

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", "SOCIOLOG", "SOCIOL", "ANTHRO", "ECON", "GOV", "HLTHPOL", "GHHP", "ESPP", "HISTSCI", "PSY", "SOC", "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", "S 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
```

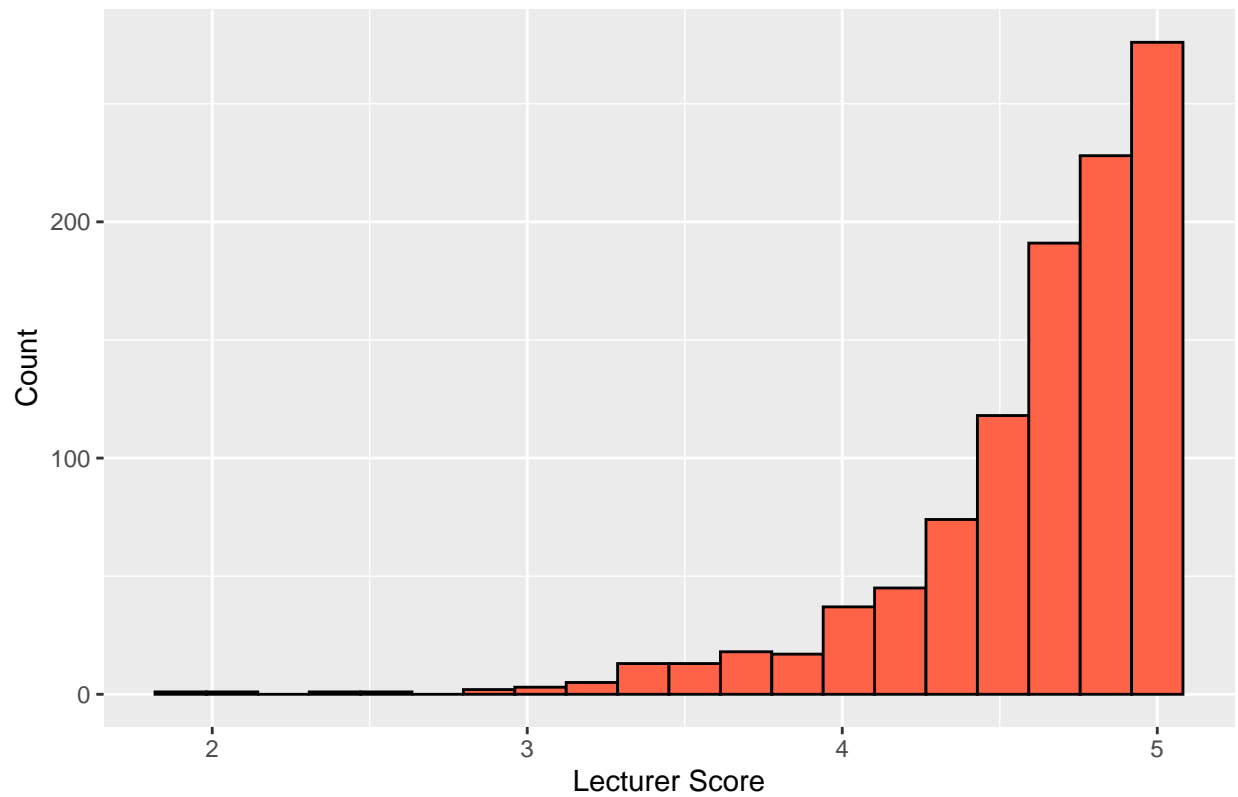
```

