

3.2-Scientific Hypotheses

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You should know today

- How to elaborate a sound scientific hypothesis
- How to differentiate scientific and statistical hypotheses
- Connecting hypotheses and questions
- How to write hypotheses in scientific texts

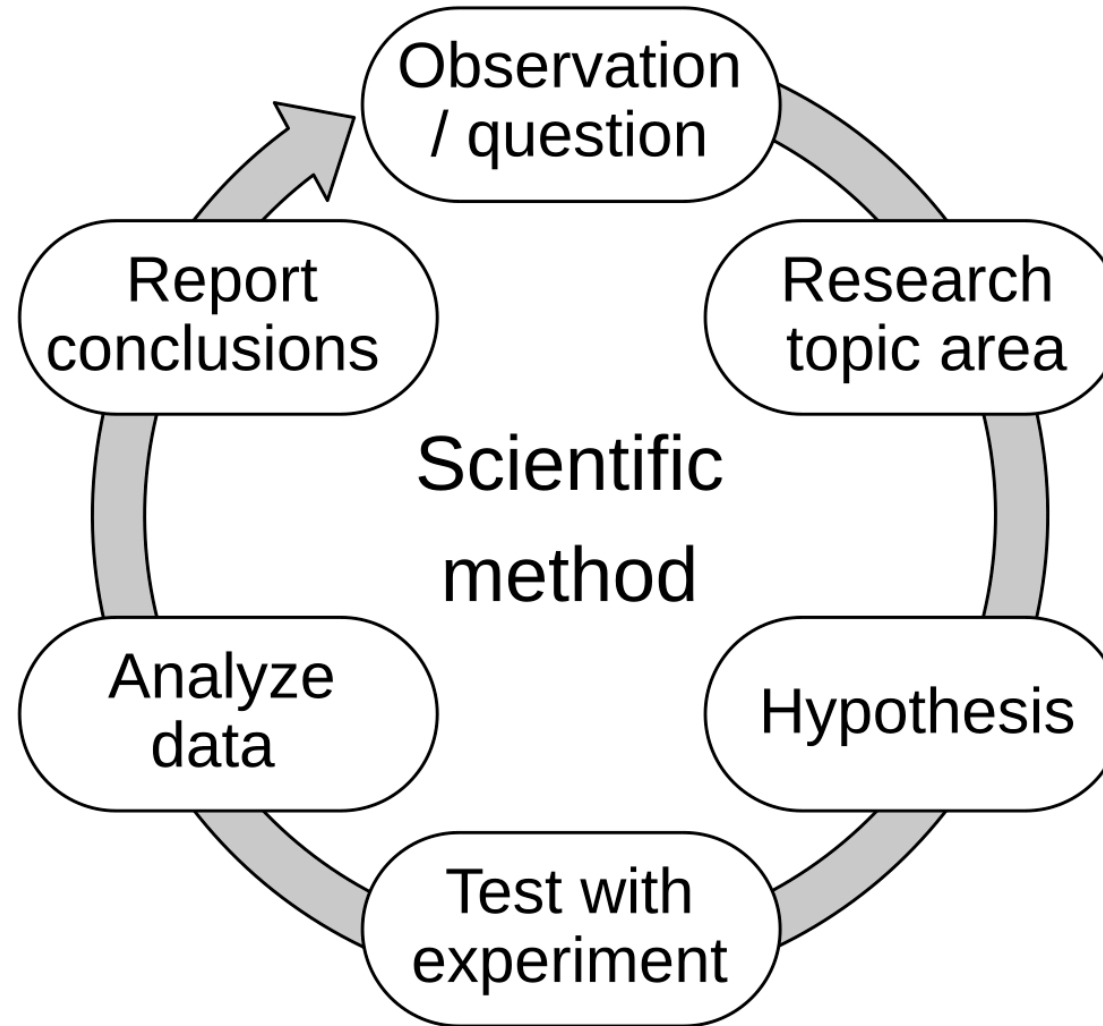
Why we need a hypothesis?



source: Mad About Science

- Candidate explanation to a phenomenon
- Contain previsions and expectations
- Feedback theory
- **Advance Science**

The mechanics of Science



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Research Methods & Data Analysis

It is a statement

- It is affirmative
- It is not a questions
- Must lead to expectations if confirmed
- Self-explanatory

