



11.204

112102 :: Recitation 11:: Project 2 Design

- *Design the Question* (formulate hypothesis/theory)
 - (Popper: Logic of Scientific Discovery)
 - an hypothesis or theory (S) may be measured by its 'logical content' which might be described as the class of all statements which are logically entailed by (S). an example may be given by Newton's laws of motion, or Maxwell's equations. In each case the class of statements logically entailed are enormous and profoundly rich: apples falling, planets revolving, tides ebbing, turbines spinning, electric motors, wireless networking, rainbows, etc.
 - example
 - racial diversity in cities is a function of property values ---> varies inversely
 - property values are a function of rent control legislation ---> varies directly
 - deduced conclusion: racial diversity function of rent control ---> varies inversely
- *Design the Argument*
 - tests a theory must pass:
 - must exhibit internal consistency: i.e. the conclusions drawn from the theory are not themselves contradictory. We can't find that diversity varies with both rent control and its inverse. If we did, then ANYTHING could be proved.
 - logically deduced conclusions of the theory (aka 'predictions') are compared with experimental results. If experiments are in accord, then the theory is verified or corroborated. If not, then the theory is falsified. It is important to note that the theory is not PROVED TRUE if the experiment affirms (S). At best we may assert its 'tentative' truth.
- *Design the Presentation*
 - (Tufte: Visual Display of Quantitative Information)

- graphical excellence: clarity, precision, efficiency, truth-- that which gives the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space.
- 5 principles of theory of data graphics:
 - 1. above all show the data
 - 2. maximise data-ink ratio
 - 3. erase non data-ink
 - 4. erase redundant data-ink
 - 5. revise and edit