Everybody welcome to this demonstration of partial correlations,

we'll be using the same example as we did in the slides earlier.

Now, the only package we'll really be using curious ggm,

which will provide some functions for computing partial correlations.

Now, recall that we have three variables; intelligence,

weight, and age measured on school children.

We assume that in fact,

our sample size is big enough that we'll just treat them as population correlations.

We produce the following correlation matrix. It's called Rho hat.

But again, let's not worry about the half part for the moment.

Just looking at this,

we're looking at a pretty high correlation between intelligence and weight,

which is the first two variables.

Now, of course,

there's a bit of a confounding variable which is age.

Let's compute the partial correlation. Adjust them for that.

These are the formulas,

again, they're given in the slides.

What happens after we subtract off the relationship between the lurking variables,

we see the correlation has shrunk to 0.02, to a much smaller.

Now, R can do this for us, and in fact,

R will have to do that for us if we ever have more than three variables at a time,

maybe four at most.

Here, we begin by specifying our correlation matrix like so.

So we give it the matrix function and vector,

going from here to here,

and then the number of rows and number of columns.

Now, we use a function from a ggm package called parcor.

Parcor stands for partial correlation.

We give it the correlation matrix R here.

What it actually gives us, and

here's why I would encourage you to actually run the function parcor

R without the whole 1, 2 in brackets.

What it actually gives us is a whole matrix of

partial correlations of each pair of variables given the rest of them.

In this case, the element in the first row and the second column

would actually be the partial correlation of the first variable, intelligence,

and the second variable weight,

given the rest of them,

which is h. In this case, there's only one other,

but if there were more others,

it would be the rest of them.

Now, similarly,

the element of the first row and the third column

would be the correlation between intelligence and age, controlling for weight.

In any case, the value is the same as what we had before.

We can also ask for it more explicitly.

The function that does that is the pcor.

It takes a vector, just one vector.

The first two elements of that vector are going to be

the variables whose correlation you want here,

it's just one-two,

and they don't have to be consecutive.

The third and other variables,

third, fourth, fifth, and so on are the variables you want to condition on.

Then of course, the second argument is just the original correlation matrix.

Again, the same value.

Again, ultimately, almost no correlation.

So weight does not really have much explanatory power when it comes to intelligence.

Now, we will also use these data to study testing correlations in the next demo.