Advanced Graphics in R

Stephen A. Sefick

2016-11-14

Outline

Topic

Brief History: ggplot2

- Data visualization system created by Hadley Wickham

Brief History: ggplot2

- Data visualization system created by Hadley Wickham
- written in R

Brief History: ggplot2

- Data visualization system created by Hadley Wickham
- written in R
- Can replace base R graphics

Brief History: ggplot2

- Data visualization system created by Hadley Wickham
- written in R
- Can replace base R graphics
- Implementation of Wilkinson's Gramar of Graphics

Build graphics in code blocks

```
p <- qplot(x, y, data=df, geom="none")

p <- p+geom_boxplot()

p <- p+facet_wrap(~factor)
```

Motivation for using ggplot2

- Very powerful and flexible

Motivation for using ggplot2

- Very powerful and flexible
- Complete your analysis in R, and then make graphics - Reproducible Research

Motivation for using ggplot2

- Very powerful and flexible
- Complete your analysis in R, and then make graphics - Reproducible Research
- Nice output abilities to export as svg for postprocessing with Inkscape

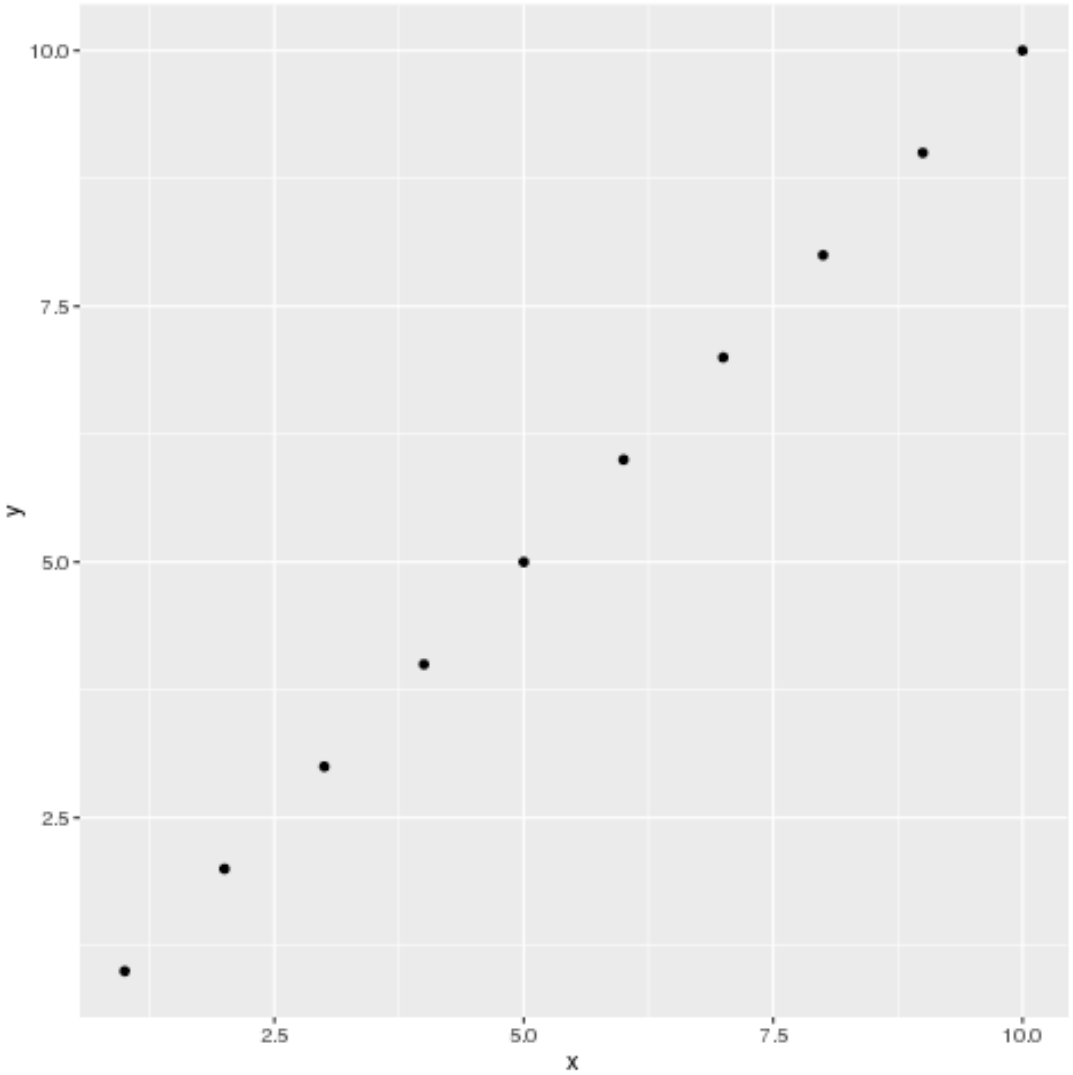
Motivation for using ggplot2

- Very powerful and flexible
- Complete your analysis in R, and then make graphics - Reproducible Research
- Nice output abilities to export as svg for postprocessing with Inkscape
- Publication Quality Graphics

