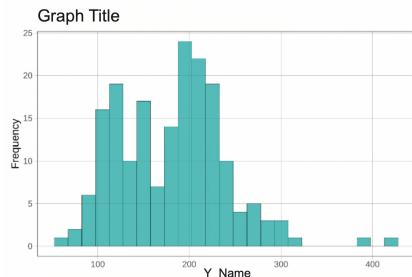


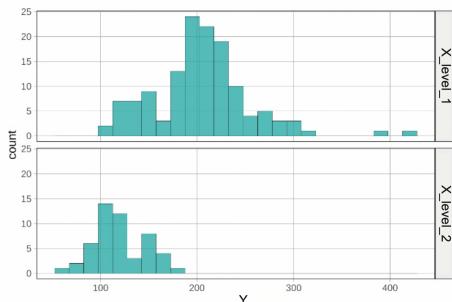
Word Equations <pre>outcome = explanatory + other stuff Y = X + other stuff</pre>	Summary Tables <pre># compute five-number summary favstats(~ Y, data = data_set) # create frequency table tally(data_set\$Y) tally(~ Y, data = data_set) # tally with logical operator tally(~ Y < 1900, data = data_set) # two-way frequency table tally(Y ~ X, data = data_set)</pre>	Simulation <pre># sample without replacement sample(data_set, 6) # sample with replacement resample(data_set, 10) # randomize # sampling distribution of b1s, # centered on 0 sdobl <- do(1000) * b1(shuffle(Y) ~ X, data = data_set) # bootstrap # sampling distribution of b1s, # centered on sample b1 sdobl_boot <- do(1000) * b1(Y ~ X, data = resample(data_set))</pre>	<pre># return TRUE for # middle 95% of distribution middle(sdobl\$b1, .95) # randomize # sampling distribution of PREs sdopre <- do(1000) * pre(shuffle(Y) ~ X, data = data_set) # randomize # sampling distribution of Fs sdof <- do(1000) * f(shuffle(Y) ~ X, data = data_set)</pre>
Basics <pre>print("Hello world!") # assign value to object my_number <- 5 # combine values into vector my_vector <- c(1, 2, 3) # first element in vector my_vector[1] # arithmetic operations sum(1, 2, 100), +, -, *, / # logical operations >, <, >=, <=, ==, !=, , &</pre>			
Data Frame <pre># view first/last six rows head(data_set) tail(data_set) # structure of data frame str(data_set) glimpse(data_set) # select variable (a column) data_set\$Y</pre>	<pre># select multiple variables select(data_set, Y1, Y2) # select first row data_set[1,] # select first column data_set[, 1] # find rows that meet condition data_set[data_set\$Y > 40] filter(data_set, Y > 300)</pre>	<pre># arrange rows by variable arrange(data_set, Y) # sort in a descending order arrange(data_set, desc(Y)) # get rid of all cases with any # missing values na.omit(data_set)</pre>	<pre># convert quantitative variable # to categorical factor(data_set\$Y) # convert categorical variable # to quantitative as.numeric(data_set\$Y)</pre>
Fitting Models to Data <pre># empty model empty_model <- lm(Y ~ NULL, data = data_set) # use one explanatory variable one_model <- lm(Y ~ X, data = data_set) # extract the best fitting b1 b1(shuffle(Y) ~ X, data = data_set) # multivariate model multi_model <- lm(Y ~ X1 + X2, data = data_set) # model predictions and residuals data_set\$empty_predict <- predict(empty_model) data_set\$empty_resid <- resid(empty_model)</pre>	Comparing Models <pre>pre(Y ~ X, data = data_set) f(Y ~ X, data = data_set) # sample F for X2 f(Y ~ X1 + X2, data = data_set, predictor = ~X2) # all the model comparisons that can be # made in relation to the multivariate model generate_models(multi_model)</pre>	Evaluating Models of the DGP <pre># produce ANOVA table supernova(empty_model) supernova(multi_model) # t-test, using pooled variance t.test(Y ~ X, data = data_set, var.equal = TRUE) # confidence interval confint(lm(Y ~ X, data = data_set)) # pairwise comparison corrections: # "Tukey", "Bonferroni", "none" pairwise(my_model, correction = "Tukey")</pre>	

