5: Examples

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```r
fig5.1A <- function(){
## ---- brain-bodyA ----
library(MASS)
plot(brain ~ body, data=mammals)
mtext(side=3, line=0.5, adj=0, "A: Unlogged data")
}
fig5.1B <- function(){
## ---- brain-bodyB ----
plot(brain ~ body, data=mammals, log="xy")
mtext(side=3, line=0.5, adj=0,
      "B: Log scales (both axes)")
}
fig5.1 <- function(){
"Run the separate functions fig5.1A() and fig5.1B()."
}
```

```r
fig5.2 <- function(){
## ---- plot-trees ----
## Code used for the plot
plot(trees, cex.labels=1.5)
  # Calls pairs(trees)
}
```

```r
fig5.3 <- function(){
## ---- trackVSroad ----
## Code
library(lattice)
xyplot(Time ~ Distance, scales=list(tck=0.5),
       groups=roadORtrack, data=DAAG::worldRecords,
       auto.key=list(columns=2), aspect=1)
## On a a colour device the default is to use
```

```r
## different colours, not different symbols,
## to distinguish groups.
}
```

```r
fig5.4A <- function(){
## ---- wrTimesA ----
## Code for Left panel
parset <- list(layout.widths=list(left.padding=2.5,
                                  right.padding=2.5))
xyplot(log(Time) ~ log(Distance),
       groups=roadORtrack, data=DAAG::worldRecords,
       scales=list(tck=0.5),
       par.settings=parset,
       auto.key=list(columns=2), aspect=1)
}
fig5.4B <- function(){
## ---- wrTimesB ----
## Right panel
xyplot(Time ~ Distance, groups=roadORtrack,
       data=DAAG::worldRecords,
       scales=list(log=10, tck=0.5),
       auto.key=list(columns=2), aspect=1)
}
fig5.4 <- function(){
"Run the separate functions fig5.4A() and fig5.4B()."
}
```

```r
suppfig5.1 <- function(){
## ---- timevsDist ----
plot(log(Time) ~ log(Distance),
     data = DAAG::worldRecords)
abline(worldrec.lm)
}
```

```r
fig5.5 <- function(){
## ---- diag12 ----
plot(worldrec.lm, which=c(1,5), sub.caption=rep("",2))
}
```

```r
fig5.6A <- function(){
## ---- nihills-spmA ----
## Scatterplot matrix; unlogged data
```

```
library(lattice)
splom(~DAAG::nihills,  lower.panel=showcorr, xlab="")
}
fig5.6B <- function(){
## ---- nihills-spmB ----
lognihills <- log(DAAG::nihills)
names(lognihills) <- paste0("l", names(DAAG::nihills))
## Scatterplot matrix; log scales
splom(~ lognihills, lower.panel=showcorr, xlab="")
}
fig5.6 <- function(){
  print("Run the separate functions fig5.6A() and fig5.6B()")
}
```

```
fig5.7 <- function(){
## Requires ggplot2
tomato <- within(DAAG::tomato, trt <- relevel(trt, ref="water only"))
ggplot2::quickplot(weight, trt, data=DAAG::tomato, xlab="Weight (g)", ylab="")
}
```

```
fig5.8 <- function(){
opar <- par(xpd=TRUE, mar=c(3.1,3.1,0.6,3.6), mgp=c(2.25, 0.5, 0))
with(DAAG::rice, interaction.plot(x.factor=fert,
                            trace.factor=variety,
                            ShootDryMass,
                            cex.lab=1.4))
par(opar)
}
```

