The Hypergeometric Distribution models sampling with replacement

Combinations and Permutations

Combinatorics studies the possible ways we can *arrange* sets of objects  
 Order is not important  
 (T,H) and (H,T) are considered the same event  
 How many categories are there?  
 Sampling – replace or not?

Combinatorics are the key to understanding probability in discrete distributions

When order is important, we work with *permutations*

When order is unimportant, we have *combinations*

Skew and Kurtosis are *higher-order* moments of distributions

Mean is the 1st moment, variance is the 2nd moment  
 Skew is a measure of asymmetry  
 kurtosis is a measure of *pointiness*  
 platykurtotic: flat with short tails, extreme events less common  
 leptokurtotic: pointy with long tails, extreme event more common  
 skew and kurtosis are measured in reference to a normal distribution

