RIDIT Analysis

Ridit analysis was proposed by Bross for both the description of differences between groups on an ordered categorical scale, and the testing of the significance of those differences. The term ridit is derived from the initials of "relative to an identified distribution." The analysis begins with the identification of a population to serve as a standard or reference group. For the reference group, we estimate that the proportion of all cases with a value on the underlying continuum is falling at or below the midpoint of each interval, that is, each interval's ridit. The final values are the ridits associated with the various categories. The ridit for a category, then, is nothing but the proportion of all subjects from the reference group falling in the lower ranking categories, plus half the proportion falling in the given category.

Given the distribution of any other group over the same categories, the mean ridit for that group may be calculated. The resulting mean value is interpretable as a probability. The mean ridit for a group is the probability that a randomly-selected case from it will get better score than a randomly-selected case from the standard group. Mathematically, the mean ridit for the reference group must always be .5. This is consistent with the fact that, if two cases are randomly selected from the same population, the first case will be at least as high half the time, and will be at least as low also half the time.

Pairwise comparisons. -In most clinical studies the most sensible comparisons are those pairwise contrasts comparing one treatment group with another. There are, in general, $K = k(k+l)/2$ possible pairwise comparisons among the k+l groups. Critical ratio tests are presented for comparing each group with the standard and each group with the others. As a control for the increased likelihood of falsely finding significance merely because several tests were performed, we recommend the Bonferroni criterion. If the desired overall significance level is α, each comparison should be tested at the significance level α/K. Thus, if $\alpha = 0.05$ and the number of groups is $K = 6$, $\alpha/K = 0.0083$ and the corresponding critical normal curve value is 2.64. This is the criterion used for adjudging the significance of each individual pairwise comparison.

Confidence intervals. - The standard errors defined explicitly or implicitly may be used to set confidence limits about the probability that a typical case in one group obtains a higher score than a typical case in another. In order to assure that the overall confidence in the entire set of intervals is at least $100(1 - \alpha\%)$ (usually 95%), the Bonferroni constant, say B, should be the factor multiplying the standard error, and not the usual 1.96.

An Example. A file labeled “TEETH.LAZ” contains results from a dental study of pain suffered by patients using four different pain relief treatments. The subjects indicated degree of pain felt after a given period of time following the dental work. Below is the image of the data file:

