STATISTICS (SPSS FOR BEGINNER
Chapter 8
Anova (1)
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- 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

- One Way Anova
  A. Case 1
  *anova_data.sav

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

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

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

How to:
1. Open anova_data.sav
2. Choose Analyze
3. Choose Compare-Means
4. Choose One-way Anova
5. Put product on the dependent list box
6. Put shift on the factor box

7. Click Options
8. Follow the tutorial
9. Click Continue
10. Click Statistics
11. Follow the tutorial
12. Click Continue
13. Click Post-Hoc
14. Follow the tutorial
15. Click Continue
16. Click Ok

1st Hypothesis:
Ho: All population variances are identical
H1: All population variance are not identical

How to make decision (find the hypothesis):
- If probability (levene test number) > 0.05, Ho is accepted
- If probability (levene test number) < 0.05, Ho is not accepted

2nd Hypothesis:
Ho: All populations mean are identical
H1: All populations mean are not identical

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_data_asg.sav

	CARD	BANK
1	12	ezprez
2	14	ezprez
3	18	ezprez
4	19	ezprez
5	16	ezprez
6	17	ezprez
7	12	ezprez
8	18	ezprez
9	19	ezprez
10	20	ezprez
11	21	ezprez
12	12	ezprez
13	15	ezprez
14	17	ezprez
15	11	ezprez
16	8	bank of best
17	3	bank of best
18	5	bank of best
19	3	bank of best
20	6	bank of best

	CARD	BANK
21	5	bank of best
22	3	bank of best
23	7	bank of best
24	5	bank of best
25	9	bank of best
26	11	bank of best
27	5	bank of best
28	4	bank of best
29	14	bank of best
30	16	bank of best
31	19	safebank
32	14	safebank
33	14	safebank
34	12	safebank
35	13	safebank
36	11	safebank
37	15	safebank
38	16	safebank
39	10	safebank
40	13	safebank

	CARD	BANK
41	16	safebank
42	12	safebank
43	16	safebank
44	11	safebank
45	17	safebank
46	26	trusty
47	24	trusty
48	22	trusty
49	27	trusty
50	29	trusty
51	31	trusty
52	27	trusty
53	29	trusty
54	26	trusty
55	28	trusty
56	30	trusty
57	32	trusty
58	27	trusty
59	29	trusty
60	25	trusty

How to:

1. Open anova_data_asg.sav
2. Choose Analyze
3. Choose Compare-Means
4. Choose One-way Anova
5. Put card on the dependent list box
6. Put bank on the factor box
7. Click Options
8. Follow the tutorial
9. Click Continue
10. Click Statistics
11. Follow the tutorial
12. Click Continue
13. Click Post-Hoc
14. Follow the tutorial
15. Click Continue
16. Click Ok

- One Way Anova for more than one variable
  *employee.sav

	Number	Gender	Fields_of_work	Status	Number_of_children	Education	Age	Period	Salary
1	156	Female	Marketing	Married	1	Bachelor	24	2	20500.00
2	157	Male	Marketing	Single	1	Vocational	27	5	26250.00
3	158	Female	Administration	Married	0	High School	25	1	17750.00
4	159	Male	Accounting	Married	3	High School	27	3	30750.00
5	160	Female	Production	Single	1	High School	28	4	31000.00
6	161	Female	Marketing	Single	1	Vocational	26	3	25750.00
7	162	Male	Marketing	Married	0	Bachelor	27	3	20750.00
8	163	Male	Accounting	Single	2	Vocational	28	5	26250.00
9	164	Male	Administration	Married	1	Vocational	29	4	21000.00
10	165	Female	Accounting	Single	1	High School	30	2	18000.00
11	166	Male	Administration	Single	0	Vocational	30	7	26750.00
12	167	Female	Production	Married	0	Bachelor	26	3	20750.00
13	168	Male	Accounting	Married	0	Vocational	27	4	21000.00
14	169	Female	Administration	Single	1	Vocational	29	5	31250.00
15	170	Female	Administration	Single	0	High School	27	3	25750.00
16	171	Female	Marketing	Married	0	Vocational	25	2	18000.00
17	172	Male	Accounting	Single	1	Vocational	24	1	30250.00
18	173	Male	Production	Married	2	Bachelor	26	1	25250.00
19	174	Female	Marketing	Single	0	High School	23	2	20500.00
20	175	Male	Accounting	Married	1	High School	27	3	30750.00
21	176	Male	Administration	Married	1	High School	29	5	21250.00
22	177	Male	Marketing	Single	1	High School	27	3	20750.00
23	178	Male	Administration	Single	0	Vocational	25	1	25250.00
24	179	Female	Administration	Married	2	Bachelor	24	1	30250.00
25	180	Male	Accounting	Married	3	Vocational	26	1	30250.00

	Number	Gender	Fields_of_work	Status	Number_of_children	Education	Age	Period	Salary
26	181	Female	Marketing	Single	2	Vocational	23	1	30250.00
27	182	Male	Marketing	Single	1	High School	26	2	20500.00
28	183	Female	Marketing	Married	1	Vocational	27	4	26000.00
29	184	Female	Administration	Single	2	Bachelor	29	5	18750.00
30	185	Female	Accounting	Married	1	Vocational	27	3	25750.00
31	186	Female	Production	Single	3	Vocational	25	4	21000.00
32	187	Female	Accounting	Married	1	High School	24	1	20250.00
33	188	Female	Administration	Married	0	Vocational	26	2	20500.00
34	189	Male	Administration	Single	0	Vocational	23	1	30250.00
35	190	Male	Administration	Single	1	Vocational	27	2	25500.00
36	191	Female	Marketing	Married	1	Bachelor	29	3	18250.00
37	192	Male	Accounting	Single	2	Vocational	27	4	31000.00
38	193	Male	Production	Married	1	Vocational	29	3	20750.00
39	194	Female	Marketing	Single	0	High School	27	2	20500.00
40	195	Male	Administration	Single	0	Vocational	25	4	26000.00
41	196	Female	Administration	Married	1	Bachelor	24	2	18000.00
42	197	Male	Accounting	Single	1	Vocational	26	4	31000.00
43	198	Female	Production	Married	0	Vocational	23	1	25250.00
44	199	Male	Marketing	Married	2	High School	27	5	21250.00
45	200	Male	Accounting	Single	1	Vocational	29	6	31500.00
46	201	Male	Administration	Single	1	Vocational	27	5	21250.00
47	202	Male	Marketing	Married	4	Bachelor	25	2	20500.00
48	203	Male	Administration	Single	0	High School	24	1	25250.00
49	204	Male	Administration	Single	1	High School	26	3	30750.00
50	205	Male	Accounting	Married	2	High School	23	1	20250.00

How to:

1. Open anova_data2.sav
2. Choose Analyze
3. Choose Compare-means
4. Choose One-way Anova
5. Put number of children, age, period, and salary on the dependent list box
6. Put field of work on the factor box
7. Click Options
8. Follow the tutorial
9. Click Continue
10. Click Statistics
11. Follow the tutorial
12. Click Continue
13. Click Post-hoc
14. Follow the tutorial
15. Click Continue
16. Click Ok