Topic

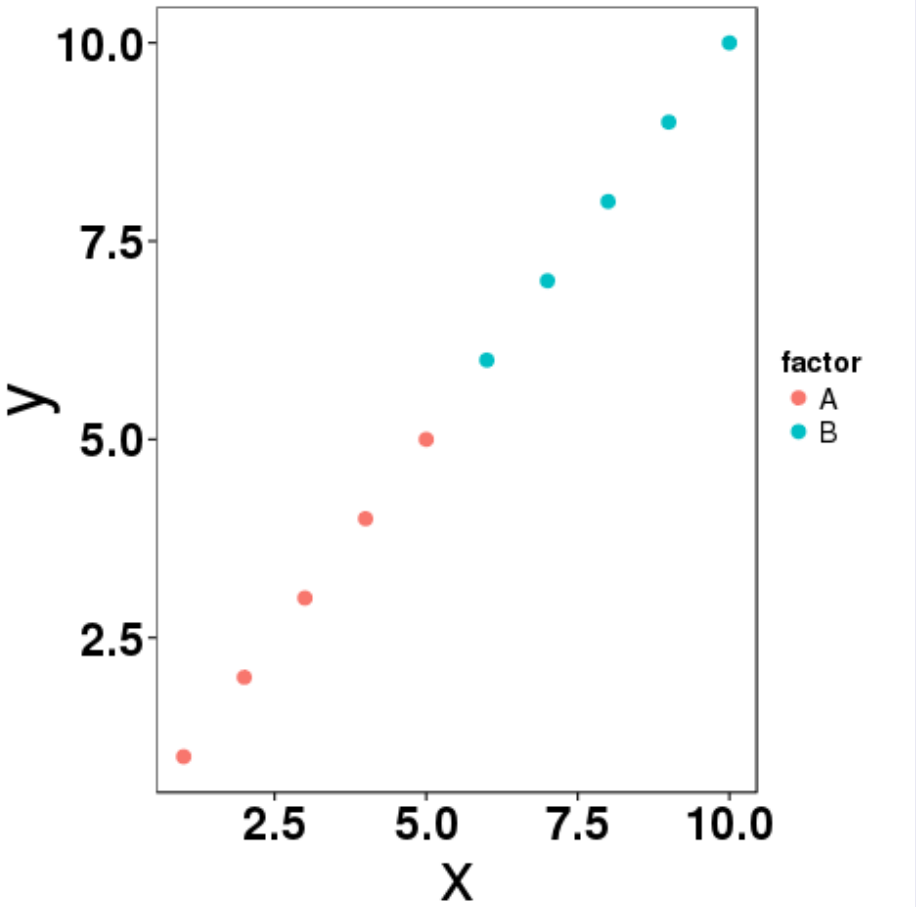
qplot

```
qplot(x, y, data=df)
```

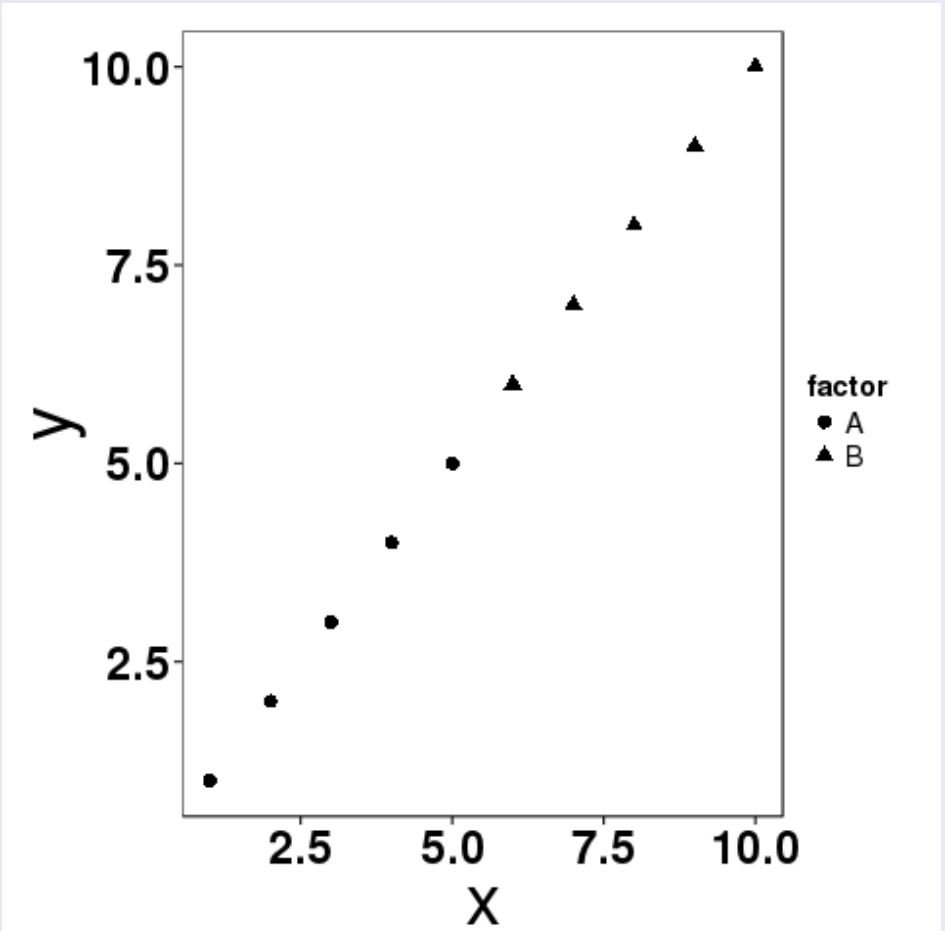


Color and shape: qplot(x, y,data=df, size=I(3)) +publication()

