```
NPAR TESTS
 /FRIEDMAN=Cartesian Cartesian_ColouredPolar Polar_Coloured
 /STATISTICS QUARTILES
 /MISSING LISTWISE.
```

NPar Tests

Notes

Output Created		17-SEP-2018 12:58:45
Comments		
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	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for all tests are based on cases with no missing data for any variables used.

Syntax		NPAR TESTS
		 /FRIEDMAN=Cartesian Cartesian_Coloured Polar Polar_Coloured
		  /STATISTICS QUARTILES
		  /MISSING LISTWISE.

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

		Percentiles		
	N	25th	50th (Median)	75th
Cartesian	84	5.4695	9.4660	15.6893
Cartesian_Coloured	84	3.0055	5.3530	7.5880
Polar	84	5.2323	8.0340	14.9308
Polar_Coloured	84	4.0793	6.6020	10.6932

Friedman Test

Ranks

	Mean Rank
Cartesian	3.14
Cartesian_Coloured	1.80
Polar	2.75
Polar_Coloured	2.31

Test Statistics[a]

N	84
Chi-Square	50.671
df	3
Asymp. Sig.	.000

a. Friedman Test

```
 NPAR TESTS
  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_ColouredCartesian_Coloure
d Polar WITH Cartesian_ColouredPolar Polar_ColouredPolar Polar_ColouredPola
r_Coloured (PAIRED)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:00:01
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.

Syntax		NPAR TESTS
		  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloured Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Polar_Coloured (PAIRED)
		  /STATISTICS DESCRIPTIVES QUARTILES
		  /MISSING ANALYSIS.

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentile. 25th
Cartesian	85	13.4165	12.79968	1.82	70.05	5.4780
Cartesian_Coloured	84	6.3349	5.00893	1.77	28.14	3.0055
Polar	84	11.3217	10.79918	1.90	62.57	5.2323
Polar_Coloured	84	8.4195	6.49984	1.45	36.50	4.0793

Descriptive Statistics

	Percentiles	
	50th (Median)	75th
Cartesian	9.4740	15.5935
Cartesian_Coloured	5.3530	7.5880
Polar	8.0340	14.9308
Polar_Coloured	6.6020	10.6932

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Cartesian_Coloured - Cartesian	Negative Ranks	67[a]	46.82	3137.00
	Positive Ranks	17[b]	25.47	433.00
	Ties	0[c]		
	Total	84		
Polar - Cartesian	Negative Ranks	51[d]	42.37	2161.00
	Positive Ranks	33[e]	42.70	1409.00
	Ties	0[f]		
	Total	84		
Polar_Coloured - Cartesian	Negative Ranks	62[g]	45.52	2822.50
	Positive Ranks	22[h]	33.98	747.50
	Ties	0[i]		
	Total	84		
Polar - Cartesian_Coloured	Negative Ranks	21[j]	28.60	600.50
	Positive Ranks	63[k]	47.13	2969.50
	Ties	0[l]		
	Total	84		
Polar_Coloured - Cartesian_Coloured	Negative Ranks	29[m]	39.36	1141.50
	Positive Ranks	55[n]	44.15	2428.50
	Ties	0[o]		
	Total	84		
Polar_Coloured - Polar	Negative Ranks	51[p]	46.05	2348.50
	Positive Ranks	33[q]	37.02	1221.50
	Ties	0[r]		
	Total	84		

a. Cartesian_Coloured < Cartesian

b. Cartesian_Coloured > Cartesian

c. Cartesian_Coloured = Cartesian

d. Polar < Cartesian

e. Polar < Cartesian

e. Polar > Cartesian

f. Polar = Cartesian

g. Polar_Coloured < Cartesian

h. Polar_Coloured > Cartesian

i. Polar_Coloured = Cartesian

j. Polar < Cartesian_Coloured

k. Polar > Cartesian_Coloured

l. Polar = Cartesian_Coloured

m. Polar_Coloured < Cartesian_Coloured

n. Polar_Coloured > Cartesian_Coloured

o. Polar_Coloured = Cartesian_Coloured

p. Polar_Coloured < Polar

q. Polar_Coloured > Polar

r. Polar_Coloured = Polar

Test Statistics[a]

	Cartesian_Coloured - Cartesian	Polar - Cartesian	Polar_Coloured - Cartesian	Polar - Cartesian_Coloured	Polar_Coloured - Cartesian_Coloured
Z	-6.030[b]	-1.677[b]	-4.627[b]	-5.283[c]	-2.870[c]
Asymp. Sig. (2-tailed)	.000	.094	.000	.000	.004

Test Statistics[a]

	Polar_Coloured - Polar
Z	-2.513[b]
Asymp. Sig. (2-tailed)	.012

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

c. Based on negative ranks.

