

1. List response and explanatory variables, showing scale (nominal, ordinal, interval, ratio) with units if ratio scale
2. Identify categorical explanatory variables as fixed (definite) or random (indefinite), giving reason for choice.
3. Show layout of variables in diagrammatic form, including nesting.
4. List each explanatory variable and all two-way pairs, in ANOVA table format (Source df).
- 5a. Identify each pair as nested or crossed.
Nested if subsampling.
Crossed if (1) Cells filled in 2-way table; or (2) Nesting can be drawn either way.
Show each pair as one of: Fix*Fix, Fix(Fix), Ran*Fix, Ran(Fix), Ran*Ran, Ran(Ran)
Ran*Fix is read as random crossed with fixed, Ran(Fix) is read as random within fixed.
- 5b. Reduced list of terms where pairs are nested: $\text{RanB(FixA)} = \text{RanB} + \text{RanB*FixA}$.
 $\text{RanB(RanA)} = \text{RanB} + \text{RanB*RanA}$.
- 6a. For 3 way and higher ANOVA, add triplets to the list.
Use all three component pairs (A*B, A*C, B*C) to determine nesting of 3 way terms.
- 6b. Reduce list of terms where triplets contain nesting:
 $\text{RanC(RanB(FixA))} = \text{RanC(RanB)} + \text{RanB(FixA)}$
- 7a, 7b. Add 4 way terms and higher, then reduce list as above.
8. Add df for each term in vertical display of reduced list. Use reduced list to form matrix: sources of variance SS displayed vertically, expected mean square EMS horizontally.
9. For each row: Add the row term in its EMS column. Add error term to row in its column
If EMS term is Ran*Row, add that term to the row.
If EMS term is Mixed*Row, add that term to the row.
If EMS term is Ran(Row), add that term to the row.
If EMS term is Mixed(Row), add that term to the row.
10. For each fixed SS row in 9 -- Fix, Fix*Fix and Fix(Fix) --
list SS that isolates the row term from mixed and random terms in the same row
I.e., $\text{SS/SS} = 1$ if fixed effect component = 0.
11. For each fixed SS row, write model for all terms in that row, then execute as GLM.
Check resulting df against df listed above.
If df matches output, form F-ratios from df and SS components.