```
fig5.9 <- function(){
## ---- MDBrainfall ----
## Code
plot(mdbRain ~ Year, data=DAAG::bomregions2012)
## Calculate and plot curve showing long-term trend
with(DAAG::bomregions2012, lines(lowess(mdbRain ~ Year,
                           f=2/3), lty=2))
## Calculate and plot curve of short-term trends
with(DAAG::bomregions2012,
     lines(lowess(mdbRain ~ Year, f=0.1), lty=1))
}
```

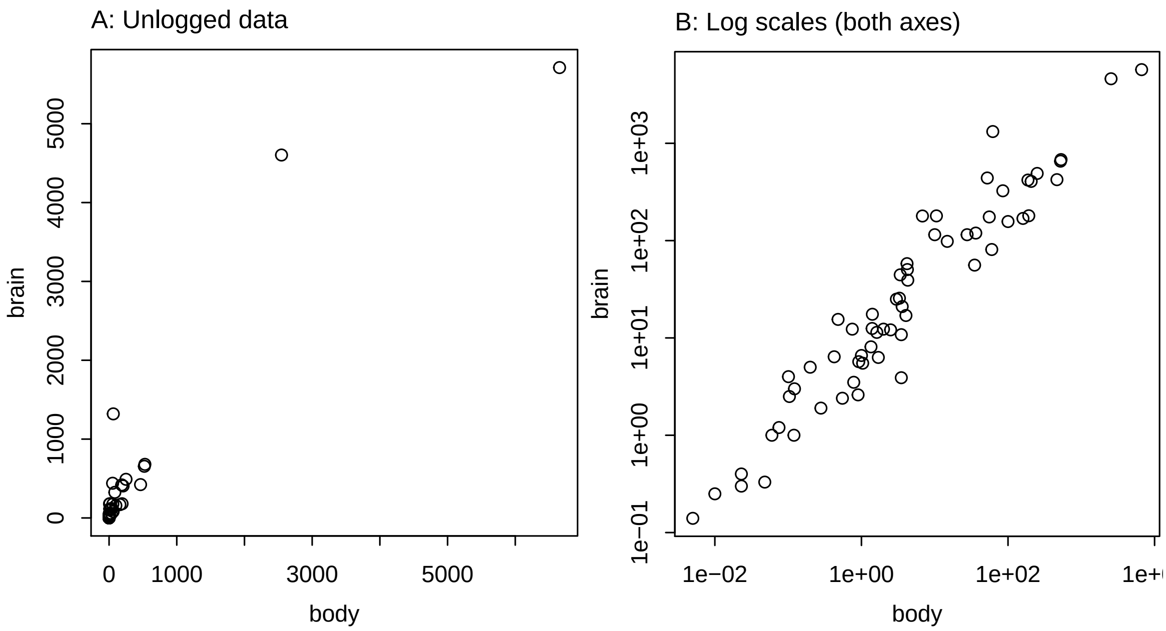


Figure 1: Brain weight (g) versus Body weight (kg), for 62 species of mammal. Panel A plots the unlogged data, while Panel B has log scales are used for both axes. Notice that, in Panel B, the scales are labeled in the original (unlogged) units.

```
figset5 <- function(){
    if(!requireNamespace('DAAG'))stop('DAAG must be installed')
  if(!requireNamespace('ggplot2'))stop('ggplot2 must be installed')
  }
```

```
figset5()

Loading required namespace:  DAAG
Loading required namespace:  ggplot2

if(!exists("worldrec.lm")){
    worldrec.lm <- lm(log(Time) ~ log(Distance),
                      data=DAAG::worldRecords)
}
```

```
fig5.2()
```

Interpreting Scatterplot Matrices:

For identifying the axes for each panel

- look across the row to the diagonal to identify the variable on the vertical axis.
- look up or down the column to the diagonal for the variable on the horizontal axis.

Each below diagonal panel is the mirror image of the corresponding above diagonal panel.

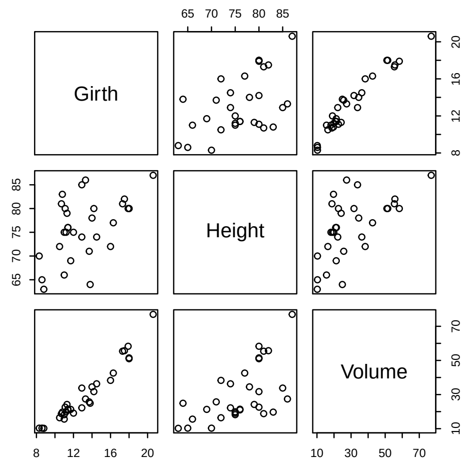


Figure 2: Scatterplot matrix for the `trees` data, obtained using the default `plot()` method for data frames. The scatterplot matrix is a graphical counterpart of the correlation matrix.