# 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"
  )

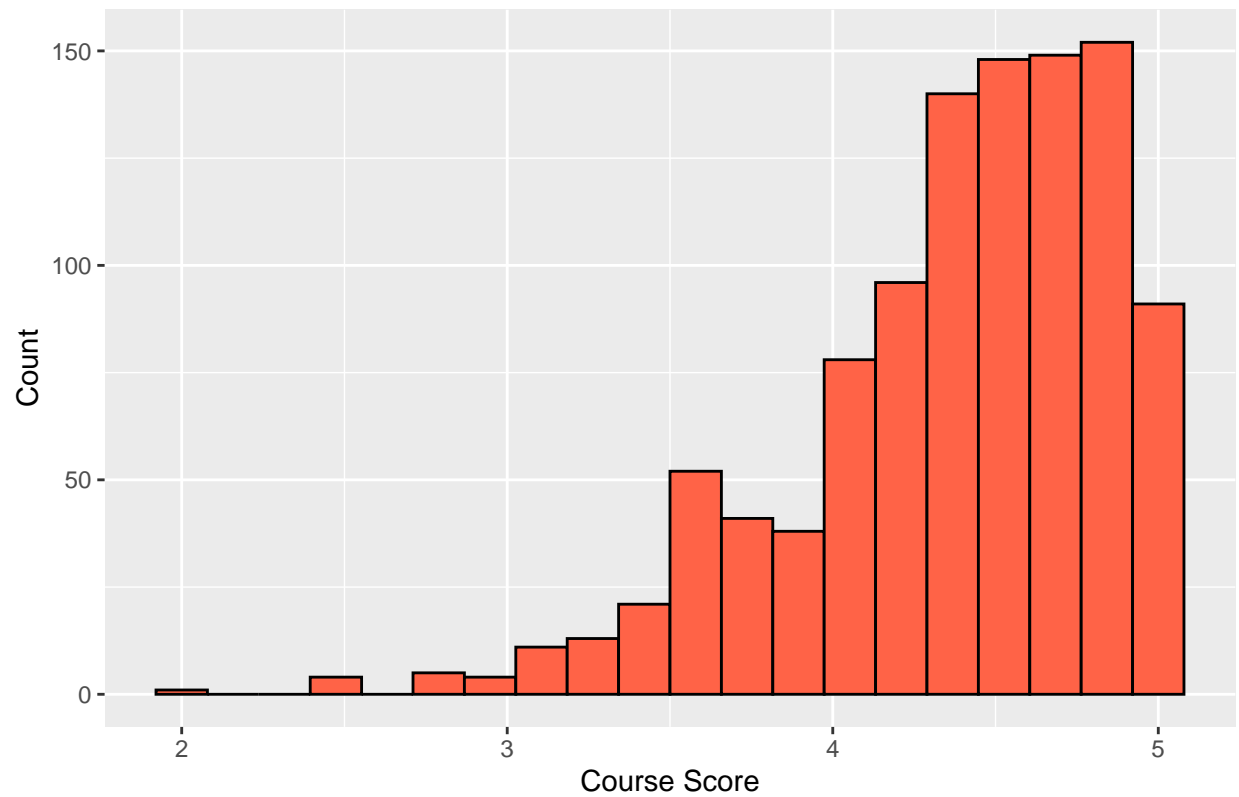
```

Distribution of Lecturer Scores

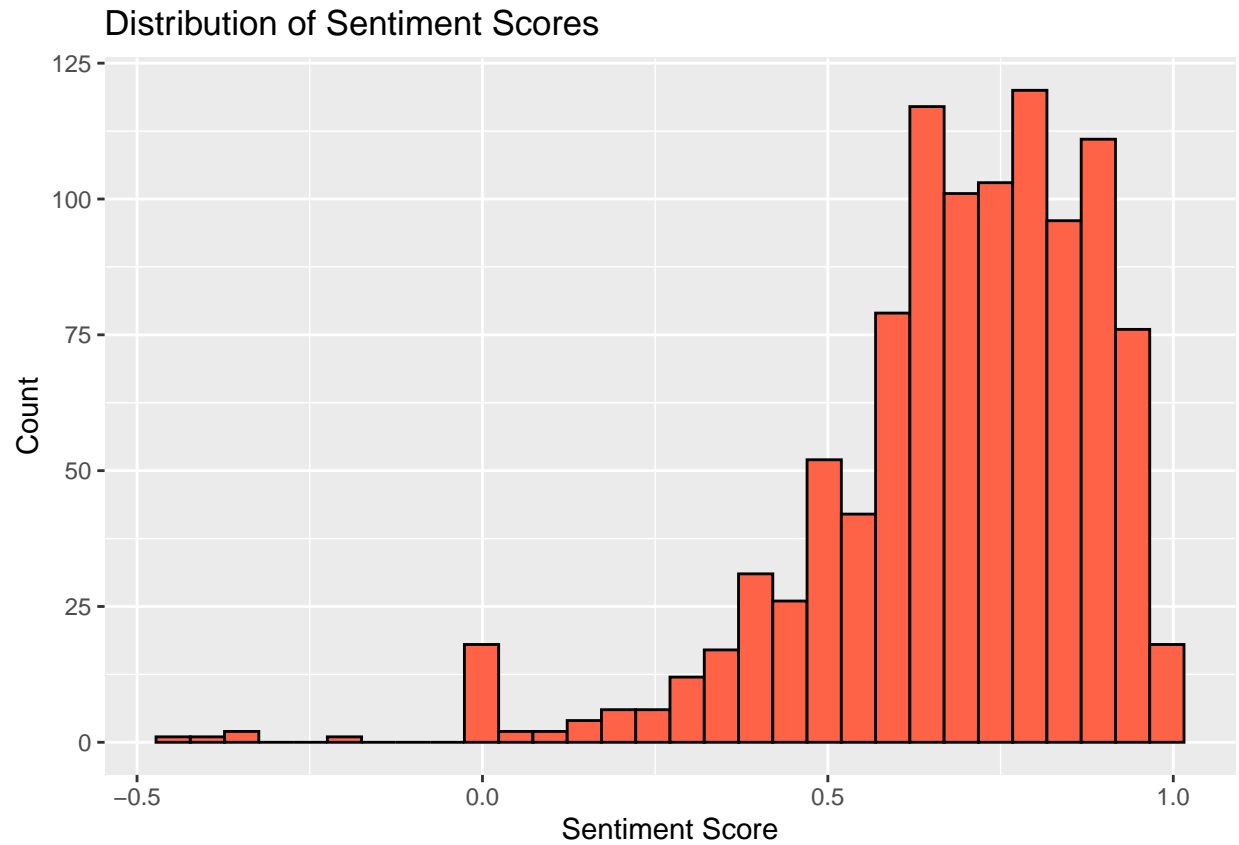


