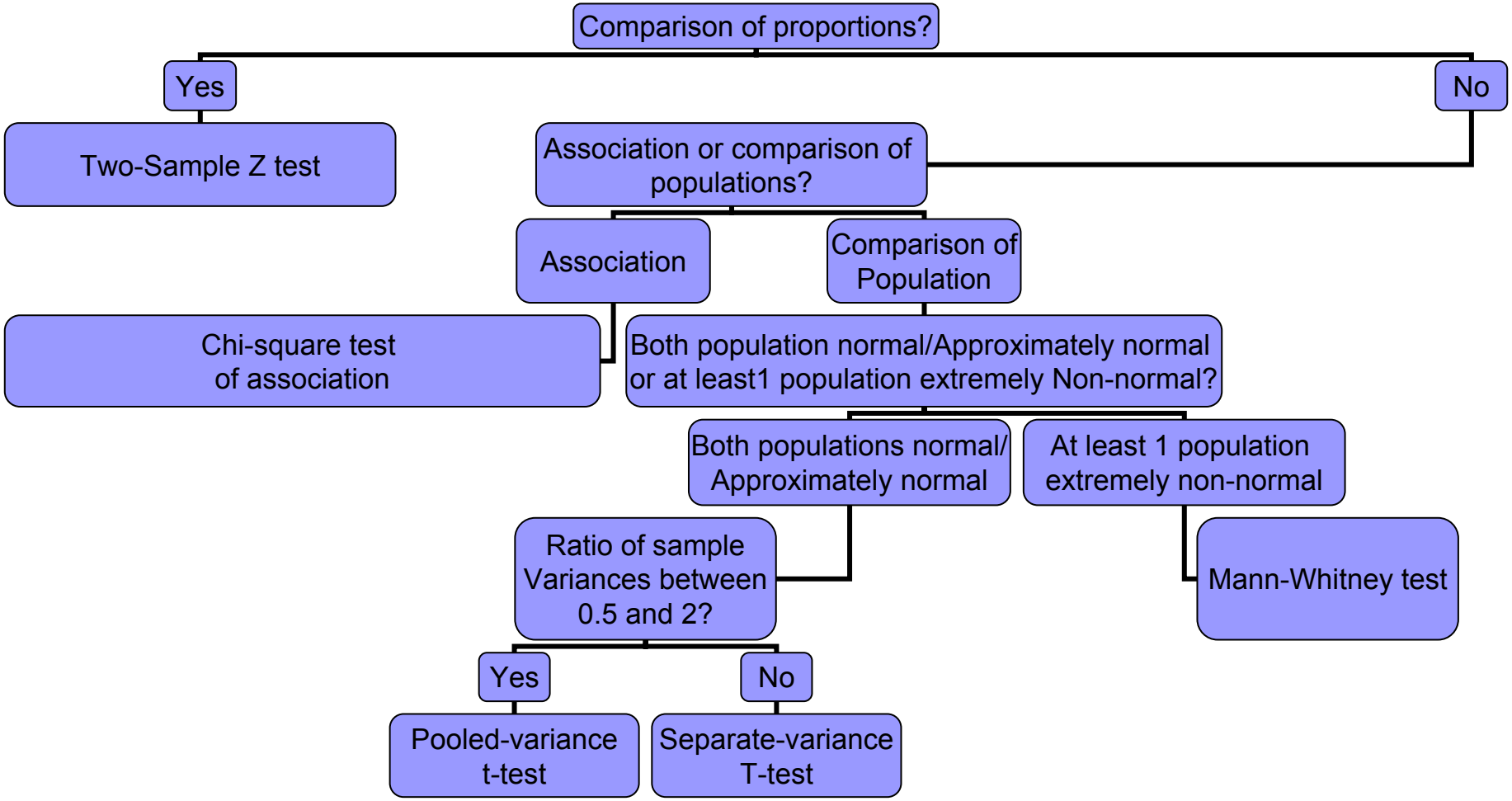
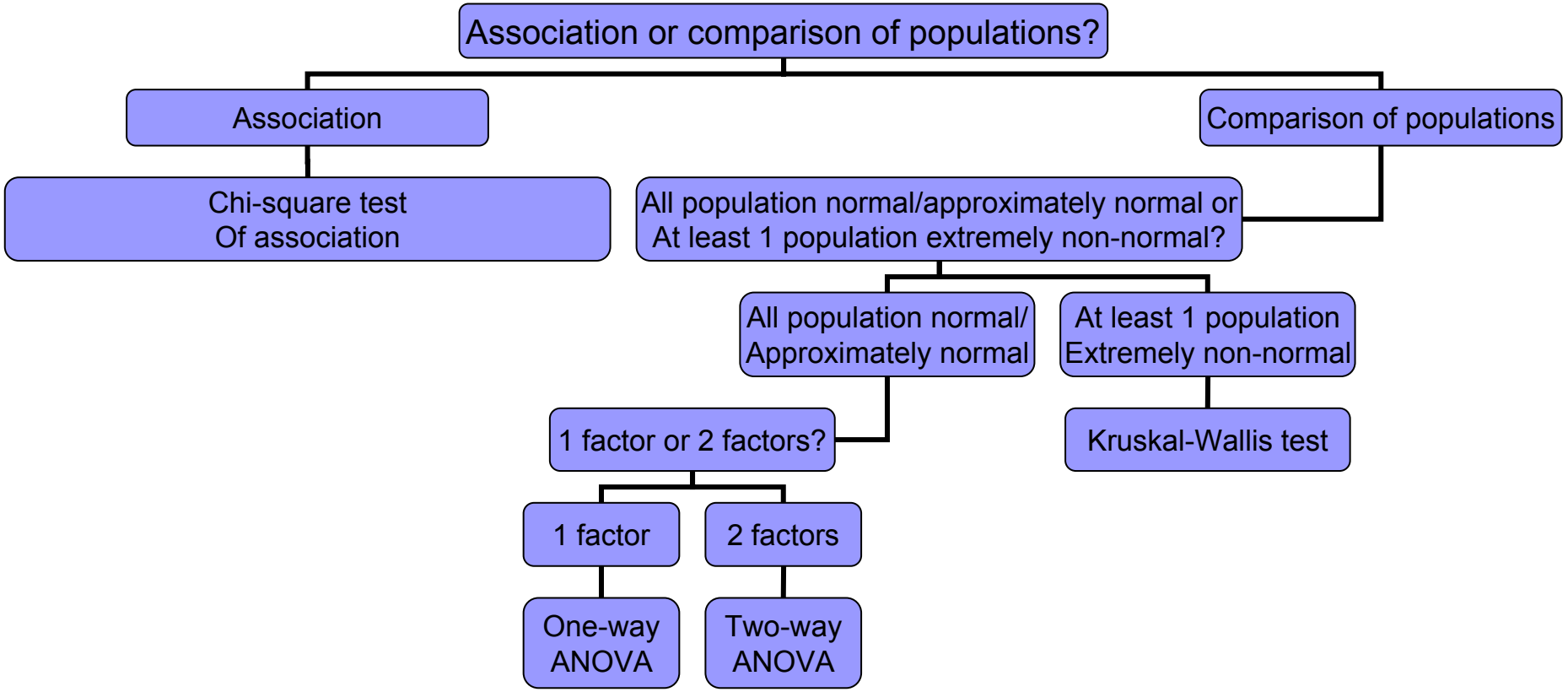
Classification by statistical properties of the study factors

