

Preliminary Analysis of TEMS Diversity Survey

Grayson Meckfessel

All code is omitted in this report for the sake of brevity. Original code can be viewed in Analysis at <https://github.com/graysonmeckfessel/diversity-survey-2023>. For original CSV data file, reach out to repository owner.

```
# Importing the complete data file
raw_data <- read.csv("/Users/graysonmeckfessel/desktop/repos/diversity-survey/Analysis/raw_data_complete")

# Filtering out incomplete surveys according to "survey ends" criteria
completed_surveys <- subset(raw_data,
  Progress == "100" &
  Finished == "True" &
  Q1 == "I understand the consent form and consent to participate in this survey" &
  (Q2 == "Undergraduate Student" | Q2 == "Graduate Student") &
  Q3 == "Yes" &
  Q4 == "Yes")

# Re-code chief complaint questions
completed_surveys <- completed_surveys %>%
  mutate(across(c(Q19_1, Q19_2, Q19_3, Q19_4, Q20_1, Q20_2, Q20_3, Q20_4, Q21_1,
    Q21_2, Q21_3, Q21_4, Q22_1, Q22_2, Q22_3, Q22_4, Q23_1, Q23_2,
    Q23_3, Q23_4),
    ~ case_when(
      . == "Very unlikely" ~ 1,
      . == "Unlikely" ~ 2,
      . == "About as likely as not" ~ 3,
      . == "Likely" ~ 4,
      . == "Very likely" ~ 5,
      TRUE ~ NA_real_))) # Handle other cases as NA

# Converting Demographically Data For Increased Usability
usable_data <- completed_surveys %>%
  mutate(
    Q32 = ifelse(Q32 == "White", "White", "Non-White"),
    Q33 = ifelse(Q33 == "Straight (Heterosexual)", "Heterosexual", "Non-Heterosexual"),
    Q34 = ifelse(Q34 %in% c("Man or Male", "Woman or Female"), Q34, "Non-Cisgender"),
    Q36 = ifelse(Q36 == "Yes", "International Student", "Non-International Student")
  )

# Writing Dictionary for Later Use
question_dictionary <- data.frame(
  ColumnName = c("Q19_1", "Q19_2", "Q19_3", "Q19_4",
    "Q20_1", "Q20_2", "Q20_3", "Q20_4",
    "Q21_1", "Q21_2", "Q21_3", "Q21_4",
    "Q22_1", "Q22_2", "Q22_3", "Q22_4",
```

```

        "Q23_1", "Q23_2", "Q23_3", "Q23_4"),
QuestionText = c("Call 911 for a minor traumatic emergency",
  "Call for Tulane EMS for a minor traumatic emergency",
  "Take transportation to see a doctor for a minor traumatic emergency",
  "Care for yourself for a minor traumatic emergency",
  "Call 911 for a minor medical emergency",
  "Call for Tulane EMS for a minor medical emergency",
  "Take transportation to see a doctor for a minor medical emergency",
  "Care for yourself for a minor medical emergency",
  "Call 911 for a psychological emergency",
  "Call for Tulane EMS for a psychological emergency",
  "Take transportation to see a doctor for a psychological emergency",
  "Care for yourself for a psychological emergency",
  "Call 911 for an ingestion emergency",
  "Call for Tulane EMS for an ingestion emergency",
  "Take transportation to see a doctor for an ingestion emergency",
  "Care for yourself for an ingestion emergency",
  "Call 911 for a cardiovascular emergency",
  "Call for Tulane EMS for a cardiovascular emergency",
  "Take transportation to see a doctor for a cardiovascular emergency",
  "Care for yourself for a cardiovascular emergency")
)

demographic_dictionary <- data.frame(
  DemographicCode = c("Q31", "Q32", "Q33", "Q34", "Q35", "Q36"),
  DemographicText = c("Year at Tulane",
    "Racial Identity",
    "Sexual Orientation",
    "Gender Identity",
    "School of Primary Study",
    "International Student")
)

```

Challenges with the Methodology of This Survey

Designing a survey ideally involves achieving balanced representation across various demographics. For instance, a completely randomized design might target equal participation among all races, genders, and sexual orientations. However, our survey, based on voluntary participation, poses certain challenges. While this approach is ethical, especially considering the sensitive nature of the topics, it introduces the potential for response bias. To understand the extent of this bias, consider the proportion of participants who identify as straight, white, male or females.

```

# Extract the number of completed surveys
sample_size <- nrow(completed_surveys)

# Count of White Respondents
w <- subset(completed_surveys, Q32 == "White")
w_count <- round((nrow(w)/sample_size)*100, 2)

# Count of Straight Respondents
s <- subset(completed_surveys, Q33 == "Straight (Heterosexual)")
s_count <- round((nrow(s)/sample_size)*100, 2)

```

```

# Count of Cisgender Respondents
cis <- subset(completed_surveys, Q34 == "Woman or Female" | Q34 == "Man or Male")
c_count <- round((nrow(cis)/sample_size)*100, 2)

# Count of Non-Cis Respondents
noncisresp <- sample_size - nrow(cis)

# Count of Straight, White, Cisgender Respondents
swc <- subset(completed_surveys,
              Q32 == "White" &
              Q33 == "Straight (Heterosexual)" &
              (Q34 == "Woman or Female" | Q34 == "Man or Male"))
swc_count <- round((nrow(swc)/sample_size)*100, 2)

# Create a data frame for the table
statistics_df <- data.frame(
  Category = c("White Respondents",
               "Straight Respondents",
               "Cisgender Respondents",
               "Straight, White, Cisgender Respondents"),
  Percentage = c(w_count, s_count, c_count, swc_count)
)

# Use knitr::kable to create a table
knitr::kable(statistics_df, format = "markdown", row.names = FALSE)

```

Category	Percentage
White Respondents	63.86
Straight Respondents	68.15
Cisgender Respondents	94.49
Straight, White, Cisgender Respondents	43.64

Total Completed Responses: 653

In this survey, a substantial portion of responses originates from what we have termed “comparison groups”¹. As our analysis involves over 8 identity categories across various demographics, ideally, each group should be similarly represented. However, this is not the case, thereby necessitating a careful approach in our analysis.

Moreover, our approach must be mindful of several factors:

1. **Changing Demographics:** University demographics are evolving, with each new class reportedly more diverse than the last. This continuous change suggests that our sample might not accurately reflect the current student body, and thus we should not rely on parametric assumptions.
2. **Small Sample Sizes:** In some categories, the response count is as low as one. Such small sizes call for careful statistical treatment.
3. **Voluntary Survey Challenges:** Participants in voluntary surveys might hesitate to disclose sensitive information, particularly concerning race, gender, and sexual orientation. This reticence can impact the reliability of responses.

¹Here, ‘comparison groups’ refer to straight, white, and/or cisgender individuals. This designation is not a philosophical statement but a practical decision. In the 2020 version of this survey, the original researchers grouped identities into “non-heterosexuals”, “non-white”, etc., due to data sparsity. Our use of ‘comparison groups’ follows this precedent but is not meant to imply any inherent normativity.