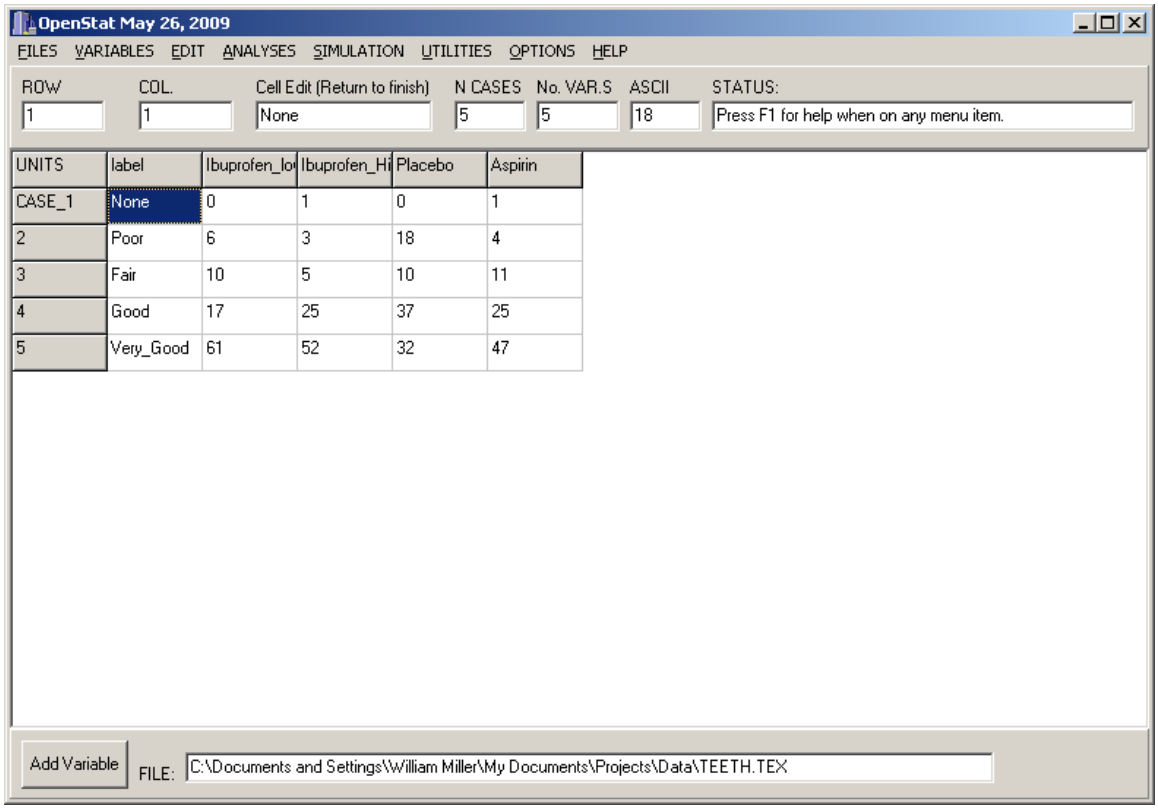

Figure 1. Sample Data for a RIDIT Analysis

The dialog form used in the analysis of this data is shown below:

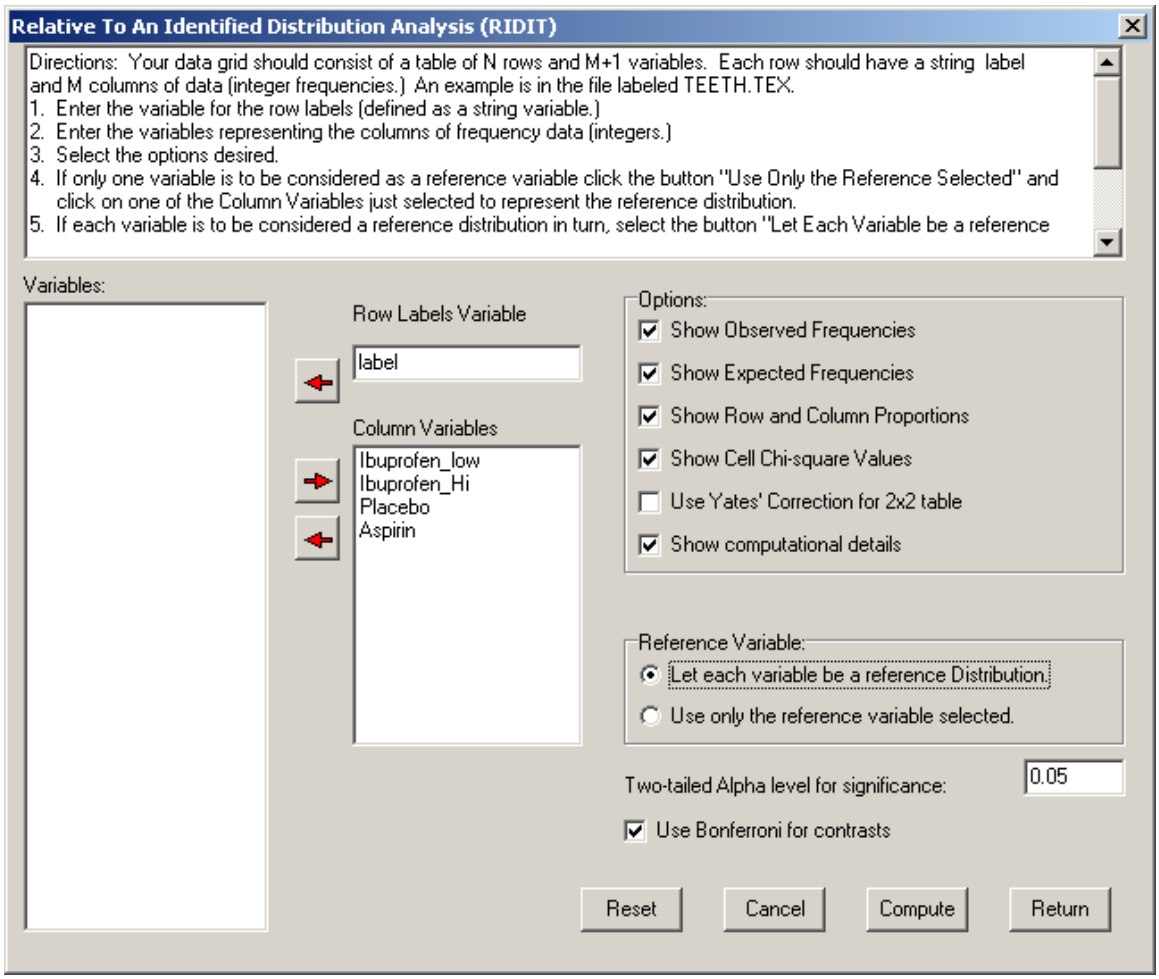

Figure 2. RIDIT Analysis Dialogue Form

When the Compute button was clicked, the following results were obtained:

