**Spatiotemporal Models for Ecologists**

**Structural equation models**

Goal: Explore how structural equation models can generalize linear models.

**Data generating process**

Envision a simple linear model:

Simulate 100 samples from this model, while (for the purposes of this demonstration) also simulating , , , and . Fit this model using the `lm` function in R, and record the estimated parameters and likelihood.

Next, load the `sem` package and refit the same model using that syntax. Compare the estimated slope with the prior linear model.

Finally, recall that a structural equation model can be implemented by defining the exogenous variance:

And defining the path matrix , and calculating the joint covariance **:**

And then defining a Wishart distribution for the sample covariance:

Where is the sample covariance. Try implementing this model yourself in R or TMB, and compare the results with the prior linear model and SEM implementation using package sem.