

Answers to additional business exercises

Chapter 16 Non parametric statistics

1. Chi-square

Use a Chi square for independence to compare the proportion of permanent versus casual staff (*employstatus*) that indicate that they would recommend the organization as a good place to work (*recommend*).

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
recommend * employstatus employment status	521	97.2%	15	2.8%	536	100.0%

recommend * employstatus employment status Crosstabulation

		employstatus employment status		Total
		1 permanent	2 casual	
recommend 0 no	Count	34	22	56
	% within recommend	60.7%	39.3%	100.0%
	% within employstatus employment status	10.4%	11.4%	10.7%
	% of Total	6.5%	4.2%	10.7%
1 yes	Count	294	171	465
	% within recommend	63.2%	36.8%	100.0%
	% within employstatus employment status	89.6%	88.6%	89.3%
	% of Total	56.4%	32.8%	89.3%
Total	Count	328	193	521
	% within recommend	63.0%	37.0%	100.0%
	% within employstatus employment status	100.0%	100.0%	100.0%
	% of Total	63.0%	37.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.135 ^b	1	.713		
Continuity Correction ^a	.049	1	.825		
Likelihood Ratio	.134	1	.714		
Fisher's Exact Test				.770	.409
Linear-by-Linear Association	.135	1	.713		
N of Valid Cases	521				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.74.

The assumption concerning a minimum cell frequency of 5 was not violated (see footnote b in the Chi-Square Tests table).

This research question involves a 2 x 2 design so we need to use the Continuity Correction value supplied on the second line of the Chi-square Tests table. The value in the Asymp. Sig. column indicates that there is no significant association between employment status and likelihood of recommendation. An inspection of the Cross tabulation table indicates that 89.6% of permanent staff and 88.6% of casual staff would recommend the organization to others as a good place to work.

2. Mann-Whitney Test

Compare the staff satisfaction scores (*totsatis*) for permanent and casual staff (*employstatus*).

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of <i>totsatis</i> Total Staff Satisfaction Scale is the same across categories of <i>employstatus</i> employment status.	Independent-Samples Mann-Whitney U Test	.495	Retain the null hypothesis.

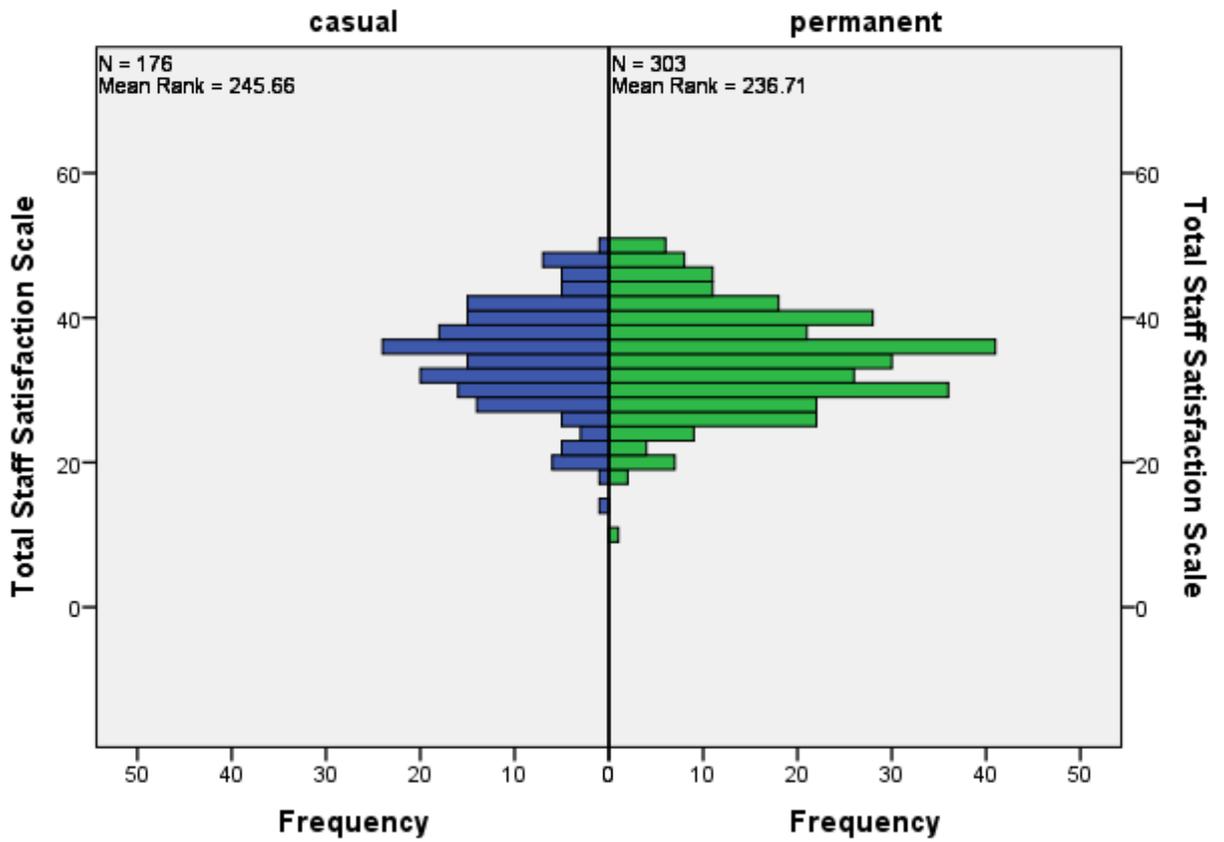
Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Mann-Whitney U Test

