experiment sandbox

resource: experimental design 4 the life sciences 4e

@cjlortie

the basic steps to becoming a design jedi

step 1. think and observe
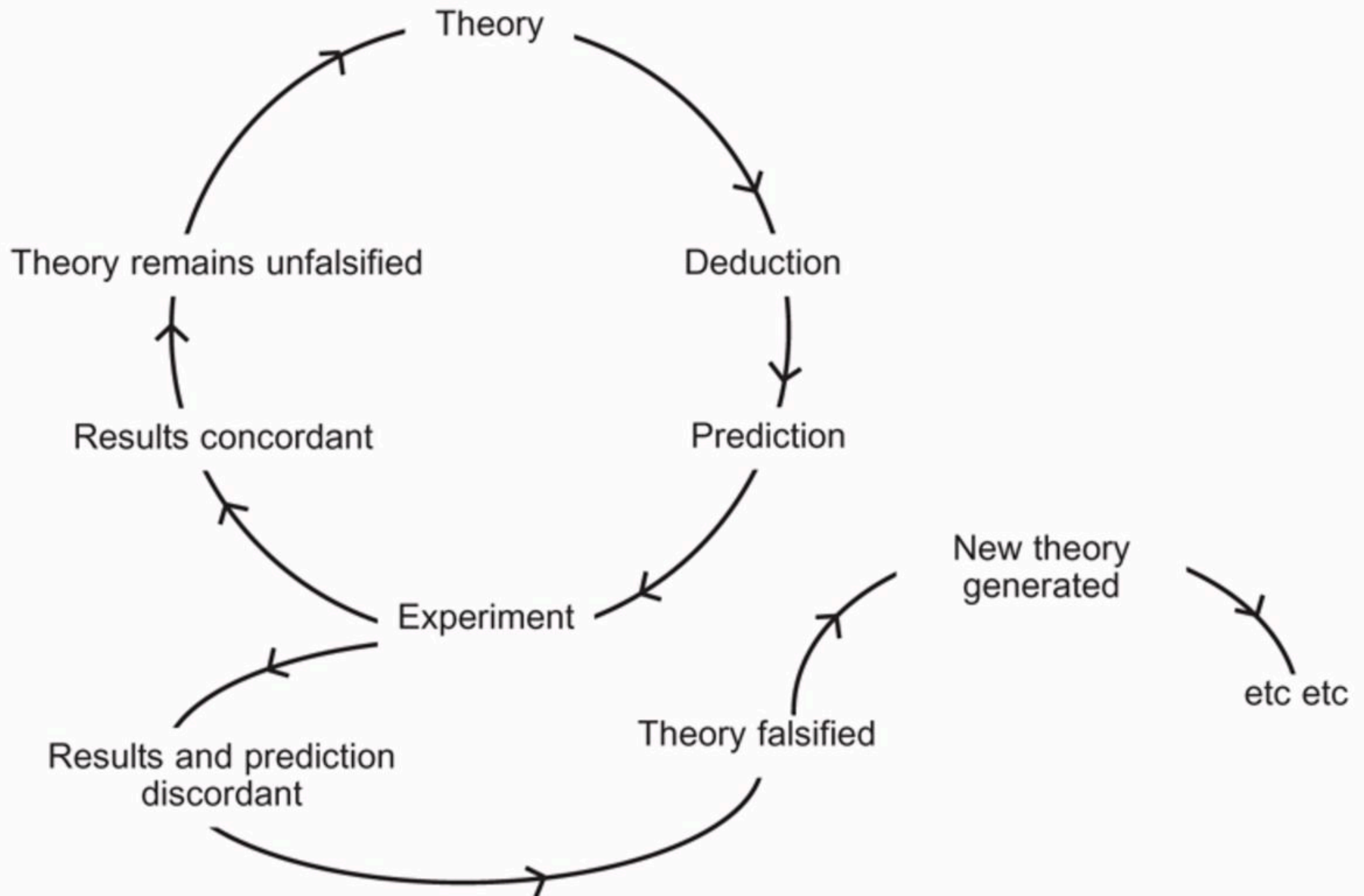
you need to find the right system to train and hone your ideas

step II. hypothesis

develop a clearly stated explanation of
how your study system works

null versus **alternative** hypothesis
and formal hypothetico-deductive model

Theory

Deduction

Prediction

Experiment

Results concordant

Theory remains unfalsified

Results and prediction discordant

Theory falsified

New theory generated

etc etc

do not need to reject the null
(or power of the darkside?)

statistical principles versus design principles

multiple hypotheses are at times needed for
an explanation of how a complex system functions

design thinking combats fake news

step 11b. pilot study

critical that you test out design before experiment

pilot study is an exploration of
data collection, methods, benefits, challenges, &
most importantly limitations

step III. predictions

predictions must be testable, unique, evidence-driven

practice predictions

indirect measure is an indicator
of the state of another (response) variable

consider all outcomes

the devil's advocate to better design

controls

reference samples/subjects for contrasts

negative = treatment added that is expected to have no effect

positive = control group manipulated
for better contrasts or tests of
experimental efficacy

I only know one truth: It's time for the Jedi to end.

end scientific **elitism** and embrace design