Despite these challenges, our goal is to derive meaningful insights from the data, recognizing its limitations but also its potential to inform our understanding of the Tulane community. Here are a some further displays of the data spread...

```
# Columns for which to create bar plots
columns <- c("Q31", "Q32", "Q33", "Q34", "Q36")
desired_order_Q31 <- c("First Year", "Second Year", "Third Year", "Fourth Year", "Fifth year +")

suppressWarnings({
  for (col in columns) {
    # Filter out NA, empty string values, and the specific unwanted response in Q36
    data_filtered <- usable_data %>%
      filter(!is.na(!sym(col)) & !!sym(col) != "") %>%
      filter(!(col == "Q36" & !!sym(col) == "I don't feel comfortable answering this question"))

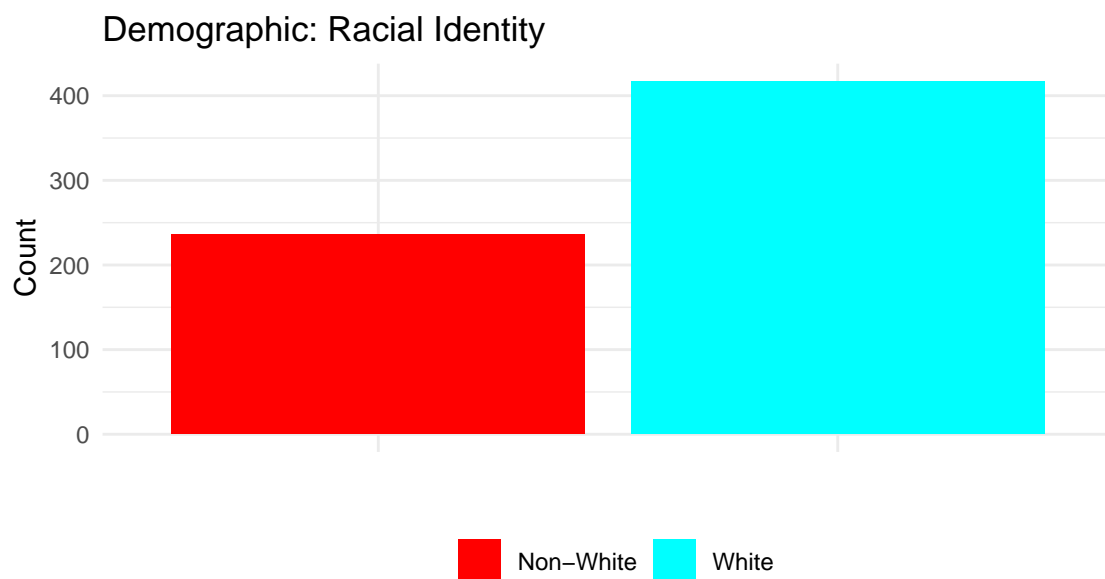
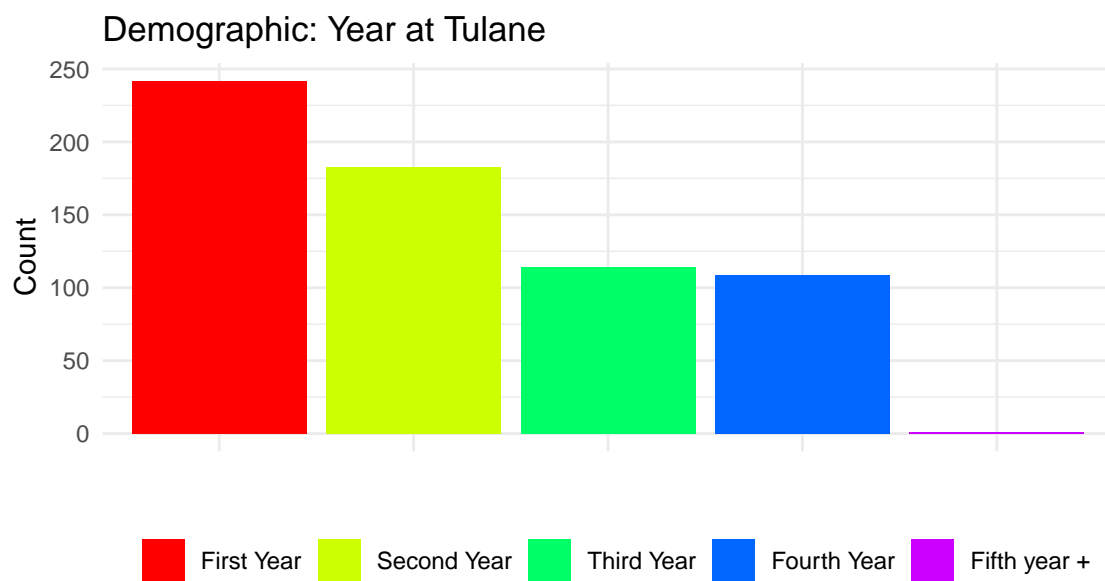
    # Get counts for the legend
    counts <- data_filtered %>%
      group_by(!!sym(col)) %>%
      summarise(Count = n()) %>%
      ungroup() %>%
      mutate(col = as.factor(!!sym(col))) # Make sure the grouping variable is a factor

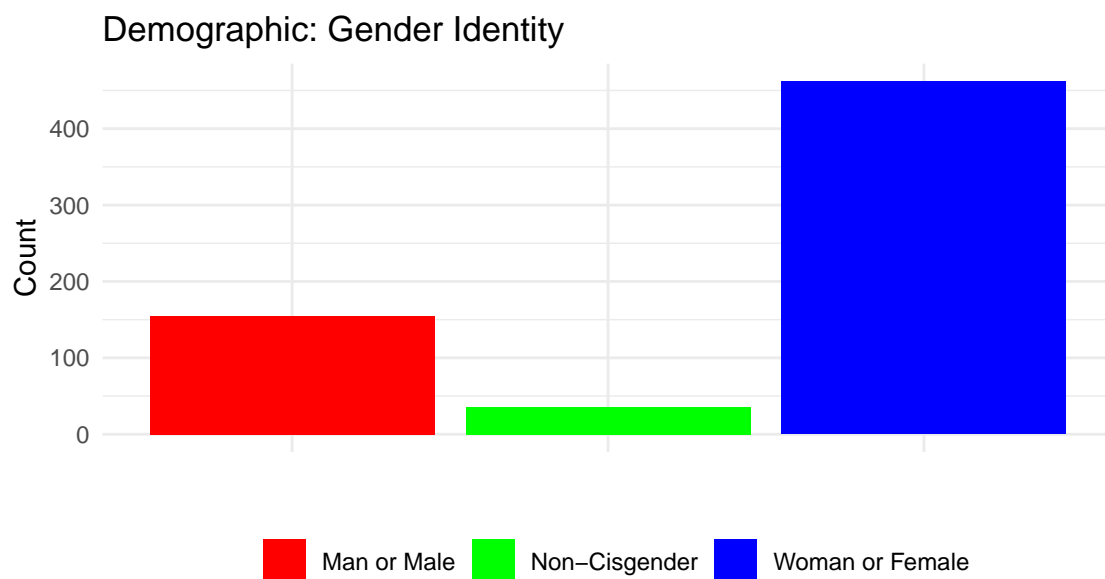
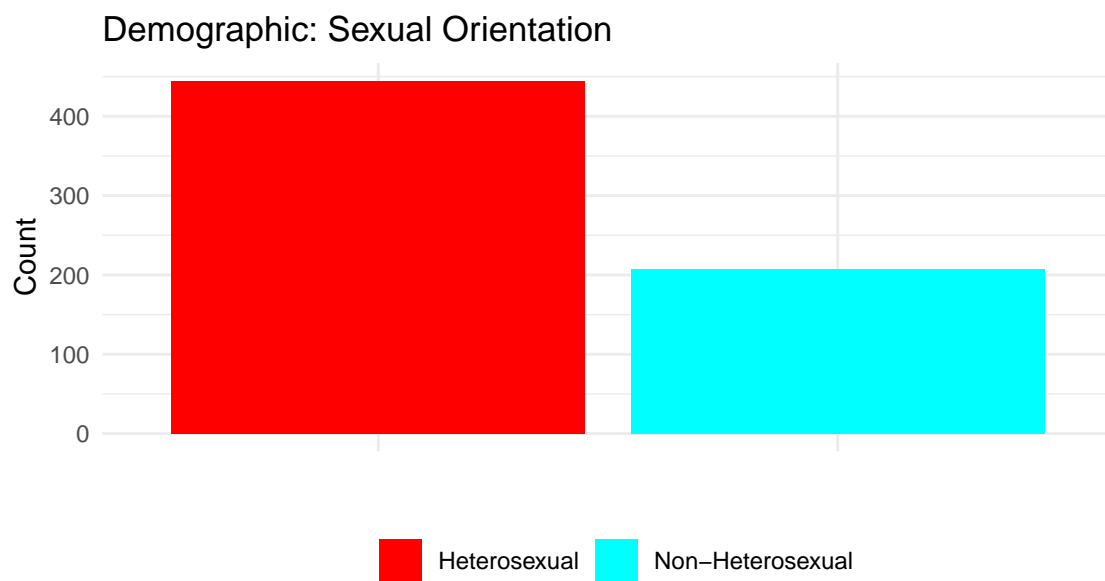
    # If the column is Q31, set the factor levels to the desired order
    if (col == "Q31") {
      counts$col <- factor(counts$col, levels = desired_order_Q31)
    }

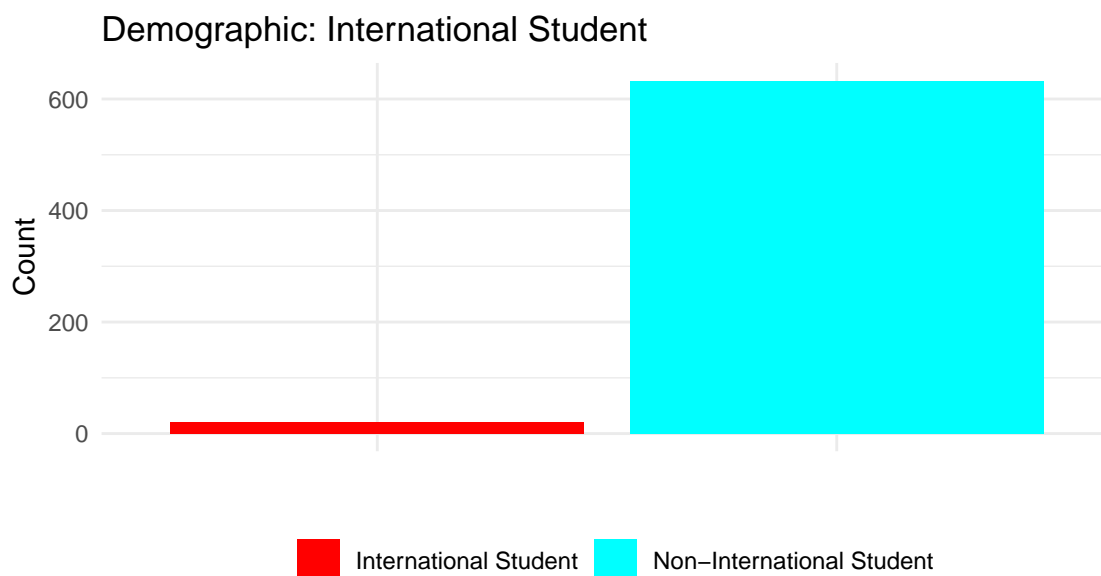
    # Find the corresponding demographic text
    demographic_text <- demographic_dictionary$DemographicText[demographic_dictionary$DemographicCode == col]

    # Create the bar plot with a unique fill color for each bar and remove the x-axis text
    p <- ggplot(counts, aes(x = col, y = Count, fill = col)) +
      geom_bar(stat = "identity") +
      scale_fill_manual(values = rainbow(n = length(counts$Count))) +
      labs(title = paste("Demographic:", demographic_text), x = "", y = "Count") +
      theme_minimal() +
      theme(plot.margin = margin(t = 50, r = 10, b = 20, l = 10),
            axis.text.x = element_blank(),
            axis.ticks.x = element_blank(),
            legend.position = "bottom",
            legend.title = element_blank()) # Remove legend title

    # Print the plot
    print(p)
  }
})
```







Now, we begin our analysis... all significance is evaluated at the $\alpha = 0.05$ level.

1. Does race/gender identity/sexual orientation have an impact on which chief complaints people are unwilling to call for?

```
# Define chief complaint questions
chief_complaints <- c("Q19_1", "Q19_2", "Q19_3", "Q19_4", "Q20_1", "Q20_2", "Q20_3", "Q20_4",
                      "Q21_1", "Q21_2", "Q21_3", "Q21_4", "Q22_1", "Q22_2", "Q22_3", "Q22_4",
                      "Q23_1", "Q23_2", "Q23_3", "Q23_4")

# Convert chief complaint variables to factors
usable_data <- usable_data %>%
  mutate(across(all_of(chief_complaints), factor))

# Run ordinal logistic regression for each chief complaint question
results <- list()
for (complaint in chief_complaints) {
  formula <- as.formula(paste(complaint, "~ Q32 + Q33 + Q34")) # Demographic variables as predictors
  model <- polr(formula, data = usable_data, Hess = TRUE)
  results[[complaint]] <- model
}

# Function to extract coefficients, standard errors, t-values, and p-values
extract_model_info <- function(model) {
  summary_model <- summary(model)
  coef_table <- coef(summary_model)
}
```

```

    estimates <- coef_table[, "Value"]
    std_errors <- coef_table[, "Std. Error"]
    t_values <- estimates / std_errors
    p_values <- 2 * pnorm(-abs(t_values))
    results_table <- data.frame(Estimate = estimates, StdError = std_errors, tValue = t_values, PValue = p_values)
    return(results_table)
}

# Function to summarize significant results
summarize_significant_results <- function(model, complaint, significance_level = 0.05) {
  model_info <- extract_model_info(model)
  significant_results <- model_info[model_info$PValue < significance_level, ]

  if (nrow(significant_results) > 0) {
    output <- paste("Chief Complaint:", complaint, "\nSignificant Predictors:\n")
    for (row in 1:nrow(significant_results)) {
      predictor_name <- rownames(significant_results)[row]
      estimate <- round(significant_results[row, "Estimate"], 3)
      p_value <- round(significant_results[row, "PValue"], 50)
      line <- paste(predictor_name, "Estimate:", estimate, "P-Value:", p_value, "\n")
      output <- paste(output, line, sep = "")
    }
  } else {
    output <- paste("Chief Complaint:", complaint, "\nNo significant predictors at p < ", significance_level)
  }

  return(output)
}

# Apply the summary function to each model and print the summary
for (i in 1:length(chief_complaints)) {
  complaint <- chief_complaints[i]
  model <- results[[complaint]]
  summary <- summarize_significant_results(model, complaint)
  cat(summary, "\n")
}

