University of Warwick, Department of Sociology, 2014/15
SO 201: SSAASS (Surveys and Statistics) (Richard Lampard)

Week 2 – Chi-square/SPSS handout

Chi-square (χ^2) statistic = (Amount of) evidence of a relationship

		Conclusion
Large chi-square (χ^2) statistic	⇒	√ relationship
Small chi-square (χ^2) statistic	⇒	× relationship

What kind of sizes (values) of the χ^2 statistic occur just as a consequence of sampling error (i.e. if there is no relationship)?

What value is only exceeded by one in twenty, or 5% (p=0.05), of χ^2 statistics if there is no relationship?

The **critical value** of χ^2_3 (at the 5% level) is 7.815

The SPSS syntax file CHISQ.SPS and the corresponding data file CHISQ.SAV can be used to generate samples (and hence χ^2 statistics) corresponding to two populations: (i) a 'real' population where there is a relationship between class and the presence/absence of teeth and (ii) a 'hypothetical' population where there is no relationship between class and the presence/absence of teeth.

[Download the data file *chisq.sav* from the following webpage:

http://go.warwick.ac.uk/so201/schedule/week2

Open the syntax file *chisq.sps* from the same page].

×: $P \geq 0.05$
√: $P < 0.05$

	SAMPLES FROM 'HYPOTHETICAL' POPULATION			SAMPLES FROM 'REAL' POPULATION		
TABLE	χ^2	SIGNIFICANCE (p)		χ^2	SIGNIFICANCE (p)	
1	1.552	0.670	×	14.629	0.002	√
2	4.244	0.236	×	14.640	0.002	√
3	2.187	0.535	×	16.724	0.001	√
4	0.748	0.862	×	6.681	0.083	×
5	3.003	0.391	×	15.965	0.001	√
6	1.220	0.748	×	4.867	0.182	×
7	3.920	0.270	×	7.322	0.062	×
8	3.677	0.299	×	16.179	0.001	√
9	3.651	0.302	×	7.905	0.048	√
10	0.348	0.951	×	18.924	0.000	√
	TOTAL 24.550		(√: 0/10)	TOTAL 123.836		(√: 7/10)

If there **is** a relationship in the population, the size of the chi-square statistic depends on: (i) the strength of the relationship; (ii) the shape of the table; (iii) sample size.

MEAN ≈ 2.5 ← SAMPLING ERROR

MEAN ≈ 12.4 = UNDERLYING PATTERN + SAMPLING ERROR