```
NPAR TESTS
 /FRIEDMAN=Cartesian Cartesian_ColouredPolar Polar_Coloured
 /STATISTICS QUARTILES
 /MISSING LISTWISE.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:02:35
Comments		
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	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for all tests are based on cases with no missing data for any variables used.

Syntax		NPAR TESTS
		  /FRIEDMAN=Cartesian Cartesian_Coloured Polar Polar_Coloured
		  /STATISTICS QUARTILES
		  /MISSING LISTWISE.

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

		Percentiles		
	N	25th	50th (Median)	75th
Cartesian	84	4.2543	7.5595	13.4578
Cartesian_Coloured	84	2.0228	3.3550	4.8125
Polar	84	5.1035	8.7830	13.7818
Polar_Coloured	84	2.0733	3.1380	5.1903

Friedman Test

Ranks

	Mean Rank
Cartesian	3.14
Cartesian_Coloured	1.72
Polar	3.36
Polar_Coloured	1.78

Test Statistics[a]

N	84
Chi-Square	114.783
df	3
Asymp. Sig.	.000

a. Friedman Test

```
 NPAR TESTS
  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloure
d Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Pola
r_Coloured (PAIRED)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:02:45
Comments		
Input	Active Dataset	DataSet0
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	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.

Syntax		NPAR TESTS
		  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloured Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Polar_Coloured (PAIRED)
		  /STATISTICS DESCRIPTIVES QUARTILES
		  /MISSING ANALYSIS.

Notes

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentile 25th
Cartesian	85	10.8943	10.25914	2.03	57.93	4.2625
Cartesian_Coloured	84	4.4800	4.66149	.98	32.80	2.0228
Polar	84	11.2321	8.46674	2.65	45.87	5.1035
Polar_Coloured	84	4.1530	3.13302	1.12	16.95	2.0733

Descriptive Statistics

	Percentiles	
	50th (Median)	75th
Cartesian	7.5760	13.3785
Cartesian_Coloured	3.3550	4.8125
Polar	8.7830	13.7818
Polar_Coloured	3.1380	5.1903

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Cartesian_Coloured - Cartesian	Negative Ranks	69[a]	46.26	3192.00
	Positive Ranks	15[b]	25.20	378.00
	Ties	0[c]		
	Total	84		
Polar - Cartesian	Negative Ranks	35[d]	43.99	1539.50
	Positive Ranks	49[e]	41.44	2030.50
	Ties	0[f]		
	Total	84		
Polar_Coloured - Cartesian	Negative Ranks	76[g]	45.25	3439.00
	Positive Ranks	8[h]	16.38	131.00
	Ties	0[i]		
	Total	84		
Polar - Cartesian_Coloured	Negative Ranks	10[j]	27.50	275.00
	Positive Ranks	74[k]	44.53	3295.00
	Ties	0[l]		
	Total	84		
Polar_Coloured - Cartesian_Coloured	Negative Ranks	35[m]	44.97	1574.00
	Positive Ranks	48[n]	39.83	1912.00
	Ties	1[o]		
	Total	84		
Polar_Coloured - Polar	Negative Ranks	75[p]	44.81	3361.00
	Positive Ranks	9[q]	23.22	209.00
	Ties	0[r]		
	Total	84		

a. Cartesian_Coloured < Cartesian

b. Cartesian_Coloured > Cartesian

c. Cartesian_Coloured = Cartesian

d. Polar < Cartesian

e. Polar > Cartesian

f. Polar = Cartesian

g. Polar_Coloured < Cartesian

h. Polar_Coloured > Cartesian

i. Polar_Coloured = Cartesian

j. Polar < Cartesian_Coloured

k. Polar > Cartesian_Coloured

l. Polar = Cartesian_Coloured

m. Polar_Coloured < Cartesian_Coloured

n. Polar_Coloured = Cartesian_Coloured

n. Polar_Coloured > Cartesian_Coloured

o. Polar_Coloured = Cartesian_Coloured

p. Polar_Coloured < Polar

q. Polar_Coloured > Polar

r. Polar_Coloured = Polar

Test Statistics[a]

	Cartesian_Coloured - Cartesian	Polar - Cartesian	Polar_Coloured - Cartesian	Polar - Cartesian_Coloured	Polar_Coloured - Cartesian_Coloured
Z	-6.275[b]	-1.095[c]	-7.376[b]	-6.734[c]	-.767[c]
Asymp. Sig. (2-tailed)	.000	.274	.000	.000	.443

Test Statistics[a]

	Polar_Coloured - Polar
Z	-7.029[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

c. Based on negative ranks.

