

# Advanced Graphics in R

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# Outline

- 1 Introduction
- 2 ggplot2 code
- 3 Publication Quality Graphics (Examples)
- 4 Exercises

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# Brief History: ggplot2

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- Implementation of Wilkinson's Grammar 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



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- Complete your analysis in R, and then make graphics - **Reproducible Research**

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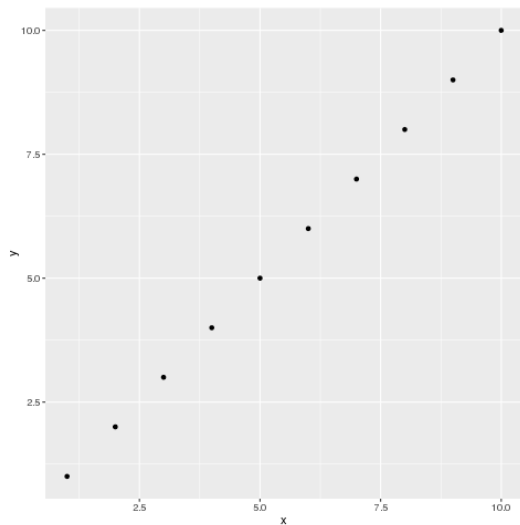
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- Complete your analysis in R, and then make graphics - **Reproducible Research**
- Nice output abilities to export as svg for postprocessing with Inkscape

# 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

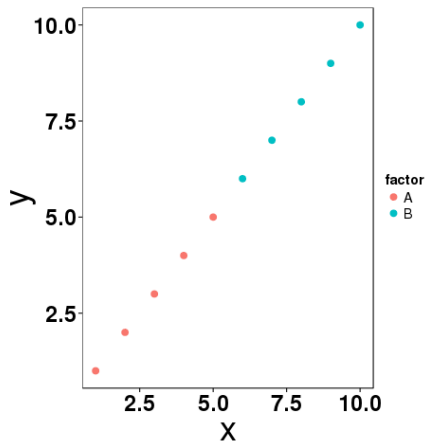
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```
qplot(x, y, data=df)
```

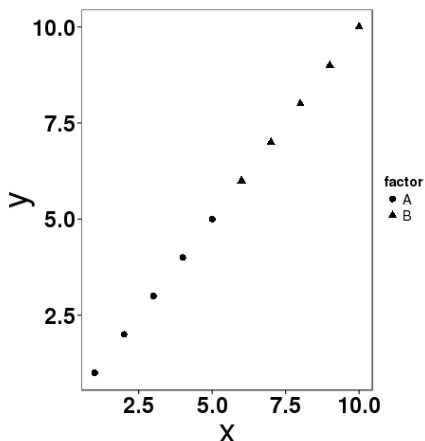


Color and shape: `qplot(x, y, data=df, size=l(3))`  
`+publication()`

`col=factor`



`shape=factor`



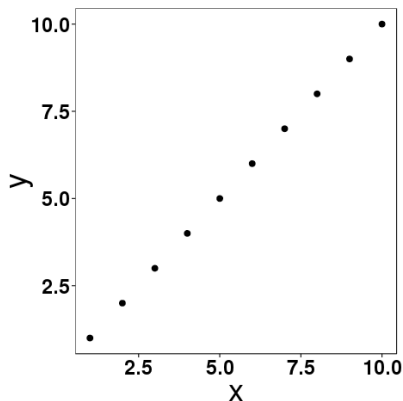
- These are the possible "kinds" of plots you can make

selected geoms:

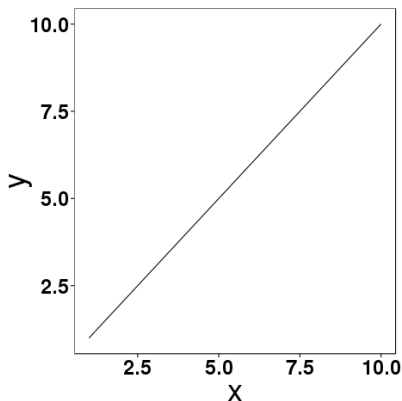
- point
- line
- boxplot
- histogram

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

geom="point"



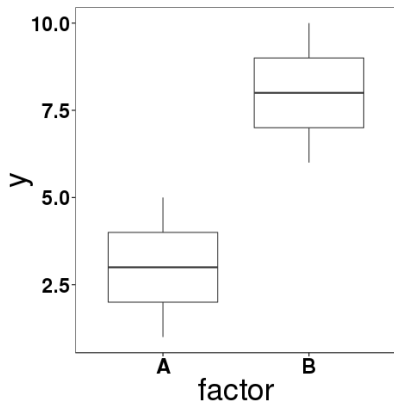
geom="line"



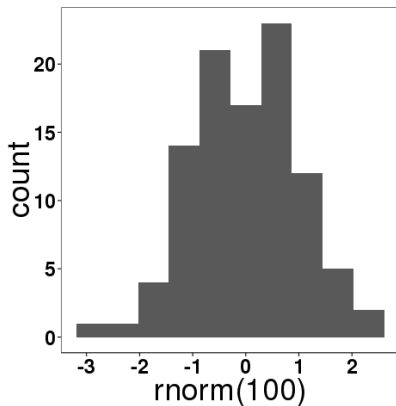


## geoms: boxplot and histogram

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

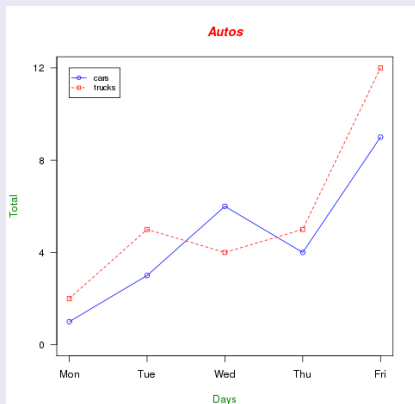


