**Categories of Missing Data**

**Missing Completely at Random (MCAR)**

* **Missing Mechanism:** Random
  + Probability of missingness is **independent** of both **observed** and **unobserved** data
* **Test:** Little’s MCAR test
  + **Significant?** Missing data is NOT MCAR
  + **Non-significant**? Missing data is MCAR
* **Procedures**:
  + **List-wise Deletion**
  + **Multiple Imputation**

**Missing at Random (MAR)**

* **Missing Mechanism:** Systematic but Conditional
  + Probability of missingness depends on **observed data** but not on the missing values themselves.
* **Test:** Logistic regression predicting missingness using observed variables
  + Significant intercept & significant slope(s) suggest data is MAR
* **Procedures:**
  + Multiple Imputation
  + Full Information Maximum Likelihood (FIML)

**Missing Not at Random (MNAR)**

* **Missing Mechanism:** Systematic and Non-Ignorable
  + Probability of missingness depends on the missing values themselves (i.e., the missingness is related to unobserved data).
* **Test:** Logistic regression predicting missingness using observed variables
  + Significant intercept ONLY suggests MNAR
  + Sensitivity analyses to assess potential biases
* **Procedures:**
  + Pattern-mixture models
  + Selection models
  + Sensitivity analysis