Hypothesis is a theory, or a model, or a claim

Ex: Earth is flat.

We call the hypothesis that is believed by majority or claim made by authority as the Null Hypothesis.

Null Hypothesis --- H0

Ex: the earth is sphere.

The claim (hypothesis) that is a new theory or a new model, or proposed by researchers, is called Alternative Hypothesis （Hypotheses (pl.)）.

Alternative Hypothesis ---- H1

H0: Earth is flat.

H1: Earth is sphere.

The process of determining which hypothesis to accept is called Hypothesis testing (HT).

HT must be based on the observation (data). If H0 cannot explain the observation, but H1 can, then it is strong evidence that H1 should be true. WE often assume H0 is true, and if the observation is consistent with H0, this means that we should accept H0; If H0 cannot explain the observed data, this indicates that H0 is wrong, we should reject H0.

In this chapter, the H0 or H1 are the claims about the parameters.

Claim: average house price in Springfield is 300K. This is a statement about the population mean value mu. If this claim is made by some organization, then it is Null Hypothesis.

H0: mu = 300K.

If a customer did some research, and he believed that the average price should be less than 300K. this is the alternative hypothesis, this is

H1: mu < 300K.

The tail probability is called p-value, which could be used to measure “close” or “far”.

If p-value is small -🡪 tail prob is small--🡪X bar and mu are far away --🡪 we should reject H0

If p-value is big -🡪 tail prob is big --🡪 X bar and mu are close --🡪consistent with H0 and we accept H0

Simplifying: p-value small 🡪Reject H0; p-value big🡪 accept H0

p-value is small or big relative to a significant level alpha.

p-value<alpha -🡪 Reject H0

p-value >alpha -🡪 accept H0