# GTSUMMARY

# CREATING SUMMARY TABLES

# INTRODUCTION

- An R package designed to create professional, publication-ready summary tables.
- Generates summary tables, including descriptive statistics, regression results, and statistical tests.
- Primarily used in medical and statistical reporting but versatile for a variety of applications.

### Note

relies on other packages such as dplyr, purr, tidyverse so install these prior

# KEY FEATURES

- Generates summary statistics like mean, median, standard deviation, etc automatically.
- Supports linear, logistic, and Cox proportional hazards regression
- Allows users to modify table appearance and content as per their needs.

# INSTALL AND LOAD PACKAGE

```r
library(gtsummary)
library(gt)
library(mgcv)
library(broom)
library(dplyr)
library(tidyr)
```

## we use air quality data set as an working example

```r
data("mtcars", package = "datasets")
 mydata <- mtcars
head(mydata)
```

```
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

# Make sure that the class of each variable are correct.

```r
str(mydata)
#I want cyl, vs, am, gear to be factor, and all other numeric
mydata$cyl <- as.factor(mydata$cyl)
mydata$vs <- as.factor(mydata$vs)
mydata$gear <- as.factor(mydata$gear)
mydata$carb <- as.factor(mydata$carb)
mydata$am <- as.factor(mydata$am)
```

# FIRST EXAMPLE: DESCRIPTIVE TABLE

```r
simple <- mydata %>%
  select(mpg,hp, qsec, vs, gear) %>%
  tbl_summary()

simple
```

# FIRST EXAMPLE: DESCRIPTIVE TABLE

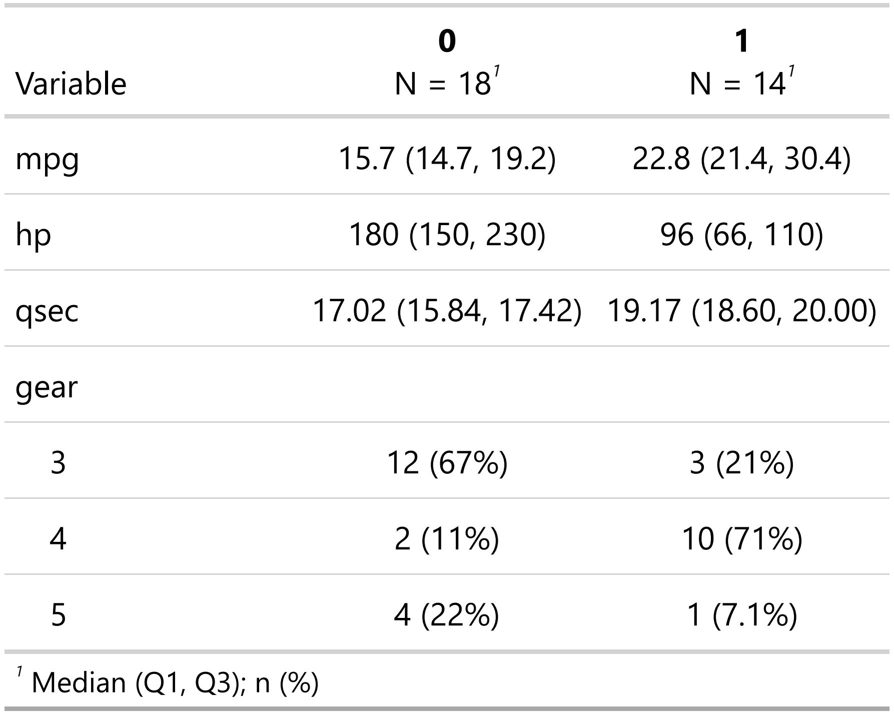
| **Characteristic** | **N = 32**[1] |
|---|---|
| mpg | 19.2 (15.4, 22.8) |
| hp | 123 (96, 180) |
| qsec | 17.71 (16.89, 18.90) |
| vs | |
| 0 | 18 (56%) |
| 1 | 14 (44%) |
| gear | |
| 3 | 15 (47%) |
| 4 | 12 (38%) |
| 5 | 5 (16%) |

[1] Median (Q1, Q3); n (%)

# FORMATTING AND STYLING