```
fig5.3()
```

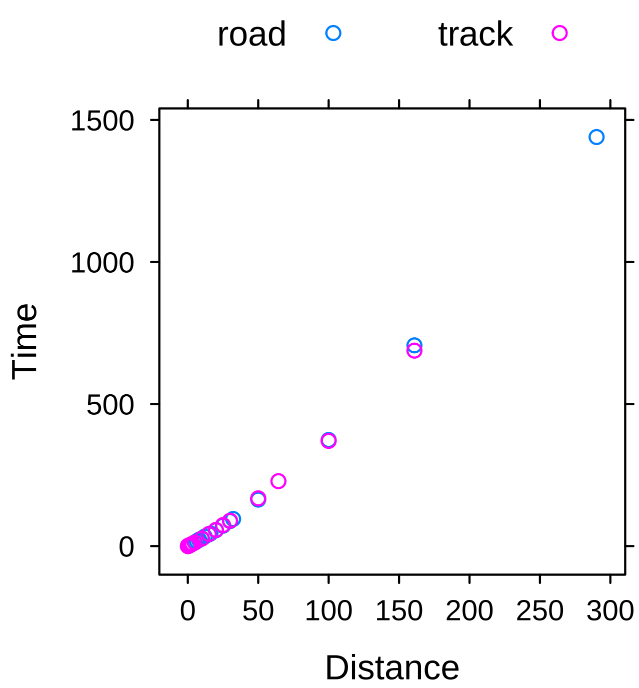


Figure 3: World record times versus distance, for field and road events.

```
fig5.4A()
fig5.4B()
```

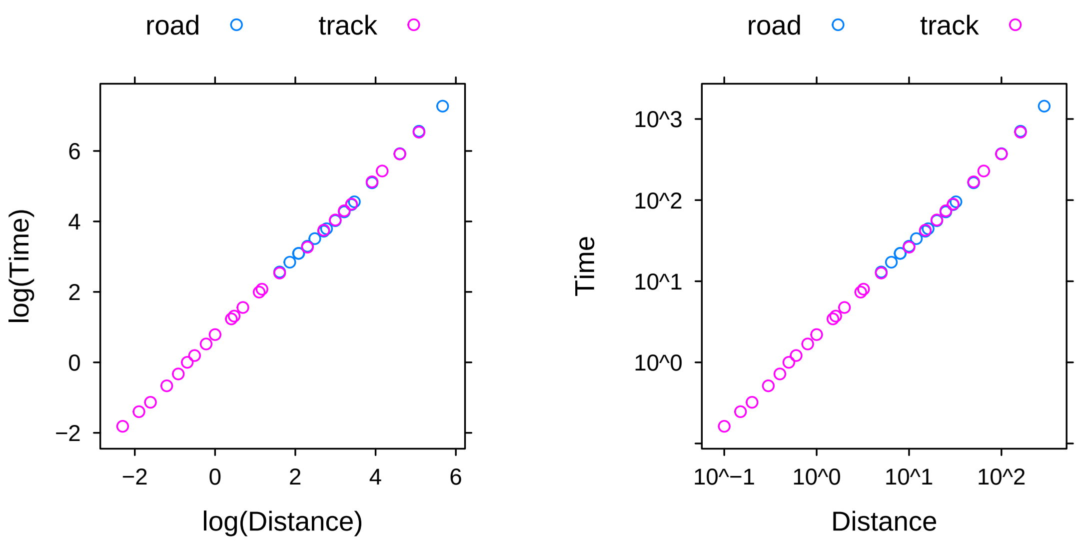
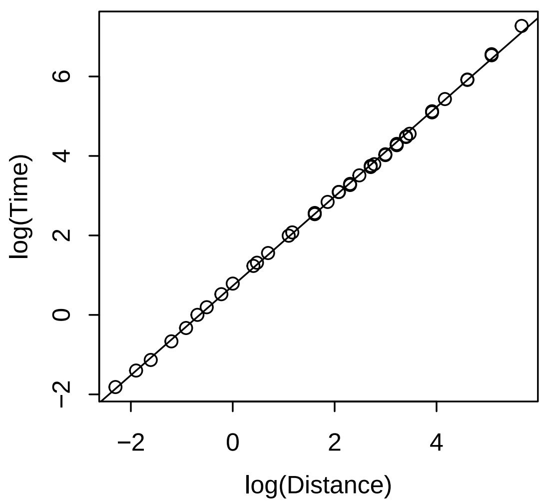


Figure 4: World record times versus distance, for field and road events, using logarithmic scales. The left panel uses labels on scales of $\log_e$, while in the right panel, labeling is in the orginal units, expressed as powers of 10.

```
suppfig5.1()
```



Supplementary Figure 1: log(time) versus log(distance), with a fitted line.

