide_clean)

# Model 3c: Gender + Course Score + Sentiment Score
model3c <- lm(lecturer_score_mean ~ course_teacher_sex * dept_type +
               course_score_mean +
               sentiment_score_mean,
               data = qguide_clean)

# Model 3d: Gender + Course Score + Sentiment Score + Department
model3d <- lm(lecturer_score_mean ~ course_teacher_sex * dept_type +
               course_score_mean +
               sentiment_score_mean +
               dept_type,
               data = qguide_clean)

# View all Model 3 specifications
summary(model3a)

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type,
##      data = qguide_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.7200 -0.1412  0.1100  0.2588  0.5288
##
```

```

## Coefficients:
##                               Estimate
## (Intercept)                  4.759032
## course_teacher_sexmale      -0.039032
## dept_typeGenEds, Expos, and First-Year Seminars   -0.084032
## dept_typeLanguages           -0.005248
## dept_typeScience/Engineering -0.175372
## dept_typeSocial Sciences    -0.118099
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars -0.031577
## course_teacher_sexmale:dept_typeLanguages            0.126612
## course_teacher_sexmale:dept_typeScience/Engineering -0.073388
## course_teacher_sexmale:dept_typeSocial Sciences     0.030270
##                               Std. Error
## (Intercept)                  0.037095
## course_teacher_sexmale       0.050136
## dept_typeGenEds, Expos, and First-Year Seminars      0.075112
## dept_typeLanguages           0.077380
## dept_typeScience/Engineering 0.053848
## dept_typeSocial Sciences    0.060425
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.094129
## course_teacher_sexmale:dept_typeLanguages             0.121989
## course_teacher_sexmale:dept_typeScience/Engineering 0.068700
## course_teacher_sexmale:dept_typeSocial Sciences      0.076885
##                               t value
## (Intercept)                  128.292
## course_teacher_sexmale       -0.779
## dept_typeGenEds, Expos, and First-Year Seminars      -1.119
## dept_typeLanguages           -0.068
## dept_typeScience/Engineering -3.257
## dept_typeSocial Sciences    -1.954
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars -0.335
## course_teacher_sexmale:dept_typeLanguages             1.038
## course_teacher_sexmale:dept_typeScience/Engineering  -1.068
## course_teacher_sexmale:dept_typeSocial Sciences      0.394
##                               Pr(>|t|)
## (Intercept)                  < 2e-16
## course_teacher_sexmale       0.43644
## dept_typeGenEds, Expos, and First-Year Seminars      0.26350
## dept_typeLanguages           0.94594
## dept_typeScience/Engineering 0.00116
## dept_typeSocial Sciences    0.05091
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.73734
## course_teacher_sexmale:dept_typeLanguages             0.29956
## course_teacher_sexmale:dept_typeScience/Engineering  0.28566
## course_teacher_sexmale:dept_typeSocial Sciences      0.69388
##                               ***
## (Intercept)
## course_teacher_sexmale
## dept_typeGenEds, Expos, and First-Year Seminars
## dept_typeLanguages
## dept_typeScience/Engineering
## dept_typeSocial Sciences
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars
## course_teacher_sexmale:dept_typeLanguages

```

```

## course_teacher_sexmale:dept_typeScience/Engineering
## course_teacher_sexmale:dept_typeSocial Sciences
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4131 on 1034 degrees of freedom
## Multiple R-squared:  0.06113,   Adjusted R-squared:  0.05296
## F-statistic: 7.481 on 9 and 1034 DF,  p-value: 1.181e-10

summary(model3b)

## 
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##     course_score_mean, data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.34653 -0.09197  0.02301  0.13337  1.03722
##
## Coefficients:
##                               Estimate
## (Intercept)                  1.951655
## course_teacher_sexmale        -0.065385
## dept_typeGenEds, Expos, and First-Year Seminars  0.006447
## dept_typeLanguages            -0.067069
## dept_typeScience/Engineering  0.047797
## dept_typeSocial Sciences     -0.028245
## course_score_mean              0.615066
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars  0.057291
## course_teacher_sexmale:dept_typeLanguages             0.150645
## course_teacher_sexmale:dept_typeScience/Engineering -0.007156
## course_teacher_sexmale:dept_typeSocial Sciences      0.076153
## 
## Std. Error
## (Intercept)          0.098518
## course_teacher_sexmale 0.036876
## dept_typeGenEds, Expos, and First-Year Seminars  0.055315
## dept_typeLanguages           0.056936
## dept_typeScience/Engineering 0.040303
## dept_typeSocial Sciences    0.044534
## course_score_mean           0.020740
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars  0.069278
## course_teacher_sexmale:dept_typeLanguages             0.089702
## course_teacher_sexmale:dept_typeScience/Engineering  0.050564
## course_teacher_sexmale:dept_typeSocial Sciences      0.056555
## 
## t value
## (Intercept)          19.810
## course_teacher_sexmale -1.773
## dept_typeGenEds, Expos, and First-Year Seminars  0.117
## dept_typeLanguages           -1.178
## dept_typeScience/Engineering 1.186
## dept_typeSocial Sciences    -0.634
## course_score_mean           29.655
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars  0.827

```