```
# Distribution of course scores
ggplot(qguide_clean, aes(x = course_score_mean)) +
  geom_histogram(bins = 20, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Course Scores",
    x = "Course Score",
    y = "Count"
  )
```

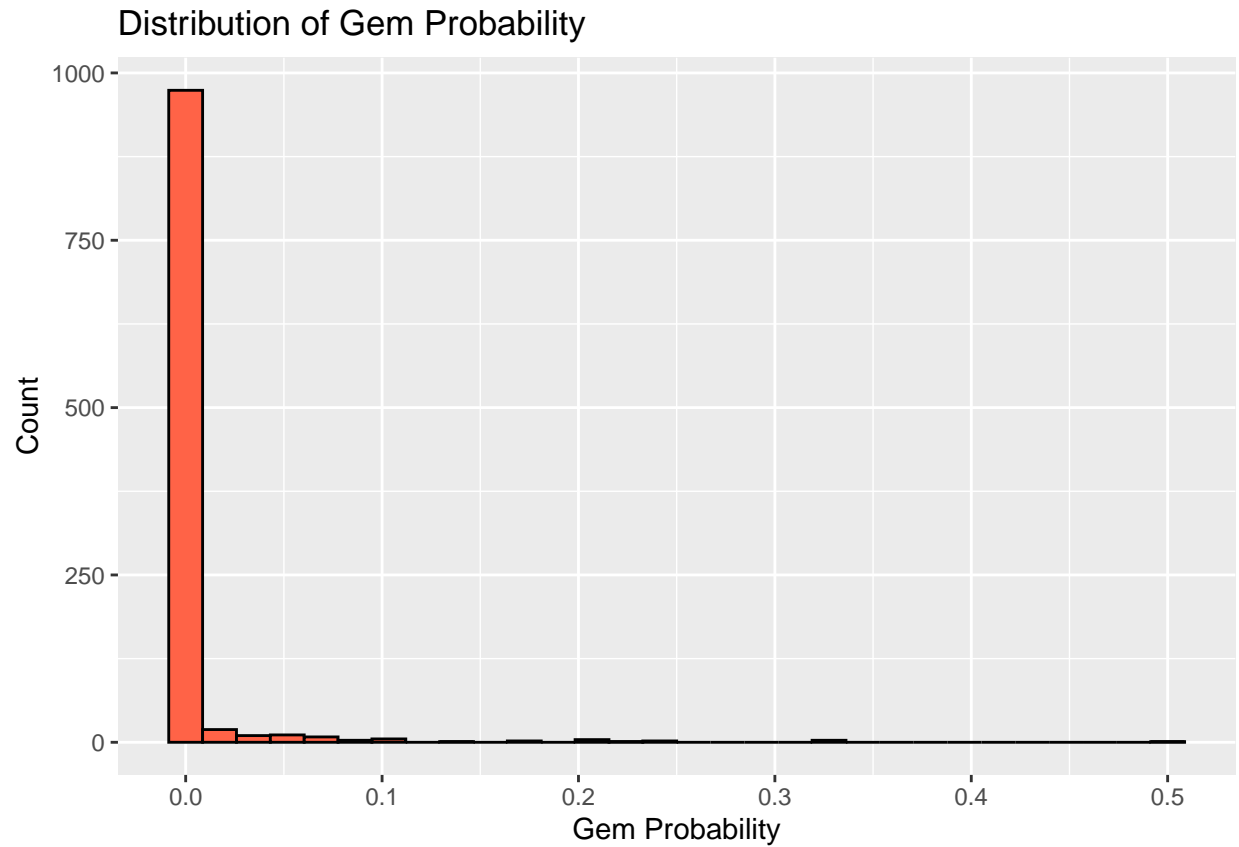
Distribution of Course Scores