Visualizations

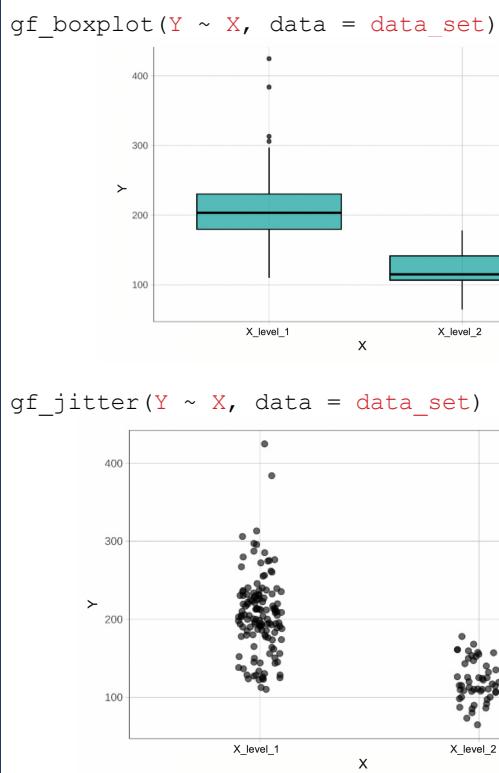
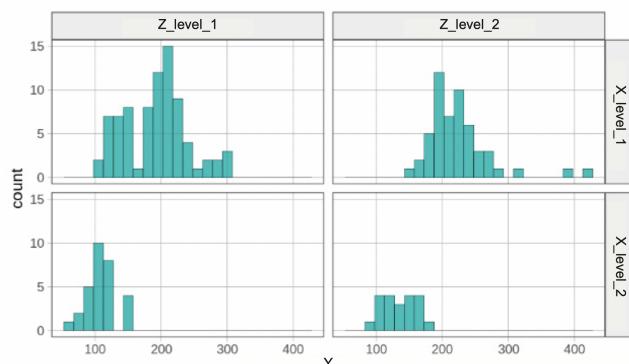
```
gf_histogram(~ Y, data = data_set) %>%
# change labels
  gf_labs(title = "Graph Title", x = "Y_Name",
  y = "Frequency")
```



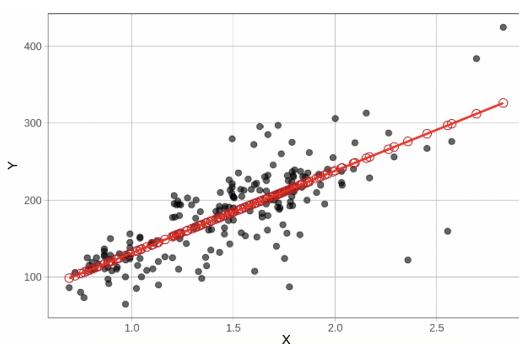
```
# faceted grid of histograms
gf_histogram(~ Y, data = data_set) %>%
  gf_facet_grid(X ~ .)
```



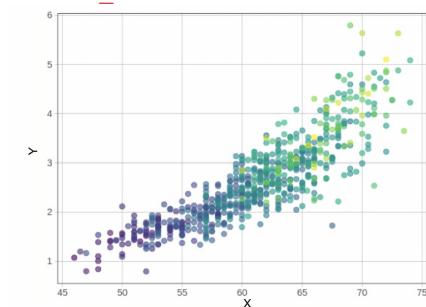
```
gf_histogram(~ Y, data = data_set) %>%
  gf_facet_grid(X ~ Z)
```



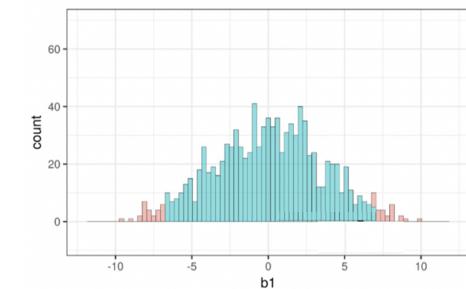
```
gf_point(Y ~ X, data = data_set) %>%
# add model predictions as red points
  gf_point(Y ~ X, shape = 1, size = 3,
  color = "firebrick") %>%
# add best fitting model as a red line
  gf_model(one_model, color = "red")
```



```
gf_point(Y ~ X, color = ~Z,
  data = data_set)
```



```
# sampling distribution of b1
gf_histogram(~b1, data = sdob1,
  fill = ~middle(b1, .95)) %>%
# modify the limits on x- and y-axes
  gf_lims(x = c(-12, 12), y = c(0, 70))
```



```
# F-distribution depicting p-value
sample_f <- f(Y ~ X, data = data_set)
xpf(sample_f, df1 = 1, df2 = 42)
```

