

SAGE Research Methods

Encyclopedia of Measurement and Statistics

Kruskal-Wallis One-Way Analysis of Variance

Edited by: Neil J. Salkind

Book Title: Encyclopedia of Measurement and Statistics

Chapter Title: "Kruskal-Wallis One-Way Analysis of Variance"

Pub. Date: 2007

Access Date: October 22, 2022

Publishing Company: Sage Publications, Inc.

City: Thousand Oaks

Print ISBN: 9781412916110

Online ISBN: 9781412952644

DOI: <https://dx.doi.org/10.4135/9781412952644.n245>

Print pages: 520-521

© 2007 Sage Publications, Inc. All Rights Reserved.

This PDF has been generated from SAGE Research Methods. Please note that the pagination of the online version will vary from the pagination of the print book.

Kruskal-Wallis analysis of variance is a statistical technique that is used to test the difference between three or more independent samples when they are of disparate size. Remember that one of the assumptions of analysis of variance (even though the test statistic is fairly robust) is that the size of the various samples must be roughly similar and that the variances must be homogeneous.

In the case that these assumptions are not met, the Kruskal-Wallis analysis of variance technique can be used. This technique is roughly similar in use to one-way ANOVA with two or more levels of one independent variable, except that in the case of Kruskal-Wallis, this nonparametric or distribution-free statistic is very often used to test for differences between ranks.

In the following example, 30 participants are asked to rate three different types of chocolate candies: plain, peanut, and almond. The rating scale is yum, OK, and average. The hypothesis being tested is that there is a difference in ratings across the three different types of candies.

Using SPSS, the data set appears as shown below in Figure 1. As you can see, each of the 30 participants rates one of three types of candies along the three-point rating scale described above.

The procedure is performed and the output is shown in Figure 2.

Chi square is the appropriate distribution against which this test is compared for a test of the significance of the difference between the three average ranks. The output shows that there are 10 observations in each group with mean ranks ranging from 14.75 to 15.9. The chi-square value is .125, and the probability that a value of this magnitude, with 2 degrees of freedom, occurred by chance is .940. In other words, there is not a significant difference between the average ranking in each of the three groups.