```
# 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"
  )
```

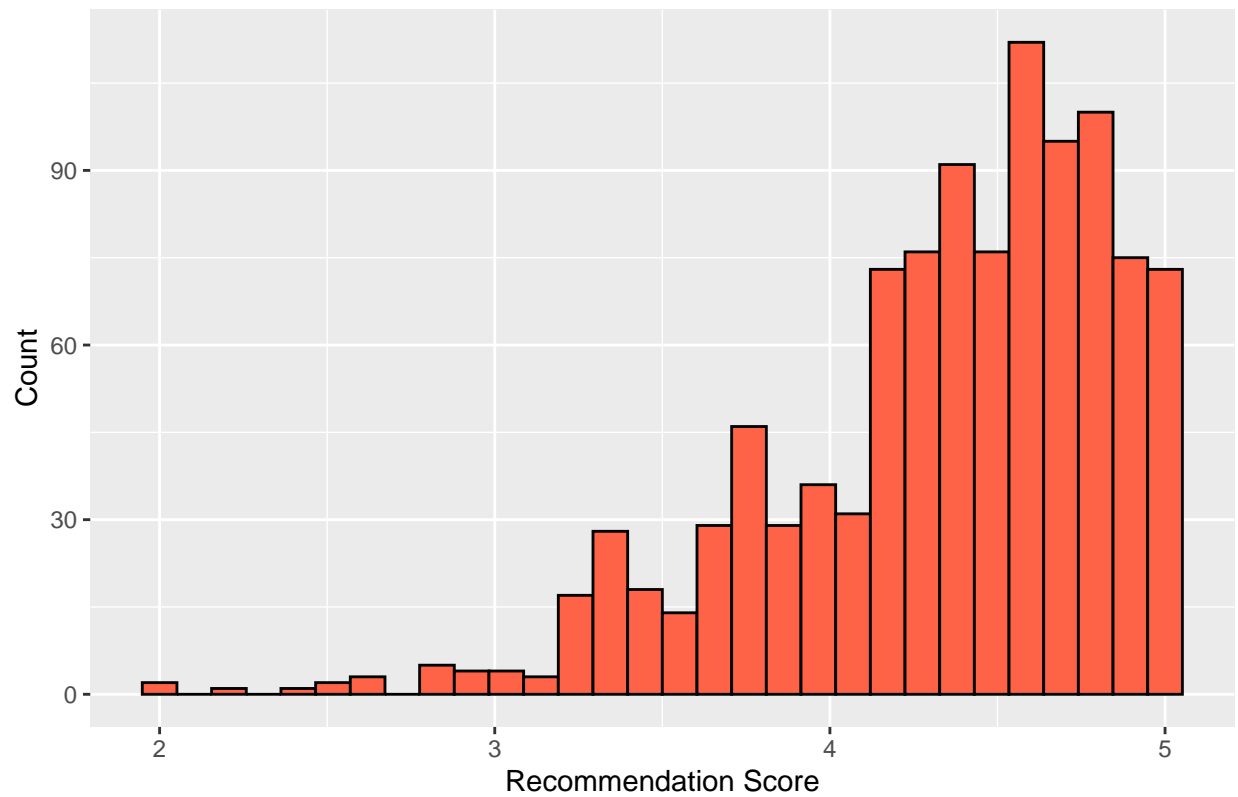


```
# Distribution of gem probability
ggplot(qguide_clean, aes(x = gem_probability_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Gem Probability",
    x = "Gem Probability",
    y = "Count"
  )
```



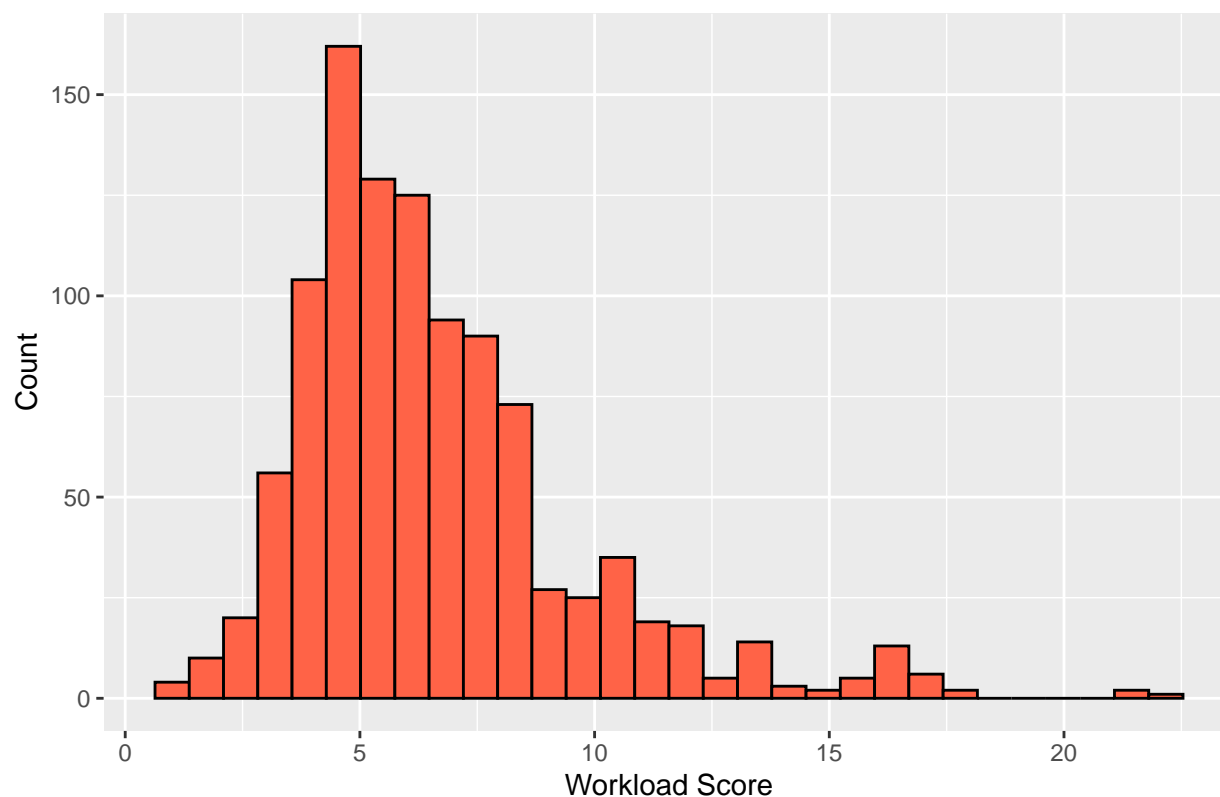
```
# Distribution of rec scores
ggplot(qguide_clean, aes(x = rec_score_mean)) +
  geom_histogram(bins = 30, fill = "tomato", color = "black") +
  labs(
    title = "Distribution of Recommendation Score",
    x = "Recommendation Score",
    y = "Count"
  )
```

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))
```

