Log Linear Models – degrees of freedom

Example – all possible outcomes for A*B*C (4x2x2)

Model	Effects	df (equation)	df (calculated)
1	A + B + C	df1 = a*b*c-(a-1)-(b-1)-(c-1)-1	10
2	A*B + C	df2 = df1-(a-1)*(b-1)	7
3	A*C + B	df3 = df1-(a-1)*(c-1)	7
4	A + B*C	df4 = df1-(b-1)*(c-1)	9
5	A*B + A*C	df5 = df2-(a-1)*(c-1)	4
6	A*B + B*C	df6 = df2-(b-1)*(c-1)	6
7	A*C + B*C	df7 = df3-(b-1)*(c-1)	6
8	A*B + A*C +B*C	df8 = df7-(a-1)*(b-1)	3
9	A*B*C	df9 = df8-(a-1)*(b-1)*(c-1)	0

- Model 1
  - Full independence (A + B + C)
  - Degrees of freedom is product of all categorical outcomes (N) minus the degrees of freedom for each individual variable minus 1.
- When you add an interaction term, the portion you subtract from the degrees of freedom set the product of degrees of freedom (e.g. (a-1)*(b-1)
- Whenever you add an interaction term (e.g. A * B) to an independent term (e.g. A*B + C), you need to subtract the value from a model with one less interaction term (for this model, there are a maximum of 3 interaction terms)
- Model 9
  - Full dependence (A * B * C)
  - Degrees of freedom is zero;