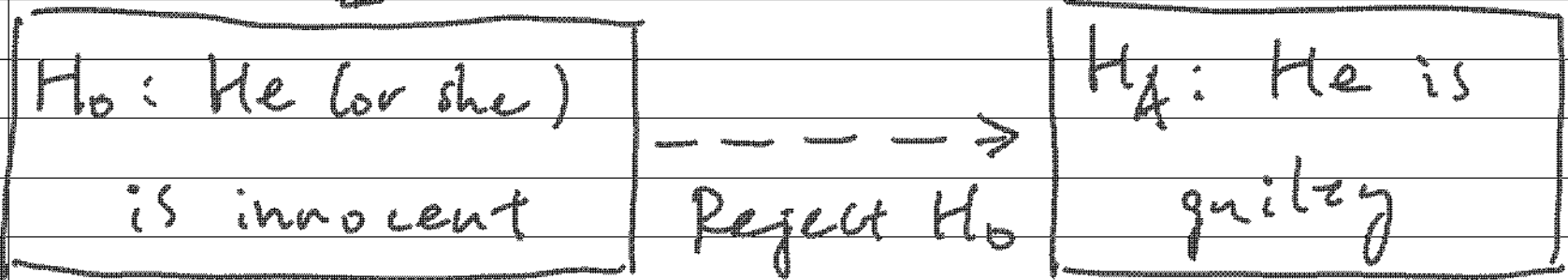


Framework for hypothesis test

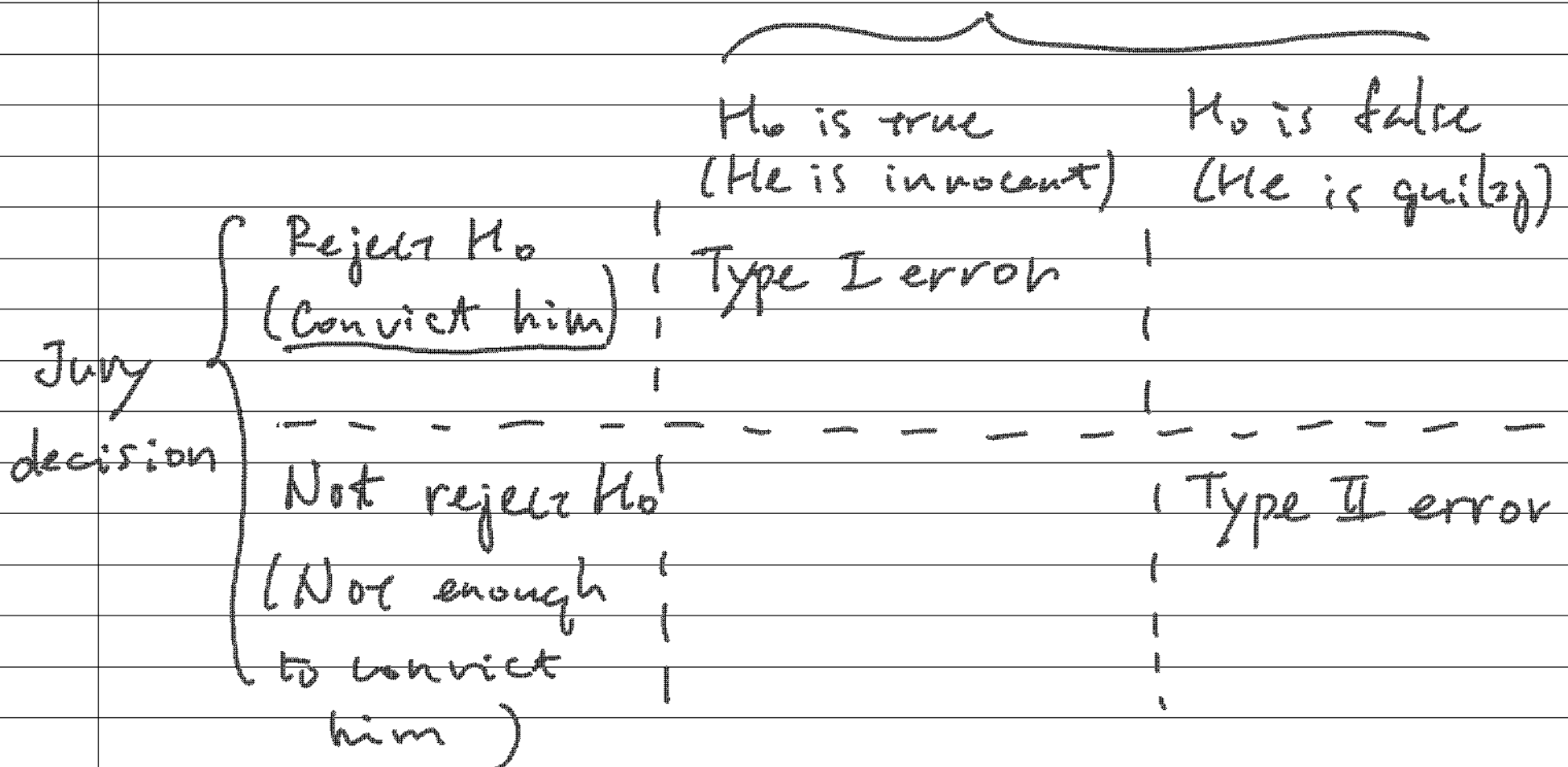
The process of determining "yes" or "no" from the outcome of experiment is called a *hypothesis test*. A widely used formalization of this procedure is due to Neyman and Pearson. Suppose that a researcher is interested in whether a new drug works. Then *null hypothesis* may be that the drug has no effect --it is often the reverse of what he or she actually believe, why? Because the researcher hopes to reject the hypothesis and announce that the new drug leads to *significant* improvements. If the null hypothesis is not rejected, the researcher announces nothing and goes on to a new experiment.