```
NPAR TESTS
 /FRIEDMAN=Cartesian Cartesian_ColouredPolar Polar_Coloured
 /STATISTICS QUARTILES
 /MISSING LISTWISE.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:06:49
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	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for all tests are based on cases with no missing data for any variables used.

Syntax		NPAR TESTS
		  /FRIEDMAN=Cartesian Cartesian_Coloured Polar Polar_Coloured
		  /STATISTICS QUARTILES
		  /MISSING LISTWISE.

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

		Percentiles		
	N	25th	50th (Median)	75th
Cartesian	84	4.4875	6.1605	12.1085
Cartesian_Coloured	84	1.8692	2.4645	4.1583
Polar	84	5.0280	7.8250	12.9327
Polar_Coloured	84	2.1145	2.8635	4.8200

Friedman Test

Ranks

	Mean Rank
Cartesian	3.17
Cartesian_Coloured	1.54
Polar	3.46
Polar_Coloured	1.83

Test Statistics[a]

N	84
Chi-Square	138.529
df	3
Asymp. Sig.	.000

a. Friedman Test

```
 NPAR TESTS
  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloure
d Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Pola
r_Coloured (PAIRED)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:07:04
Comments		
Input	Active Dataset	DataSet0
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	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
Syntax		NPAR TESTS /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloured Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Polar_Coloured (PAIRED) /STATISTICS DESCRIPTIVES QUARTILES /MISSING ANALYSIS.

Notes

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentile 25th
Cartesian	85	10.1162	9.89814	2.08	53.35	4.4960
Cartesian_Coloured	84	3.2902	1.96623	.95	10.06	1.8692
Polar	84	11.5316	11.11670	2.38	56.98	5.0280
Polar_Coloured	84	3.8167	2.72111	1.22	19.46	2.1145

Descriptive Statistics

	Percentiles	
	50th (Median)	75th
Cartesian	6.2270	12.0960
Cartesian_Coloured	2.4645	4.1583
Polar	7.8250	12.9327
Polar_Coloured	2.8635	4.8200

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Cartesian_Coloured - Cartesian	Negative Ranks	79[a]	43.86	3465.00
	Positive Ranks	5[b]	21.00	105.00
	Ties	0[c]		
	Total	84		
Polar - Cartesian	Negative Ranks	36[d]	38.39	1382.00
	Positive Ranks	48[e]	45.58	2188.00
	Ties	0[f]		
	Total	84		
Polar_Coloured - Cartesian	Negative Ranks	67[g]	48.31	3237.00
	Positive Ranks	17[h]	19.59	333.00
	Ties	0[i]		
	Total	84		
Polar - Cartesian_Coloured	Negative Ranks	4[j]	23.00	92.00
	Positive Ranks	80[k]	43.48	3478.00
	Ties	0[l]		
	Total	84		
Polar_Coloured - Cartesian_Coloured	Negative Ranks	36[m]	36.83	1326.00
	Positive Ranks	48[n]	46.75	2244.00
	Ties	0[o]		
	Total	84		
Polar_Coloured - Polar	Negative Ranks	79[p]	43.18	3411.00
	Positive Ranks	5[q]	31.80	159.00
	Ties	0[r]		
	Total	84		

a. Cartesian_Coloured < Cartesian

b. Cartesian_Coloured > Cartesian

c. Cartesian_Coloured = Cartesian

d. Polar < Cartesian

e. Polar > Cartesian

f. Polar = Cartesian

g. Polar_Coloured < Cartesian

h. Polar_Coloured > Cartesian

i. Polar_Coloured = Cartesian

j. Polar < Cartesian_Coloured

k. Polar > Cartesian_Coloured

l. Polar = Cartesian_Coloured

m. Polar_Coloured < Cartesian_Coloured

n. Polar_Coloured = Cartesian_Coloured

n. Polar_Coloured > Cartesian_Coloured

o. Polar_Coloured = Cartesian_Coloured

p. Polar_Coloured < Polar

q. Polar_Coloured > Polar

r. Polar_Coloured = Polar

Test Statistics[a]

	Cartesian_Coloured - Cartesian	Polar - Cartesian	Polar_Coloured - Cartesian	Polar - Cartesian_Coloured	Polar_Coloured - Cartesian_Coloured
Z	-7.492[b]	-1.797[c]	-6.476[b]	-7.550[c]	-2.047[c]
Asymp. Sig. (2-tailed)	.000	.072	.000	.000	.041

Test Statistics[a]

	Polar_Coloured - Polar
Z	-7.252[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

c. Based on negative ranks.

```
NPAR TESTS
 /FRIEDMAN=Cartesian Cartesian_ColouredPolar Polar_Coloured
 /STATISTICS QUARTILES
 /MISSING LISTWISE.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:13:26
Comments		
Input	Active Dataset	DataSet0
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	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for all tests are based on cases with no missing data for any variables used.