```

```

## Chief Complaint: Q19_1
## Significant Predictors:
## 1|2 Estimate: 1.336 P-Value: 1.26639073658405e-07
## 2|3 Estimate: 2.822 P-Value: 6.85392904301443e-21
## 3|4 Estimate: 3.243 P-Value: 7.430009986397e-23
## 4|5 Estimate: 4.072 P-Value: 3.86657340429292e-22
##
## Chief Complaint: Q19_2
## Significant Predictors:
## Q33Non-Heterosexual Estimate: -0.545 P-Value: 0.00869126733369664
## 1|2 Estimate: 0.589 P-Value: 0.00535504392802504
## 2|3 Estimate: 1.904 P-Value: 2.09637860602494e-16
## 3|4 Estimate: 2.837 P-Value: 1.56893121914925e-25
## 4|5 Estimate: 3.967 P-Value: 4.50268693981381e-25
##
## Chief Complaint: Q19_3

```



```

## Significant Predictors:
## 2|3 Estimate: 1.124 P-Value: 4.47939226118528e-09
## 3|4 Estimate: 2.099 P-Value: 4.99143547505097e-23
## 4|5 Estimate: 3.93 P-Value: 6.81083175619453e-30
##
## Chief Complaint: Q19_4
## Significant Predictors:
## 1|2 Estimate: -4.012 P-Value: 7.69779751244053e-26
## 2|3 Estimate: -3.491 P-Value: 5.40734350907086e-28
## 3|4 Estimate: -2.672 P-Value: 1.7637122795443e-25
## 4|5 Estimate: -0.627 P-Value: 0.00241610342502019
##
## Chief Complaint: Q20_1
## Significant Predictors:
## Q34Woman or Female Estimate: -0.425 P-Value: 0.0485468616691984
## 1|2 Estimate: 0.652 P-Value: 0.00277762896266042
## 2|3 Estimate: 2.461 P-Value: 4.5436372574397e-20
## 3|4 Estimate: 3.924 P-Value: 1.91393545992938e-20
## 4|5 Estimate: 5.881 P-Value: 7.59445894767489e-09
##
## Chief Complaint: Q20_2
## Significant Predictors:
## 2|3 Estimate: 1.671 P-Value: 5.03017992696101e-15
## 3|4 Estimate: 2.684 P-Value: 5.32377569995413e-26
## 4|5 Estimate: 4.334 P-Value: 1.84482340579719e-22
##
## Chief Complaint: Q20_3
## Significant Predictors:
## Q34Woman or Female Estimate: 0.515 P-Value: 0.00279335715253452
## 1|2 Estimate: -0.738 P-Value: 5.56089970365366e-05
## 3|4 Estimate: 1.26 P-Value: 1.71079261155452e-11
## 4|5 Estimate: 3.351 P-Value: 6.36223e-45
##
## Chief Complaint: Q20_4
## Significant Predictors:
## 1|2 Estimate: -4.197 P-Value: 3.56088659068662e-33
## 2|3 Estimate: -3.198 P-Value: 1.48811125685706e-35
## 3|4 Estimate: -1.959 P-Value: 2.6575154484081e-21
##
## Chief Complaint: Q21_1
## Significant Predictors:
## Q34Non-Cisgender Estimate: -1.123 P-Value: 0.0246594521026494
## Q34Woman or Female Estimate: -0.523 P-Value: 0.00534411142378646
## 2|3 Estimate: 1.265 P-Value: 8.89915321801491e-10
## 3|4 Estimate: 2.057 P-Value: 4.28029662042622e-19
## 4|5 Estimate: 3.804 P-Value: 2.99959829983502e-22
##
## Chief Complaint: Q21_2
## Significant Predictors:
## Q32White Estimate: -0.322 P-Value: 0.0394106651644749
## Q33Non-Heterosexual Estimate: -0.461 P-Value: 0.00949217258901901
## Q34Woman or Female Estimate: -0.412 P-Value: 0.0203298191598127
## 1|2 Estimate: -0.495 P-Value: 0.00825903161912905
## 2|3 Estimate: 0.534 P-Value: 0.00447629715319645

```

```

## 3|4 Estimate: 1.264 P-Value: 1.59123325270106e-10
## 4|5 Estimate: 2.633 P-Value: 3.52329807502733e-24
##
## Chief Complaint: Q21_3
## Significant Predictors:
## 1|2 Estimate: -0.511 P-Value: 0.0037419002611618
## 3|4 Estimate: 1.063 P-Value: 3.87899642022225e-09
## 4|5 Estimate: 2.907 P-Value: 2.15452994238965e-33
##
## Chief Complaint: Q21_4
## Significant Predictors:
## Q34Woman or Female Estimate: 0.474 P-Value: 0.00645302977229574
## 1|2 Estimate: -2.3 P-Value: 1.01950848792884e-24
## 2|3 Estimate: -1.587 P-Value: 1.25270188943254e-15
## 3|4 Estimate: -0.786 P-Value: 2.3480355274957e-05
## 4|5 Estimate: 0.704 P-Value: 0.00014104990206689
##
## Chief Complaint: Q22_1
## Significant Predictors:
## 1|2 Estimate: -0.979 P-Value: 3.67223342769604e-08
## 3|4 Estimate: 0.577 P-Value: 0.000904679352006833
## 4|5 Estimate: 1.811 P-Value: 2.17228424966833e-21
##
## Chief Complaint: Q22_2
## Significant Predictors:
## 1|2 Estimate: -2.756 P-Value: 3.80940126288801e-35
## 2|3 Estimate: -2.141 P-Value: 9.57149095064745e-26
## 3|4 Estimate: -1.379 P-Value: 5.43807761048076e-13
##
## Chief Complaint: Q22_3
## Significant Predictors:
## Q34Non-Cisgender Estimate: 0.847 P-Value: 0.0219360700840843
## Q34Woman or Female Estimate: 0.474 P-Value: 0.00630640921832447
## 1|2 Estimate: -0.839 P-Value: 6.74773610828731e-06
## 3|4 Estimate: 1.161 P-Value: 7.03506978764904e-10
## 4|5 Estimate: 2.799 P-Value: 1.91619790111411e-36
##
## Chief Complaint: Q22_4
## Significant Predictors:
## 1|2 Estimate: -1.814 P-Value: 8.70570436757493e-20
## 2|3 Estimate: -0.678 P-Value: 0.000221710722055508
## 4|5 Estimate: 1.525 P-Value: 1.76164562910704e-15
##
## Chief Complaint: Q23_1
## Significant Predictors:
## Q33Non-Heterosexual Estimate: -0.404 P-Value: 0.0472504943848
## 1|2 Estimate: -3.384 P-Value: 1.3099711707464e-28
## 2|3 Estimate: -2.892 P-Value: 2.65808104979583e-26
## 3|4 Estimate: -2.369 P-Value: 2.4034483047516e-21
## 4|5 Estimate: -1.05 P-Value: 2.62107446228689e-06
##
## Chief Complaint: Q23_2
## Significant Predictors:
## 1|2 Estimate: -2.916 P-Value: 3.12186254102876e-31

```

```

## 2|3 Estimate: -2.196 P-Value: 3.91380022892605e-23
## 3|4 Estimate: -1.741 P-Value: 1.31184635111683e-16
## 4|5 Estimate: -0.626 P-Value: 0.00150213427129576
##
## Chief Complaint: Q23_3
## Significant Predictors:
## 1|2 Estimate: -1.279 P-Value: 1.00592247628678e-11
## 2|3 Estimate: -0.443 P-Value: 0.0146176806658324
## 4|5 Estimate: 1.072 P-Value: 5.88286932882394e-09
##
## Chief Complaint: Q23_4
## Significant Predictors:
## 2|3 Estimate: 1.62 P-Value: 6.92100522579869e-15
## 3|4 Estimate: 2.265 P-Value: 2.06254237786526e-24
## 4|5 Estimate: 2.749 P-Value: 2.47381038742951e-30
##

```

To investigate whether race, gender identity, or sexual orientation impacts the likelihood of individuals being unwilling to call for help in various emergency situations, a comprehensive statistical analysis was conducted. This analysis involved the application of ordinal logistic regression to assess the influence of demographic variables on the responses to different emergency scenarios. Of the data, the following was significant...

1. Minor Medical Emergency:

- Sexual orientation showed a significant impact on the likelihood of calling for Tulane EMS. Non-Heterosexual individuals were less likely to call compared to Heterosexual individuals.
- Gender identity had a significant effect on taking alternative transportation to see a doctor, with Women or Female individuals being more likely to take this action.

2. Psychological Emergency:

- Significant differences were observed based on sexual orientation in the likelihood of calling for Tulane EMS. Non-Heterosexual individuals were less likely to call compared to Heterosexual individuals.

3. Ingestion Emergency:

- Year at Tulane (student's year) showed significant differences in the likelihood of calling for Tulane EMS, but without a consistent trend across different years.
- Gender identity impacted the likelihood of taking alternative transportation to see a doctor, with Non-Cisgender and Women or Female individuals being more likely to take this action.

4. Cardiovascular Emergency:

- Year at Tulane influenced the likelihood of calling for Tulane EMS for a cardiovascular emergency, with Fourth-Year students being less likely to call compared to First-Year students.