col=factor



shape=factor



geoms

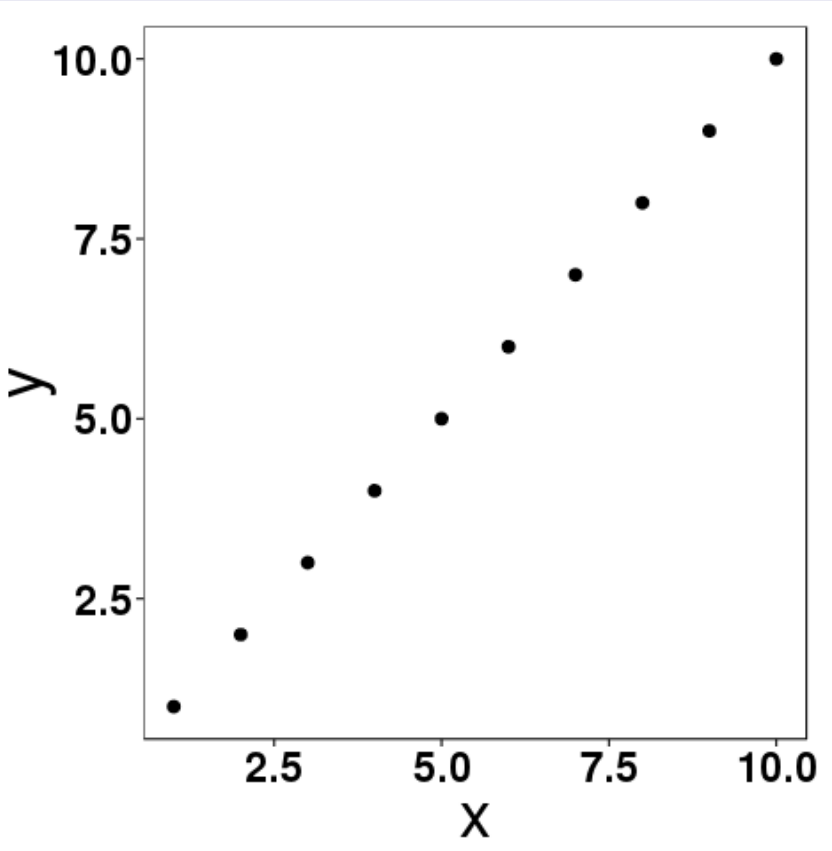
- These are the possible "kinds" of plots you can make

selected geoms:

