

**Handout on**

**Variable Types**

**And**

**Levels of**

**Measurement**

## Discrete versus Continuous Data

Discrete data of the finite type:

- Number of eggs a hen can lay in a day
- Number of rooms in a house

Discrete data of the infinite type:

- Number of rolls of a dice waiting for a 2 to turn up. With a biased die this could go on forever. But, each roll can be counted.
- Number of revolutions of the earth forward from now.

**With discrete data it is possible to count the different possible outcomes which may arise.**

Continuous data:

- An object's weight might be determined as 2.0 pounds. With increasing precision of measurement, it could be weighed at 2.01 or 2.009 or 2.0089, etc. The number of digits is limited only by our ability to measure, and conceptually they form an infinite sequence.
- Temperature is measured at 88 degrees on one day and 90 degrees on the next. The true temperature values did not jump from 88 to 90. There was a smooth change with an infinite number of temperature values between the two levels.

**With continuous data it is impossible to count the different possible outcomes which may arise.**

# Levels of Measurement

**Nominal:** names, labels, categories—no apparent order

- Gender
- Political party

**Ordinal:** nominal with an apparent order—may have an assigned value, but the differences are meaningless.

- Wine graded as below average, average or above average (could have ranks assigned: 1, 2, 3)
- Survey responses: strongly disagree, disagree, neutral, agree, strongly agree.

**Interval:** ordinal and quantitative with meaningful differences but no natural zero.

- Temperature—zero degrees is not the absence of heat.
- Years—meaningful difference but arbitrary origin.

**Ratio:** interval with a natural starting point or origin.

- Weight, length, times in a race.

Importance of this is that the choice of statistical method depends on the type of data and level of measurement.