Now we will take a deeper dive into the reasons why the significant groups differed in their responses. We will do this by looking at both the relative frequencies and written responses of factors which influenced decision making. Note, these are all hypothetical scenarios where participants were asked to rate their likelihood of taking different actions rather than any sort of actualization.

```

filter_responses <- function(data, questions, demo, demo_value) {
  # Filter data for the specific demographic group
  demo_filtered_data <- data[data[[demo]] == demo_value, ]

  # Select non-empty responses in the demographic group
  non_empty_responses <- demo_filtered_data[apply(demo_filtered_data[questions], 1, function(x) any(x != ""))]

  # Return the filtered responses
  return(non_empty_responses)
}

# Columns for questions
questions_minor_medical <- c("Q25_1", "Q25_2", "Q25_3", "Q25_4", "Q25_5", "Q25_6", "Q25_7", "Q25_8")
questions_psychological <- c("Q26_1", "Q26_2", "Q26_3", "Q26_4", "Q26_5", "Q26_6", "Q26_7", "Q26_8")
questions_ingestion <- c("Q27_1", "Q27_2", "Q27_3", "Q27_4", "Q27_5", "Q27_6", "Q27_7", "Q27_8")
questions_cardiovascular <- c("Q28_1", "Q28_2", "Q28_3", "Q28_4", "Q28_5", "Q28_6", "Q28_7", "Q28_8")

# Filter responses
responses_minor_medical_non_heterosexual <- filter_responses(usable_data, questions_minor_medical, "Q33", "Non-Cis")
responses_minor_medical_women_female <- filter_responses(usable_data, questions_minor_medical, "Q34", "Woman or Trans")

responses_psychological_non_heterosexual <- filter_responses(usable_data, questions_psychological, "Q33", "Non-Cis")
responses_psychological_women_female <- filter_responses(usable_data, questions_psychological, "Q34", "Woman or Trans")

responses_ingestion_non_cisgender <- filter_responses(usable_data, questions_ingestion, "Q34", "Non-Cis")
responses_ingestion_women_female <- filter_responses(usable_data, questions_ingestion, "Q34", "Woman or Trans")

responses_cardiovascular_fourth_year <- filter_responses(usable_data, questions_cardiovascular, "Q31", "Fourth Year")

# Mapping of question codes to response options
response_options <- c("Q25_1" = "Lack of Trust",
                     "Q25_2" = "Previous Neg. Experience",
                     "Q25_3" = "Don't Want An EMT I Know",
                     "Q25_4" = "Police Involvement",
                     "Q25_5" = "Tulane/Housing Involvement",
                     "Q25_6" = "Don't Know How to Call TEMS",
                     "Q25_7" = "Prefer NOEMS",
                     "Q25_8" = "Other",
                     "Q26_1" = "Lack of Trust",
                     "Q26_2" = "Previous Neg. Experience",
                     "Q26_3" = "Don't Want An EMT I Know",
                     "Q26_4" = "Police Involvement",
                     "Q26_5" = "Tulane/Housing Involvement",
                     "Q26_6" = "Don't Know How to Call TEMS",
                     "Q26_7" = "Prefer NOEMS",
                     "Q26_8" = "Other",
                     "Q27_1" = "Lack of Trust",
                     "Q27_2" = "Previous Neg. Experience",
                     "Q27_3" = "Don't Want An EMT I Know",
                     "Q27_4" = "Police Involvement",
                     "Q27_5" = "Tulane/Housing Involvement",
                     "Q27_6" = "Don't Know How to Call TEMS",
                     "Q27_7" = "Prefer NOEMS",
                     "Q27_8" = "Other",

```

```

      "Q28_1" = "Lack of Trust",
      "Q28_2" = "Previous Neg. Experience",
      "Q28_3" = "Don't Want An EMT I Know",
      "Q28_4" = "Police Involvement",
      "Q28_5" = "Tulane/Housing Involvement",
      "Q28_6" = "Don't Know How to Call TEMS",
      "Q28_7" = "Prefer NOEMS",
      "Q28_8" = "Other")

# Function to create bar plots for responses
create_bar_plot <- function(data, title) {
  # Count the number of non-empty responses for each question
  response_counts <- colSums(data != "")

  # Convert to a data frame for ggplot
  df <- data.frame(Question = names(response_counts), Count = response_counts)

  # Create the bar plot
  ggplot(df, aes(x = Question, y = Count)) +
    geom_bar(stat = "identity", fill = "purple") +
    theme_minimal() +
    labs(title = title, x = "Response Option", y = "Count") +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
}

# Update the create_bar_plot function to use response options as x-axis labels and order them
create_bar_plot <- function(data, title) {
  # Count the number of non-empty responses for each question
  response_counts <- colSums(data != "")

  # Map the question codes to response options
  response_labels <- names(response_counts)
  response_labels <- response_options[response_labels]

  # Convert to a data frame for ggplot
  df <- data.frame(Question = response_labels, Count = response_counts)

  # Order the response options
  ordered_responses <- c("Lack of Trust", "Previous Neg. Experience", "Don't Want An EMT I Know",
                        "Police Involvement", "Tulane/Housing Involvement", "Don't Know How to Call TEMS",
                        "Prefer NOEMS", "Other")
  df$Question <- factor(df$Question, levels = ordered_responses)

  # Create the bar plot
  ggplot(df, aes(x = Question, y = Count)) +
    geom_bar(stat = "identity", fill = "purple") +
    theme_minimal() +
    labs(title = title, x = "", y = "Count") +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
}

```

```

# Generate bar plots for each set of responses
plot_minor_medical_non_heterosexual <- create_bar_plot(responses_minor_medical_non_heterosexual, "Minor Medical Emergency Responses: Non-Heterosexual")
plot_minor_medical_women_female <- create_bar_plot(responses_minor_medical_women_female, "Minor Medical Emergency Responses: Women Female")

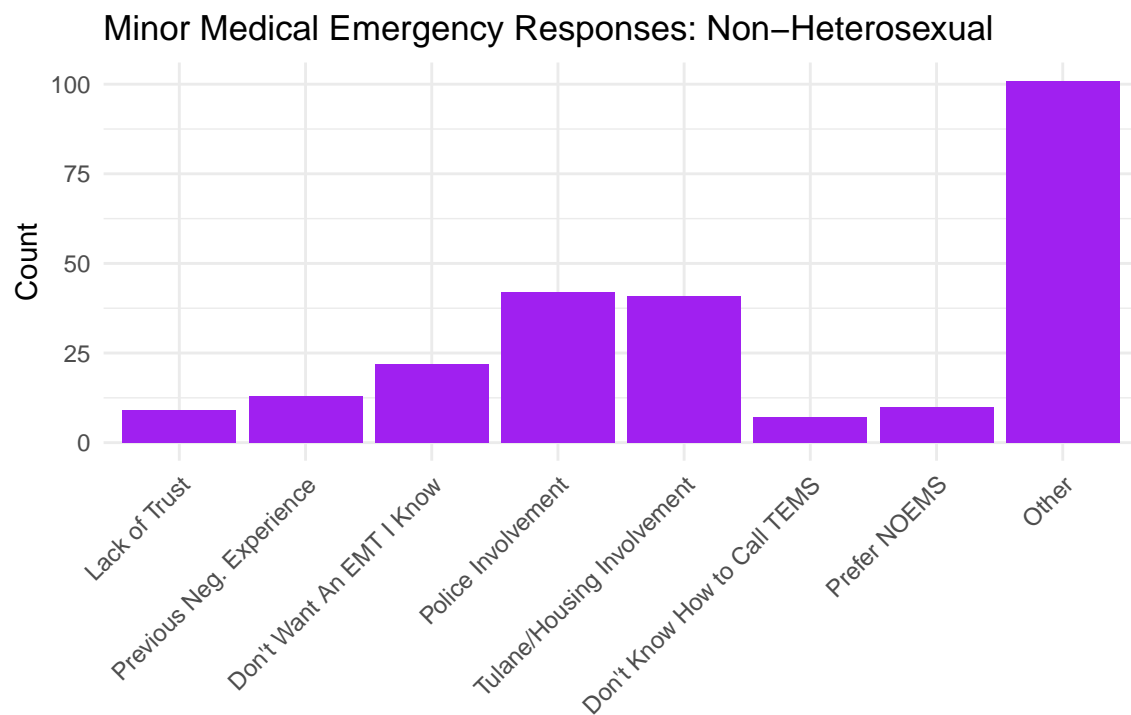
plot_psychological_non_heterosexual <- create_bar_plot(responses_psychological_non_heterosexual, "Psychological Emergency Responses: Non-Heterosexual")

plot_ingestion_non_cisgender <- create_bar_plot(responses_ingestion_non_cisgender, "Ingestion Emergency Responses: Non-Cisgender")
plot_ingestion_women_female <- create_bar_plot(responses_ingestion_women_female, "Ingestion Emergency Responses: Women Female")

plot_cardiovascular_fourth_year <- create_bar_plot(responses_cardiovascular_fourth_year, "Cardiovascular Emergency Responses: Fourth Year")

# Print plot and then print responses from Q25_8_TEXT for Non-Heterosexual
print(plot_minor_medical_non_heterosexual)

```



```

knitr::kable(data.frame(Response = usable_data$Q25_8_TEXT[usable_data$Q33 == "Non-Heterosexual" & usable_data$Q33 != "Other"], stringsAsFactors = FALSE))

```

Table 2: Responses Labeled 'Other' for Non-Heterosexual

Response
Unnecessary
Seems unnecessary- I would like to save the calls for an emergency
Waste of other people's time
easier for me to deal with it
Same as above. Not an immediate emergency so I would rather drive there myself.
I might not need hospitalization
May not be necessary

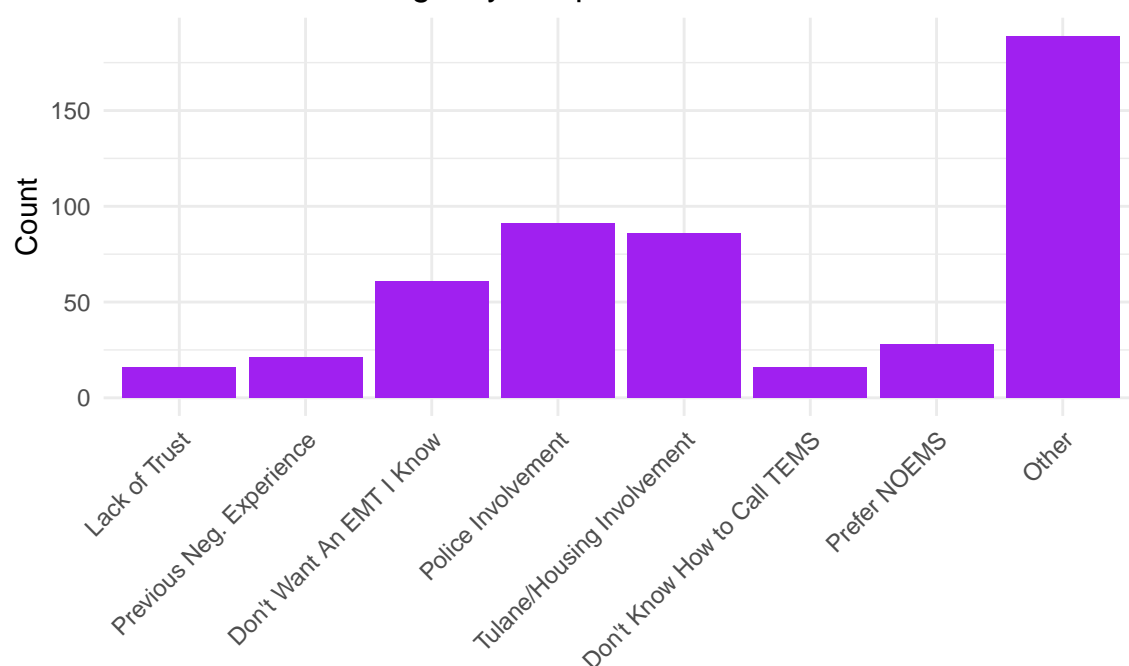
Response
I don't think the services are necessary
I can take care of it myself.
I would likely minimize the severity of the emergency until the pain became serious enough
I wouldn't need to in this situation either
I do not consider it serious enough.
Unnecessary
I can call an Uber or take care of it myself.
Minor things i'd feel less likely to need an ambulance and would not want to waste anyone's time
I don't think it would be that necessary
Not necessary
Injury doesn't require EMS
do not feel a need
it's not important enough to call, i'd go to campus health
I feel like its not a big enough deal to call TEMS
Too minor
I can probably figure it out by myself, and if I can't, I would rather use my own transportation since it's not an emergency.
Im not about to go to the ER for a slight fever
treat it myself
Don't want to take up limited EMS resources for a non emergency
I feel I can care for that myself.
I would call.
Not necessary
Again, I can treat myself well enough in minor situations
Prefer bringing myself to doctor
i can go to a doctor that i know
If I am having symptoms like these I wait to see if they go away and if they do not I go to a doctor myself.
Seems like something I could go to campus health for
Don't think it's big enough to warrant help
Feels unimportant
If it's minor don't feel the need to call
It is not serious enough to call an ambulance
A tele health call may be better suited for this situation
The hospital seems unnecessary
Also wouldn't want to waste their time.
I can also drive myself to a hospital.
I can usually take care of it myself
For minor medical emergencies I have taken myself to student health or In-n-out Urgency when that's full
I can drive myself if it's not life threatening
Not call anyone
TEMS services not needed
probably something I'll just handle myself
I worry the members would appraise my issue as being too minor
N/A
Can treat self
Feel it's unnecessary
seems silly to call ambulance for something so minor
not necessary
If it is not urgent I wouldn't call any EMS
i would not deem that an emergency requiring medical attention
Depends how severe the pain is. I would trust members of TEMS to care for this situation.
rather go to a doctor