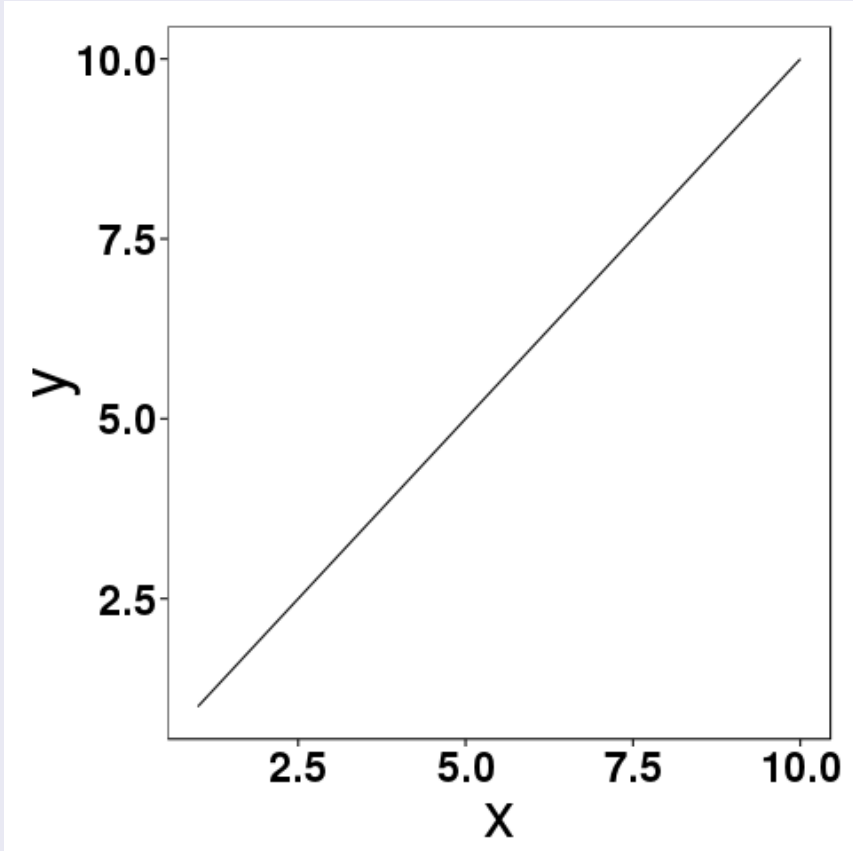
- point
- line
- boxplot
- histogram

geoms: point and line qplot(x, y, data=a, size=I(3)) +publication()

geom="point"

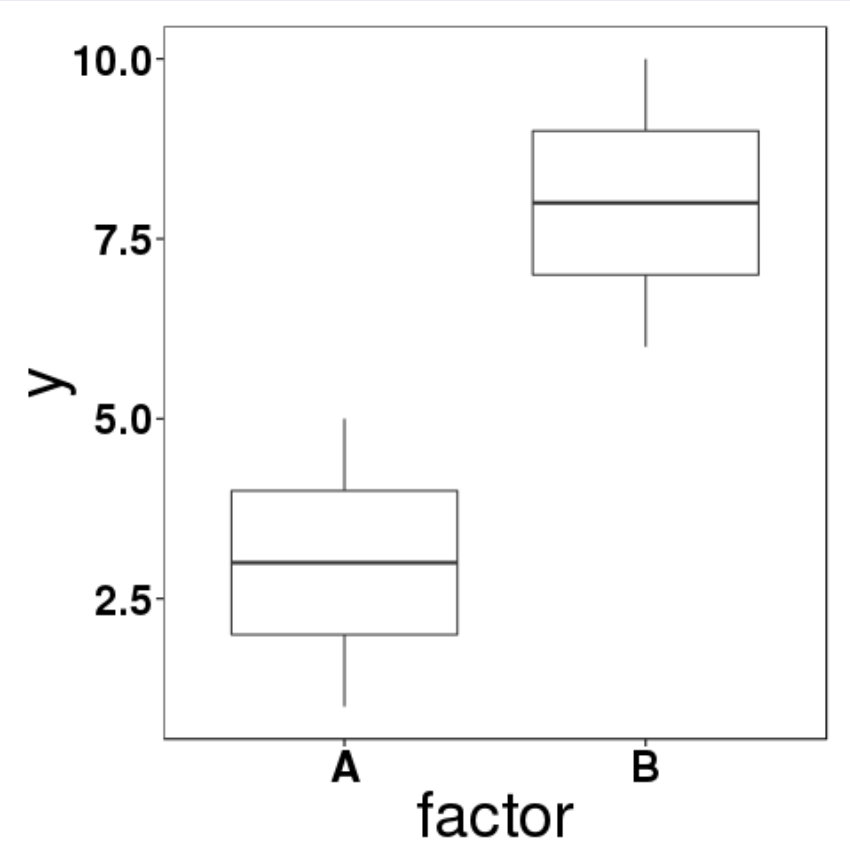


geom="line"