```r
descriptive <- mydata %>%
  select(mpg,hp, qsec, vs, gear) %>%
  tbl_summary( by = "vs") %>%
  modify_header(label ~ "Variable")


descriptive
```

# FORMATTING AND STYLING



| Variable | **0**<br>N = 18[1] | **1**<br>N = 14[1] |
|---|---|---|
| mpg | 15.7 (14.7, 19.2) | 22.8 (21.4, 30.4) |
| hp | 180 (150, 230) | 96 (66, 110) |
| qsec | 17.02 (15.84, 17.42) | 19.17 (18.60, 20.00) |
| gear | | |
| 3 | 12 (67%) | 3 (21%) |
| 4 | 2 (11%) | 10 (71%) |
| 5 | 4 (22%) | 1 (7.1%) |

[1] Median (Q1, Q3); n (%)

# MORE FEATURES

add mean and standard deviation instead of quartiles, change column/ row percentage

```r
descriptive <- mydata %>%
  select(mpg,hp, qsec, vs, gear) %>%
  tbl_summary(
  by = "vs",
  statistic = list(
    all_continuous() ~ "{mean} ({sd})",
    all_dichotomous() ~ "{n} ({p}%)",
    all_categorical() ~ "{n} ({p}%)"
  ),
  missing = "no",
  percent = "column",  # You can change this to "row" if you want row percentages instead
  digits = list(all_categorical() ~ c(0, 1))
) %>%
  modify_header(label ~ "Variable")

descriptive
```

# MORE FEATURES

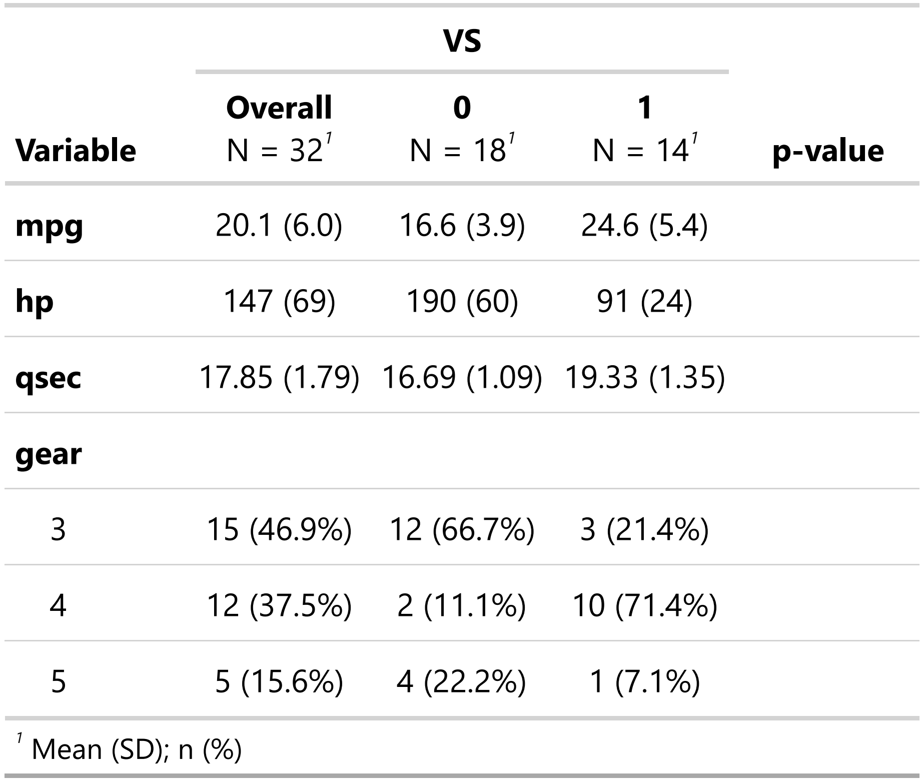
| | **0** | **1** |
|---|---|---|
| Variable | N = 18[1] | N = 14[1] |
| mpg | 16.6 (3.9) | 24.6 (5.4) |
| hp | 190 (60) | 91 (24) |
| qsec | 16.69 (1.09) | 19.33 (1.35) |
| gear | | |
| 3 | 12 (66.7%) | 3 (21.4%) |
| 4 | 2 (11.1%) | 10 (71.4%) |
| 5 | 4 (22.2%) | 1 (7.1%) |

[1] Mean (SD); n (%)

# ADDING STATISTICAL TESTS

