Test of Assumption of Equal Variances Using STATCAL (R), SPSS & Minitab

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Numeric Data

Name of Variable

Score A
Score B
Score C

Set Number of Column

1 30

Set Number of Row

1 100

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
1	78.00	75.00	75.00															
2	75.00	98.00	57.00															

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Download STATCAL in www.statcal.com

Citations

APA

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In this article, we will explain step by step how to test of assumption of equal variances using STATCAL. Beside that, we will compare STATCAL's result with other software such as SPSS & Minitab.

1.1 Data

Table 1.1.1 is presented data of 17 persons of score A based on group A, B and C.

Table 1.1.1

Person	Group	Score A
1	1	54
2	1	57
3	1	53
4	1	52
5	1	49
6	1	48
7	2	67
8	2	68
9	2	65
10	2	67
11	2	65
12	3	87
13	3	86
14	3	81
15	3	93
16	3	87
17	3	88

Value	Label for Group
1	Group A
2	Group B
3	Group C

Based on the data in Table 1.1.1, we will test assumption of equal variances of score A based on group A, B and C using STATCAL.

1.2 Input Numeric Data in STATCAL

Input numeric data in STATCAL as in Figure 1.2.1 until Figure 1.2.3.

STATCAL

How to Input Data in STATCAL?

Input Numeric Data

Input Categorical Data

Graph

Descriptive

Input Numeric Data

Numeric Data

Name of Variable

Score A

Set Number of Column

1 30

Set Number of Row

1 100

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
1	54.00												
2	57.00												
3	53.00												
4	52.00												
5	49.00												
6	48.00												
7	67.00												
8	68.00												
9	65.00												
10	67.00												
11	65.00												
12	87.00												
13	86.00												
14	81.00												
15	93.00												

Figure 1.2.1 Input Numeric Data

STATCAL

How to Input Data in STATCAL?

Input Numeric Data

Input C

Input Numeric Data

Numer

Name of Variable

Score A

Set Number of Column

1 30

Set Number of Row

1 100

	V1	V2	V3	V4	V5
1	54.00				
2	57.00				
3	53.00				
4	52.00				
5	49.00				
6	48.00				
7	67.00				
8	68.00				
9	65.00				
10	67.00				
11	65.00				
12	87.00				

Figure 1.2.2 Giving Name of Variable

Your Numeric Data

Score A	
1	54
2	57
3	53
4	52
5	49
6	48
7	67
8	68
9	65
10	67
11	65
12	87
13	86
14	81
15	93
16	87
17	88

Number of NA in Score A = 0

Figure 1.2.3 Your Numeric Data Must be Appeared in “Your Numeric Data” Part

1.3 Input Categorical Data in STATCAL

Input categorical data in STATCAL as in Figure 1.3.1 until Figure 1.3.3.

ATCAL?

Input Numeric Data

Input Categorical Data

Graph

Descriptive

Input Categorical Data

Categorical Data

Set Number of Column

1 30

Set Number of Row

1 100

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
1	1.00											
2	1.00											
3	1.00											
4	1.00											
5	1.00											
6	1.00											
7	2.00											
8	2.00											
9	2.00											
10	2.00											
11	2.00											
12	3.00											
13	3.00											
14	3.00											

Figure 1.3.1 Input Categorical Data

Name of Variable

Group

Label

	V1	V2	V3	V4
1	Group A			
2	Group B			
3	Group C			
4				

Set Number of Column

130

Set Number of Row

1100

	V1	V2	V3	V4	V5	V6	V
1	1.00						
2	1.00						
3	1.00						
4	1.00						
5	1.00						
6	1.00						
7	2.00						
8	2.00						
9	2.00						
10	2.00						
11	2.00						
12	3.00						
13	3.00						
14	3.00						
15	3.00						

Figure 1.2.2 Giving Name and Label

Your Categorical Data

Group

1 Group A

2 Group A

3 Group A

4 Group A

5 Group A

6 Group A

7 Group B

8 Group B

9 Group B

10 Group B

11 Group B

12 Group C

13 Group C

14 Group C

15 Group C

16 Group C

17 Group C

Figure 1.3.3 Your Categorical Data Must be Appeared in “Your Categorical Data” Part

1.4 Test of Assumption of Equal Variances with STATCAL

For testing assumption of equal variances in STATCAL, choose **Statistics => Test of Homogeneity of Variance** (Figure 1.4.1). In Figure 1.4.2, variable **Score A** and **Group** are moved to the right box.

Figure 1.4.1 Menu for Testing Assumption of Equal Variances in STATCAL

Figure 1.4.2 Selection of Variable

1.5 STATCAL's Result

Result of STATCAL can be seen in **Result** part.

Figure 1.5.1 Boxplot

Levene Test

Show entries

Search:

df1	df2	statistic of levene	p-value	conclusion
2	14	0.7068	0.51	p-value > 0.05, assumption of homogeneity of variance is received, at the level of significance is 5%

Figure 1.5.2 Test of Assumption of Equal Variances Using Levene Test

Bartlett Test

Show entries

Search:

df	statistic of Bartlett	p-value	conclusion
2	3.6803	0.1588	p-value > 0.05, assumption of homogeneity of variance is received, at the level of significance is 5%

Figure 1.5.3 Test of Assumption of Equal Variances Using Bartlett Test

Test of Normality (Assumption) with Kolmogorov-Smirnov

Show 10 entries Search:

Group	Statistic of Kolomogorov-Smirnov (KS)	P-Value of KS	Number of Observation
Group A	0.164	0.997	6
Group B	0.273	0.851	5
Group C	0.231	0.907	6

Figure 1.5.4 Normality Assumption Test Result Based on Kolmogorov-Smirnov Test

1.6 Comparison with SPSS

Given SPSS's result for testing assumption of equal variances based on Levene test. We use SPSS version 17.

The figure shows two screenshots of the SPSS Data Editor. The left screenshot shows the 'Data' view with columns 'Group' and 'ScoreA'. The right screenshot shows the 'Data' view with columns 'Group' and 'ScoreA'.

1 : Group	1.0	ScoreA
1	1.00	54.00
2	1.00	57.00
3	1.00	53.00
4	1.00	52.00
5	1.00	49.00
6	1.00	48.00
7	2.00	67.00
8	2.00	68.00
9	2.00	65.00
10	2.00	67.00
11	2.00	65.00
12	3.00	87.00
13	3.00	86.00
14	3.00	81.00
15	3.00	93.00
16	3.00	87.00
17	3.00	88.00

Figure 1.6.1 Data in SPSS

Test of Homogeneity of Variances

Score A			
Levene Statistic	df1	df2	Sig.
.707	2	14	.510

Figure 1.6.2 Result of Levene Test Based on SPSS

1.7 Comparison with Minitab

Given Minitab's result for testing assumption of equal variances. We use Minitab version 16.

Figure 1.8.1 Data in Minitab

Figure 1.8.2 Result of Levene and Bartlett Test Based on Minitab