```

## course_teacher_sexmale:dept_typeLanguages           1.679
## course_teacher_sexmale:dept_typeScience/Engineering -0.142
## course_teacher_sexmale:dept_typeSocial Sciences      1.347
##                                         Pr(>|t|)
## (Intercept)                                <2e-16
## course_teacher_sexmale                      0.0765
## dept_typeGenEds, Expos, and First-Year Seminars    0.9072
## dept_typeLanguages                         0.2391
## dept_typeScience/Engineering                0.2359
## dept_typeSocial Sciences                   0.5261
## course_score_mean                           <2e-16
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.4084
## course_teacher_sexmale:dept_typeLanguages          0.0934
## course_teacher_sexmale:dept_typeScience/Engineering   0.8875
## course_teacher_sexmale:dept_typeSocial Sciences     0.1784
##
## (Intercept)                                ***
## course_teacher_sexmale                      .
## dept_typeGenEds, Expos, and First-Year Seminars
## dept_typeLanguages                         .
## dept_typeScience/Engineering                .
## dept_typeSocial Sciences                   ***
## course_score_mean                           ***
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars .
## course_teacher_sexmale:dept_typeLanguages          .
## course_teacher_sexmale:dept_typeScience/Engineering   .
## course_teacher_sexmale:dept_typeSocial Sciences
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3037 on 1033 degrees of freedom
## Multiple R-squared:  0.4929, Adjusted R-squared:  0.488
## F-statistic: 100.4 on 10 and 1033 DF,  p-value: < 2.2e-16

```

```
summary(model3c)
```

```

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##      course_score_mean + sentiment_score_mean, data = qguide_clean)
##
## Residuals:
##       Min     1Q     Median      3Q     Max
## -2.26575 -0.09637  0.02150  0.13202  1.04115
##
## Coefficients:
## (Intercept)                               Estimate
## (Intercept)                               1.974647
## course_teacher_sexmale                  -0.063930
## dept_typeGenEds, Expos, and First-Year Seminars  0.002082
## dept_typeLanguages                     -0.069887
## dept_typeScience/Engineering            0.044667
## dept_typeSocial Sciences                -0.032286
## course_score_mean                      0.597730

```

| | |
|---|------------|
| ## sentiment_score_mean | 0.080134 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.054136 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.152762 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | -0.008594 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 0.077013 |
| ## | Std. Error |
| ## (Intercept) | 0.099549 |
| ## course_teacher_sexmale | 0.036862 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.055347 |
| ## dept_typeLanguages | 0.056926 |
| ## dept_typeScience/Engineering | 0.040325 |
| ## dept_typeSocial Sciences | 0.044578 |
| ## course_score_mean | 0.023523 |
| ## sentiment_score_mean | 0.051424 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.069260 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.089651 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | 0.050538 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 0.056518 |
| ## | t value |
| ## (Intercept) | 19.836 |
| ## course_teacher_sexmale | -1.734 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.038 |
| ## dept_typeLanguages | -1.228 |
| ## dept_typeScience/Engineering | 1.108 |
| ## dept_typeSocial Sciences | -0.724 |
| ## course_score_mean | 25.410 |
| ## sentiment_score_mean | 1.558 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.782 |
| ## course_teacher_sexmale:dept_typeLanguages | 1.704 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | -0.170 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 1.363 |
| ## | Pr(> t) |
| ## (Intercept) | <2e-16 |
| ## course_teacher_sexmale | 0.0832 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.9700 |
| ## dept_typeLanguages | 0.2198 |
| ## dept_typeScience/Engineering | 0.2683 |
| ## dept_typeSocial Sciences | 0.4691 |
| ## course_score_mean | <2e-16 |
| ## sentiment_score_mean | 0.1195 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.4346 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.0887 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | 0.8650 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 0.1733 |
| ## | *** |
| ## (Intercept) | . |
| ## course_teacher_sexmale | . |
| ## dept_typeGenEds, Expos, and First-Year Seminars | . |
| ## dept_typeLanguages | . |
| ## dept_typeScience/Engineering | . |
| ## dept_typeSocial Sciences | . |
| ## course_score_mean | *** |
| ## sentiment_score_mean | . |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | . |