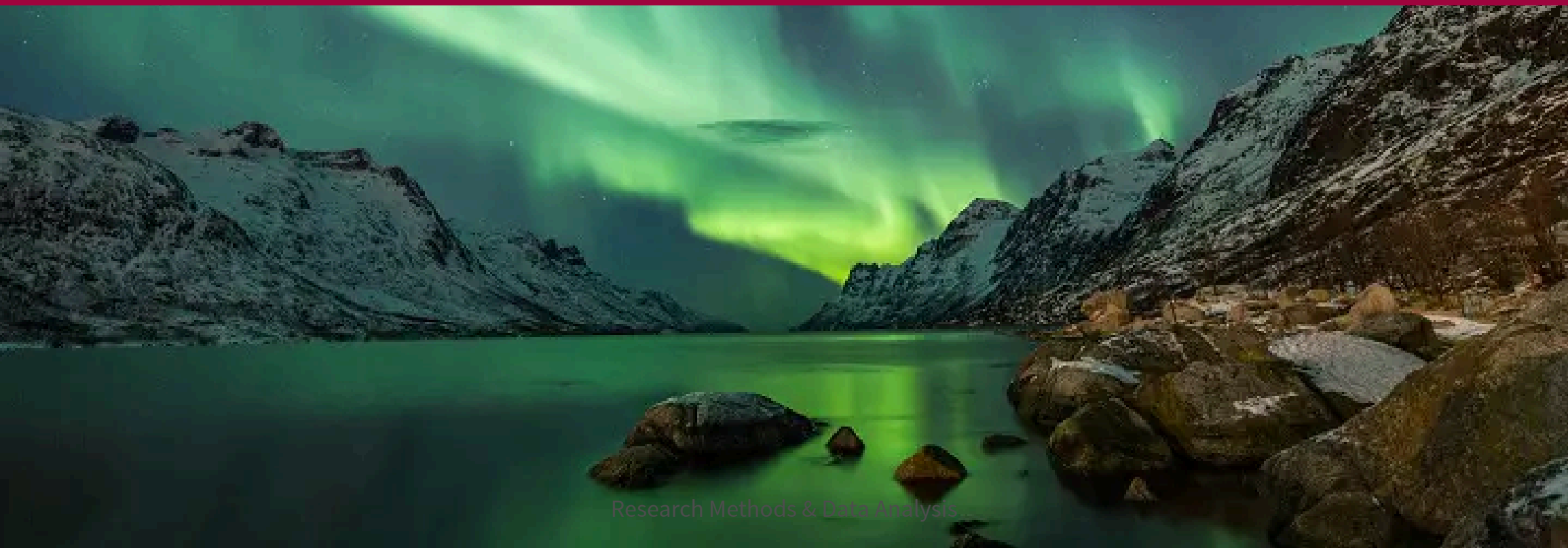
What is the cause of *aurora borealis*?



**This is the manifestation of joy of the Gods
that throw some bright blanket in the night sky**



Auroras result from emissions of photons in Earth's atmosphere, above 80 km (50 mi), from ionized nitrogen atoms regaining an electron, and oxygen atoms and nitrogen based molecules returning from an excited state to ground state