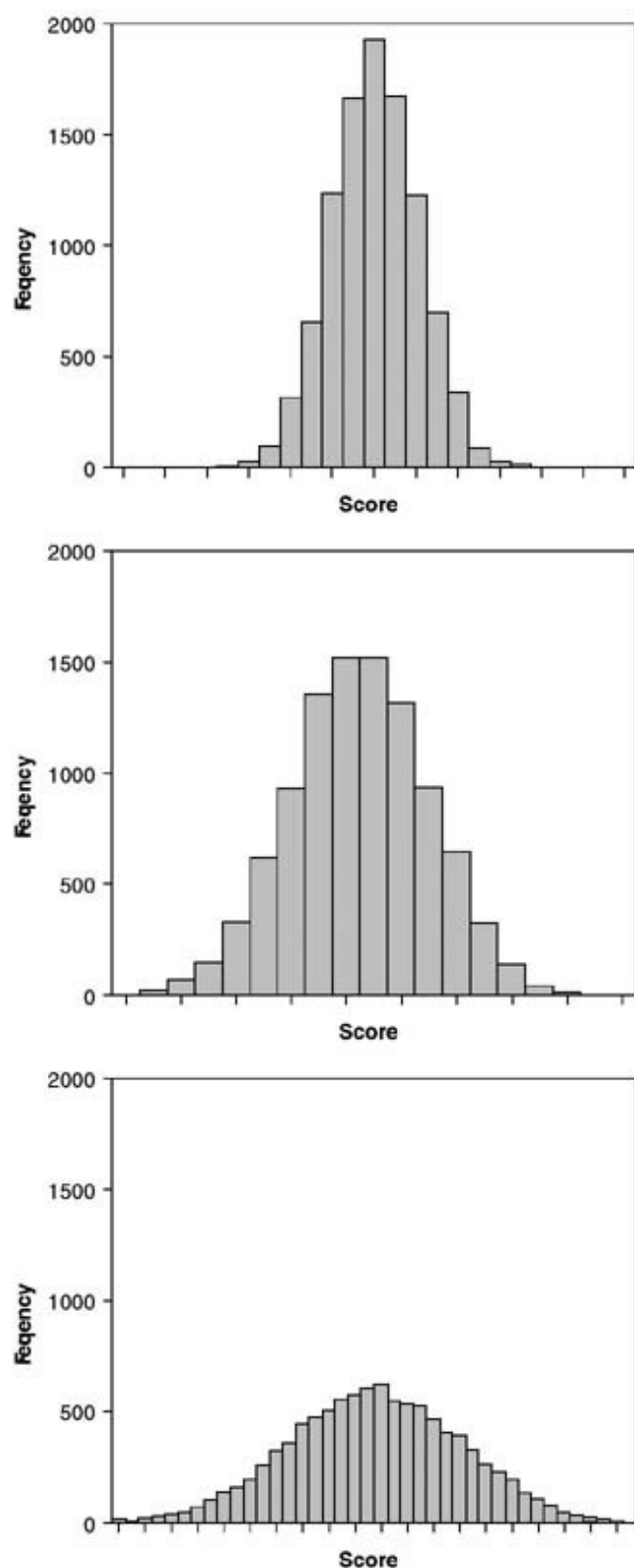


Figure 1 The Data Set Where Candies Are Ranked by 30 Participants

Table 1 State Faculty Salary Average and Grade for Public 2- and 4-Year Institutions, 2002–03 to 2003–04

2003-04						MO	47,010	1	56,335	0	1
State	Two-Year	Trend2	Four-Year	Trend4	Barg	MS	42,595	4	52,275	4	2
						MT	37,419	2	53,141	3	1
AK	62,220	2	55,865	0	1	NC	37,906	0	62,267	4	2
AL	43,829	3	56,122	3	2	ND	37,282	1	50,308	1	2
AR	37,873	2	50,313	3	2	NE	40,775	0	61,893	1	1
AZ	58,799	4	68,410	4	1	NH	41,906	0	66,716	0	1
CA	70,305	4	78,168	4	1	NJ	62,795	3	77,462	2	1
CO	42,137	0	61,461	0	1	NM	41,224	2	57,978	4	1
CT	59,729	2	73,402	1	1	NV	51,508	2	70,304	2	1
DE	53,773	1	76,762	2	1	NY	59,421	4	67,474	3	1
FL	47,306	3	63,391	4	1	OH	50,642	2	66,655	3	1
GA	43,609	1	61,773	2	2	OK	40,689	2	52,798	2	2
HI	52,506	1	65,832	1	1	OR	51,719	3	56,900	1	1
IA	42,663	1	69,378	4	1	PA	54,213	4	69,441	3	1
ID	41,988	2	51,125	1	2	RI	52,688	3	68,317	3	1
IL	56,984	4	63,188	1	1	SC	40,498	1	58,918	3	2
IN	41,821	1	63,277	2	2	SD	38,981	1	50,859	0	1
KS	43,163	1	60,840	2	1	TN	41,841	2	58,493	4	2
KY	44,428	2	58,220	3	1	TX	46,190	2	61,194	2	2
LA	41,049	3	56,255	3	2	UT	41,746	0	57,385	0	2
MA	55,574	2	67,076	1	1	VA	45,912	0	66,161	1	2
MD	55,357	0	67,780	0	1	WA	48,153	2	63,240	1	1
ME	44,745	3	56,215	2	1	WI	61,199	4	65,470	2	1
MI	65,895	4	69,351	3	1	WV	40,497	4	51,934	4	2
MN	54,285	0	67,915	0	1	WY	44,273	2	61,721	2	2

(Continued)

Figure 2 The Results of the Kruskal-Wallis Test

Neil J. Salkind

<http://dx.doi.org/10.4135/9781412952644.n245>

See also

- [Analysis of Variance \(ANOVA\)](#)

Further Reading

Smerz, J. M. Cognitive functioning in severe dementia and relationship to need driven behaviors and functional status. Dissertation Abstracts International: Section B: The Sciences and Engineering 66 (3B) 1737 (2005).

Woo, J. Ho, S. C. Wong, E. M. C. Depression is the predominant factor contributing to morale as measured by the Philadelphia Geriatric Morale Scale in elderly Chinese aged 70 years and over. International Journal of Geriatric Psychiatry 20 (11) 1052–1059 (2005).