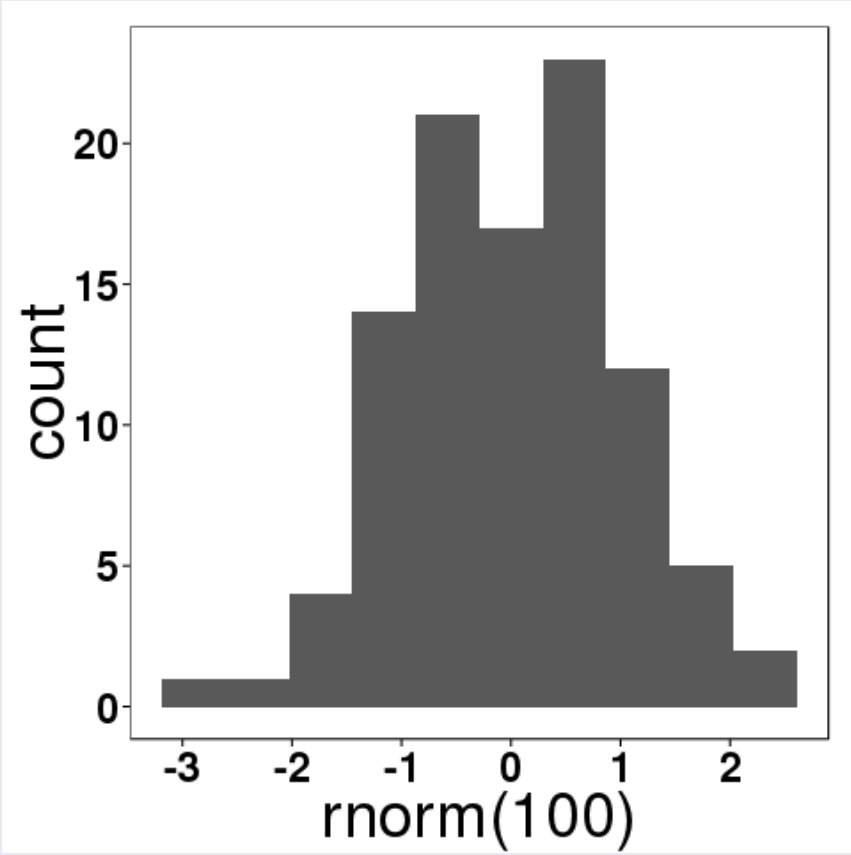


geoms: boxplot and histogram

qplot(factor, y, data=a, geom="boxplot")+publication()

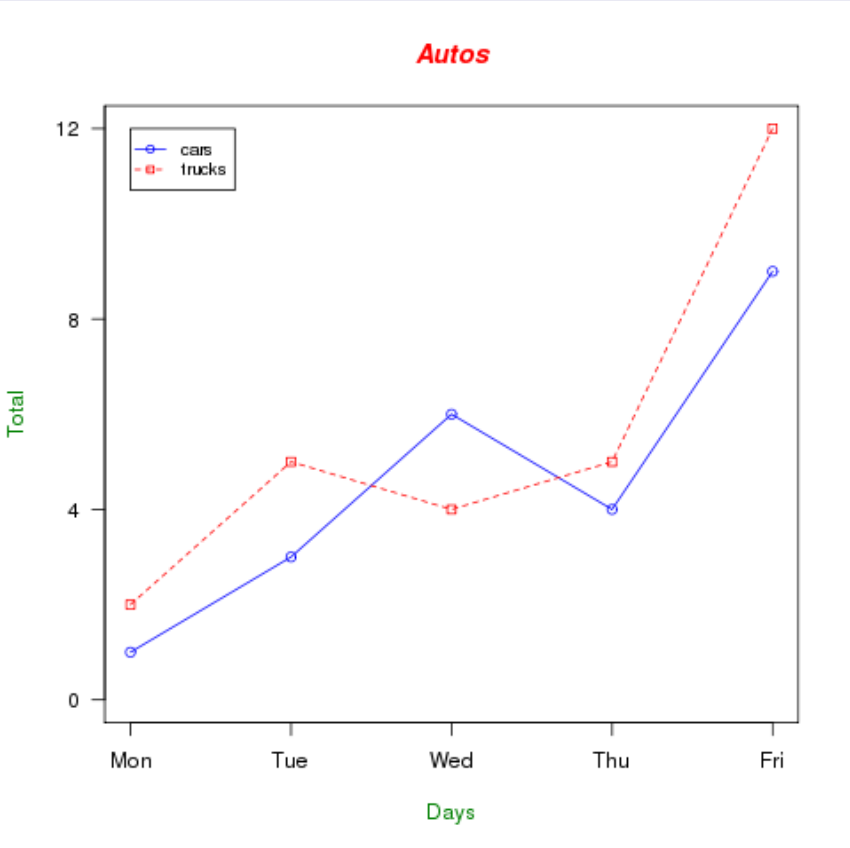


qplot(rnorm(100), geom="histogram", bins=10)+publication()

