Pretty plots with `par`

BISC 888–1 Simon Fraser University

Sean C. Anderson
`sean@seananderson.ca`
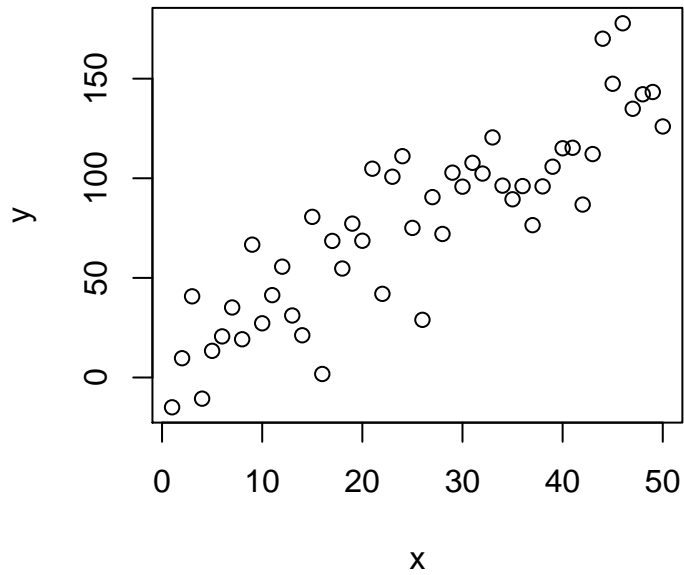
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1 Making one panel look good

In this section, we're going to start with a default base graphics plot and thoroughly customize it.

Let's start with a basic scatterplot. We'll generate some data and make a default plot.

```
set.seed(2)
x <- seq_len(50)
y <- x * 3 + rnorm(50, sd = 20)
plot(x, y)
```

First, let's set up `par`. We're going to reduce the character expansion value `cex`.

```
par(cex = 0.8)
```

We're also going to set `mgp`, which controls the XX, XX, and XX.
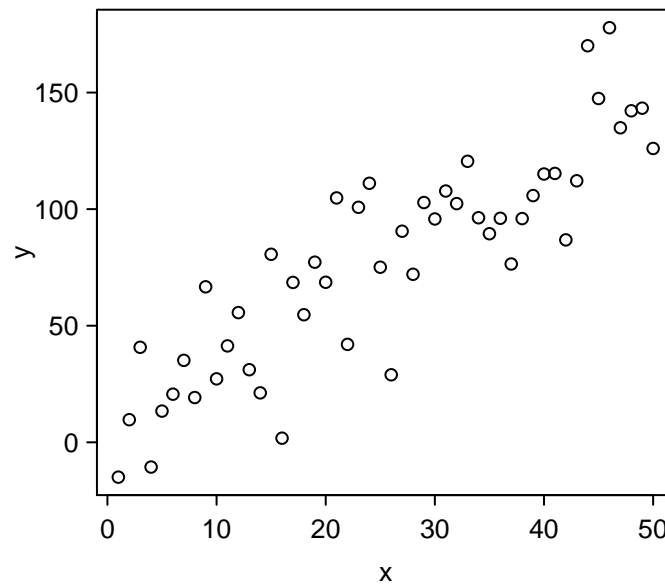
```
par(mgp = c(2, 0.6, 0))
```

We're going to reduce the tick length by setting `tck`.

```
par(tck = -0.02)
```

We're going to make all the axis text horizontal by setting `las` (label axis style).

```
par(las = 1)
```

```
plot(x, y)
```


We're getting there. Now let's emphasize the data by lightening the axes and axis labels. There are multiple ways to do this, but I'm going to show you the most flexible way: starting with a blank plot and building it up piece by piece:

```
plot(x, y, type = "n", axes = FALSE, ann = FALSE)
points(x, y)
axis_col <- "grey50"
box(col = axis_col)
axis(1, col = axis_col, col.axis = axis_col)
axis(2, col = axis_col, col.axis = axis_col)
mtext("X axis label", side = 1, col = axis_col, line = 2.0, cex = 0.9)
mtext("Y axis label", side = 2, col = axis_col, las = 3,
```

```
line = 2.2, cex = 0.9)
```
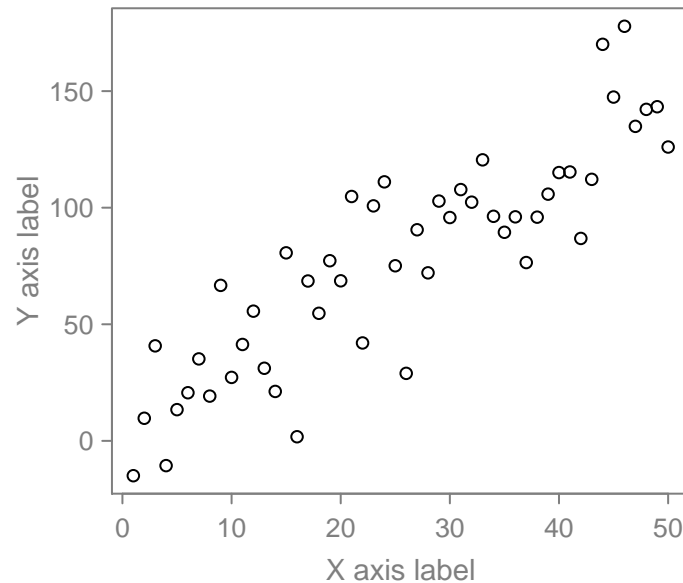
2   Adding a colour dimension

This is going to be much more involved than in `ggplot`, but bear with me. It's also very flexible. First we're going to bring in a colour palette. Then we're going to match cut that colour palette up according to our data. Then we're going to join that colour palette to the data we want to plot.