Response

It's fine
doesn't feel severe enough
I wouldn't likely try to seek out medical attention for that
It's not that serious for me to call/cultural beliefs
not serious enough
I wouldn't need EMS, just a ride to a doctor
It doesn't seem important enough to get ems involved
I don't necessarily see the point of calling an EMS over something so minor
I can treat it myself
too minor to call anyone
Not too serious. I can treat myself.
It's unnecessary
I don't feel like it's at the severity to need outside assistance like TEMS.
Possible costs
Easy to care for
Don't want to waste their time
would rather go elsewhere, ambulance seems unnecessary
probably not that serious
Not necessary
Unnecessary
Not important enough to need help
I can either care for it myself or drive myself/get a ride to the hospital if I need to.
money/ incurring costs
Campus health offers care, so I wouldn't really need TEMS
I feel like I wouldn't need EMS

```
# Print plot and then print responses from Q25_8_TEXT for Woman or Female  
print(plot_minor_medical_women_female)
```


Minor Medical Emergency Responses: Women or Female



```
knitr::kable(data.frame(Response = usable_data$Q25_8_TEXT[usable_data$Q34 == "Woman or Female" & usable_data$Q34 != "Other"], stringsAsFactors = FALSE))
```

Table 3: Responses Labeled ‘Other’ for Woman or Female

Response
I do not believe it to be necessary for minor medical emergencies
It's not serious enough to call TEMS when I can take OTC medication and sleep
Seems unnecessary- I would like to save the calls for an emergency
Waste of other people's time
easier for me to deal with it
Same as above. Not an immediate emergency so I would rather drive there myself.
I don't want to go to the hospital
dont need it
May not be necessary
It doesn't feel like a medical emergency, I don't feel like there is much they could do.
I don't think the services are necessary
I can take care of it myself.
I would likely minimize the severity of the emergency until the pain became serious enough
I wouldn't need to in this situation either
I don't need to call for something like this.
minor
Does not seem necessary - I can handle it myself
not necessary
I do not consider it serious enough.
Again, depending on the severity and the situation, I don't think I would need an EMT
Don't feel the need to unless it's persistent
too much work

Response
I can call an Uber or take care of it myself.
Minor thing that I can treat myself
Minor things i'd feel less likely to need an ambulance and would not want to waste anyone's time
I can deal with it myself
Situation does not require EMS
I don't think it would be that necessary
Not difficult to deal with on my own
Not necessary
I know how to care for this myself.
it is not necessary
Not necessary
none
Injury doesn't require EMS
ambulance isn't necessary
dont think its necessary
it's not important enough to call, i'd go to campus health
I feel like its not a big enough deal to call TEMS
Too minor
Im not about to go to the ER for a slight fever
I could probably treat it myself
treat it myself
not necessary
Don't want to take up limited EMS resources for a non emergency
Doesn't seem necessary to call TEMS for a small issue
I have a car and would be able to drive myself somewhere to get treated
I dont feel like that is emergent enough, i would go to doctor if symptoms persisted
Not necessary
I don't think it requires EMS
it's a minor injury that could be handled on its own
Prefer bringing myself to doctor
not necessary
I can treat it
i can go to a doctor that i know
can deal myself
I can handle it myself
I feel like it's unnecessary and costs too much
If I am having symptoms like these I wait to see if they go away and if they do not I go to a doctor myself.
Don't think it's big enough to warrant help
Not an emergency. I can go to doctor after making an appt.
I can deal with those myself
Feels unimportant
can manage, if it's bad i'll go to walk in clinic
Think it's unnecessary
If it's minor don't feel the need to call
Feel like I can care for it myself
It is not serious enough to call an ambulance
The hospital seems unnecessary
Also wouldn't want to waste their time.
Again, wouldn't want the ambulance involved
I can care for it myself
not needed

Response

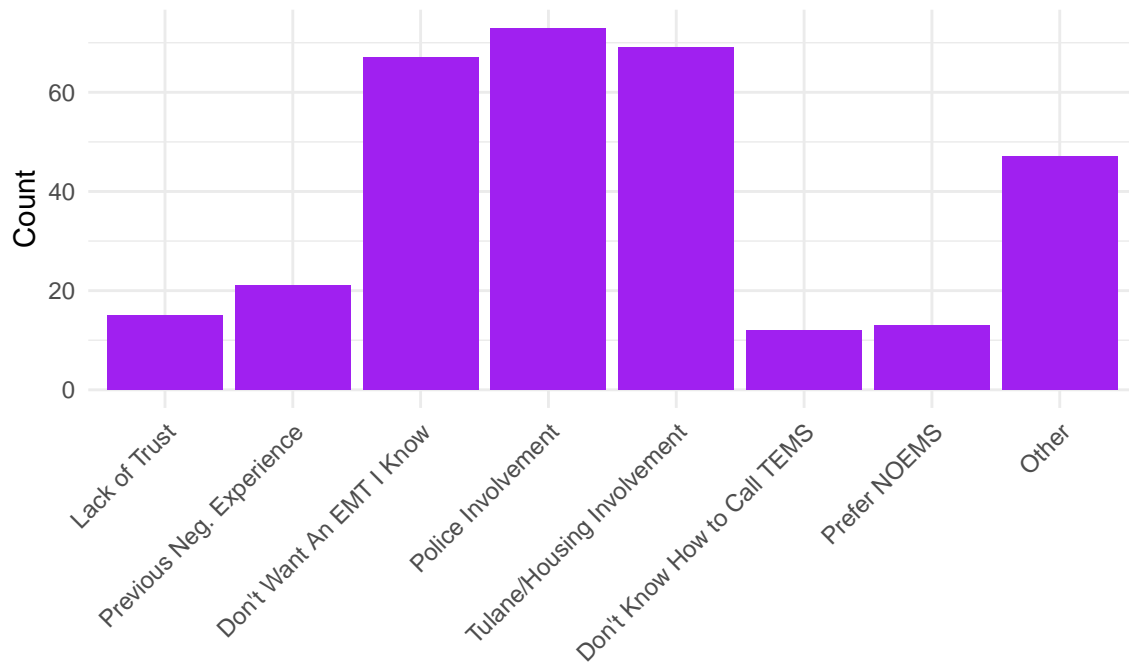
I think that type of injury is minor, something I can probably just go to campus health for or ask my parents about.
it's easier to just drive there or have a friend drive me
Involvement of TUPD (trash)
Those aren't serious enough to me
I don't think it's too big of a deal
I can also drive myself to a hospital.
For minor medical emergencies I have taken myself to student health or In-n-out Urgency when that's full
Not call anyone
there's no need
TEMS services not needed
probably something I'll just handle myself
I worry the members would appraise my issue as being too minor
not enough to warrant
I don't feel my situation warrants the need for emergency medical attention.
Don't want to bother them as it's not major medical emergency
It's not an emergency, and I can probably deal with it on my own. If I need to see a doctor, I can schedule an appointment.
i would rather just make a doctors apt on my own
Not severe enough
N/A
I don't feel it's necessary
Can treat self
This can easily be treated alone
Not needed
seems silly to call ambulance for something so minor
Not something an EMS would be needed for
No problem calling TEMS
It seems unnecessary to call TEMS
not necessary
Not that serious or will see obgyn about those issues
Its not necessary
I feel that this is not as extreme and can be cared for on my own
Telehealth is easier
Likely unnecessary
If it is not urgent I wouldn't call any EMS
I don't want someone who I could see around campus to know my medical history
Not a big deal
i would not deem that an emergency requiring medical attention
It's fine
doesn't feel severe enough
I wouldn't likely try to seek out medical attention for that
It's not that serious for me to call/cultural beliefs
See above
not serious enough
Don't need hospital
Don't feel it's necessary
i would not want to waste time
I can treat it myself
I would rather use a doctor so I can monitor my issue which is not an emergency
People at campus health were super unhelpful when I was suffering from a UTI and Kidney infection. So I just call my dads doctor now.

Response

too minor to call anyone
unnecessary
It's unnecessary
Possible costs
I can treat it myself
Can handle it myself
Easy to care for
its not an immediate medical problem, i can uber to urgent care
Not necessary
Don't think it's necessary.
Don't want to waste their time
I can treat myself in this situation
Not necessary
probably not that serious
Not a big enough deal
unnecessary
my mom is a doctor so i would call her
Not necessary
Unnecessary
Not severe enough
can be solved by local doctor or self-treated
Not important enough to need help
I have a mother in the medical field that can help me deal with the issues first
I do not think I need it for fever
Campus health offers care, so I wouldn't really need TEMS
If it's not serious, I would not call anyone and just walk to campus health
I can take care of minor emergencies myself

```
# Print plot and then print responses from Q26_8_TEXT for Non-Heterosexual  
print(plot_psychological_non_heterosexual)
```

Psychological Emergency Responses: Non-Heterosexual



```
knitr::kable(data.frame(Response = usable_data$Q26_8_TEXT[usable_data$Q33 == "Non-Heterosexual" & usable_data$Q33 != "Other"], stringsAsFactors = FALSE))
```

Table 4: Responses Labeled 'Other' for Non-Heterosexual

Response
Might be awkward as a member of Tulane EMS.
I don't think the services are necessary
I don't think it would be that necessary
do not feel a need
I don't know how they would help
I just personally would not call for transportation to a hospital for something like this since I would probably just work through it or have my friends help me.
I would call.
Concern about level of training for these kinds in incidents
I would call my therapist instead.
I just don't think it's big enough of an emergency
I would rather call someone I trust
I would only do it if they were at risk of hurting themselves, otherwise I think it might escalate the situation more than help it.
I don't think TEMS can help me with an anxiety attack, they aren't trained therapists
I have other resources available for this kind of emergency that pose less risk to my social and academic standing at Tulane
I would call a close friend
unsure what TEMS could do in this situation that CAPS could not do
N/A
more likely to call the line or the counseling center
could handle myself

Response

I don't feel that someone could help me out of these episodes.