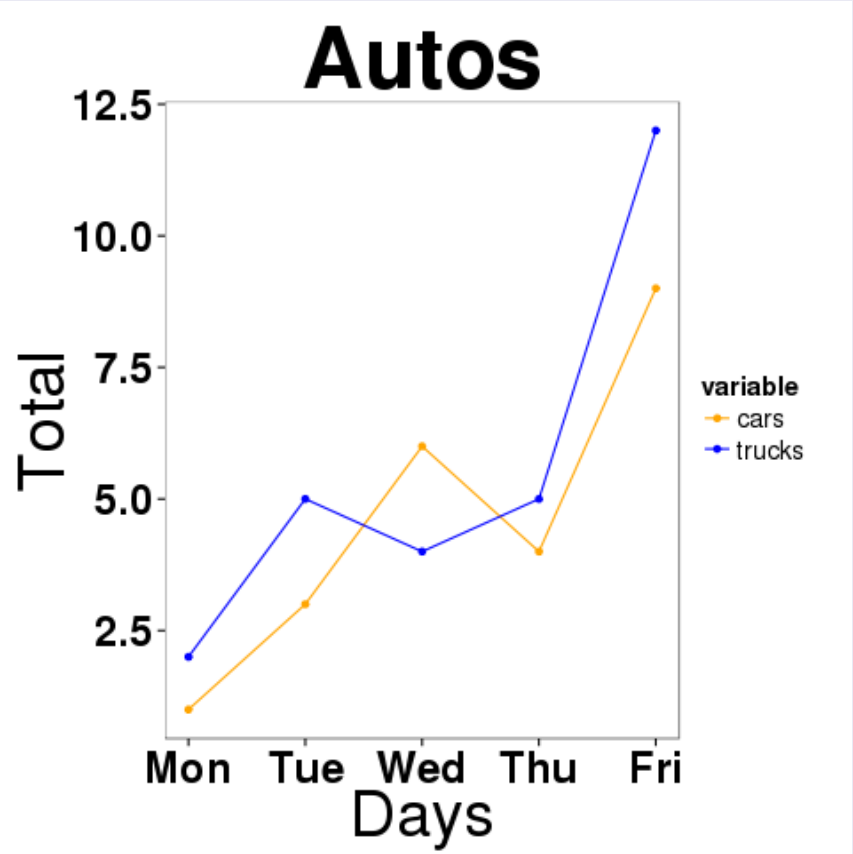


Base R versus ggplot2

Base R



ggplot2



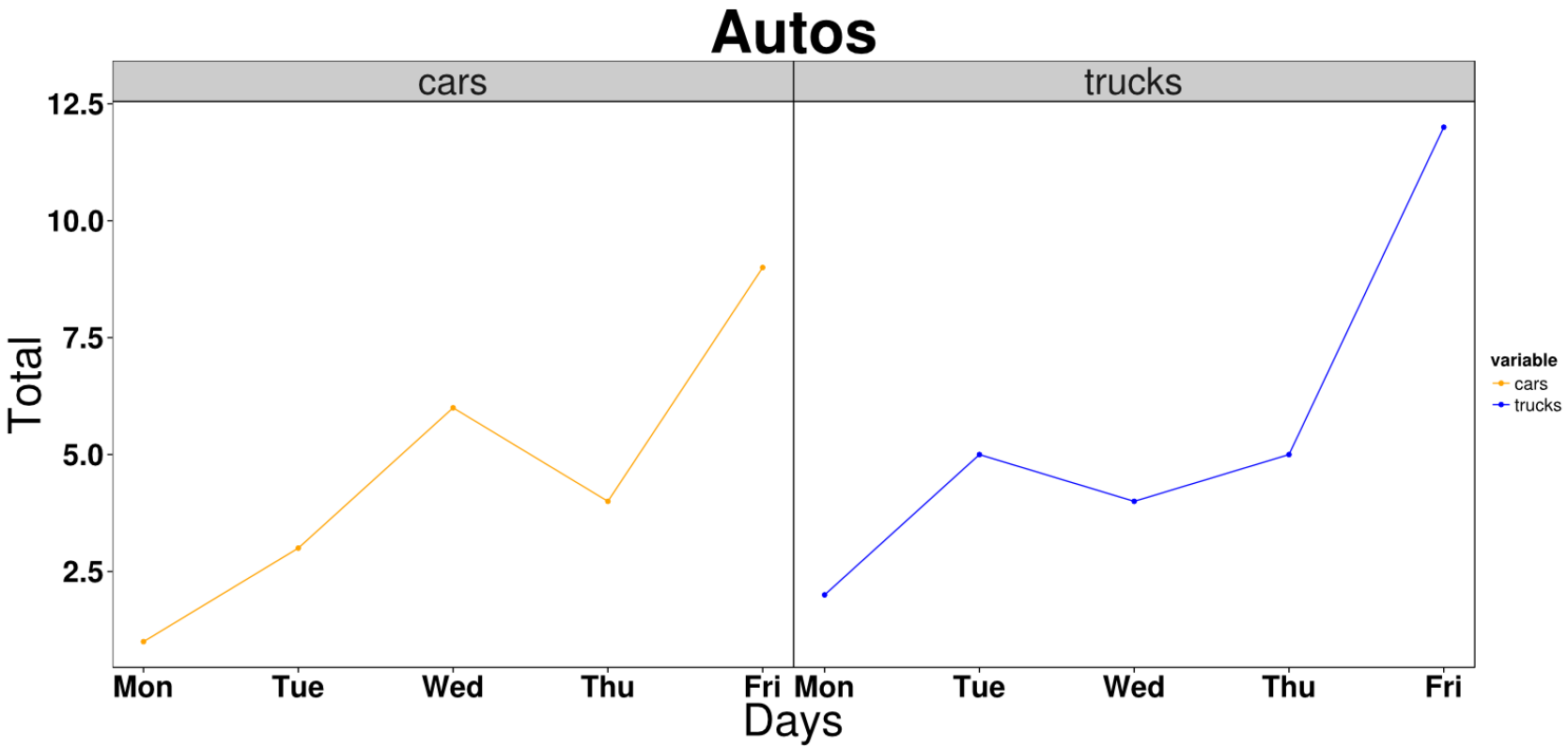
Base R graphics code

```
#data
cars <- c(1, 3, 6, 4, 9)
trucks <- c(2, 5, 4, 5, 12)
g_range <- range(0, cars, trucks)

#plot
plot(cars, type="o", col="blue", ylim=g_range,
   axes=FALSE, ann=FALSE)
axis(1, at=1:5, lab=c("Mon","Tue","Wed","Thu","Fri"))
axis(2, las=1, at=4*0:g_range[2])
box()
lines(trucks, type="o", pch=22, lty=2, col="red")
title(main="Autos", col.main="red", font.main=4)
title(xlab="Days", col.lab=rgb(0,0.5,0))
title(ylab="Total", col.lab=rgb(0,0.5,0))
legend(1, g_range[2], c("cars","trucks"), cex=0.8,
   col=c("blue","red"), pch=21:22, lty=1:2);
```

