Appendix

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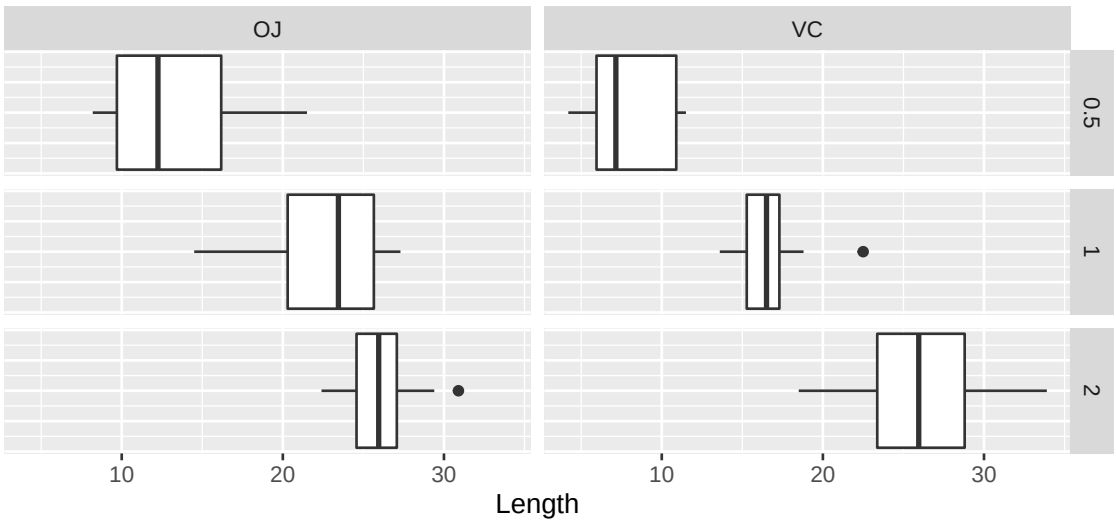
```
## ----setup, include=FALSE-----------------------------------------------------
knitr::opts_chunk$set(echo = FALSE)


## ----Load_Data, message = FALSE-----------------------------------------------
library(datasets); library(tidyverse)
library(gridExtra); library(knitr)
phi <- (1+sqrt(5))/2 #For fig dimensions
data("ToothGrowth")
dat <- ToothGrowth


## ----Summary, fig.height = 4, fig.width= 4*phi--------------------------------
grouped <- group_by(dat, dose, supp)
ggplot(grouped, aes(len)) +
        geom_boxplot() +
        theme(axis.ticks.y = element_blank(),
              axis.text.y = element_blank()) +
        facet_grid(dose~supp) +
        xlab("Length")
```



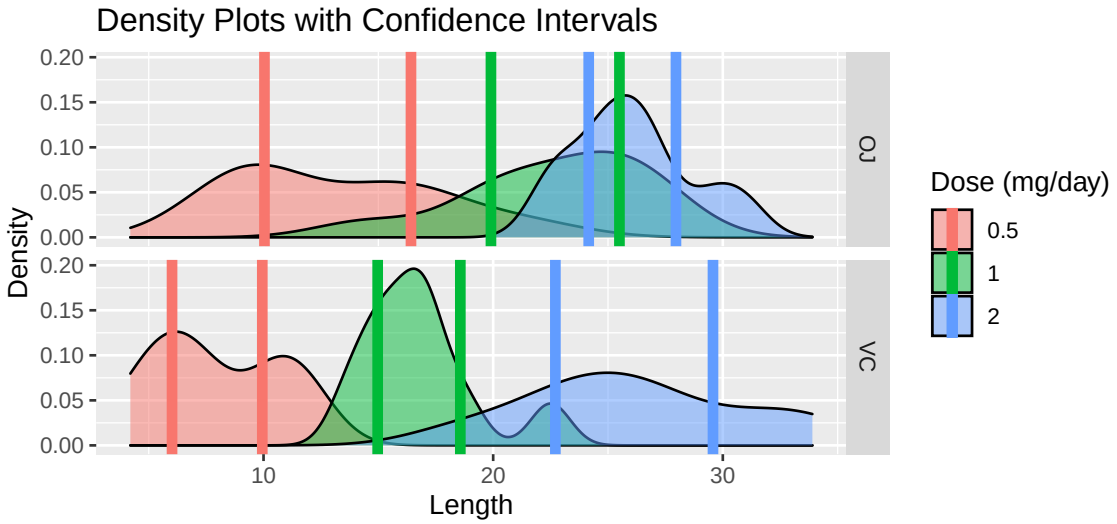

```
summary <- summarize(grouped,
          Count = sum(!is.na(len)), Mean = mean(len), Median = median(len),
          Range = paste0("[",range(len)[1], ", ", range(len)[2], "]"),
          Shaprio_Wilk_Test = round(shapiro.test(len)$p.value, 3))
kable(summary)
```