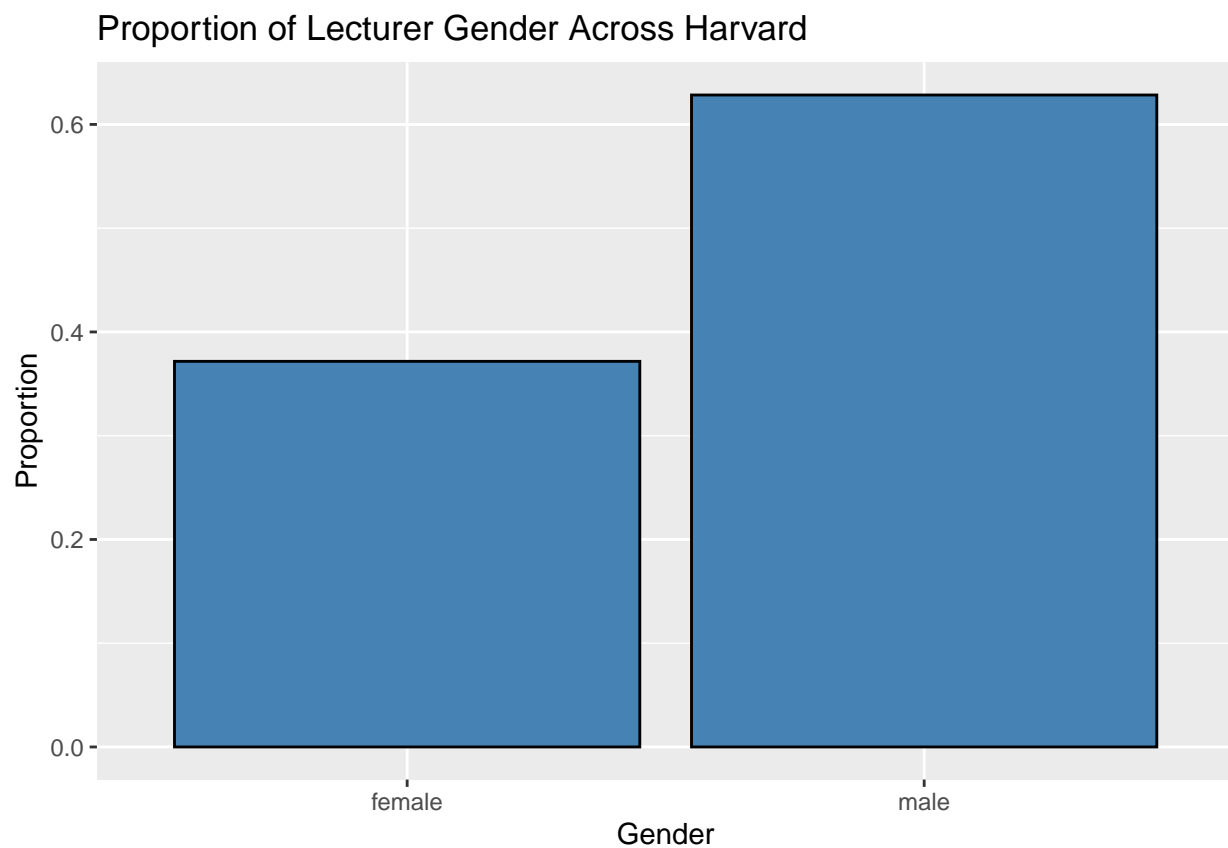
```
## # A tibble: 2 x 3
##   course_teacher_sex      n prop
##   <chr>                <int> <dbl>
## 1 female                388 0.372
## 2 male                  656 0.628
```

```
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
```