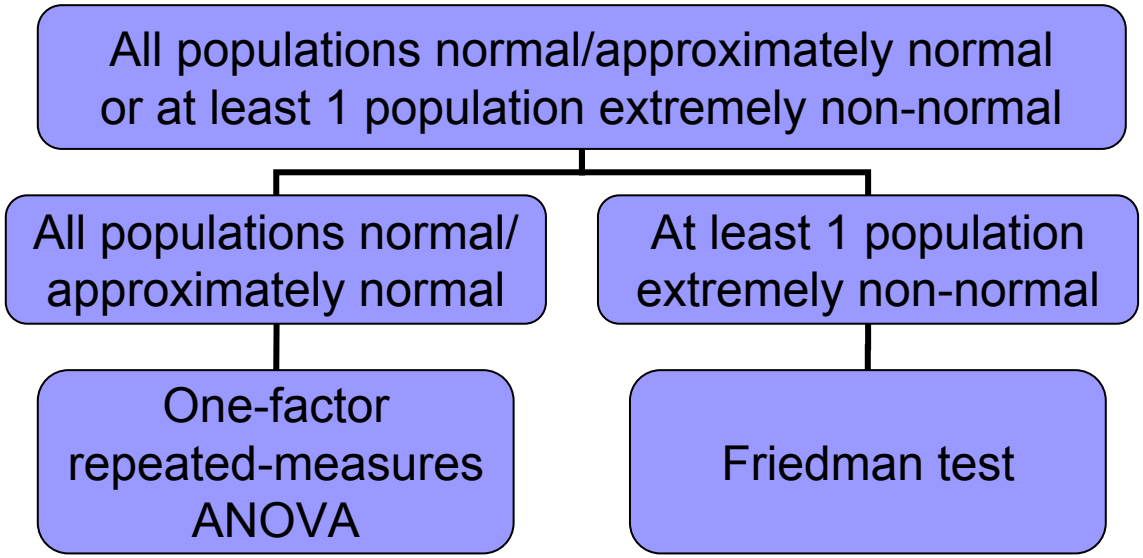
STATISTICAL PROCEDURES FOR TWO INDEPENDENT SAMPLES



STATISTICAL PROCEDURES FOR THREE OR MORE INDEPENDENT SAMPLES

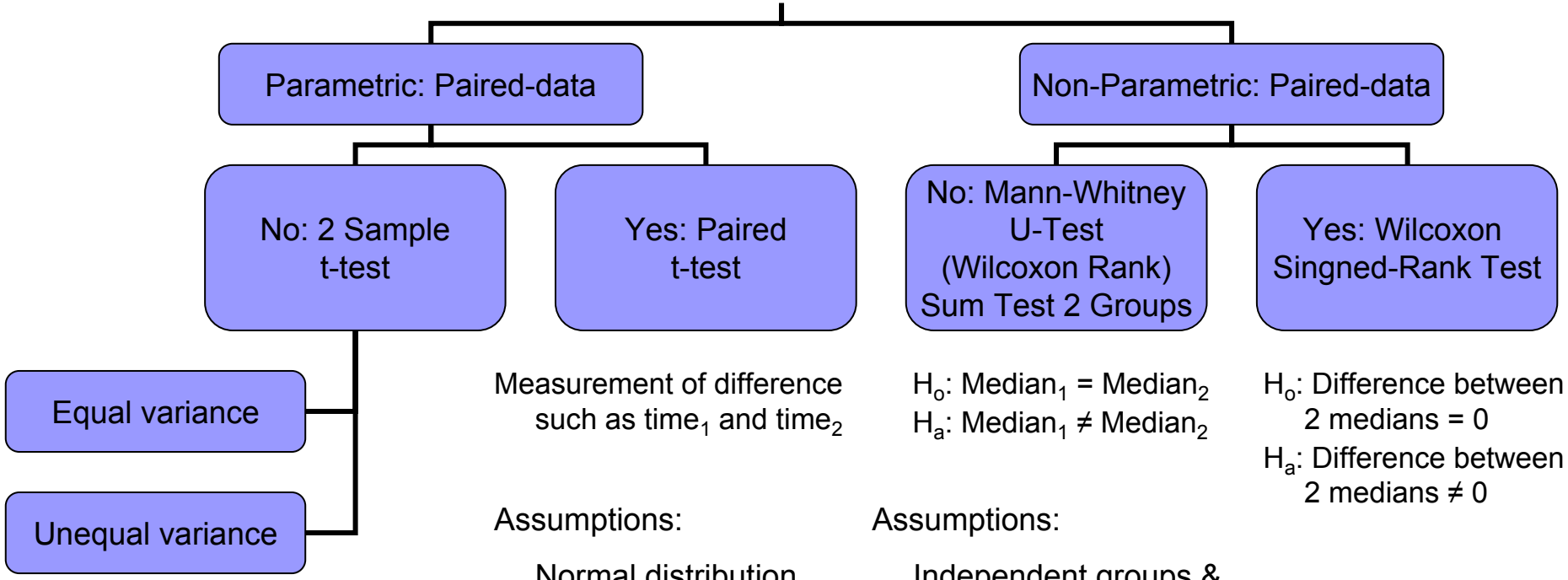


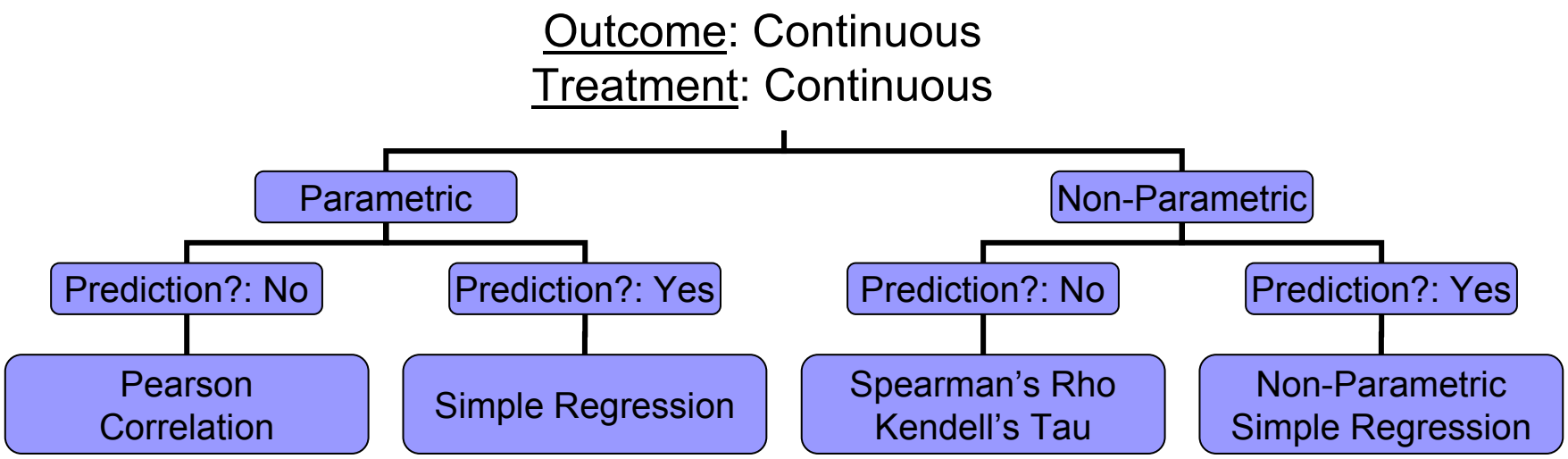
STATISTICAL PROCEDURES FOR THREE OR MORE SAMPLES OF REPEATED MEASUREMENTS



Classification by an outcome (dependent variable) vs. a treatment (independent variable)

Outcome: Continuous
Treatment: Two Group (Dichotomous)