dose	supp	Count	Mean	Median	Range	Shaprio_Wilk_Test
0.5	OJ	10	13.23	12.25	[8.2, 21.5]	0.182

dose	supp	Count	Mean	Median	Range	Shaprio_Wilk_Test
0.5	VC	10	7.98	7.15	[4.2, 11.5]	0.170
1.0	OJ	10	22.70	23.45	[14.5, 27.3]	0.415
1.0	VC	10	16.77	16.50	[13.6, 22.5]	0.270
2.0	OJ	10	26.06	25.95	[22.4, 30.9]	0.815
2.0	VC	10	26.14	25.95	[18.5, 33.9]	0.919

```
## ----t_tests-------------------------------------------------------------------
subsets <- matrix(rep(rep(NA, 10), 6), nrow = 6, ncol = 10)
CIs <- matrix(rep(rep(NA, 2), 6), nrow = 6, ncol = 2)
a <- 0.05
for (i in 0:5) {
        subsets[i + 1,] <- seq(1 + 10*i, 10*(i + 1), by = 1)
        con <- t.test(dat[subsets[i + 1,],]$len,
                      alternative = "two.sided", conf.level = 1 - a)$conf.int
        CIs[i + 1, 1] <- con[1]
        CIs[i + 1, 2] <- con[2]
}
CIs <- data.frame(LB = CIs[,1], UB = CIs[,2],
                  supp = rep(c("VC", "OJ"), each = 3),
                  dose = rep(c(0.5,1.0,2.0), times = 2))

## ----Denisty_Plot, fig.height = 4, fig.width = 4*phi---------------------------
ggplot(grouped, aes(len)) +
        facet_grid(supp~.) +
        geom_density(aes(group = dose, fill = as.factor(dose)), alpha = 0.5) +
        geom_vline(data = CIs[CIs$supp == "VC",], lwd = 2,
                   aes(xintercept = LB,
                       group = dose, color = as.factor(dose))) +
        geom_vline(data = CIs[CIs$supp == "VC",], lwd = 2,
                   aes(xintercept = UB,
                       group = dose, color = as.factor(dose))) +
        geom_vline(data = CIs[CIs$supp == "OJ",], lwd = 2,
                   aes(xintercept = LB,
                       group = dose, color = as.factor(dose))) +
        geom_vline(data = CIs[CIs$supp == "OJ",], lwd = 2,
                   aes(xintercept = UB,
                       group = dose, color = as.factor(dose))) +
        labs(x = "Length", y = "Density",
             fill = "Dose (mg/day)", color = "Dose (mg/day)") +
        ggtitle("Density Plots with Confidence Intervals")
```




```
## ------------------------------------------------------------------------
#Ceiling and floor-ing values to maintain confidence level
CIs$LB <- ceiling(CIs$LB*100)/100
CIs$UB <- floor(CIs$UB*100)/100
names(CIs) <- c("Lower_Bound", "Upper_Bound",
                "supp", "dose")
kable(CIs)
```

Lower_Bound	Upper_Bound	supp	dose
6.02	9.94	VC	0.5
14.98	18.56	VC	1.0
22.71	29.57	VC	2.0
10.04	16.42	OJ	0.5
19.91	25.49	OJ	1.0
24.17	27.95	OJ	2.0