Felsenstein paper

Correlation can lead to the right answer between traits, but…

-need to connect to trees (that are good)

-another question is whether calculating independent contrasts is needed to understand correlation

Branch lengths are important!!!

Calculating amount of contrast is dependent on branch length (and its variance). Can be used to compare nodes to branch ends. In case of nodes take into account branches that go off of it

Independent contrast says that a change that causes a fork in a tree is not related to a different change that causes another fork

-sort of based on Brownian motion models

Alternative model: if you don’t believe in Brownian motion, then compare non-overlapping pairs of branches

-however, this causes loss of half of the data because of the lack of overlap

Pagel paper

Matrix on pg 40 – q variables represent instantaneous transitions. Can only do one transition at a time (this is assumption of model)

-these rates may be different going both ways

-[0,0] to [1,1] transitions in this model would only be possible if the two traits were causal (i.e. dependent on each other)

Model assumes equal frequency at the roots

Madison paper

Main figure

Determine correlation through simulations. Be careful of rates being used, but higher sample sizes will help

Ways to determine if correlation is happening:

-compare to parsimony (count # of events)

-break up tree into different groups