```
fig5.5()
```

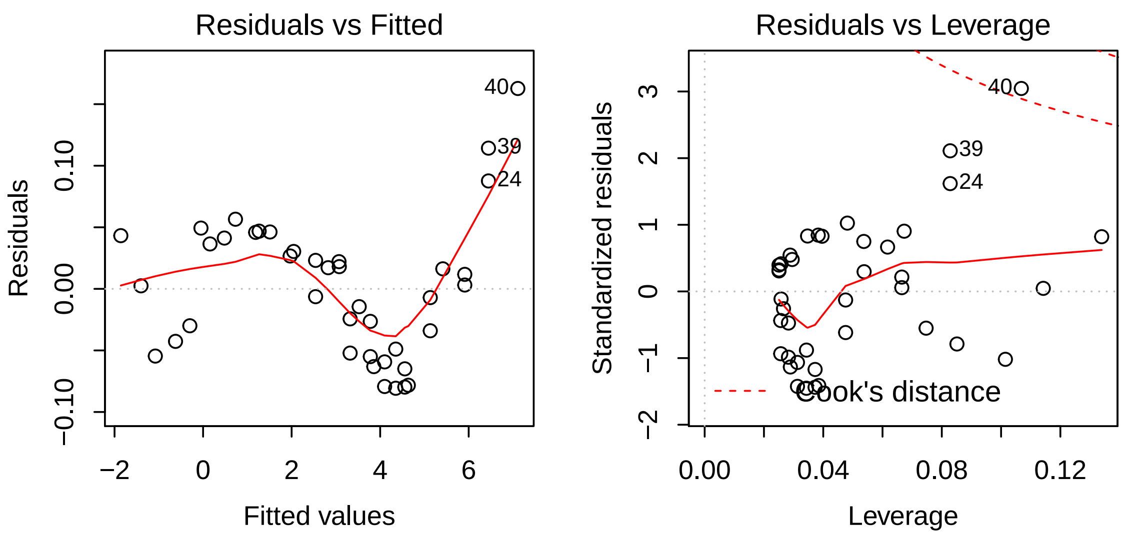


Figure 5: First and last of the default diagnostic plots, from the linear model for log(record time) versus log(distance), for field and road events.