Total Staff Satisfaction Scale across employment status

Independent-Samples Mann-Whitney U Test Summary	
Total N	479
Mann-Whitney U	27659.500
Wilcoxon W	43235.500
Test Statistic	27659.500
Standard Error	1459.051
Standardized Test Statistic	.682
Asymptotic Sig.(2-sided test)	.495

Independent-Samples Mann-Whitney U Test employment status



The results of the Mann-Whitney U test indicate that there is no statistically significant difference in staff satisfaction scores between permanent and casual staff.

3. Kruskal-Wallis Test

Conduct a Kruskal-Wallis Test to compare staff satisfaction scores (*totsatis*) across each of the length of service categories (use the *servicegp3* variable).

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of <i>totsatis</i> Total Staff Satisfaction Scale is the same across categories of <i>servicegp3</i> length of service grp 3.	Independent-Samples Kruskal-Wallis Test	.003	Reject the null hypothesis.

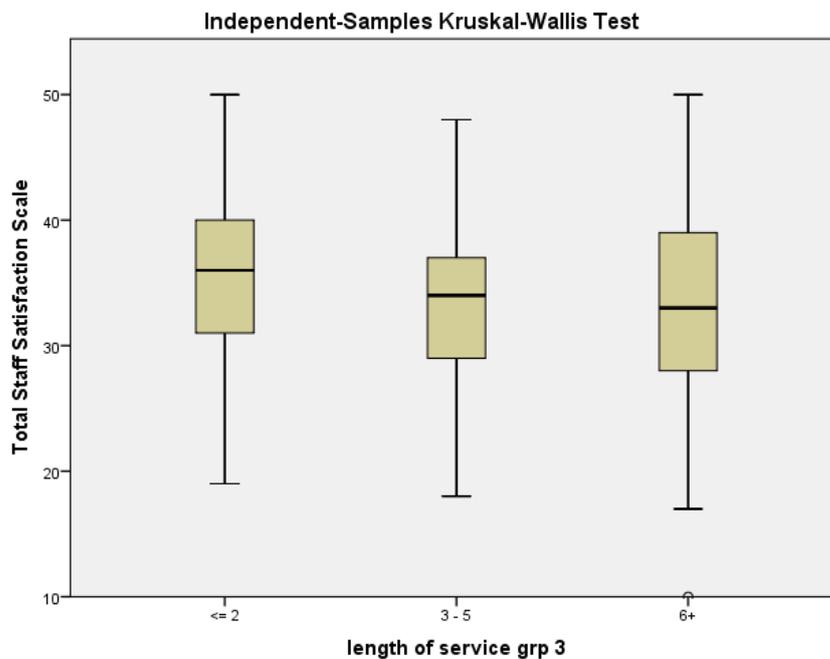
Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Kruskal-Wallis Test

Total Staff Satisfaction Scale across length of service grp 3

Independent-Samples Kruskal-Wallis Test Summary	
Total N	435
Test Statistic	11.466 ^a
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.003

a. The test statistic is adjusted for ties.



Pairwise Comparisons of servicegp3 length of service grp 3

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
3 6+-2 3 - 5	3.303	15.497	.213	.831	1.000
3 6+-1 <= 2	43.214	14.411	2.999	.003	.008
2 3 - 5-1 <= 2	39.911	14.693	2.716	.007	.020

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

The results of this analysis indicate that there is a significant difference ($p=.003$) in staff satisfaction scores for workers with different length of service. The highest satisfaction levels were observed for people with 2 or less years of service. Post-hoc tests show there was a significant difference in satisfaction levels for this group (≤ 2 yrs service) compared with both other groups (3-5yrs, 6+yrs).