STATISTICS (SPSS FOR BEGINNER
Chapter 9
Anova (2)
Dimaz Ramananda, S.E., M.Ak.

- Anova is used for examining the differences in the mean values of the dependent variable associated with the effect of the controlled independent variables.

- Assumptions used in anova:
  a. The populations to be tested are normally distributed
  b. The variances of the populations are the same
  c. Samples are not related to each othe

- Two Way Anova
  A. Case 1
  *anova_data2.sav

	PRODUCT	SHIFT	GENDER
1	5	first	female
2	6	first	female
3	4	first	male
4	7	first	male
5	6	first	female
6	8	first	female
7	5	first	male
8	6	first	male
9	9	first	male
10	4	first	female
11	7	first	male
12	4	first	female
13	7	first	male
14	9	first	female
15	5	first	female
16	6	first	male
17	8	first	male
18	5	first	male
19	4	first	male
20	10	first	female

	PRODUCT	SHIFT	GENDER
21	6	second	female
22	8	second	female
23	4	second	male
24	7	second	male
25	5	second	female
26	8	second	female
27	6	second	male
28	7	second	male
29	9	second	male
30	11	second	female
31	5	second	male
32	4	second	female
33	10	second	male
34	8	second	female
35	5	second	female
36	4	second	male
37	8	second	male
38	7	second	male
39	5	second	male
40	7	second	female

	PRODUCT	SHIFT	GENDER
41	4	third	female
42	8	third	female
43	10	third	male
44	8	third	male
45	5	third	female
46	6	third	female
47	8	third	male
48	6	third	male
49	4	third	male
50	7	third	female
51	5	third	male
52	6	third	female
53	8	third	male
54	6	third	female
55	9	third	female
56	5	third	male
57	11	third	male
58	12	third	male
59	8	third	male
60	5	third	female

How to:
1. Open anova_data2.sav
2. Choose Analyze
3. Choose General-Linear Model
4. Choose Univariate
5. Put product on the dependent variable box
6. Put shift and gender into the fixed factor box
7. Click Ok

How to make decision (find the hypothesis):

- If probability (F number) > 0.05, Ho is accepted
- If probability (F number) < 0.05, Ho is not accepted

B. Case 2

*anova_data2_asg.sav

	CARD	BANK	MONTH
1	12	ezprez	Jan
2	14	ezprez	Feb
3	18	ezprez	Mar
4	19	ezprez	Apr
5	16	ezprez	May
6	17	ezprez	Jun
7	12	ezprez	Jul
8	18	ezprez	Aug
9	19	ezprez	Sep
10	20	ezprez	Oct
11	21	ezprez	Nov
12	12	ezprez	Dec
13	15	ezprez	Jan
14	17	ezprez	Feb
15	11	ezprez	Mar
16	8	bank of best	Jan
17	3	bank of best	Feb
18	5	bank of best	Mar
19	3	bank of best	Apr
20	6	bank of best	May
21	5	bank of best	Jun
22	3	bank of best	Jul
23	7	bank of best	Aug
24	5	bank of best	Sep
25	9	bank of best	Oct
26	11	bank of best	Nov
27	5	bank of best	Dec
28	4	bank of best	Jan
29	14	bank of best	Feb
30	16	bank of best	Mar
31	19	safebank	Jan
32	14	safebank	Feb
33	14	safebank	Mar
34	12	safebank	Apr
35	13	safebank	May
36	11	safebank	Jun
37	15	safebank	Jul
38	16	safebank	Aug
39	10	safebank	Sep
40	13	safebank	Oct
41	16	safebank	Nov
42	12	safebank	Dec
43	16	safebank	Jan
44	11	safebank	Feb
45	17	safebank	Mar
46	26	trusty	Jan
47	24	trusty	Feb
48	22	trusty	Mar
49	27	trusty	Apr
50	29	trusty	May
51	31	trusty	Jun
52	27	trusty	Jul
53	29	trusty	Aug
54	26	trusty	Sep
55	28	trusty	Oct
56	30	trusty	Nov
57	32	trusty	Dec
58	27	trusty	Jan
59	29	trusty	Feb
60	25	trusty	Mar

How to:

1. Open anova_data2_asg.sav
2. Choose Analyze
3. Choose General-Linear Model
4. Choose Univariate
5. Put card on the dependent variable box
6. Put bank and month into the fixed factor box
7. Click Ok

How to make decision (find the hypothesis):

- If probability (F number) > 0.05, Ho is accepted
- If probability (F number) < 0.05, Ho is not accepted

- Contrast Anova

  A. Case 1

  *anova_contrast_data.sav

	LOCATION	SELL
1	Michigan	25
2	Michigan	23
3	Michigan	27
4	Michigan	27
5	Michigan	28
6	Michigan	29
7	Michigan	30
8	Michigan	22
9	Michigan	23
10	Michigan	27
11	Michigan	35
12	Michigan	26
13	Michigan	28
14	Michigan	21
15	Michigan	18
16	Oregon	39
17	Oregon	37
18	Oregon	36
19	Oregon	33
20	Oregon	28

	LOCATION	SELL
21	Oregon	32
22	Oregon	29
23	Oregon	36
24	Oregon	39
25	Oregon	41
26	Oregon	26
27	Oregon	37
28	Oregon	25
29	Oregon	39
30	Oregon	34
31	Georgia	28
32	Georgia	24
33	Georgia	28
34	Georgia	31
35	Georgia	25
36	Georgia	21
37	Georgia	29
38	Georgia	26
39	Georgia	36
40	Georgia	26

	LOCATION	SELL
41	Georgia	28
42	Georgia	29
43	Georgia	24
44	Georgia	26
45	Georgia	27
46	New Mexico	45
47	New Mexico	49
48	New Mexico	48
49	New Mexico	35
50	New Mexico	42
51	New Mexico	38
52	New Mexico	35
53	New Mexico	41
54	New Mexico	45
55	New Mexico	37
56	New Mexico	39
57	New Mexico	44
58	New Mexico	45
59	New Mexico	37
60	New Mexico	40

How to:

1. Open anova_contrast_data.sav
2. Choose compare means
3. Choose one-way anova
4. Put Sell on the dependent list box
5. Put Location on the factor box
6. Click contrast
7. Follow tutorial
8. Click continue
9. Click Ok

How to make decision (find the hypothesis):

- If probability (sig number on the contrast test result box) > 0.05, Ho is accepted
- If probability (sig number on the contrast test result box) < 0.05, Ho is not accepted

B. Case 2

	LOCATION	SALE
1	Tokyo	25
2	Tokyo	23
3	Tokyo	27
4	Tokyo	27
5	Tokyo	28
6	Tokyo	29
7	Tokyo	30
8	Tokyo	22
9	Tokyo	23
10	Tokyo	27
11	Tokyo	35
12	Tokyo	26
13	Tokyo	28
14	Tokyo	21
15	Tokyo	18
16	Bangkok	39
17	Bangkok	37
18	Bangkok	36
19	Bangkok	33
20	Bangkok	28
21	Bangkok	32
22	Bangkok	29
23	Bangkok	36
24	Bangkok	39
25	Bangkok	41
26	Bangkok	26
27	Bangkok	37
28	Bangkok	25
29	Bangkok	39
30	Bangkok	34
31	Seoul	28
32	Seoul	24
33	Seoul	28
34	Seoul	31
35	Seoul	25
36	Seoul	21
37	Seoul	29
38	Seoul	26
39	Seoul	36
40	Seoul	26
41	Seoul	28
42	Seoul	29
43	Seoul	24
44	Seoul	26
45	Seoul	27
46	Jakarta	45
47	Jakarta	49
48	Jakarta	48
49	Jakarta	35
50	Jakarta	42
51	Jakarta	38
52	Jakarta	35
53	Jakarta	41
54	Jakarta	45
55	Jakarta	37
56	Jakarta	39
57	Jakarta	44
58	Jakarta	45
59	Jakarta	37
60	Jakarta	40

How to:

1. Open anova_contrast_data.sav
2. Choose compare means
3. Choose one-way anova
4. Put Sale on the dependent list box
5. Put Location on the factor box
6. Click contrast
7. Follow tutorial
8. Click continue
9. Click Ok

How to make decision (find the hypothesis):

- If probability (sig number on the contrast test result box) > 0.05, Ho is accepted
- If probability (sig number on the contrast test result box) < 0.05, Ho is not accepted