H_o: r = 0

H_a: r ≠ 0

Y_i: Int + b_i × X

H_o: b_i = 0

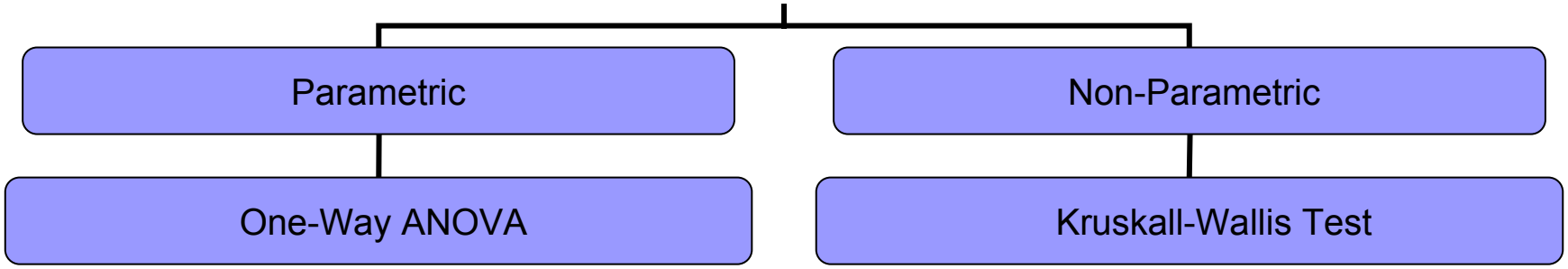
H_a: b_i ≠ 0

H_o: X&Y are mutually independent

H_a: Tendency for larger values of X to be paired with larger values of Y & vice-versa

Y_i: Int + b_i × X

Outcome: Continuous
Treatment: > 3 Groups



K groups

H_o: $\mu_1 = \mu_2 = \ldots = \mu_k$
H_a: At least one of the means is different from one of the other means

Test with overall F-Test

Assumptions:
Independent, normal distribution & group variances are equal

If overall F-Test is significant, then use multiple comparisons procedures to identify pairwise differences

K groups

H_o: $Median_1 = \ldots = Median_k$
H_a: At least one of the medians is different from one of the other medians