ggplot graphics code

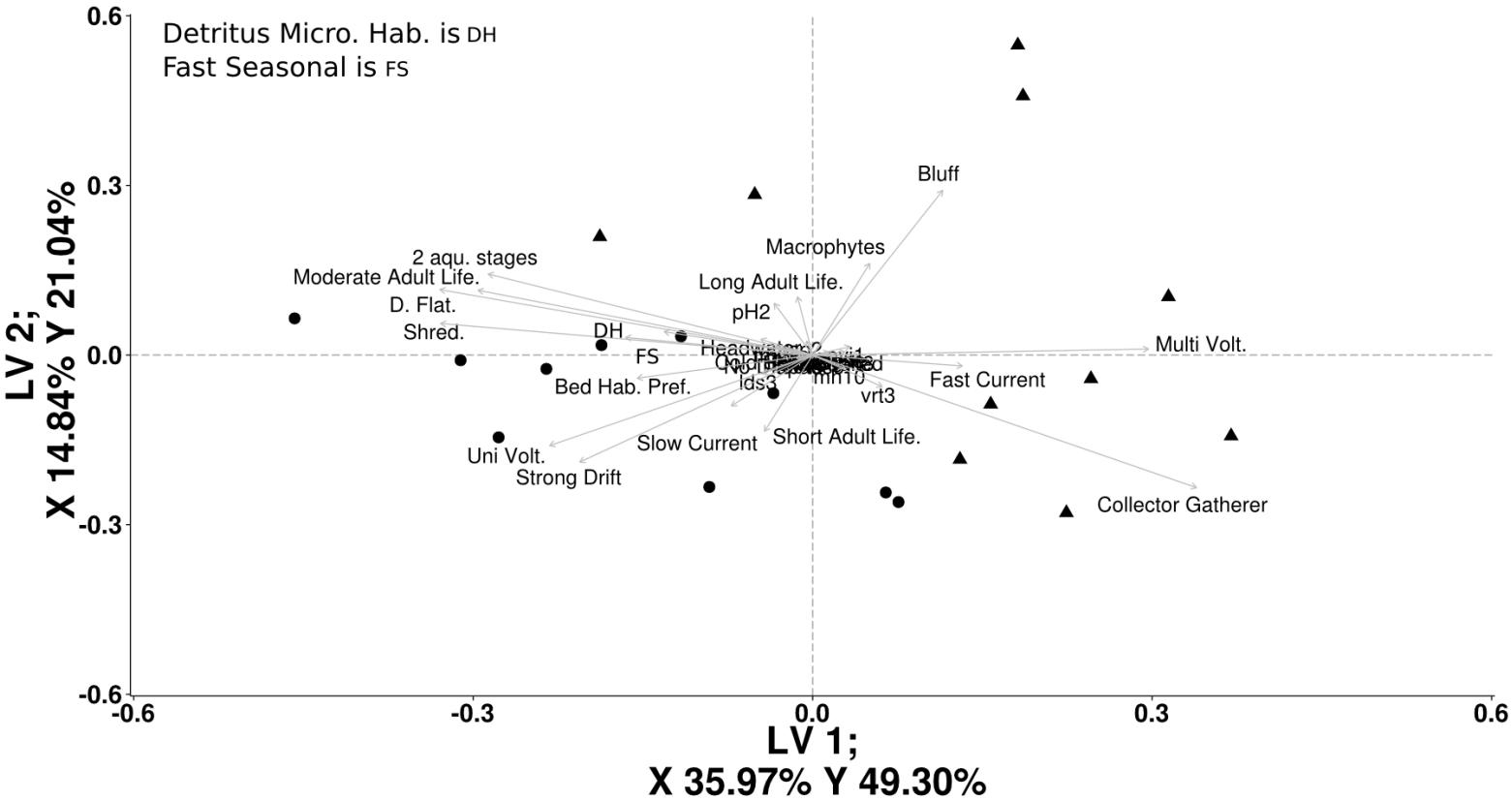
```
#data
library(ggplot2)
library(reshape2)
ct <- data.frame(cars = c(1, 3, 6, 4, 9), trucks = c(2, 5, 4, 5, 12), day=c(1:5))
ct.melt <- melt(ct, id.var="day")

#ggplot2
p <- qplot(day, value, data=ct.melt, col=variable)
p <- p+geom_line()
p <- p+scale_x_continuous(labels=c("Mon", "Tue", "Wed", "Thu", "Fri"))
p <- p+xlab("Days")
p <- p+ylab("Total")
p <- p+ggtitle("Autos")
p
```