```
fig5.6A()
fig5.6B()
```

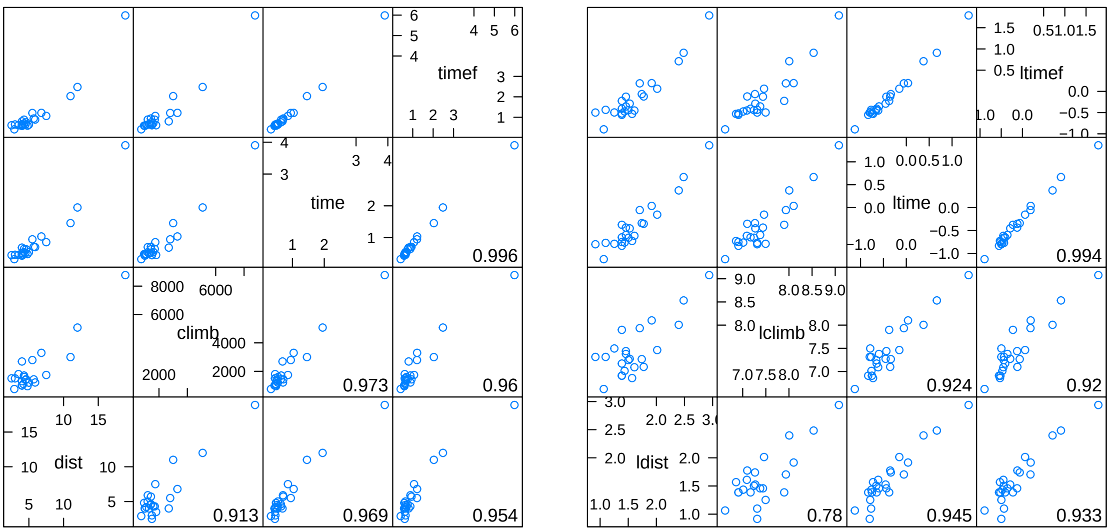


Figure 6: Scatterplot matrices for the Northern Ireland mountain racing data. The left panel is for the unlogged data, while the right panel is for the logged data. Code has been added that shows the correlations, in the lower panel.

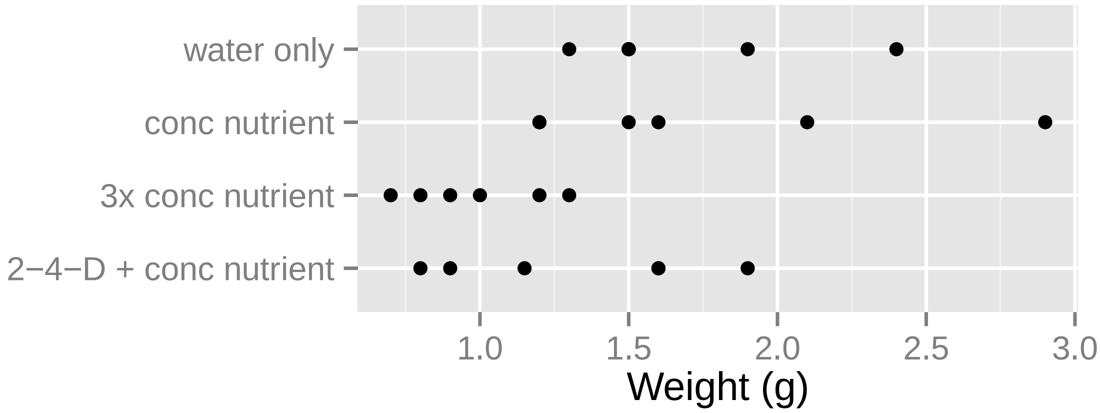


Figure 7: Weights (g) of tomato plants grown under four different treatments.

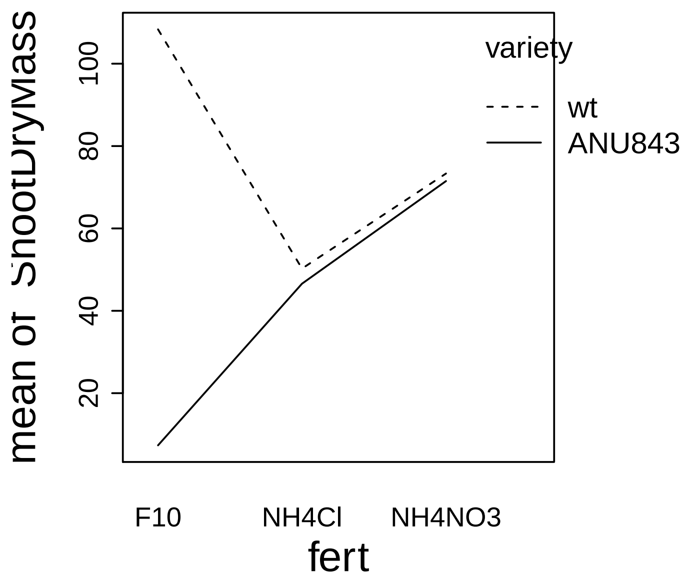


Figure 8: Interaction plot for the terms `fert` and `variety`, with `ShootDryMass` as the dependent variable. Notice that for fertilizer F10, there is a huge variety difference in the response. For the other fertilizers, there is no difference of consequence.

```r
fig5.9()
```

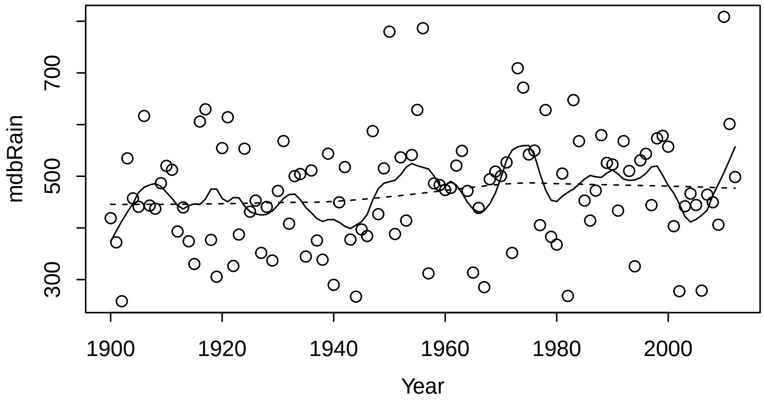


Figure 9: Annual rainfall in the Australian Murray-Darling Basin. by year. The `lowess()` function is used to The dashed curve with `f=2/3` captures the overall trend, while the solid curve with `f=0.1` captures trends on a scale of around eleven years. (10% of the 113 year range from 1900 to 2012 is a little more than 11 years.)