```r
descriptive <- mydata %>%
  select(mpg,hp, qsec, vs, gear) %>%
  tbl_summary(
    by = "vs",
    statistic = list(
      all_continuous() ~ "{mean} ({sd})",
      all_dichotomous() ~ "{n} ({p}%)",
      all_categorical() ~ "{n} ({p}%)"
    ),
    missing = "no",
    percent = "column",
    digits = list(all_categorical() ~ c(0, 1))
  ) %>%
  add_overall() %>% # Add overall column
  add_p(
    test = list(
      all_continuous() ~ "t.test", # t-test for continuous variables
      all_categorical() ~ "chisq.test" # chi-square test for categorical variables
    ),
    pvalue_fun = ~style_pvalue(.x, digits = 3) # Optionally set the number of digits for p-
  ) %>%
  modify_header(label ~ "**Variable**") %>% # Modify the header
```

# ADDING STATISTICAL TESTS



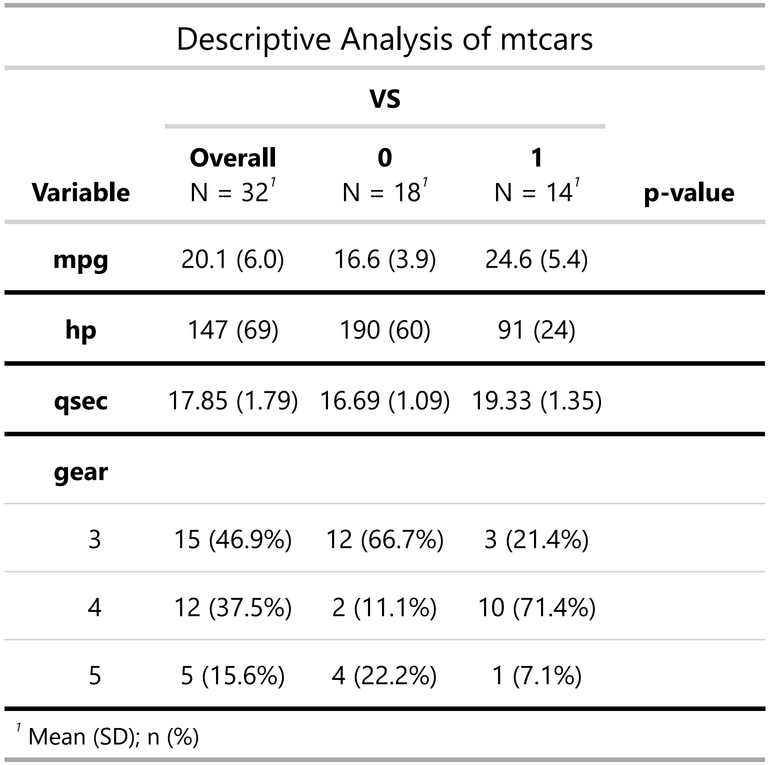
|  | VS |  |  |  |
|---|---|---|---|---|
| **Variable** | **Overall**<br>N = 32[1] | **0**<br>N = 18[1] | **1**<br>N = 14[1] | **p-value** |
| **mpg** | 20.1 (6.0) | 16.6 (3.9) | 24.6 (5.4) |  |
| **hp** | 147 (69) | 190 (60) | 91 (24) |  |
| **qsec** | 17.85 (1.79) | 16.69 (1.09) | 19.33 (1.35) |  |
| **gear** |  |  |  |  |
| 3 | 15 (46.9%) | 12 (66.7%) | 3 (21.4%) |  |
| 4 | 12 (37.5%) | 2 (11.1%) | 10 (71.4%) |  |
| 5 | 5 (15.6%) | 4 (22.2%) | 1 (7.1%) |  |

[1] Mean (SD); n (%)

# MAKING TABLE MORE PUBLICATION READY