It's fine

do not feel that professional medical attention would impact recovery time, unless in the event of an emergency so severe I no longer feel control or certainty about its end

I don't know how EMS will handle it and therefore is not something I want to figure out while in such a precarious

I can treat it myself

i believe i am able to handle it

I can handle it myself.

Psychological emergency is a broad term and for most psychological-related problems, I feel comfortable handling them. However, I would call for psychotic episode, active suicidal ideation, losing consciousness from an anxiety attack etc.

Costs

I prefer finding someone professional later

I have psychiatric sources I would call first

I have ptsd so some members have similar physical characteristics similar to my abuser which would worsen a ptsd attack

unless it was a violent issue, emergency services usually can't do much if the person needs to be in psych treatment

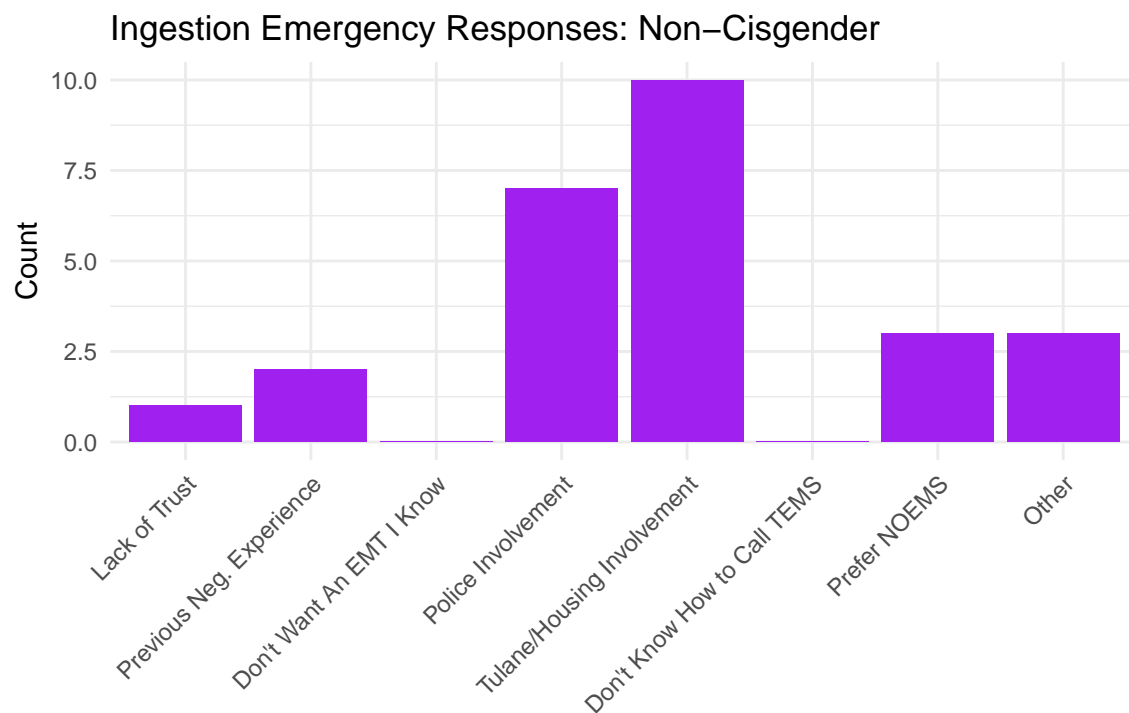
Not really necessary

I can handle it myself

money/ incurring costs

```
# Print plot and then print responses from Q27_8_TEXT for Non-Cisgender
```

```
print(plot_ingestion_non_cisgender)
```

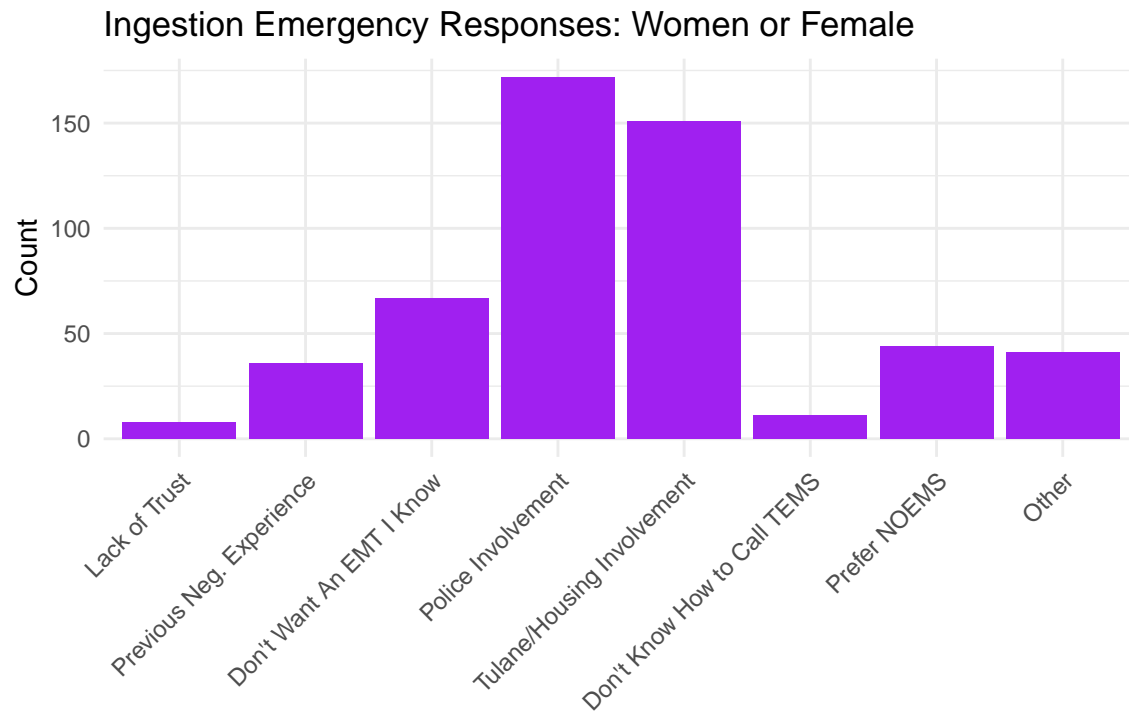


```
knitr::kable(data.frame(Response = usable_data$Q27_8_TEXT[usable_data$Q34 == "Non-Cisgender" & usable_data$Q34 == "Woman or Female"]))
```

Table 5: Responses Labeled ‘Other’ for Non-Cisgender

Response
i would call tems.
None

```
# Print plot and then print responses from Q27_8_TEXT for Woman or Female
print(plot_ingestion_women_female)
```



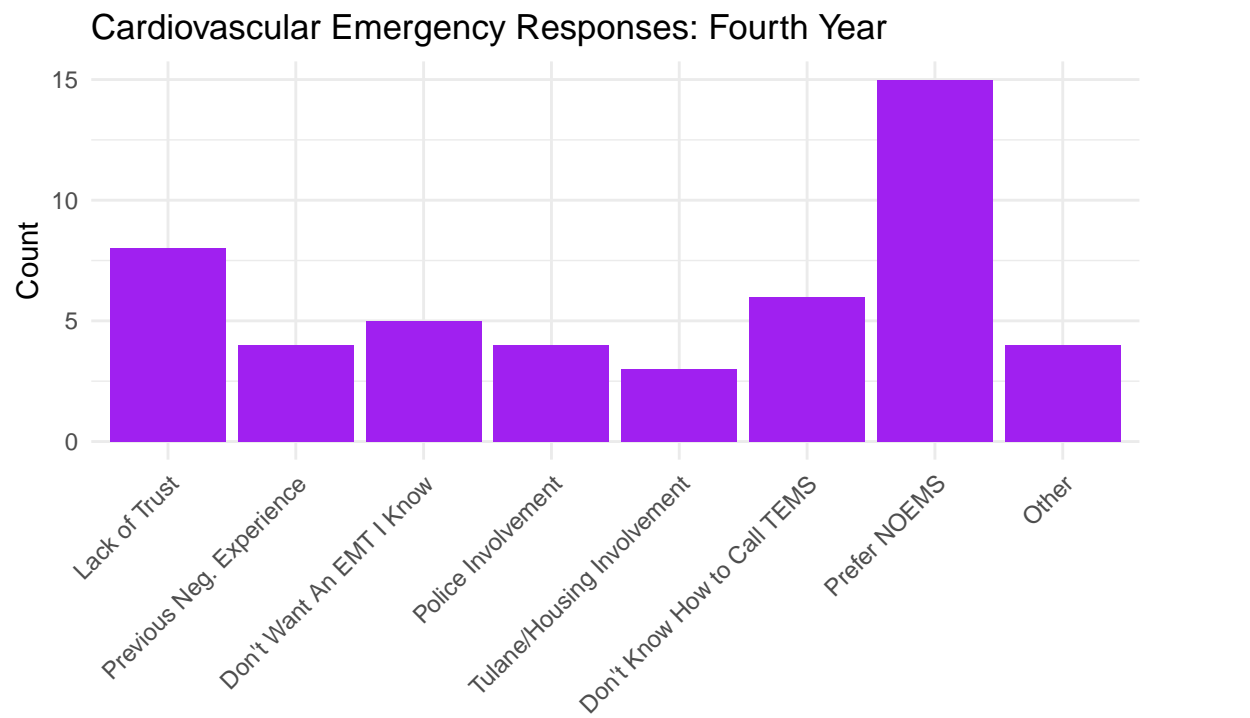
```
knitr::kable(data.frame(Response = usable_data$Q27_8_TEXT[usable_data$Q34 == "Woman or Female" & usable_data$Q34 == "Woman or Female"]))
```

Table 6: Responses Labeled ‘Other’ for Woman or Female

Response
I don't drink or do any form of drug so this situation doesn't apply
none
never experienced this
If its super severe I'd rather get ALS involved
cost
I would call.
I would call
I would definitely call TEMS.

