CHAPTER 16: MULTIWAY FREQUENCY ANALYSIS

This chapter demonstrates procedures for Hierarchical Loglinear Analysis using SPSS for Windows for the complete example from Chapter 16 of Using Multivariate Statistics (UMS). To follow this example, use the data set titled MFA_p863.sav.

Analysis of multiway frequency tables typically requires three steps: (1) screening, (2) choosing and testing appropriate models, and (3) evaluating and interpreting the selected model. A small-sample example of hypothetical data with three discrete variables is illustrated below in Table 16.1 (p. 863 from the UMS text). The first variable is type of preferred reading material, readtype, with two levels: science fiction (scifi) and spy novels (spy). The second variable is sex (male and female). The third variable is three levels of profession, profess: politicians (polit), administrators (admin), and belly dancers (belly).

Table 16.1
Small Sample of Hypothetical Data for Illustration of Multiway Frequency Analysis

<table>
<thead>
<tr>
<th>Profession</th>
<th>Sex</th>
<th>SCIFI</th>
<th>SPY</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Politicians</td>
<td>Male</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>25</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>Administrators</td>
<td>Male</td>
<td>10</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>Belly dancers</td>
<td>Male</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>30</td>
<td>45</td>
</tr>
</tbody>
</table>
16.1 EVALUATION OF ASSUMPTIONS

The **Crosstabs** command is used to evaluate adequacy of expected frequencies. Each $2 \times 2$ crosstab table is built individually; hence, you should restrict all tables to cases with complete data. Use these SPSS commands:

>` Analyze

>` Descriptive Statistics

>` Crosstabs...

> Row(s): **readtype**

> Column(s): **sex**

>` Cells...

> Under Counts

> [✓] Observed

> [✓] Expected

> Under Percentages

> [✓] Row

> [✓] Column

>` Continue

>` OK

Then, follow the same procedure to get the two remaining combinations of variables:

Row(s): **readtype**  Column(s): **profess**

Row(s): **sex**  Column(s): **profess**
16.2 HIERARCHICAL LOG-LINEAR ANALYSIS

The choice of **Model Selection** is for hierarchical analysis. To produce the hierarchical log-linear analysis, follow the SPSS commands below.

> Analyze
  > Loglinear
  > Model Selection…

Factor(s):

**readtype**

> Define Range…
  Minimum: enter 1
  Maximum: enter 2

**sex**

> Define Range…
  Minimum: enter 1
  Maximum: enter 2

**profess**

> Define Range…
  Minimum: enter 1
  Maximum: enter 3

Under Model Building

◎ Use backward elimination:

> Options

Under Display

[ ] Frequencies
[ ] Residuals

Under Display for Saturated Model

[ ] Association table

> Continue
> OK