Claim: The defendant is guilty

The opposite

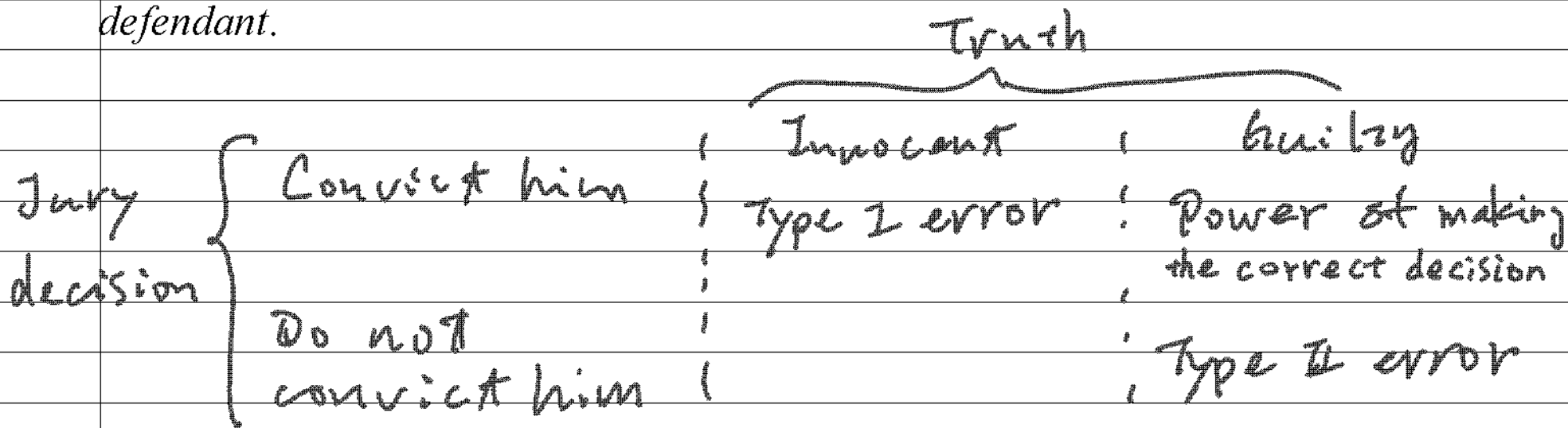


Truth

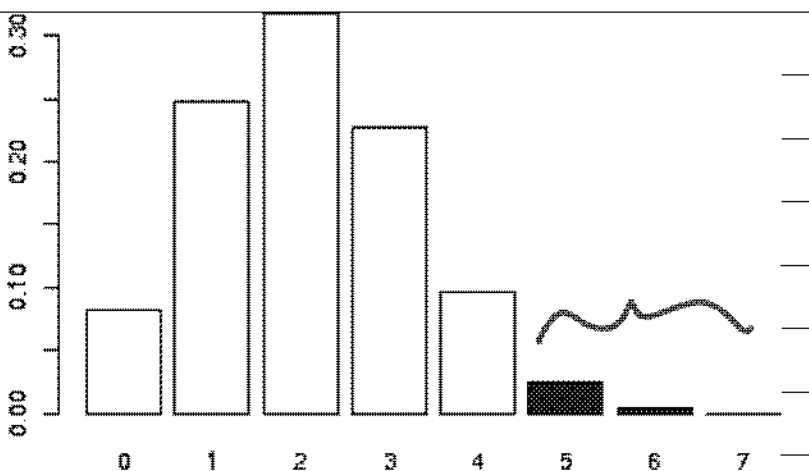


Mechanism of decision making

Jury Problem. Consider a jury decision in which it takes 5 of the seven jurors to convict. We assume that jurors act independently and each makes the *right decision* with probability 0.7. The random variable X is the number of *votes against the defendant*.



If innocent, type I error will be 0.03



If guilty, the power will be 0.65

