

Psychology 407
Assignment K

I. Goodwin and Michael (1981) performed a study of newborn infants, recording birth position (left or right) and head position preference (whether the child consistently looked right, had a bias toward looking right, had a bias toward looking left, or consistently looked left). The observed frequencies are shown below:

Birth position	Head position preference			
	Consistent right	Biased right	Biased left	Consistent left
Left	29	8	8	4
Right	18	7	12	13

a) Test the association between the two attributes using Pearson’s chi-square test of association. Obtain the expected frequencies under attribute independence and interpret the discrepancies between “obtained” and “expected”.

b) Test the goodness-of-fit of the column marginal sums against a uniform distribution.

c) Obtain and interpret Goodman-Kruskals’s index of predictive association for predicting head *from* birth position.

II. In a review of the evidence regarding the therapeutic value of ascorbic acid (Vitamin C) for treating the common cold, Pauling (1971) describes a 1961 French study involving 279 skiers during two periods of 5–7 days. The study was double-blind with one group of 140 subjects receiving a placebo while a second group of 139 received 1 gram of ascorbic acid per day. Of interest is the relative occurrence of colds for the two groups where the data are as follows.

	Cold	No Cold
Placebo	31	109
Ascorbic Acid	17	122

a) Test the association using Pearson’s chi-square test; obtain the expected values of the cell frequencies under independence.

b) What is the four-fold point correlation?

III. For the present purposes, assume mental patients can be classified as psychotics or neurotics. A psychiatrist, while studying the symptoms of a sample of 20 from each of these populations found that six patients in the neurotic group had suicidal feelings and two in the psychotic group:

	Psychotics	Neurotics
Suicidal feelings	2	6
No suicidal feelings	18	14

a) Carry out a test of association using Fisher's exact test. How does the p-value compare to the chi-square approximation?

IV. A psychiatrist wished to assess the effect of the symptom "depersonalization" of the prognosis of depressed patients. Twenty-three depressed patients, who were diagnosed as being "depersonalized", were matched one-to-one for age, sex, duration of illness, and on certain personality variables, with 23 depressed patients who were diagnosed as not being "depersonalized". The number of pairs of patients from the two samples who, on discharge after a course of ECT, were diagnosed as "recovered" or "not recovered" are given below:

		Depersonalized	
		Not recovered	Recovered
Not depersonalized	Recovered	5	14
	Not Recovered	2	2

a) Using McNemar's test of correlated proportions, test the equality of the "recovered" proportions for the two types of patients. Carry out the test using the chi-square approximation *and* the exact version based on the binomial distribution.

V. In viewing a set of video tapes of 50 couples involved in marital counseling, two raters assigned the couples to one of three behavioral categories based on the interactions observed. The data turned out as follows (C_1 , C_2 , and C_3 denote the behavioral categories):

		rater b		
		C_1	C_2	C_3
rater a	C_1	14	2	3
	C_2	0	10	1
	C_3	6	2	12

a) Obtain Cohen's Kappa statistic for these data and test its significance against zero using the hypothesis of independence between the raters.