# PSYC402 – Week 11

# Lab activities

In this lab, you’ll gain understanding of and practice with:

* when and why to apply simple and multiple regression to answer questions in psychological science
* conducting multiple regression in R
* interpreting the R output of simple and multiple linear regression
* reporting results for simple and multiple linear regression following APA guidelines

## Lab activity 1: Interpreting and reporting results

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| Have a look at the R output below.  What is the outcome or dependent variable? **Word reading**  What is the predictor or independent variable? N**on-word reading**  Is the overall model significant? **Yes, *F*(1,50) = 69.03, *p* < .001**  How much variance does the model account for? **58%** | |
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| What do you conclude from the plots and output below?  Does the relationship appear linear? **Yes. The dots and the pink line assemble quite closely on the dashed line.**  Looking at the plots and output below, do the residuals show normality and homoscedasticity?  **The qq-plot suggest that the residuals are normally distributed as the dots fall close to the solid blue line and within the range of the dashed blue lines. The Shapiro-Wilk test of normality confirms this (it is not significant). Similarly, the output of the non-constant variance score tests is not significant suggesting that the residuals are homoscedastic.** | |
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## Lab activity 2: Conducting simple and multiple regression

### Background

Today, to help get a practical understanding of regression, you will be working with real data and using regression to explore the question of whether there is a relationship between voice acoustics and ratings of perceived trustworthiness.

#### The Voice

The prominent theory of voice production is the **source-filter theory** (Fant, 1960) which suggests that vocalisation is a two-step process: air is pushed through the larynx (vocal chords) creating a vibration, i.e. the source, and this is then shaped and moulded into words and utterances as it passes through the neck, mouth and nose, and depending on the shape of those structures at any given time you produce different sounds, i.e. the filter. One common measure of the source is pitch (otherwise called Fundamental Frequency or F0 (F-zero)) (Titze, 1994), which is a measure of the vibration of the vocal chords, in Hertz (Hz); males have on average a lower pitch than females for example. Likewise, one measure of the filter is called formant dispersion (measured again in Hz), and is effectively a measure of the length of someone’s vocal tract (or neck). Height and neck length are suggested to be negatively correlated with formant dispersion, so tall people tend to have smaller formant dispersion. So all in, the sound of your voice is thought to give some indication of what you look like.

More recently, work has focussed on what the sound of your voice suggests about your personality. [McAleer, Todorov and Belin (2014)](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0090779) suggested that vocal acoustics give a perception of your trustworthiness and dominance to others, regardless of whether or not it is accurate. One extension of this is that trust may be driven by malleable aspects of your voice (e.g. your pitch) but not so much by static aspects of your voice (e.g. your formant dispersion). Pitch is considered malleable because you can control the air being pushed through your vocal chords (though you have no conscious control of your vocal chords), whereas dispersion may be controlled by the structure of your throat which is much more rigid due to muscle, bone, and other things that keep your head attached. This idea of certain traits being driven by malleable features and others by static features was previously suggested by [Oosterhof and Todorov (2008)](https://www.pnas.org/content/105/32/11087" \t "_blank) and has been tested with some validation by [Rezlescu, Penton, Walsh, Tsujimura, Scott and Banissy (2015)](https://link.springer.com/article/10.1007/s10919-015-0214-8" \t "_blank).

So, the research question today is: can vocal acoustics, namely pitch and formant dispersion, predict perceived trustworthiness from a person’s voice? We will only look at male voices today, but you have the data for female voices as well should you wish to practice (note that in the field, tendency is to analyse male and female voices separately as they are effectively sexually dimorphic). As such, we hypothesise that **a linear combination of pitch and dispersion will predict perceived vocal trustworthiness in male voices**. This is what we will analyse.

To complete this lab activity, please open the R-script (402\_wk12\_labAct2.R) in R Studio and work your way through it.

**Answers to questions are in the ‘402\_wk12\_labAct2\_withAnswers.R’ script.**