Response
I don't drink or party, so I don't feel this applies to me.
No problem calling TEMS if needed
don't want my coach notified
probably would
I would call EMS unless it was resolvable with time
I don't want someone who I could see around campus to know my medical history
i would call unless there was evidence that i or the person would be ok without intervention
depends on the severity of the emergency/idea that i could handle it myself
I most likely wouldn't have the capacity to do that

```
# Print plot and then print responses from Q28_8_TEXT for Fourth Year
print(plot_cardiovascular_fourth_year)
```



```
knitr::kable(data.frame(Response = usable_data$Q28_8_TEXT[usable_data$Q31 == "Fourth Year" & usable_data$Q31 != "Other"], stringsAsFactors = FALSE))
```

Table 7: Responses Labeled ‘Other’ for Fourth Year

Response
n/a
none

2. Does getting rejected from TEMS make you less likely to call for help?

```
# Adding a new column for TEMS application status
usable_data <- usable_data %>%
  mutate(TEMS_Status = case_when(
    Q9 == "Yes" & Q10 == "No" ~ "Rejected",
    Q9 == "Yes" & Q10 == "Yes" ~ "Accepted",
    Q9 == "No" ~ "Neither"
  ))

# Convert TEMS_Status to a factor
usable_data$TEMS_Status <- factor(usable_data$TEMS_Status)

# Define chief complaint questions
chief_complaints <- c("Q19_1", "Q19_2", "Q19_3", "Q19_4", "Q20_1", "Q20_2", "Q20_3", "Q20_4",
  "Q21_1", "Q21_2", "Q21_3", "Q21_4", "Q22_1", "Q22_2", "Q22_3", "Q22_4",
  "Q23_1", "Q23_2", "Q23_3", "Q23_4")

# Convert chief complaint variables to factors
usable_data <- usable_data %>%
  mutate(across(all_of(chief_complaints), factor))

# Run ordinal logistic regression for each chief complaint question
results <- list()
for (complaint in chief_complaints) {
  formula <- as.formula(paste(complaint, "~ TEMS_Status")) # TEMS application status as predictor
  model <- polr(formula, data = usable_data, Hess = TRUE)
  results[[complaint]] <- model
}

# Function to extract coefficients, standard errors, t-values, and p-values
extract_model_info <- function(model) {
  summary_model <- summary(model)
  coef_table <- coef(summary_model)
  estimates <- coef_table[, "Value"]
  std_errors <- coef_table[, "Std. Error"]
  t_values <- estimates / std_errors
  p_values <- 2 * pnorm(-abs(t_values))
  results_table <- data.frame(Estimate = estimates, StdError = std_errors, tValue = t_values, PValue = p_values)
  return(results_table)
}

# Function to summarize significant results
summarize_significant_results <- function(model, complaint, significance_level = 0.05) {
  model_info <- extract_model_info(model)
  significant_results <- model_info[model_info$PValue < significance_level, ]

  if (nrow(significant_results) > 0) {
    output <- paste("Chief Complaint:", complaint, "\nSignificant Predictors:\n")
    for (row in 1:nrow(significant_results)) {
      predictor_name <- rownames(significant_results)[row]
    }
  }
}
```

```

        estimate <- round(significant_results[row, "Estimate"], 3)
        p_value <- round(significant_results[row, "PValue"], 50)
        line <- paste(predictor_name, "Estimate:", estimate, "P-Value:", p_value, "\n")
        output <- paste(output, line, sep = "")
      }
    } else {
      output <- paste("Chief Complaint:", complaint, "\nNo significant predictors at p <", significant)
    }

    return(output)
  }

# Apply the summary function to each model and print the summary
for (i in 1:length(chief_complaints)) {
  complaint <- chief_complaints[i]
  model <- results[[complaint]]
  summary <- summarize_significant_results(model, complaint)
  cat(summary, "\n")
}

```

```

## Chief Complaint: Q19_1
## Significant Predictors:
## 1|2 Estimate: 2.025 P-Value: 3.01607769795289e-06
## 2|3 Estimate: 3.508 P-Value: 4.62360458400516e-14
## 3|4 Estimate: 3.927 P-Value: 5.20470419750332e-16
## 4|5 Estimate: 4.754 P-Value: 6.60782793619628e-18
##
## Chief Complaint: Q19_2
## Significant Predictors:
## 1|2 Estimate: 0.808 P-Value: 0.00634394995617916
## 2|3 Estimate: 2.112 P-Value: 1.16727861874621e-11
## 3|4 Estimate: 3.037 P-Value: 9.27334284302816e-19
## 4|5 Estimate: 4.164 P-Value: 2.0486070964218e-21
##
## Chief Complaint: Q19_3
## Significant Predictors:
## 2|3 Estimate: 1.02 P-Value: 0.000114550135583973
## 3|4 Estimate: 1.996 P-Value: 8.40282524241213e-13
## 4|5 Estimate: 3.826 P-Value: 1.13465347804973e-22
##
## Chief Complaint: Q19_4
## Significant Predictors:
## TEMS_StatusNeither Estimate: -0.767 P-Value: 0.0415747745580393
## 1|2 Estimate: -4.959 P-Value: 5.71592843465332e-24
## 2|3 Estimate: -4.438 P-Value: 1.39836796616268e-23
## 3|4 Estimate: -3.621 P-Value: 1.43708276413458e-19
## 4|5 Estimate: -1.574 P-Value: 1.64915653428205e-05
##
## Chief Complaint: Q20_1
## Significant Predictors:
## 1|2 Estimate: 1.218 P-Value: 0.000194001421981211
## 2|3 Estimate: 3.008 P-Value: 1.86199275856869e-16
## 3|4 Estimate: 4.465 P-Value: 1.13071997216683e-19

```

```

## 4|5 Estimate: 6.42 P-Value: 9.18023744695364e-10
##
## Chief Complaint: Q20_2
## Significant Predictors:
## TEMS_StatusNeither Estimate: -0.646 P-Value: 0.0268494830155194
## TEMS_StatusRejected Estimate: -1.11 P-Value: 0.0155810741538323
## 2|3 Estimate: 1.406 P-Value: 1.07985035026021e-06
## 3|4 Estimate: 2.425 P-Value: 1.75564538764802e-14
## 4|5 Estimate: 4.075 P-Value: 2.82411777259043e-17
##
## Chief Complaint: Q20_3
## Significant Predictors:
## 1|2 Estimate: -1.292 P-Value: 2.00748258552582e-07
## 2|3 Estimate: -0.476 P-Value: 0.0499415763332917
## 3|4 Estimate: 0.671 P-Value: 0.00584222970770731
## 4|5 Estimate: 2.75 P-Value: 1.97790310628557e-22
##
## Chief Complaint: Q20_4
## Significant Predictors:
## 1|2 Estimate: -4.206 P-Value: 1.59442103206244e-25
## 2|3 Estimate: -3.208 P-Value: 6.36784144999444e-23
## 3|4 Estimate: -1.972 P-Value: 8.2486237009596e-12
##
## Chief Complaint: Q21_1
## Significant Predictors:
## 1|2 Estimate: 0.619 P-Value: 0.0307465089209943
## 2|3 Estimate: 1.812 P-Value: 1.1820769387737e-09
## 3|4 Estimate: 2.592 P-Value: 2.56982963126533e-16
## 4|5 Estimate: 4.33 P-Value: 4.70568454763902e-22
##
## Chief Complaint: Q21_2
## Significant Predictors:
## TEMS_StatusNeither Estimate: -0.782 P-Value: 0.00462436433553427
## TEMS_StatusRejected Estimate: -0.98 P-Value: 0.0182672214713769
## 1|2 Estimate: -0.55 P-Value: 0.0391187321804048
## 3|4 Estimate: 1.181 P-Value: 1.47937140877015e-05
## 4|5 Estimate: 2.548 P-Value: 1.01642464986905e-15
##
## Chief Complaint: Q21_3
## Significant Predictors:
## 3|4 Estimate: 1.191 P-Value: 5.56645734423528e-06
## 4|5 Estimate: 3.034 P-Value: 4.47403145932519e-23
##
## Chief Complaint: Q21_4
## Significant Predictors:
## 1|2 Estimate: -2.451 P-Value: 2.35866215837238e-17
## 2|3 Estimate: -1.744 P-Value: 9.65206872485436e-11
## 3|4 Estimate: -0.953 P-Value: 0.000229718454274728
## 4|5 Estimate: 0.515 P-Value: 0.043933767063078
##
## Chief Complaint: Q22_1
## Significant Predictors:
## TEMS_StatusNeither Estimate: 0.726 P-Value: 0.00743486730281287
## TEMS_StatusRejected Estimate: 0.919 P-Value: 0.0201051256468016

```

```

## 2|3 Estimate: 0.585 P-Value: 0.0263862647978231
## 3|4 Estimate: 1.234 P-Value: 3.75314699633227e-06
## 4|5 Estimate: 2.469 P-Value: 9.55140115980675e-19
##
## Chief Complaint: Q22_2
## Significant Predictors:
## 1|2 Estimate: -2.027 P-Value: 1.29468521887685e-12
## 2|3 Estimate: -1.408 P-Value: 2.56149442447314e-07
## 3|4 Estimate: -0.643 P-Value: 0.016195369583861
## 4|5 Estimate: 1.03 P-Value: 0.000128434093568462
##
## Chief Complaint: Q22_3
## Significant Predictors:
## 1|2 Estimate: -0.778 P-Value: 0.00282531876259427
## 3|4 Estimate: 1.193 P-Value: 5.11512920190181e-06
## 4|5 Estimate: 2.823 P-Value: 8.91911043449543e-23
##
## Chief Complaint: Q22_4
## Significant Predictors:
## 1|2 Estimate: -2.36 P-Value: 1.0265682748956e-18
## 2|3 Estimate: -1.227 P-Value: 1.2670995521133e-06
## 4|5 Estimate: 0.977 P-Value: 0.000112624295177121
##
## Chief Complaint: Q23_1
## Significant Predictors:
## 1|2 Estimate: -3.446 P-Value: 9.36770363082054e-20
## 2|3 Estimate: -2.957 P-Value: 5.66704867176664e-17
## 3|4 Estimate: -2.438 P-Value: 3.7283194400841e-13
## 4|5 Estimate: -1.131 P-Value: 0.000351056408106088
##
## Chief Complaint: Q23_2
## Significant Predictors:
## 1|2 Estimate: -3.495 P-Value: 6.99108160395803e-22
## 2|3 Estimate: -2.774 P-Value: 6.80945516535395e-16
## 3|4 Estimate: -2.318 P-Value: 5.35934254533348e-12
## 4|5 Estimate: -1.201 P-Value: 0.000233093138684599
##
## Chief Complaint: Q23_3
## Significant Predictors:
## 1|2 Estimate: -1.266 P-Value: 8.21211055166442e-07
## 4|5 Estimate: 1.08 P-Value: 2.29185544871087e-05
##
## Chief Complaint: Q23_4
## Significant Predictors:
## 2|3 Estimate: 1.238 P-Value: 1.6106159778296e-06
## 3|4 Estimate: 1.883 P-Value: 3.34773869994726e-12
## 4|5 Estimate: 2.367 P-Value: 1.28945788217132e-16
##

```

To determine whether the status of an application to Tulane EMS (accepted, rejected, or neither) influences the likelihood of calling for help in various emergency scenarios, an in-depth statistical analysis using ordinal logistic regression was conducted. This analysis evaluated the impact of TEMS application status on responses to different chief complaint questions. The following are the significant results...

1. Minor Traumatic Emergency:

- Individuals with no history of applying to TEMS were less likely to choose self-care compared to those who had applied.