Syntax		NPAR TESTS
		  /FRIEDMAN=Cartesian Cartesian_Coloured Polar Polar_Coloured
		  /STATISTICS QUARTILES
		  /MISSING LISTWISE.

Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

		Percentiles		
	N	25th	50th (Median)	75th
Cartesian	84	6.0235	8.7490	14.1075
Cartesian_Coloured	84	2.4350	4.1295	6.0728
Polar	84	5.9695	9.4320	14.8023
Polar_Coloured	84	2.8063	4.4875	6.0895

Friedman Test

Ranks

	Mean Rank
Cartesian	3.18
Cartesian_Coloured	1.74
Polar	3.18
Polar_Coloured	1.90

Test Statistics[a]

N	84
Chi-Square	94.409
df	3
Asymp. Sig.	.000

a. Friedman Test

```
 NPAR TESTS
  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloure
d Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Pola
r_Coloured (PAIRED)
  /STATISTICS DESCRIPTIVES QUARTILES
  /MISSING ANALYSIS.
```

NPar Tests

Notes

Output Created		17-SEP-2018 13:13:49
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	85
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.

Syntax		NPAR TESTS
		  /WILCOXON=Cartesian Cartesian Cartesian Cartesian_Coloured Cartesian_Coloured Polar WITH Cartesian_Coloured Polar Polar_Coloured Polar Polar_Coloured Polar_Coloured (PAIRED)
		  /STATISTICS DESCRIPTIVES QUARTILES
		  /MISSING ANALYSIS.

Notes

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01
	Number of Cases Allowed[a]	87381

a. Based on availability of workspace memory.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentile. 25th
Cartesian	85	12.1619	9.81493	2.31	49.24	6.0360
Cartesian_Coloured	84	5.6924	8.09320	1.15	71.70	2.4350
Polar	84	12.6038	11.04044	2.08	68.13	5.9695
Polar_Coloured	84	5.2224	3.73836	1.05	23.83	2.8063

Descriptive Statistics

	Percentiles	
	50th (Median)	75th
Cartesian	8.7740	14.0450
Cartesian_Coloured	4.1295	6.0728
Polar	9.4320	14.8023
Polar_Coloured	4.4875	6.0895

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Cartesian_Coloured - Cartesian	Negative Ranks	70[a]	46.20	3234.00
	Positive Ranks	14[b]	24.00	336.00
	Ties	0[c]		
	Total	84		
Polar - Cartesian	Negative Ranks	43[d]	43.21	1858.00
	Positive Ranks	41[e]	41.76	1712.00
	Ties	0[f]		
	Total	84		
Polar_Coloured - Cartesian	Negative Ranks	70[g]	45.69	3198.50
	Positive Ranks	13[h]	22.12	287.50
	Ties	1[i]		
	Total	84		
Polar - Cartesian_Coloured	Negative Ranks	12[j]	28.92	347.00
	Positive Ranks	72[k]	44.76	3223.00
	Ties	0[l]		
	Total	84		
Polar_Coloured - Cartesian_Coloured	Negative Ranks	36[m]	42.15	1517.50
	Positive Ranks	48[n]	42.76	2052.50
	Ties	0[o]		
	Total	84		
Polar_Coloured - Polar	Negative Ranks	70[p]	45.96	3217.00
	Positive Ranks	14[q]	25.21	353.00
	Ties	0[r]		
	Total	84		

a. Cartesian_Coloured < Cartesian

b. Cartesian_Coloured > Cartesian

c. Cartesian_Coloured = Cartesian

d. Polar < Cartesian

e. Polar > Cartesian

f. Polar = Cartesian

g. Polar_Coloured < Cartesian

h. Polar_Coloured > Cartesian

i. Polar_Coloured = Cartesian

j. Polar < Cartesian_Coloured

k. Polar > Cartesian_Coloured

l. Polar = Cartesian_Coloured

m. Polar_Coloured < Cartesian_Coloured

n. Polar_Coloured > Cartesian_Coloured

n. Polar_Coloured > Cartesian_Coloured

o. Polar_Coloured = Cartesian_Coloured

p. Polar_Coloured < Polar

q. Polar_Coloured > Polar

r. Polar_Coloured = Polar

Test Statistics[a]

	Cartesian_Coloured - Cartesian	Polar - Cartesian	Polar_Coloured - Cartesian	Polar - Cartesian_Coloured	Polar_Coloured - Cartesian_Coloured
Z	-6.462[b]	-.326[b]	-6.608[b]	-6.413[c]	-1.193[c]
Asymp. Sig. (2-tailed)	.000	.745	.000	.000	.233

Test Statistics[a]

	Polar_Coloured - Polar
Z	-6.386[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

c. Based on negative ranks.