```
qplot(rnorm(100),  
geom="histogram",  
bins=10)+publication()
```

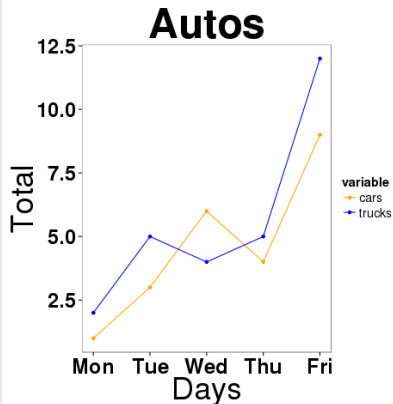


# Base R versus ggplot2

## 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)

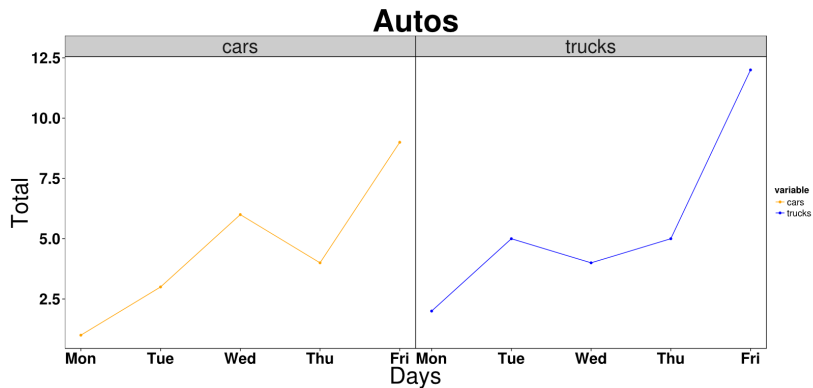
#plot
plot(cars, type="o", col="blue", ylim=g_range,
     axes=FALSE, ann=FALSE)
axis(1, at=1:5, lab=c("Mon", "Tue", "Wed", "Thu", "Fri"))
axis(2, las=1, at=4*0:g_range[2])
box()
lines(trucks, type="o", pch=22, lty=2, col="red")
title(main="Autos", col.main="red", font.main=4)
title(xlab="Days", col.lab=rgb(0,0.5,0))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

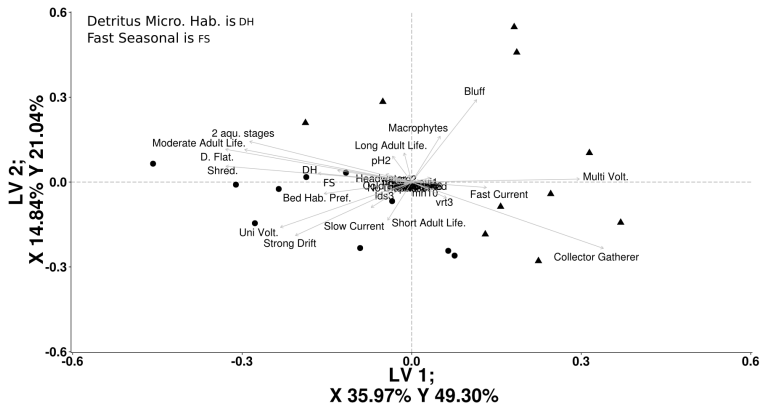
#ggplot2
p <- qplot(day, value, data=ct.melt, col=variable)
p <- p+geom_line()
p <- p+scale_x_continuous(labels=c("Mon", "Tue", "Wed", "Thu", "Fri"))
p <- p+xlab("Days")
p <- p+ylab("Total")
p <- p+ggtitle("Autos")
p
```

Faceting: `p+facet_wrap(~variable)`

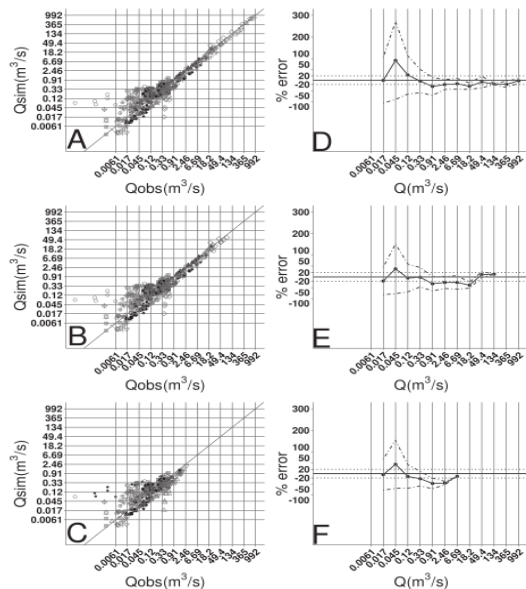


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# Publication Quality Graphics: Partial Least Squares



# Publication Quality Graphics: 6 panel figure





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# Let's get started

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