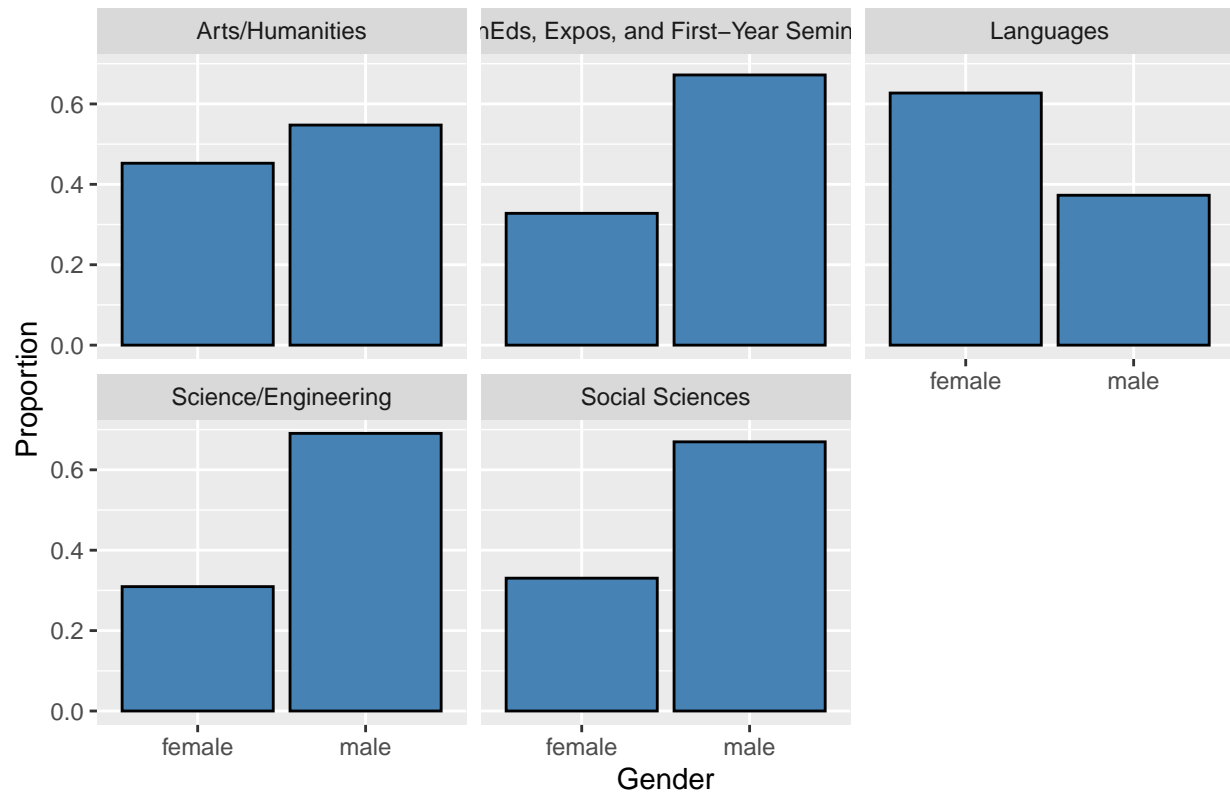

| | | | | |
|----|-----------------------|--------|-----|-------|
| ## | 6 Languages | male | 22 | 0.373 |
| ## | 7 Science/Engineering | female | 112 | 0.309 |
| ## | 8 Science/Engineering | male | 250 | 0.691 |
| ## | 9 Social Sciences | female | 75 | 0.330 |
| ## | 10 Social Sciences | male | 152 | 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"
  )
)
```

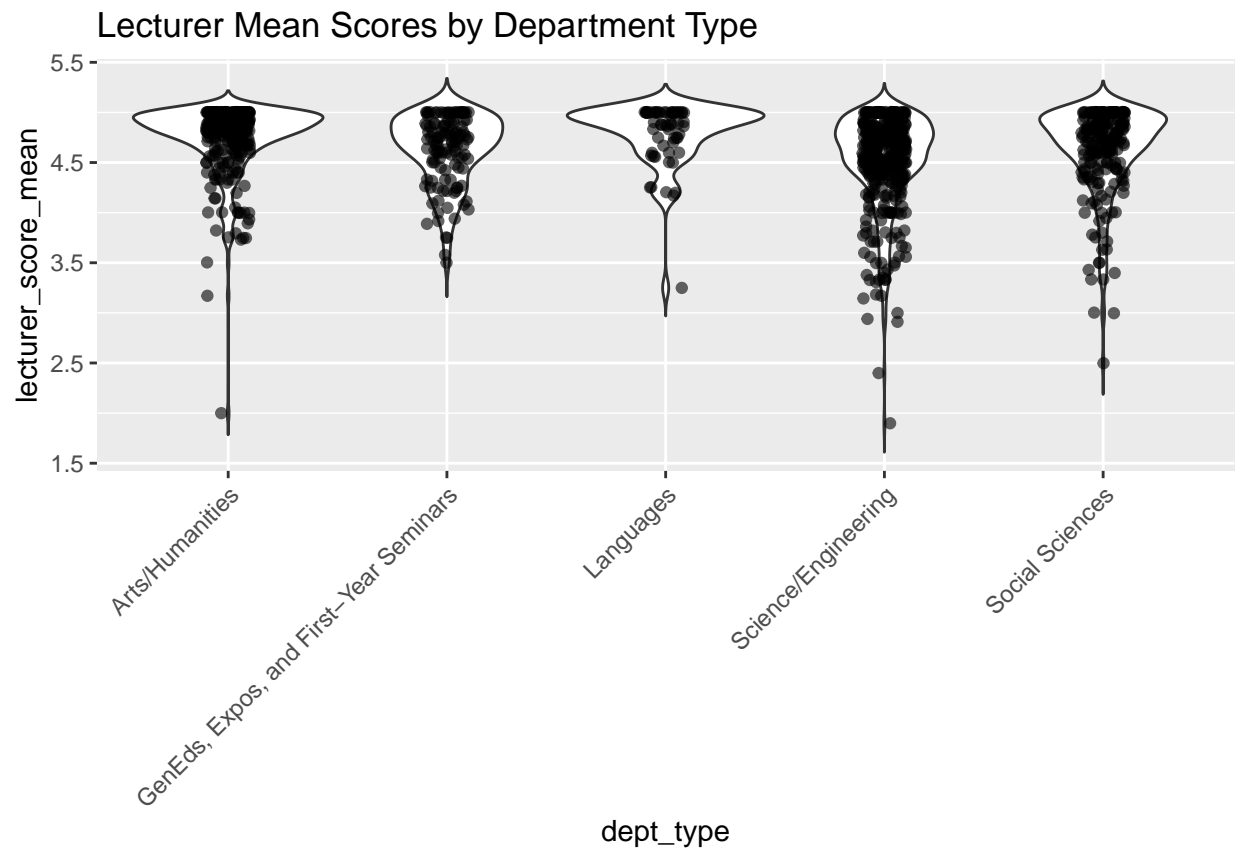