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Chi-square Analysis Results
No. of Cases = 365

OBSERVED FREQUENCIES

             Frequencies
          Ibuprofen_lowIbuprofen_Hi   Placebo   Aspirin     Total

      None          0         1         0         1         2
      Poor          6         3        18         4        31
      Fair         10         5        10        11        36
      Good         17        25        37        25       104
 Very_Good         61        52        32        47       192
     Total         94        86        97        88       365

EXPECTED FREQUENCIES

             Expected Values
```

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.515	0.471	0.532	0.482
Poor	7.984	7.304	8.238	7.474
Fair	9.271	8.482	9.567	8.679
Good	26.784	24.504	27.638	25.074
Very_Good	49.447	45.238	51.025	46.290

ROW PROPORTIONS

Proportions

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin	Total
None	0.000	0.500	0.000	0.500	1.000
Poor	0.194	0.097	0.581	0.129	1.000
Fair	0.278	0.139	0.278	0.306	1.000
Good	0.163	0.240	0.356	0.240	1.000
Very_Good	0.318	0.271	0.167	0.245	1.000
Total	0.258	0.236	0.266	0.241	1.000

COLUMN PROPORTIONS

Proportions

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin	Total
None	0.000	0.012	0.000	0.011	0.005
Poor	0.064	0.035	0.186	0.045	0.085
Fair	0.106	0.058	0.103	0.125	0.099
Good	0.181	0.291	0.381	0.284	0.285
Very_Good	0.649	0.605	0.330	0.534	0.526
Total	1.000	1.000	1.000	1.000	1.000

CHI-SQUARED VALUE FOR CELLS

Chi-square Values

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.515	0.593	0.532	0.556
Poor	0.493	2.536	11.567	1.615
Fair	0.057	1.430	0.020	0.620
Good	3.574	0.010	3.171	0.000
Very_Good	2.700	1.011	7.093	0.011

Chi-square = 38.103 with D.F. = 12. Prob. > value = 0.000

Liklihood Ratio = 38.318 with prob. > value = 0.0001

phi correlation = 0.3231

Pearson Correlation r = -0.1158

Mantel-Haenszel Test of Linear Association = 4.884 with probability > value = 0.0271

The coefficient of contingency = 0.307

Cramer's V = 0.187

ANALYSIS FOR STANDARD Ibuprofen_low

Frequencies Observed

Frequencies

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0	1	0	1
Poor	6	3	18	4
Fair	10	5	10	11
Good	17	25	37	25
Very_Good	61	52	32	47

Column Proportions Observed

Proportions

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.012	0.000	0.011
Poor	0.064	0.035	0.186	0.045
Fair	0.106	0.058	0.103	0.125
Good	0.181	0.291	0.381	0.284
Very_Good	0.649	0.605	0.330	0.534

Ridit calculations for Ibuprofen_low

CALCULATIONS

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.000	0.000	0.000
Poor	0.064	0.032	0.000	0.032
Fair	0.106	0.053	0.064	0.117
Good	0.181	0.090	0.170	0.261
Very_Good	0.649	0.324	0.351	0.676

Ridit calculations for Ibuprofen_Hi

CALCULATIONS

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.012	0.006	0.000	0.006
Poor	0.035	0.017	0.012	0.029
Fair	0.058	0.029	0.047	0.076
Good	0.291	0.145	0.105	0.250
Very_Good	0.605	0.302	0.395	0.698

Ridit calculations for Placebo

CALCULATIONS

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.000	0.000	0.000
Poor	0.186	0.093	0.000	0.093
Fair	0.103	0.052	0.186	0.237
Good	0.381	0.191	0.289	0.479
Very_Good	0.330	0.165	0.670	0.835

Ridit calculations for Aspirin

CALCULATIONS

	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.011	0.006	0.000	0.006
Poor	0.045	0.023	0.011	0.034
Fair	0.125	0.062	0.057	0.119