```

## course_teacher_sexmale:dept_typeLanguages
## course_teacher_sexmale:dept_typeScience/Engineering
## course_teacher_sexmale:dept_typeSocial Sciences
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3035 on 1032 degrees of freedom
## Multiple R-squared:  0.4941, Adjusted R-squared:  0.4887
## F-statistic: 91.62 on 11 and 1032 DF,  p-value: < 2.2e-16

summary(model3d)

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##     course_score_mean + sentiment_score_mean + dept_type, data = qguide_clean)
##
## Residuals:
##      Min        1Q    Median        3Q       Max
## -2.26575 -0.09637  0.02150  0.13202  1.04115
##
## Coefficients:
##                               Estimate
## (Intercept)                1.974647
## course_teacher_sexmale      -0.063930
## dept_typeGenEds, Expos, and First-Year Seminars  0.002082
## dept_typeLanguages          -0.069887
## dept_typeScience/Engineering 0.044667
## dept_typeSocial Sciences   -0.032286
## course_score_mean            0.597730
## sentiment_score_mean         0.080134
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars  0.054136
## course_teacher_sexmale:dept_typeLanguages                      0.152762
## course_teacher_sexmale:dept_typeScience/Engineering           -0.008594
## course_teacher_sexmale:dept_typeSocial Sciences               0.077013
##
## Std. Error
## (Intercept)                0.099549
## course_teacher_sexmale      0.036862
## dept_typeGenEds, Expos, and First-Year Seminars  0.055347
## dept_typeLanguages          0.056926
## dept_typeScience/Engineering 0.040325
## dept_typeSocial Sciences   0.044578
## course_score_mean            0.023523
## sentiment_score_mean         0.051424
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars  0.069260
## course_teacher_sexmale:dept_typeLanguages                      0.089651
## course_teacher_sexmale:dept_typeScience/Engineering           0.050538
## course_teacher_sexmale:dept_typeSocial Sciences               0.056518
##
## t value
## (Intercept)                19.836
## course_teacher_sexmale      -1.734
## dept_typeGenEds, Expos, and First-Year Seminars  0.038
## dept_typeLanguages          -1.228
## dept_typeScience/Engineering 1.108

```

```

## dept_typeSocial Sciences -0.724
## course_score_mean 25.410
## sentiment_score_mean 1.558
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.782
## course_teacher_sexmale:dept_typeLanguages 1.704
## course_teacher_sexmale:dept_typeScience/Engineering -0.170
## course_teacher_sexmale:dept_typeSocial Sciences 1.363
##
Pr(>|t|) 
## (Intercept) <2e-16
## course_teacher_sexmale 0.0832
## dept_typeGenEds, Expos, and First-Year Seminars 0.9700
## dept_typeLanguages 0.2198
## dept_typeScience/Engineering 0.2683
## dept_typeSocial Sciences 0.4691
## course_score_mean <2e-16
## sentiment_score_mean 0.1195
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars 0.4346
## course_teacher_sexmale:dept_typeLanguages 0.0887
## course_teacher_sexmale:dept_typeScience/Engineering 0.8650
## course_teacher_sexmale:dept_typeSocial Sciences 0.1733
##
## (Intercept) ***
## course_teacher_sexmale .
## dept_typeGenEds, Expos, and First-Year Seminars
## dept_typeLanguages
## dept_typeScience/Engineering
## dept_typeSocial Sciences
## course_score_mean ***
## sentiment_score_mean
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars
## course_teacher_sexmale:dept_typeLanguages .
## course_teacher_sexmale:dept_typeScience/Engineering .
## course_teacher_sexmale:dept_typeSocial Sciences
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3035 on 1032 degrees of freedom
## Multiple R-squared: 0.4941, Adjusted R-squared: 0.4887
## F-statistic: 91.62 on 11 and 1032 DF, p-value: < 2.2e-16

summary(fullmodel3)