`RColorBrewer` is an excellent package for colour palettes. We're going to start with one of those. Since the data we're going to colour is continuous we're going to pick a continuous colour scale.

First, let's create some fake data we want to colour by. We'll call this column `z`. We'll combine, `x`, `y`, and `z` in a data frame.

```
z <- 50:1
d <- data.frame(x, y, z)
```

There are a number of ways to do this. We'll use `findInterval`.

```
library(RColorBrewer)
pal <- brewer.pal(9, "YlOrRd")
pal_df <- data.frame(pal = pal, cuts = seq(min(d$z), max(d$z),
    length.out = length(pal)), stringsAsFactors = FALSE)
pal_df

##        pal   cuts
## 1 #FFFFCC  1.000
## 2 #FFEDA0  7.125
## 3 #FED976 13.250
## 4 #FEB24C 19.375
## 5 #FD8D3C 25.500
## 6 #FC4E2A 31.625
## 7 #E31A1C 37.750
## 8 #BD0026 43.875
## 9 #800026 50.000
```

```
pal_indices <- findInterval(d$z, pal_df$cuts)
```

```
d$col <- pal_df$pal[pal_indices]
```

```
plot(d$x, d$y, col = d$col, pch = 19)
```
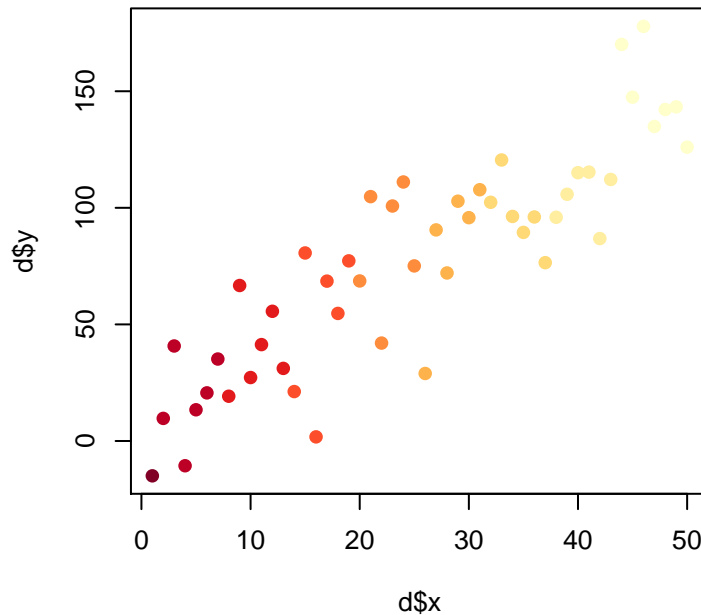
3 Adding lines and polygons

We're going to work through an example adding a linear model fit and shaded confidence intervals to our scatter plot.

Many ways (and for this simple case, many much simpler ways), but this is a general example that can work across any linear or non-linear model with minimal modification.

Fit the model:

```
m <- lm(y ~ x, data = d)
```

Predict:

```
pred_df <- data.frame(x = seq(min(x), max(x), length.out = 100))
pred_df$fit <- predict(m, newdata = pred_df)
se <- predict(m, newdata = pred_df, se = TRUE)$se.fit
pred_df$lower <- pred_df$fit + 1.96 * se
pred_df$upper <- pred_df$fit - 1.96 * se
```
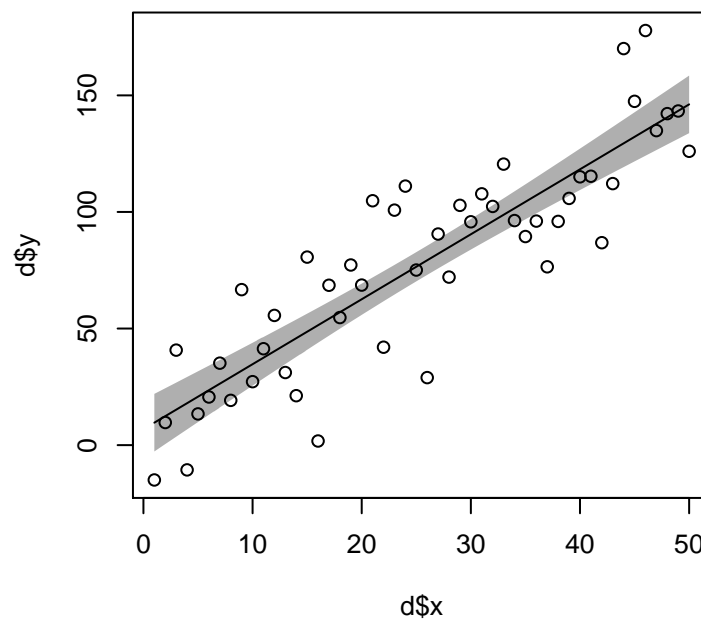
And plot it again:

```
plot(d$x, d$y)
with(pred_df, lines(x, fit))
with(pred_df, polygon(c(x, rev(x)), c(lower, rev(upper)),
  border = NA, col = "#00000050"))
```


(2) coefficient plot points segments