```
Good            0.284      0.142      0.182      0.324
Very_Good       0.534      0.267      0.466      0.733

Ridits for all variables

            RIDITS
          Ibuprofen_low Ibuprofen_Hi    Placebo    Aspirin
None            0.000      0.006      0.000      0.006
Poor            0.032      0.029      0.093      0.034
Fair            0.117      0.076      0.237      0.119
Good            0.261      0.250      0.479      0.324
Very_Good       0.676      0.698      0.835      0.733

Mean RIDITS Using the Reference Values

Variables Ibuprofen_low  Ibuprofen_Hi     Placebo     Aspirin
                0.500       0.492       0.340       0.451


Overall mean for RIDITS in non-reference groups =   0.4244
Chisquared =   27.695 with probability <   0.0000

z critical ratios

Variables Ibuprofen_low  Ibuprofen_Hi     Placebo     Aspirin
                0.000      -0.182      -3.823      -1.146


significance level used for comparisons =    2.394
Ibuprofen_Hi vs Ibuprofen_low not significant
Placebo vs Ibuprofen_low significant
Aspirin vs Ibuprofen_low not significant
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. (two analyses omitted to conserve space)
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ANALYSIS FOR STANDARD Aspirin

Frequencies Observed

            Frequencies
          Ibuprofen_lowIbuprofen_Hi   Placebo   Aspirin

      None         0         1         0         1
      Poor         6         3        18         4
      Fair        10         5        10        11
      Good        17        25        37        25
 Very_Good        61        52        32        47

Column Proportions Observed

            Proportions
          Ibuprofen_low Ibuprofen_Hi    Placebo    Aspirin
None            0.000      0.012      0.000      0.011
Poor            0.064      0.035      0.186      0.045
Fair            0.106      0.058      0.103      0.125
Good            0.181      0.291      0.381      0.284
```

Very_Good	0.649	0.605	0.330	0.534

Ridit calculations for Ibuprofen_low

CALCULATIONS				
	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.000	0.000	0.000
Poor	0.064	0.032	0.000	0.032
Fair	0.106	0.053	0.064	0.117
Good	0.181	0.090	0.170	0.261
Very_Good	0.649	0.324	0.351	0.676

Ridit calculations for Ibuprofen_Hi

CALCULATIONS				
	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.012	0.006	0.000	0.006
Poor	0.035	0.017	0.012	0.029
Fair	0.058	0.029	0.047	0.076
Good	0.291	0.145	0.105	0.250
Very_Good	0.605	0.302	0.395	0.698

Ridit calculations for Placebo

CALCULATIONS				
	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.000	0.000	0.000
Poor	0.186	0.093	0.000	0.093
Fair	0.103	0.052	0.186	0.237
Good	0.381	0.191	0.289	0.479
Very_Good	0.330	0.165	0.670	0.835

Ridit calculations for Aspirin

CALCULATIONS				
	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.011	0.006	0.000	0.006
Poor	0.045	0.023	0.011	0.034
Fair	0.125	0.062	0.057	0.119
Good	0.284	0.142	0.182	0.324
Very_Good	0.534	0.267	0.466	0.733

Ridits for all variables

RIDITS				
	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
None	0.000	0.006	0.000	0.006
Poor	0.032	0.029	0.093	0.034
Fair	0.117	0.076	0.237	0.119
Good	0.261	0.250	0.479	0.324
Very_Good	0.676	0.698	0.835	0.733

Mean RIDITS Using the Reference Values

Variables	Ibuprofen_low	Ibuprofen_Hi	Placebo	Aspirin
	0.549	0.546	0.384	0.500

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Overall mean for RIDITS in non-reference groups =   0.4902
Chisquared =   20.447 with probability <   0.0001

z critical ratios

Variables Ibuprofen_low  Ibuprofen_Hi     Placebo     Aspirin
               1.146       1.040      -2.730       0.000


significance level used for comparisons =    2.394
Ibuprofen_low vs Aspirin not significant
Ibuprofen_Hi vs Aspirin not significant
Placebo vs Aspirin significant
```

Notice that we chose to let ***each*** group be the comparison standard. This permitted comparisons among each of the groups. Typically however one would select only one group as a standard with which to compare to the other groups. If "aspirin" was the standard comparison group, only the "placebo" treatment group was significantly different.