```r
descriptive_modified <- descriptive %>%
  as_gt() %>%
  gt::tab_options(
    table.font.size = "small",
    heading.title.font.size = "medium",
    heading.subtitle.font.size = "small"
  ) %>%
  gt::tab_header(
    title = "Descriptive Analysis of mtcars"
  ) %>%
  gt::cols_align(
    align = "center",
    columns = everything()
  ) %>%
  gt::tab_style(
    style = cell_borders(
      sides = "bottom",
      color = "black",
      weight = px(2)
    ),
    locations = cells_body(
      columns = everything(), # style to all columns in the table, not just specific ones
```

# MAKING TABLE MORE PUBLICATION READY



Descriptive Analysis of mtcars

| | **vs** | | | |
|---|---|---|---|---|
| **Variable** | **Overall**<br>N = 32[1] | **0**<br>N = 18[1] | **1**<br>N = 14[1] | **p-value** |
| **mpg** | 20.1 (6.0) | 16.6 (3.9) | 24.6 (5.4) | |
| **hp** | 147 (69) | 190 (60) | 91 (24) | |
| **qsec** | 17.85 (1.79) | 16.69 (1.09) | 19.33 (1.35) | |
| **gear** | | | | |
| 3 | 15 (46.9%) | 12 (66.7%) | 3 (21.4%) | |
| 4 | 12 (37.5%) | 2 (11.1%) | 10 (71.4%) | |
| 5 | 5 (15.6%) | 4 (22.2%) | 1 (7.1%) | |

[1] Mean (SD); n (%)

# ADVANCED FEATURES

# REGRESSION TABLES

```r
mod<- lm(mpg ~ vs + hp +gear, data = mydata)
tbl_regression(mod)
```

Now you can format the tables as you like by adding more commands

# REGRESSION TABLES

| Characteristic | Beta | 95% CI[1] | p-value |
|---|---|---|---|
| vs | | | |
| 0 | — | — | |
| 1 | 1.8 | -1.7, 5.2 | 0.3 |
| hp | -0.06 | -0.09, -0.03 | <0.001 |
| gear | | | |
| 3 | — | — | |
| 4 | 2.2 | -1.2, 5.5 | 0.2 |
| 5 | 6.4 | 3.1, 9.8 | <0.001 |

[1] CI = Confidence Interval

# FORMATTING