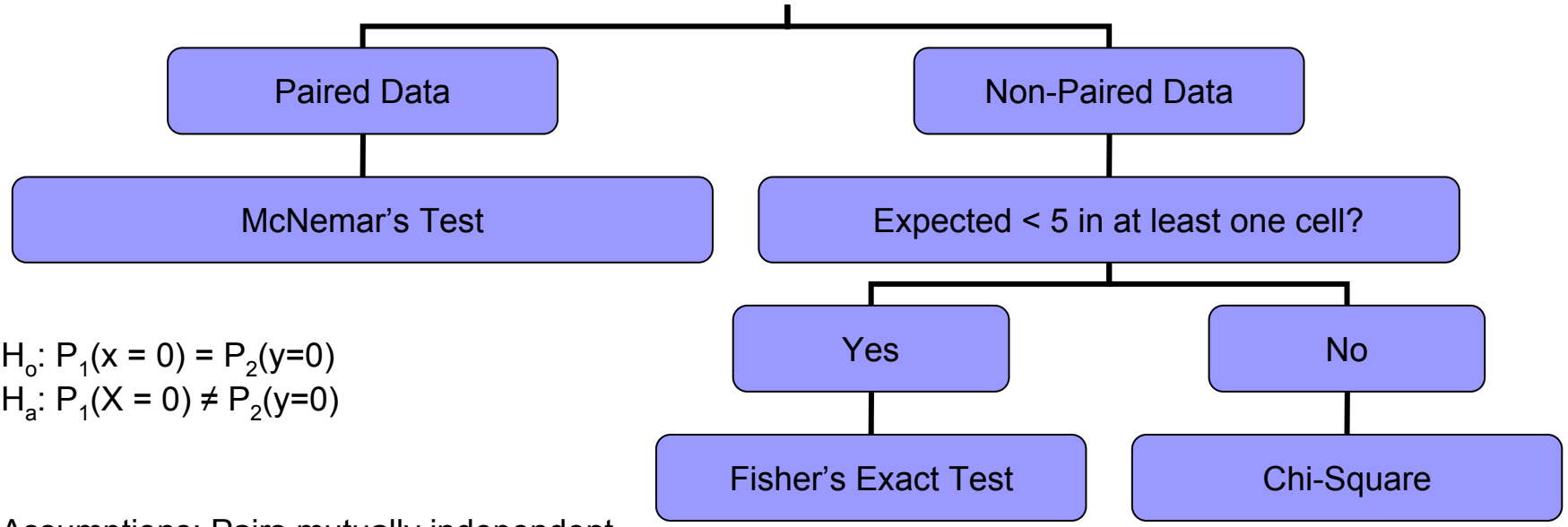
Test with X

Assumptions:
Independent observations, data can be ranked

If overall X is significant, it can be difficult to do multiple comparisons

Solution: Do one-way ANOVA on ranks of data

Outcome: Continuous
Treatment: > 3 Groups



H_o: $P_1(x = 0) = P_2(y=0)$
H_a: $P_1(X = 0) \neq P_2(y=0)$

Assumptions: Pairs mutually independent

H_o: No association
H_a: Association

P-value is probability of getting the result we observed

Assumptions:
Independence and row & column totals are fixed

H_o: $P_1 = P_2$
H_a: $P_1 \neq P_2$

Assumptions:
Independence and row & column totals are fixed

Outcome: Ordinal (Dichotomous)
Treatment: 2 Groups (Dichotomous)

Mann Whitney U-Test

outcome: Continuous; Treatment: 2 groups

Kruskall Wallis Test

Outcome: Continuous; Treatment: > 3 groups

Spearman's Rho

Outcome: Continuous; Treatment: Continuous

Treatment: Ordinal

Spearman's Rho

Chi-Square Test for Trend

Outcome: Nominal

Treatment: Nominal

Chi-Square

Treatment: 2 or more groups

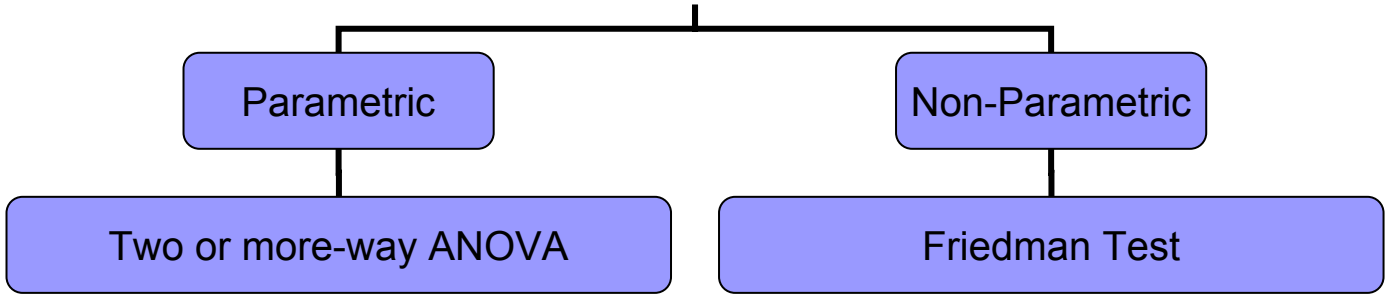
Chi-Square

Treatment: Ordinal

Chi-Square Test for Trend

One outcome with several study factors including treatment (risk, potential confounding, or prognostic in nature

Outcome: Continuous
Treatment: > 3 Groups with other study factor (s)



K groups for each of the study factors (i) including treatment

H_o: $\mu_{1i} = \ldots = \mu_{ki}$
H_a: At least one of the means is different from one of the other means adjusting for other i factors in the model

Test with overall F-Test

Assumptions:
Independent, normal distribution & group variances are equal

If the interaction term of the study factors is significant, the significance of the other terms in the model would be invalid

K groups for each of the two study factors (treatment and another study factor)