```
# Bar plot of gender proportions by department type
ggplot(qguide_clean, aes(x = course_teacher_sex)) +
  geom_bar(aes(y = after_stat(prop), group = 1), fill = "steelblue", color = "black") +
  facet_wrap(~ dept_type) +
  labs(
    title = "Proportion of Lecturer Gender by Department Type",
    x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

Proportion of Lecturer Gender by Department Type

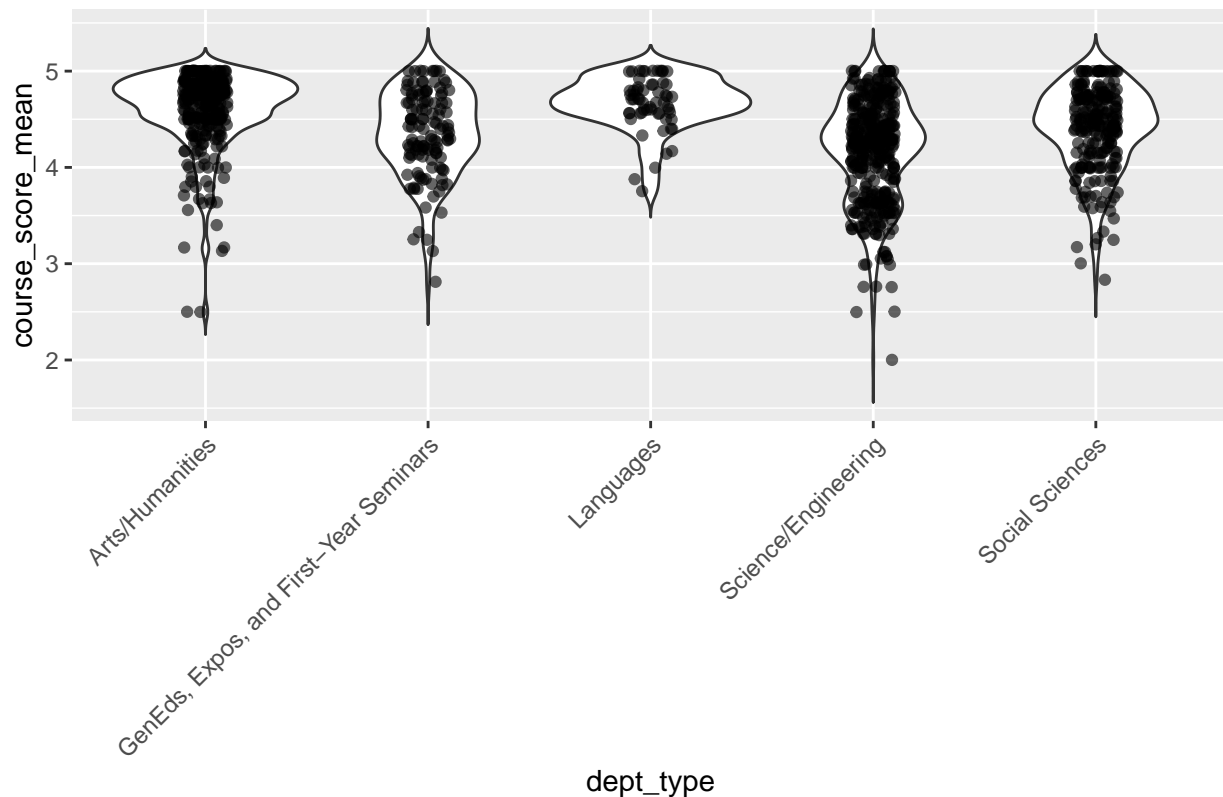


```
# Violin plot of lecturer score by department type
ggplot(qguide_clean, aes(x = dept_type, y = lecturer_score_mean)) +
  geom_violin(trim = FALSE) +
  geom_jitter(width = 0.1, alpha = 0.6) +
  labs(title = "Lecturer Mean Scores by Department Type") +
  theme(
    axis.text.x = element_text(angle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