Types of hypotheses

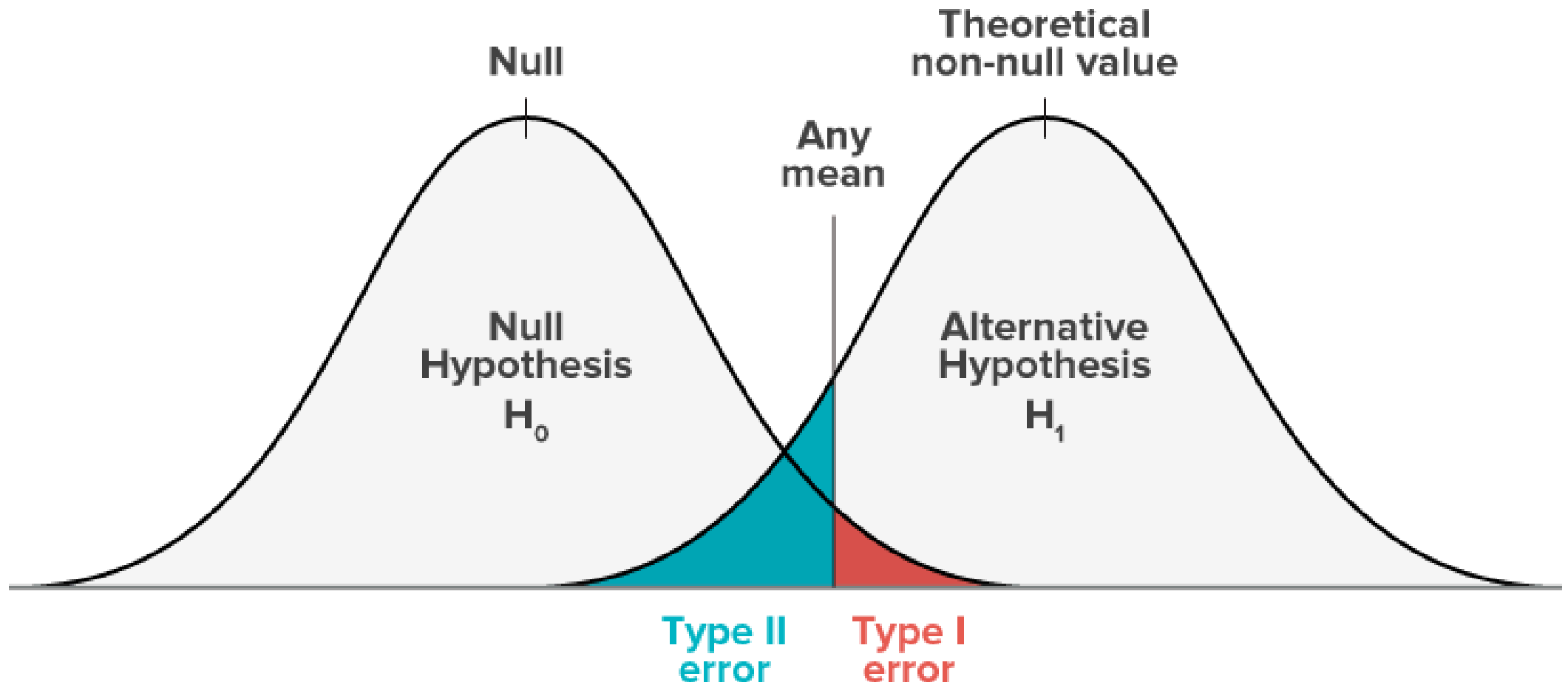
Scientific Hypotheses

- Candidate statements to explain an observed phenomenon
- Meant to generate logical predictions
- Working guidelines

Statistical Hypotheses

- Logical predictions
- Confirmed by stats
- Can be drawn in a graph

Statistical hypotheses



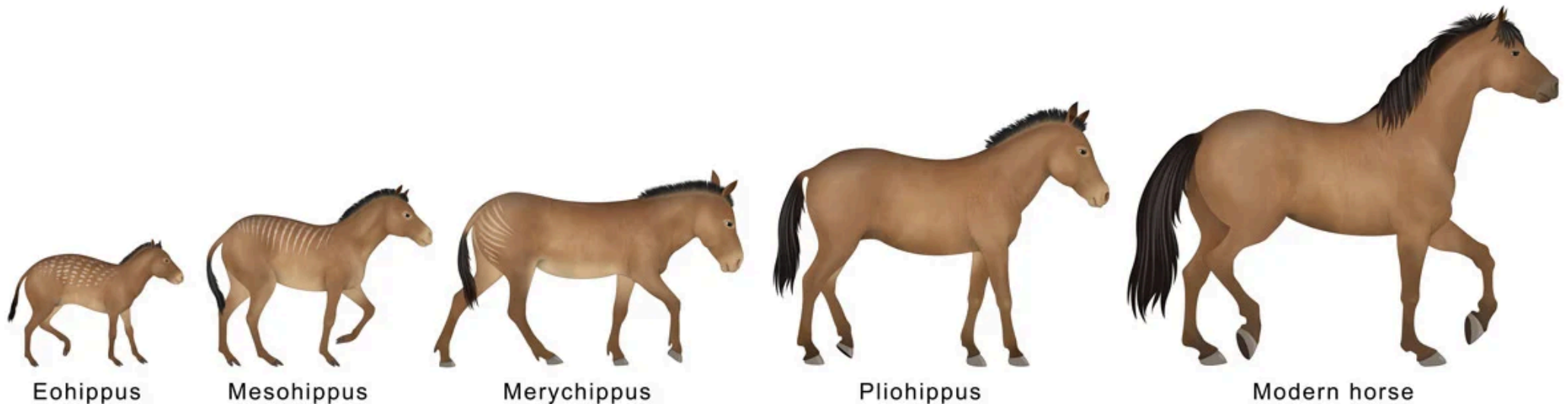
6. Differences Between Statistical and Scientific Hypotheses



Let's train a bit

Given the question: What caused the increase in body mass during the evolution of horses?

Create both a *scientific* and a *statistical* hypotheses about the size of horses



A good working hypothesis is everything

- A wrong hypotheses will misguide you
- A good hypothesis will keep you excited and up to date.
- Needs training

How to write hypotheses?

- You should tell a story
- Don't use a subheading
- Never refer to statistical hypotheses

The “If/then” method

- *If* drug X have an effect on reducing headache, *then*
- *When* many exotic species are introduced in the ecosystem, *then* the likelihood of severe ecological disruption increases

The *statement* method

- Drug X reduce the headaches because it blocks the neuroreceptors of pain
- Exotic species in high quantities disrupts ecological mutualistic networks

How good is my hypothesis?

- Testable? 😊
- Objective? 😊
- Relevant? 😊

End of session on RM