Faceting: p+facet$_{wrap}$(~variable)

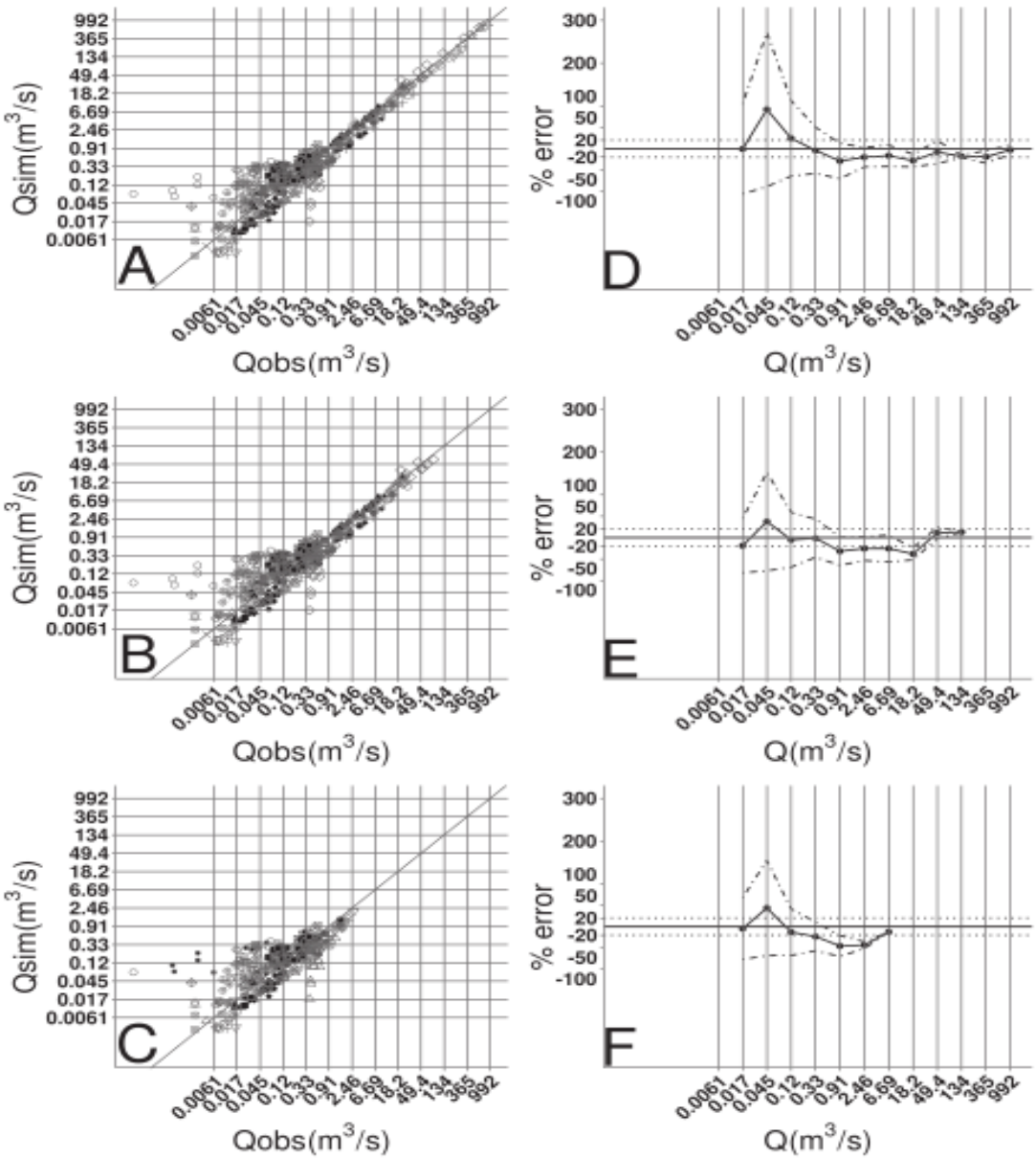


Topic

Publication Quality Graphics: Partial Least Squares



Publication Quality Graphics: 6 panel figure



Topic

Let's get started

1. General introduction to ggplot2
2. Velocity data from an experiment I ran in Sandy Creek
3. Questions?