2. Minor Medical Emergency:

- Both rejected applicants and those who never applied to TEMS were less likely to consider calling TEMS for help.

3. Psychological Emergency:

- For the question “Call for Tulane EMS for a psychological emergency” (Q21_2) and “Care for yourself for a psychological emergency” (Q21_4), non-applicants and rejected applicants were less likely to opt for these choices.

4. Ingestion Emergency:

- Non-applicants and rejected applicants showed a higher inclination to call 911 in contrast to accepted applicants.

The analysis indicates that the TEMS application status can influence the decision-making process in emergency situations, highlighting the varied perceptions and trust levels towards the EMS system among different groups.²

3. Does race/gender identity/sexual orientation have an impact on opinions of TEMS?

```
# Importing the complete data file
raw_data <- read.csv("/Users/graysonmeckfessel/desktop/repos/diversity-survey/Analysis/raw_data_comple

# Filtering out incomplete surveys according to "survey ends" criteria
completed_surveys <- subset(raw_data,
                             Progress == "100" &
                             Finished == "True" &
                             Q1 == "I understand the consent form and consent to participate in this survey"
                             (Q2 == "Undergraduate Student" | Q2 == "Graduate Student") &
                             Q3 == "Yes" &
                             Q4 == "Yes")

# Re-code chief complaint questions
completed_surveys <- completed_surveys %>%
  mutate(across(c(Q19_1, Q19_2, Q19_3, Q19_4, Q20_1, Q20_2, Q20_3, Q20_4, Q21_1,
                  Q21_2, Q21_3, Q21_4, Q22_1, Q22_2, Q22_3, Q22_4, Q23_1, Q23_2,
                  Q23_3, Q23_4),
```

²Here, I have omitted filtering the data and generating graphs since it is very time consuming to do this in R, if you end up wanting to evaluate these graphs, I recommend using python. It could be valuable to look at them, ggplot2 just started to break my soul so I shifted my focus on the analysis itself opposed to the visualization.

```

      ~ case_when(
        . == "Very unlikely" ~ 1,
        . == "Unlikely" ~ 2,
        . == "About as likely as not" ~ 3,
        . == "Likely" ~ 4,
        . == "Very likely" ~ 5,
        TRUE ~ NA_real_))) # Handle other cases as NA

# Converting Demographically Data For Increased Usability
usable_data <- completed_surveys %>%
  mutate(
    Q32 = ifelse(Q32 == "White", "White", "Non-White"),
    Q33 = ifelse(Q33 == "Straight (Heterosexual)", "Heterosexual", "Non-Heterosexual"),
    Q34 = ifelse(Q34 %in% c("Man or Male", "Woman or Female"), Q34, "Non-Cisgender"),
    Q36 = ifelse(Q36 == "Yes", "International Student", "Non-International Student")
  )

# Define Q30 questions
Q30_questions <- c("Q30_1", "Q30_2", "Q30_3", "Q30_4", "Q30_5", "Q30_6")

# Convert Q30 questions to ordered factors
usable_data <- usable_data %>%
  mutate(across(all_of(Q30_questions), ~factor(case_when(
    . == "Strongly disagree" ~ "1",
    . == "Disagree" ~ "2",
    . == "Neutral" ~ "3",
    . == "Agree" ~ "4",
    . == "Strongly agree" ~ "5"
  )), levels = c("1", "2", "3", "4", "5"), ordered = TRUE)))

# Run ordinal logistic regression for each Q30 question
Q30_results <- list()
for (question in Q30_questions) {
  formula <- as.formula(paste(question, "~ Q32 + Q33 + Q34 + Q31")) # Including Q31 for year
  model <- polr(formula, data = usable_data, Hess = TRUE)
  Q30_results[[question]] <- model
}

# Summarize results for each Q30 question
for (i in 1:length(Q30_questions)) {
  question <- Q30_questions[i]
  model <- Q30_results[[question]]
  summary <- summarize_significant_results(model, question)
  cat(summary, "\n")
}

## Chief Complaint: Q30_1
## Significant Predictors:
## Q32White Estimate: 0.379 P-Value: 0.0136908327789974
## Q34Non-Cisgender Estimate: -1.148 P-Value: 0.00291225849262696
## 1|2 Estimate: -4.553 P-Value: 0.000124515222689103
## 2|3 Estimate: -3.321 P-Value: 0.00457213698650718
##

```

```

## Chief Complaint: Q30_2
## Significant Predictors:
## Q34Non-Cisgender Estimate: -1.177 P-Value: 0.00323369889051738
## 1|2 Estimate: -4.375 P-Value: 0.000362354563277997
## 2|3 Estimate: -3.433 P-Value: 0.00427095942686154
##
## Chief Complaint: Q30_3
## Significant Predictors:
## Q34Non-Cisgender Estimate: -1.07 P-Value: 0.00745648569326962
## 1|2 Estimate: -6.689 P-Value: 2.27667267136374e-08
## 2|3 Estimate: -5.421 P-Value: 1.28950568053619e-06
## 3|4 Estimate: -2.848 P-Value: 0.00873129190320179
##
## Chief Complaint: Q30_4
## Significant Predictors:
## 4|5 Estimate: 2.715 P-Value: 0.0105904684905595
##
## Chief Complaint: Q30_5
## Significant Predictors:
## Q34Non-Cisgender Estimate: 1.377 P-Value: 0.000410068156968937
## 2|3 Estimate: 2.453 P-Value: 0.0352973692777143
## 3|4 Estimate: 4.727 P-Value: 6.86184164968558e-05
## 4|5 Estimate: 6.365 P-Value: 5.30701648270591e-07
##
## Chief Complaint: Q30_6
## Significant Predictors:
## Q34Non-Cisgender Estimate: 1.112 P-Value: 0.00565063472028885
## 3|4 Estimate: 3.297 P-Value: 0.00165258480055783
## 4|5 Estimate: 4.5 P-Value: 3.16537502550564e-05
##

```

To assess whether demographic factors such as race, gender identity, and sexual orientation influence perceptions of Tulane EMS members, an in-depth statistical analysis using ordinal logistic regression was executed. This analysis examined the impact of these demographic variables on responses to questions about Tulane EMS members' social inclusivity, trustworthiness, kindness, cliqueness, social exclusivity, and rudeness.³ Here are the significant results...

1. Social Inclusivity:

- Race (White): A significant predictor with an estimate of 0.379 (p-value: 0.014). This suggests that being White is associated with a higher likelihood of agreeing that Tulane EMS members are socially inclusive.
- Gender Identity (Non-Cisgender): A significant negative predictor with an estimate of -1.148 (p-value: 0.003). Non-Cisgender individuals are less likely to perceive Tulane EMS members as socially inclusive.

2. Social Trustworthiness:

- Gender Identity (Non-Cisgender): A significant negative predictor with an estimate of -1.177 (p-value: 0.003). Non-Cisgender individuals are less likely to agree that Tulane EMS members are socially trustworthy.

³The significant results here are not two-way... ie the fact that white people view TEMS as socially inclusive does not imply that non-white people believe the opposite. The lack of significance means no conclusion can be drawn from all other hypotheses assessed.

3. Kindness:

- Gender Identity (Non-Cisgender): A significant negative predictor with an estimate of -1.07 (p-value: 0.007). This indicates that Non-Cisgender individuals are less likely to agree that Tulane EMS members are kind.

Practically Relevant Results and Suggested Action:

First off, the outputs in the Rmd file with the code included are a little messy, so if you need me to interpret any p-values or anything beyond this results section, please let me know. The p-values are in the file with the outputs included. I didn't make it more presentable because I didn't know how much of this was going to be used so I figured it wasn't a good use of time to be a perfectionist. However, here are my take aways from the analysis...

CCC Questions vs. Demographic Data

1. Minor Medical Emergency: Though significance was observed here with respect to non-heterosexuals and women/females, the graphs and text responses illustrate how a vast amount of respondents think it's just not that urgent to call TEMS for this.
 - SUGGESTED ACTION: Nothing. Many minor medical emergencies do not require EMS.
2. Psychological Emergency: Non-Heterosexual individuals were less likely to call TEMS compared to Heterosexual individuals. After reviewing the text responses and graphs, it is evident that many people within this group have varied reasons for preferring alternative care ranging from a lack of trust to personal preference with alternative resources.
 - SUGGESTED ACTION: Implement robust psychiatric emergency training run by outside professional organizations and advertise to the community that this training is being implemented. This should at the minimum present a better image of the competency of the EMTs in TEMS (something that was a concern for many respondents).
3. Ingestion Emergency: Non-Cisgender people and Women/Female individuals were more likely to take alternative means of transportation to a hospital. After reviewing the responses, it is evident that fear of police and Tulane housing involvement played a large role in this decision.
 - SUGGESTED ACTION: Work with university administration to ensure punishments for over-intoxication are not stringent to the point where people will opt out of taking life saving measures.
4. Cardiovascular Emergency: Fourth-Year students were less likely to call TEMS compared to First-Years. A large amount of respondents preferred NOEMS over TEMS for such emergencies.
 - SUGGESTED ACTION: Nothing. NOEMS is far more equipped to handle such emergencies and fourth years typically know the city of New Orleans more than first years, which may be why they opt for a different EMS service. Thus, it may just be a natural and unavoidable patient preference.

CCC Questions vs. Application Status

For this section, I have avoided drawing conclusions or making suggestions. This is because it may be overreaching to draw causal relationships between application status and decisions in an emergency for the significant results. It is logical that there would be many more factors that would influence someone's decision prior to some deep vendetta against the organization. A large clue that the results should be handled this way is in the fact that, for the most part, people who had no application history often behaved identically to those that were rejected. Here are the significant results from this section once more...

1. Minor Traumatic Emergency: Individuals with no history of applying to TEMS were less likely to choose self-care compared to those who had applied.
2. Minor Medical Emergency: Both rejected applicants and those who never applied to TEMS were less likely to consider calling TEMS for help.
3. Psychological Emergency: For the question "Call for Tulane EMS for a psychological emergency" and "Care for yourself for a psychological emergency", non-applicants and rejected applicants were less likely to opt for these choices.
4. Ingestion Emergency: Non-applicants and rejected applicants showed a higher inclination to call 911 in contrast to accepted applicants.

Perceptions vs. Demographic Data

The results of the perception data are interesting because most of the significant results originated from the participants who identified themselves as non-cisgender. Non-cisgender individuals were less likely to find TEMS members socially inclusive, socially trustworthy, and kind. This is an interesting finding because the presence of significance in one demographic across multiple negative perceptions may suggest a true causal relationship. However, we need to recall that there may be bias in the data given the disproportionate sample sizes...

Number of Cisgender Respondents: 617

Number of Non-Cisgender Respondents: 36

- **SUGGESTED ACTION:** Conduct a follow-up study to evaluate the connection between perceptions of TEMS and gender identity. This should be done by developing an experimental design with equal numbers of participants across demographic factors. This will provide a more reliable way to analyze the data and draw causal connections.