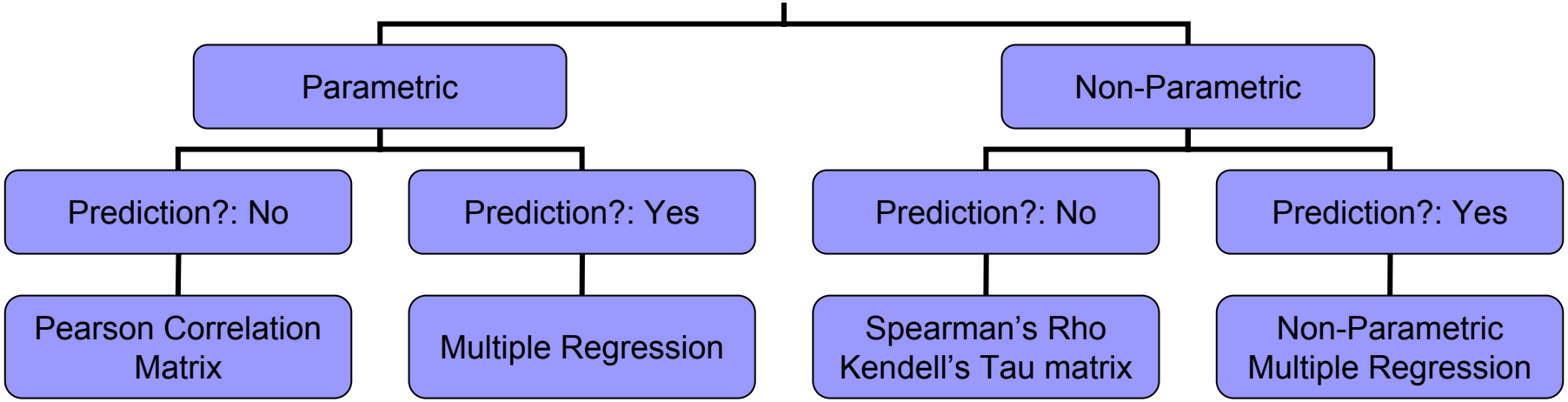
For each of the two factors:
H_o: $Median_{1i} = \ldots = Median_{ki}$
H_a: At least one of the medians is different from one of the other medians

Assumptions:
Independent observations & data can be ranked

If overall X is significant, it can be difficult ot do multiple comparisons

Solution: Do two-way ANOVA on ranked data

Outcome: Continuous
Treatment: Continuous with other study factor (s = $_i$)



For each factor:
H_o: r = 0
H_a: r ≠ 0

Y_i=Int+(b_1X_1)+(b_2X_2)+(b_iX_i)

H_o: b_1, b_2, or …b_i, = 0
H_a: b_1, b_2, or …b_i, ≠ 0

H_o: X & Y are mutually independent

H_a: Tendency for larger values of X to be paired with larger values of Y & vice-versa

Hypothesis: See multiple regression

Requires diagnostic evaluation and data transformation

Assumptions:
Independence and normal distribution

Check for multicoliniarity among study factors

Assumptions:
Random sample and data can be ranked

Outcome: Dichotomous

Treatment: Continuous/ordinal/nominal with other study factor (s = $_i$)

Logistic Model

Magnitude of the effect is measured by odds ratio of each of the study factors including the treatment

Outcome: Waiting time

Treatment: Continuous/ordinal/nominal with other study factor (s = $_i$)

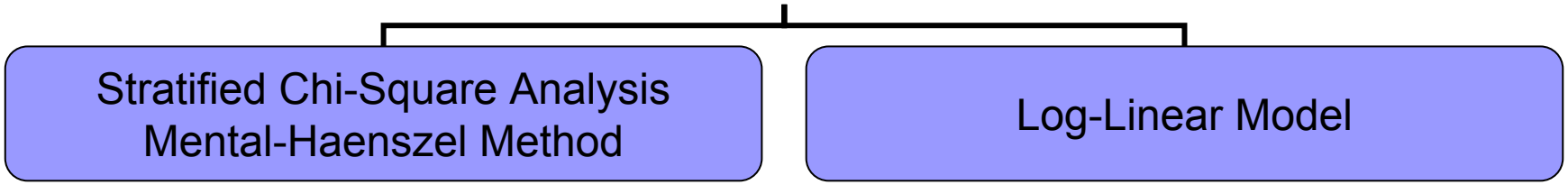
Survival Model

Cox Proportional Hazard Model

Magnitude of the effect/survival is measured by Proportional hazard odds ratio of each of the study factors including the treatment

Outcome: Dichotomous

Treatment: Dichotomous with other factors that are categorical or nominal



Magnitude of the effect is measured by odds ratio of each of the study factors including the treatment