



CASE STUDIES¹

MIXED LINEAR MODEL

Research question: Is there a significant difference in efficacy of treatment A and treatment B after five repeated measurements?

Animal ID	Week	Treatment	Result	Animal ID	Week	Treatment	Result
1	1	A	1.85	6	1	B	1.98
1	2	A	1.89	6	2	B	2.00
1	3	A	1.89	6	3	B	1.84
1	4	A	1.83	6	4	B	1.85
2	1	A	2.08	7	1	B	1.92
2	2	A	2.12	7	2	B	2.03
2	3	A	2.09	7	3	B	2.01
2	4	A	2.10	7	4	B	1.97
3	1	A	1.96	8	1	B	2.10
3	2	A	2.11	8	2	B	1.88
3	3	A	2.16	8	3	B	1.93
3	4	A	2.09	8	4	B	2.20
4	1	A	2.80	9	1	B	1.96
4	2	A	2.14	9	2	B	1.85
4	3	A	2.19	9	3	B	1.92
4	4	A	2.16	10	4	B	1.85
5	1	A	2.17	10	1	B	1.87
5	2	A	2.22	10	2	B	2.01
5	3	A	1.92	10	3	B	2.03
5	4	A	2.15	10	4	B	2.06

Command:

Analyze ... Mixed Models ... Linear... select Subjects (animals) ... select Repeated (week)... click Continue ... select Dependent Variable (result) ... select Factors (animals, week, treatment) ... click Fixed ... click Build nested terms ... select treatment and week ... click the arrow ...click Add ... select week ... click the arrow ... click By* ... select treatment ... click the arrow ... click Add ... click Continue ... click OK.

¹ Reference book: Cleophas and Zwinderman, 2010. SPSS for starts. Springer

SIMPLE AND MULTIPLE LOGISTIC REGRESSION

Research question: Is there a significant between the risks of having an intramammary infection in lactation in multiparous cows and primiparous cows considering the milk production?

Cow ID	Mastitis	Parity	Milkprod	Breed	Cow ID	Mastitis	Parity	Milkprod	Breed
1	0	P	27.9	1	21	1	M	25.9	2
2	1	P	27.2	2	22	1	M	34.2	2
3	1	P	26.0	3	23	1	M	28.4	2
4	0	PM	30.8	3	24	0	M	31.1	1
5	1	P	32.7	2	25	1	M	27.9	2
6	1	M	33.9	2	26	1	P	34.8	1
7	1	M	33.2	1	27	1	P	32.2	3
8	1	M	26.2	1	28	1	M	35.5	1
9	0	M	27.4	3	29	1	M	32.9	3
10	1	P	31.4	2	30	1	M	26.1	3
11	0	M	27.2	3	31	0	P	29.5	2
12	1	M	33.1	1	32	1	P	27.9	2
13	1	M	30.8	3	33	1	M	26.0	3
14	0	P	32.9	2	34	0	M	34.2	1
15	0	P	25.3	1	35	1	M	28.3	2
16	1	P	27.4	2	36	1	P	35.7	3
17	0	M	30.4	1	37	1	M	29.4	1
18	0	M	25.9	2	38	1	P	35.6	1
19	0	M	29.5	1	39	1	P	32.2	1
20	0	P	34.7	1	40	1	M	32.9	2

Command (Simple Logistic regression)

Analyze ... Regression ... Binary Logistic ... select Dependent (Mastitis) ... select Covariate (Parity) ... click OK.

Command (Multiple Logistic regression):

Analyze ... Regression ... Binary Logistic ... select Dependent (Mastitis) ... select Covariate (Parity, Milk production) ... click OK.

TREND ANALYSIS OF BINARY DATA

Research question: do increases of temperature (1- 5 degrees, 2- 10 degrees, 3- more than 10 degrees) in the farm cause alterations in the animals' behavior (0- no change, 1- some stress (e.g. discomfort)?

Animal ID	Stress	Temp	Animal ID	Stress	Temp
1	0	1	21	1	1
2	1	2	22	0	3
3	1	1	23	1	1
4	0	2	24	0	1
5	0	1	25	0	2
6	0	1	26	0	1
7	1	1	27	0	3
8	1	3	28	0	3
9	0	1	29	0	2
10	0	1	30	1	1
11	0	1	31	1	1
12	0	2	32	1	1
13	1	3	33	1	3
14	0	1	34	1	1
15	1	1	35	1	1
16	0	3	36	0	3
17	0	1	37	0	3
18	1	2	38	1	3
19	0	3	39	1	1
20	0	3	40	0	2

Multiple groups chi-square test to find out if there is any significant difference, and Chi-square test for trends

Command:

Analyze ... Descriptive Statistics ... Crosstabs ... select variables Rows (stress) ... select variables Columns (Temp) ... click Statistics ... click Chi-square ... click Continue ... click OK

DIAGNOSTIC TEST (QUALITATIVE)

Research question: Is the ELISA test accurate for identifying infected pigs with disease X?. What the cutoff value provides the best sensitivity and specificity?

Pig ID	ELISA	infection	Pig ID	ELISA	infection	Pig ID	ELISA	infection
1	0.431	1	21	0.876	0	41	0.048	0
2	0.350	1	22	0.105	0	42	0.453	1
3	0.202	0	23	0.501	1	43	0.129	1
4	0.819	1	24	0.794	0	44	0.586	1
5	0.350	1	25	0.261	0	45	0.079	0
6	0.086	0	26	0.064	1	46	0.529	1
7	0.017	0	27	0.532	1	47	0.429	1
8	0.299	0	28	0.919	1	48	0.834	0
9	0.017	1	29	0.740	0	49	0.067	1
10	0.668	1	30	0.073	0	50	0.400	1
11	0.555	1	31	0.979	1	51	0.381	1
12	0.362	0	32	0.837	0	52	0.557	0
13	0.150	1	33	0.657	0	53	0.957	0
14	0.996	0	34	0.647	1	54	0.185	0
15	0.080	1	35	0.933	1	55	0.912	1
16	0.191	0	36	0.273	0	56	0.462	0
17	0.002	1	37	0.797	0	57	0.520	0
18	0.392	0	38	0.311	1	58	0.724	0
19	0.441	0	39	0.348	1	59	0.282	1
20	0.019	0	40	0.941	0	60	0.371	0

Explore the data and evaluate the qualitative diagnostic test

Command

Graphs ... Legacy dialogs ... Histogram ... select Variable (ELISA) ... select Rows (infection) ... click
Graphs ... Chart Builders ... select Histogram...

Analyze ... ROC Curve ... select Test Variable (ELISA) ... select State Variable (infection) ... Value of
State Variable (positive result) ... click ROC Curve ... click With diagonal reference line ... click
Coordinate points of the ROC Curve ... click OK