# Practical 1

### Jumping Rivers

### Getting Started

First load the **ggplot2** package

```
library("ggplot2")
and the OK Cupid data set
data(okcupid, package = "jrSouth")
```

#### Scatter plots

1. Let's start by creating a basic scatter plot of the heights and ages. We do this using the geom\_point() command

```
# alpha makes the points transparent
ggplot(data = okcupid) +
geom_point(aes(x = age, y = height), alpha = 0.2)
```

2. To save typing, we're going to store the original ggplot object as a variable

```
g = ggplot(data = okcupid)
g1 = g + geom_point(aes(x = age, y = height), alpha = 0.2)
```

So now running g1 will produce the graph

g1

- 3. The arguments x and y here are called aesthetics. What do you think happens if you omit the y aesthetic?
- 4. For geom\_point(), both the x and y aesthetics are required. This particular geom has other aesthetics: shape, colour, size and alpha. For instance we can specify that we wish to map the variable sex to a colour aesthetic by including it inside aes()

```
g + geom_point(aes(x = age, y = height, colour = sex))
```

5. Change colour = sex to colour = height. Why do you think there's a change in the legend?

## Bar plots

geom\_bar() can be used to create a bar chart. It requires only one aesthetic and that is x. For the provided aesthetic, the frequencies will be calculated and shown as a bar. For example

```
g + geom_bar(aes(x = body_type))
```

- 1. Change the axis labels to "Body Type" and "Total" by adding two more layers, using + xlab("Body Type") and + ylab("Total")
- 2. Split the graph up into the two genders (hint: use colour and fill).

<sup>&</sup>lt;sup>1</sup>These are available for most geoms. For a collection of aesthetics see the relevant help pages.

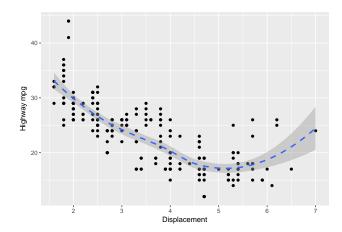


Figure 1: Graphics for section 1

- 3. With such long labels, it might make more sense to rotate the graph such that the bars and labels are horizontal. Switch the x and y axes using a coord\_flip() layer added to your graph.
- 4. I am not too keen on how the female and male bars are displayed on top of each other. The argument to change these is position. The default is stack, for example we can put the bars next to each other using

```
g + geom_bar(aes(x = body_type, colour = sex, fill = sex), position = "dodge") +
    coord_flip()
```

Other values you might try here are position = fill, position = jitter, or position = identity.

5. What does the fill position argument do?

# Box plots

1. Box plots are a great way to visualise the shape of a distribution of some variable. Start by creating a boxplot of peoples ages in the okcupid data. The x = 1 in the code below lets us have just a single boxplot for all ages

```
g = ggplot(okcupid)
g + geom_boxplot(aes(x = 1, y = age))
```

2. Switch out the x = 1 for x = smokes to get a boxplot for each group

### Copy cat

The aim of this section is to recreate the graphics in figure 1 and 2. Feel free to experiment. To begin, load the package

```
library("ggplot2")
and the mpg data set
data(mpg, package="ggplot2")
dim(mpg)
```

1) Figure 1: Create a scatter plot of engine displacement, displ, against highway mpg, hwy. To get started:

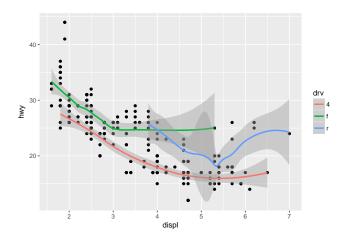


Figure 2: Graphics for section 1

```
ggplot(data=mpg, aes(x=displ, y=hwy)) +
geom_point() + xlab("Displacement")
```

Now add a dashed loss line and change the y-axis label. Hint: try  $stat_smooth()$  and ylab('New label').

2) Figure 2: Using stat\_smooth(), add a loess line conditional on the drive.