##
## Call:
## lm(formula = lecturer_score_mean ~ course_teacher_sex * dept_type +
##     workload_score_mean + course_score_mean + sentiment_score_mean,
##     data = qguide_clean)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.25641 -0.09346  0.02003  0.13218  1.06325
##
## Coefficients:
##                                         Estimate

```

| | |
|---|------------|
| ## (Intercept) | 1.921869 |
| ## course_teacher_sexmale | -0.060199 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.006200 |
| ## dept_typeLanguages | -0.078301 |
| ## dept_typeScience/Engineering | 0.033597 |
| ## dept_typeSocial Sciences | -0.030105 |
| ## workload_score_mean | 0.005558 |
| ## course_score_mean | 0.600516 |
| ## sentiment_score_mean | 0.088366 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.054245 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.151919 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | -0.008268 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 0.071110 |
| ## | Std. Error |
| ## (Intercept) | 0.104602 |
| ## course_teacher_sexmale | 0.036904 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.055360 |
| ## dept_typeLanguages | 0.057113 |
| ## dept_typeScience/Engineering | 0.040861 |
| ## dept_typeSocial Sciences | 0.044563 |
| ## workload_score_mean | 0.003408 |
| ## course_score_mean | 0.023566 |
| ## sentiment_score_mean | 0.051630 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.069204 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.089580 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | 0.050498 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 0.056589 |
| ## | t value |
| ## (Intercept) | 18.373 |
| ## course_teacher_sexmale | -1.631 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.112 |
| ## dept_typeLanguages | -1.371 |
| ## dept_typeScience/Engineering | 0.822 |
| ## dept_typeSocial Sciences | -0.676 |
| ## workload_score_mean | 1.631 |
| ## course_score_mean | 25.482 |
| ## sentiment_score_mean | 1.712 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.784 |
| ## course_teacher_sexmale:dept_typeLanguages | 1.696 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | -0.164 |
| ## course_teacher_sexmale:dept_typeSocial Sciences | 1.257 |
| ## | Pr(> t) |
| ## (Intercept) | <2e-16 |
| ## course_teacher_sexmale | 0.1031 |
| ## dept_typeGenEds, Expos, and First-Year Seminars | 0.9109 |
| ## dept_typeLanguages | 0.1707 |
| ## dept_typeScience/Engineering | 0.4111 |
| ## dept_typeSocial Sciences | 0.4995 |
| ## workload_score_mean | 0.1033 |
| ## course_score_mean | <2e-16 |
| ## sentiment_score_mean | 0.0873 |
| ## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars | 0.4333 |
| ## course_teacher_sexmale:dept_typeLanguages | 0.0902 |
| ## course_teacher_sexmale:dept_typeScience/Engineering | 0.8700 |

```

## course_teacher_sexmale:dept_typeSocial Sciences          0.2092
##
## (Intercept)                                         ***
##
## course_teacher_sexmale
## dept_typeGenEds, Expos, and First-Year Seminars
## dept_typeLanguages
## dept_typeScience/Engineering
## dept_typeSocial Sciences
## workload_score_mean
## course_score_mean
## sentiment_score_mean
## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars
## course_teacher_sexmale:dept_typeLanguages
## course_teacher_sexmale:dept_typeScience/Engineering
## course_teacher_sexmale:dept_typeSocial Sciences
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3033 on 1031 degrees of freedom
## Multiple R-squared:  0.4954, Adjusted R-squared:  0.4895
## F-statistic: 84.34 on 12 and 1031 DF,  p-value: < 2.2e-16

stargazer(model3a, model3b, model3c, model3d, fullmodel3,
           type = "text",
           title = "Lecturer Scores by Department Type Regressions: Progressive Controls",
           column.labels = c("No Controls", "+Course Score", "+Sentiment Score", "+Department", "Full"),
           keep.stat = c("n", "rsq"))

## 
## Lecturer Scores by Department Type Regressions: Progressive Controls
## -----
## Dependents
## -----
## lecture
## -----
## No Controls +Course Score +Sentiment Score
## (1)      (2)

## -----
## course_teacher_sexmale                      -0.039    -0.065*
## (0.050)   (0.037)
## 
## dept_typeGenEds, Expos, and First-Year Seminars   -0.084    0.006
## (0.075)   (0.055)
## 
## dept_typeLanguages                         -0.005    -0.067
## (0.077)   (0.057)
## 
## dept_typeScience/Engineering            -0.175***   0.048
## (0.054)   (0.040)
## 
## dept_typeSocial Sciences                  -0.118*   -0.028
## (0.060)   (0.045)
## 
## workload_score_mean
## 
```

```

##          0.615***  

## course_score_mean      (0.021)  

##  

##  

## sentiment_score_mean  

##  

##  

## course_teacher_sexmale:dept_typeGenEds, Expos, and First-Year Seminars -0.032    0.057  

## (0.094)    (0.069)  

##  

##  

## course_teacher_sexmale:dept_typeLanguages           0.127    0.151*  

## (0.122)    (0.090)  

##  

##  

## course_teacher_sexmale:dept_typeScience/Engineering -0.073    -0.007  

## (0.069)    (0.051)  

##  

##  

## course_teacher_sexmale:dept_typeSocial Sciences     0.030    0.076  

## (0.077)    (0.057)  

##  

##  

## Constant          4.759***   1.952***  

## (0.037)    (0.099)  

##  

##  

## -----  

## Observations       1,044    1,044  

## R2                 0.061    0.493  

## -----  

## Note:  


```