```r
table_model <- tbl_regression(
  mod
) %>%
  add_global_p(anova_fun = gtsummary::tidy_wald_test)
table_model
```

# FORMATTING

| Characteristic | Beta | 95% CI[1] | p-value |
|---|---|---|---|
| vs | | | 0.3 |
| 0 | — | — | |
| 1 | 1.8 | -1.7, 5.2 | |
| hp | -0.06 | -0.09, -0.03 | <0.001 |
| gear | | | <0.001 |
| 3 | — | — | |
| 4 | 2.2 | -1.2, 5.5 | |
| 5 | 6.4 | 3.1, 9.8 | |

[1] CI = Confidence Interval

**Tip**

For logistic models you can add exponentiate = TRUE, command to get the odds ratio

# MERGING TABLES

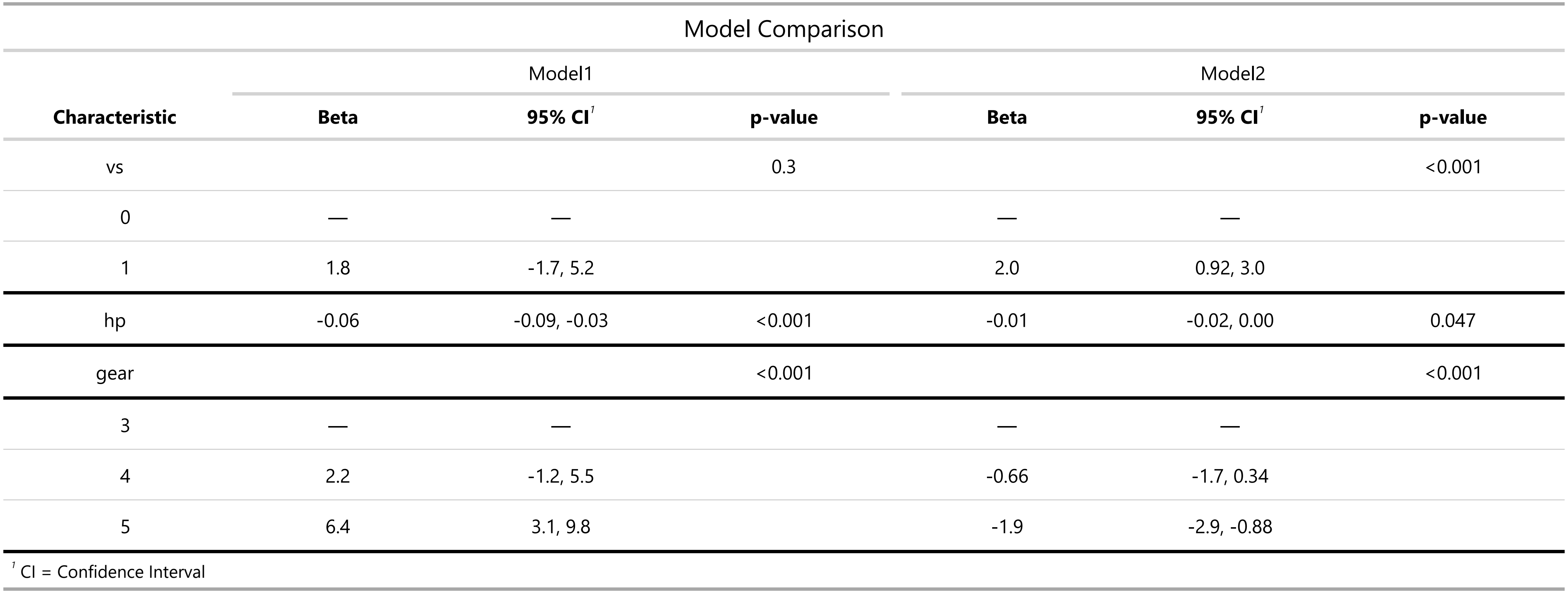
```r
mod1<- lm(qsec ~ vs + hp +gear, data = mydata)

table_model_1 <- tbl_regression(
  mod1
) %>%
  add_global_p(anova_fun = gtsummary::tidy_wald_test)

# Merge the regression tables for comparison
comparison_table <- tbl_merge(
  tbls = list(table_model, table_model_1),
  tab_spanner = c("Model1","Model2")
)

comparison_table
```

# MERGING TABLES

| | Model1 | | | Model2 | | |
|---|---|---|---|---|---|---|
| **Characteristic** | **Beta** | **95% CI**[1] | **p-value** | **Beta** | **95% CI**[1] | **p-value** |
| vs | | | 0.3 | | | <0.001 |
| 0 | — | — | | — | — | |
| 1 | 1.8 | -1.7, 5.2 | | 2.0 | 0.92, 3.0 | |
| hp | -0.06 | -0.09, -0.03 | <0.001 | -0.01 | -0.02, 0.00 | 0.047 |
| gear | | | <0.001 | | | <0.001 |
| 3 | — | — | | — | — | |
| 4 | 2.2 | -1.2, 5.5 | | -0.66 | -1.7, 0.34 | |
| 5 | 6.4 | 3.1, 9.8 | | -1.9 | -2.9, -0.88 | |

[1] CI = Confidence Interval