```
# 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")

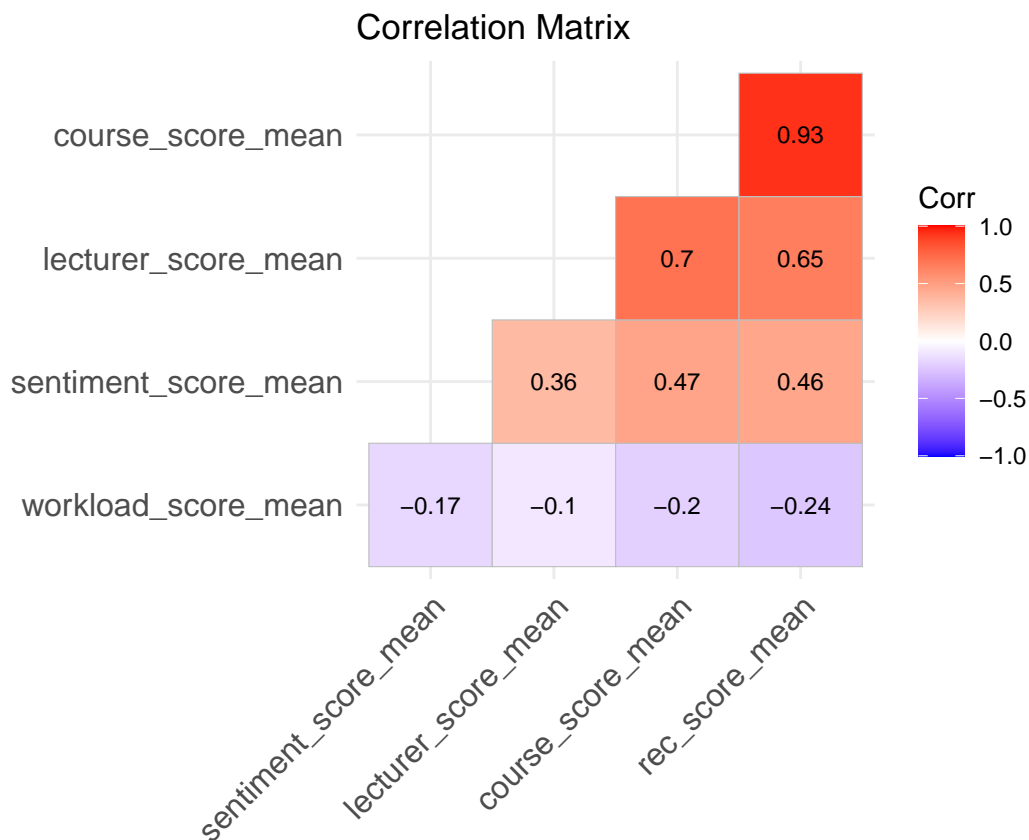
# View numeric correlation matrix
corr_mat
```

```
##              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 rec_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 ggcorrplot package.
## Please report the issue at <https://github.com/kassambara/ggcorrplot/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)
##
## 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
```

```
##
## 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)
```

```
modella <- 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
modell1c <- lm(lecturer_score_mean ~ course_teacher_sex +
              dept_type +
              sentiment_score_mean,
              data = qguide_clean)

# Model 1d: Gender + Dept Type + Sentiment Score + Course Score
modell1d <- lm(lecturer_score_mean ~ course_teacher_sex +
              dept_type +
              sentiment_score_mean +
              course_score_mean,
              data = qguide_clean)

# View all Model 1 specifications
summary(modell1a)

```

```

##
## 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(modell1b)
```

```

##
## 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
##                                   Pr(>|t|)
## (Intercept)                       < 2e-16 ***
## course_teacher_sexmale             0.04963 *
## 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|)
## (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|)
## (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
##                               (0.045)    (0.042)    (0.034)
##
## dept_typeLanguages                0.040      0.010     -0.008
##                               (0.059)    (0.056)    (0.044)
##
## dept_typeScience/Engineering      -0.224***   -0.195***    0.035
##                               (0.033)    (0.031)    (0.026)
##
## dept_typeSocial Sciences          -0.096***   -0.097***    0.016
##                               (0.037)    (0.035)    (0.028)
##
## sentiment_score_mean                0.695***    0.077
##                               (0.058)    (0.051)
```

```
##
## course_score_mean 0.598***
## (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:
```

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

```
## (Intercept)      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)
##
## sentiment_score_mean         0.590***      0.585*** 0
##                               (0.053)      (0.050)
##
## dept_typeGenEds, Expos, and First-Year Seminars -0.186*** -
##                               (0.035)
##
## dept_typeLanguages          0.023
##                               (0.045)
##
```

```
## dept_typeScience/Engineering -0.258*** -
## (0.026)
##
## dept_typeSocial Sciences -0.127*** -
## (0.028)
##
## 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:
##
## (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:
##                                     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
## =====
##                                     Dependent Variable: lecture_score
##                                     -----
##                                     No Controls +Course Score +Sentiment Score +Department
##                                     (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
```

```

##
## course_score_mean                                0.615***
##                                                    (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:

```