Multiway Contingency Tables Analysis For The Social Sciences

Multiway Contingency Tables Analysis for the Social Sciences by Thomas D. Wickens

★★★★★ 5 out of 5

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Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 439 pages

Multiway contingency tables are a powerful tool for analyzing categorical data in the social sciences. They allow researchers to investigate the relationships between multiple variables and identify patterns and trends in their data.

What are Multiway Contingency Tables?

A multiway contingency table is a table that displays the frequency of occurrence of different combinations of values for two or more categorical variables. For example, a researcher might create a three-way contingency table to investigate the relationship between gender, race, and income. The table would show the number of people in each combination of these three variables.

How to Analyze Multiway Contingency Tables

There are a number of different statistical methods that can be used to analyze multiway contingency tables. The most common method is chi-square analysis. Chi-square analysis tests the hypothesis that there is no relationship between the variables in the table. If the chi-square test is significant, then it means that there is a statistically significant relationship between the variables.

In addition to chi-square analysis, other statistical methods that can be used to analyze multiway contingency tables include log-linear analysis and correspondence analysis. Log-linear analysis is a more complex method than chi-square analysis, but it can provide more information about the relationship between the variables in the table. Correspondence analysis is a graphical method that can be used to visualize the relationship between the variables in the table.

Applications of Multiway Contingency Tables in the Social Sciences

Multiway contingency tables are used in a wide variety of applications in the social sciences. Some of the most common applications include:

- Investigating the relationship between two or more categorical variables

- Identifying patterns and trends in data

- Testing hypotheses about the relationship between variables

- Making predictions about future events

Multiway contingency tables are a powerful tool for analyzing categorical data in the social sciences. They allow researchers to investigate the relationships between multiple variables and identify patterns and trends in

their data. By understanding how to analyze multiway contingency tables, researchers can gain valuable insights into the social world.

Image Descriptions

Contingency table analysis

- Contingency table analysis is an important analysis method in statistics
- It can be used to inference whether one factor is correlated with another factor.
- For example, "Does smoking cause a lung cancer?"
- Let $S=1$ denote that a person smoke, and $S=0$ denotes that the person does not smoke
- Let $L=1$ denotes that the person suffers from a lung cancer, and $L=0$ denotes that the person does not have a lung cancer
- Table 1 is a contingency table (列聯表), Table 2 shows the corresponding Probability of each cell

Table 1	L=1	L=0	Total
S=1	8	19	27
S=0	1	16	17
Total	9	35	44

Table 2	L=1	L=0	Total
S=1	P_{11}	P_{10}	$P_{1\cdot}$
S=0	P_{01}	P_{00}	$P_{0\cdot}$
Total	$P_{\cdot1}$	$P_{\cdot0}$	1

What these observed frequencies are not

	Less than HS	HS grad	Some college	College grad	TOTAL
Diabetic	33	25	20	17	95
Not diabetic	218	389	393	178	1178
TOTAL	251	414	413	195	1273

$$\frac{95}{1273} \approx .075$$

$$\frac{33}{251} \approx .131 \qquad \frac{25}{414} \approx .060$$

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Chi Square Results for Association

Taste		Repurchase			
		Yes	Maybe	No	Row Total
Satisfied	Observed	44	5	3	52
	Expected	29.64	11.44	10.92	
	Contribution to χ^2	6.957	3.625	5.744	
OK	Observed	6	8	9	23
	Expected	13.11	5.06	4.83	
	Contribution to χ^2	3.856	1.708	3.600	
Not Satisfied	Observed	7	9	9	25
	Expected	14.25	5.50	5.25	
	Contribution to χ^2	3.689	2.227	2.679	
Column Total		57	22	21	100

Alpha   0.05
Degrees of Freedom   4
p Value   0.0000
The null hypothesis is rejected.
There is evidence that Taste and Repurchase are associated

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