```r
comparison_table_final <- as_gt(comparison_table) %>%
  gt::tab_options(
    table.font.size = "small",
    heading.title.font.size = "medium",
    heading.subtitle.font.size = "small"
  ) %>%
  gt::tab_header(
    title = "Model Comparison"
  ) %>%
  gt::cols_align(
    align = "center",
    columns = everything()
  ) %>%
  gt::tab_style(
    style = cell_text(weight = "bold"),
    locations = cells_column_labels(
      columns = everything()
    )
  ) %>%
  gt::tab_style(
    style = cell_borders(
      sides = "bottom",
```



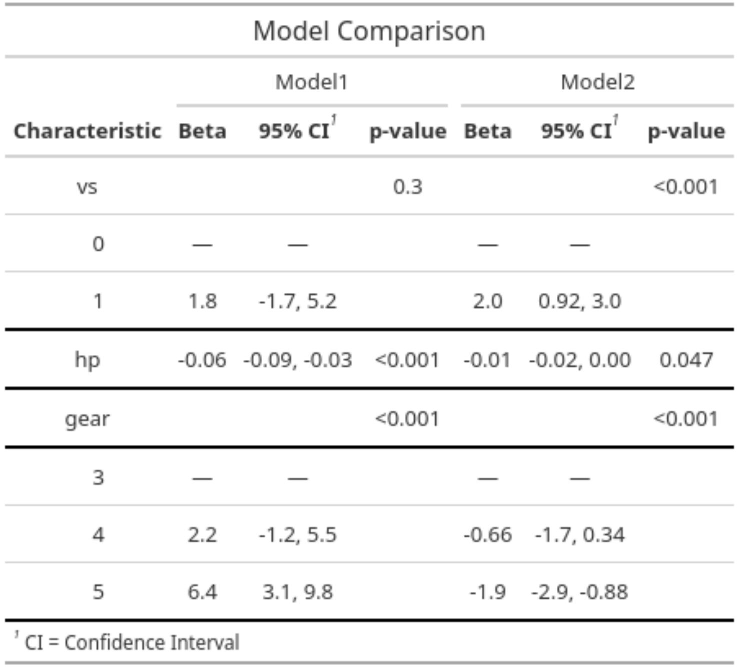
Model Comparison

| | Model1 | | | Model2 | | |
|---|---|---|---|---|---|---|
| **Characteristic** | **Beta** | **95% CI**[1] | **p-value** | **Beta** | **95% CI**[1] | **p-value** |
| vs | | | 0.3 | | | <0.001 |
| 0 | — | — | | — | — | |
| 1 | 1.8 | -1.7, 5.2 | | 2.0 | 0.92, 3.0 | |
| hp | -0.06 | -0.09, -0.03 | <0.001 | -0.01 | -0.02, 0.00 | 0.047 |
| gear | | | <0.001 | | | <0.001 |
| 3 | — | — | | — | — | |
| 4 | 2.2 | -1.2, 5.5 | | -0.66 | -1.7, 0.34 | |
| 5 | 6.4 | 3.1, 9.8 | | -1.9 | -2.9, -0.88 | |

[1] CI = Confidence Interval

# SAVING TABLES

```r
#saving into word document
gtsave(comparison_table_final, "table.docx")


# Save the gt table as an HTML file
gtsave(comparison_table_final, "table.html")

# Capture the HTML file as an image using webshot2
webshot2::webshot("table.html", file = "table.png", vwidth = 1000, vheight = 800)
```



Model Comparison

| | Model1 | | | Model2 | | |
|---|---|---|---|---|---|---|
| **Characteristic** | **Beta** | **95% CI**[1] | **p-value** | **Beta** | **95% CI**[1] | **p-value** |
| vs | | | 0.3 | | | <0.001 |
| 0 | — | — | | — | — | |
| 1 | 1.8 | -1.7, 5.2 | | 2.0 | 0.92, 3.0 | |
| hp | -0.06 | -0.09, -0.03 | <0.001 | -0.01 | -0.02, 0.00 | 0.047 |
| gear | | | <0.001 | | | <0.001 |
| 3 | — | — | | — | — | |
| 4 | 2.2 | -1.2, 5.5 | | -0.66 | -1.7, 0.34 | |
| 5 | 6.4 | 3.1, 9.8 | | -1.9 | -2.9, -0.88 | |

[1] CI = Confidence Interval