

## **RAGE-RGEQUATE Manual**

**GUI Version  
October 2004**

### **Disclaimer of Warranty**

No warranties are made, express or implied, that LEGS is free of error, that it is consistent with any particular standard, or that it will meet the requirements of any particular application. The author disclaims any direct or consequential damages resulting from use of this program.

## Introduction

This manual describes how to run the computer program *RAGE-RGEQUATE*. This program conducts random groups equipercenile equating using cubic spline postsMOOTHing and log-linear presMOOTHing. Kolen and Brennan (2004) give descriptions of these methods.

The original version of *RAGE* was written in the *C* programming language by Lingjia Zeng for Macintosh computers. The original version of *RGEQUATE* was written in the *C* programming by Bradley Hanson for Macintosh computers. Both of these programs have extensive graphical output.

Under the supervision of Michael Kolen, Zhongmin Cui merged the *C*-code from the *RAGE* and *RGEQUATE* into a single *RAGE-RGEQUATE* program, eliminating all of the graphical output. The graphical output was eliminated because there was a desire to have a program that would function on both PC and Macintosh computers with minimal maintenance. We may consider adding graphical output in the future. Yueh-Mei Chien created graphical user interfaces for running the program under Windows 98/2000/XP and Mac OS *X*.

Currently there are four versions of the program: A command line program that functions under Macintosh OS 8.6 and OS 9. A command line program that functions under DOS, Windows 95/98, Windows 2000, and Windows XP. A graphical user interface (GUI) version that functions under Macintosh OS *X*. A GUI version that works under Windows 98/2000 and Windows XP.

This manual is for the GUI version that works under Windows 98/2000/XP and Macintosh OS *X*.

Please direct any questions about these programs to

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## Running the Program

After downloading and uncompressing as needed, the program is run by double-clicking on the program icon and the program window will show up as Figure 1 below.

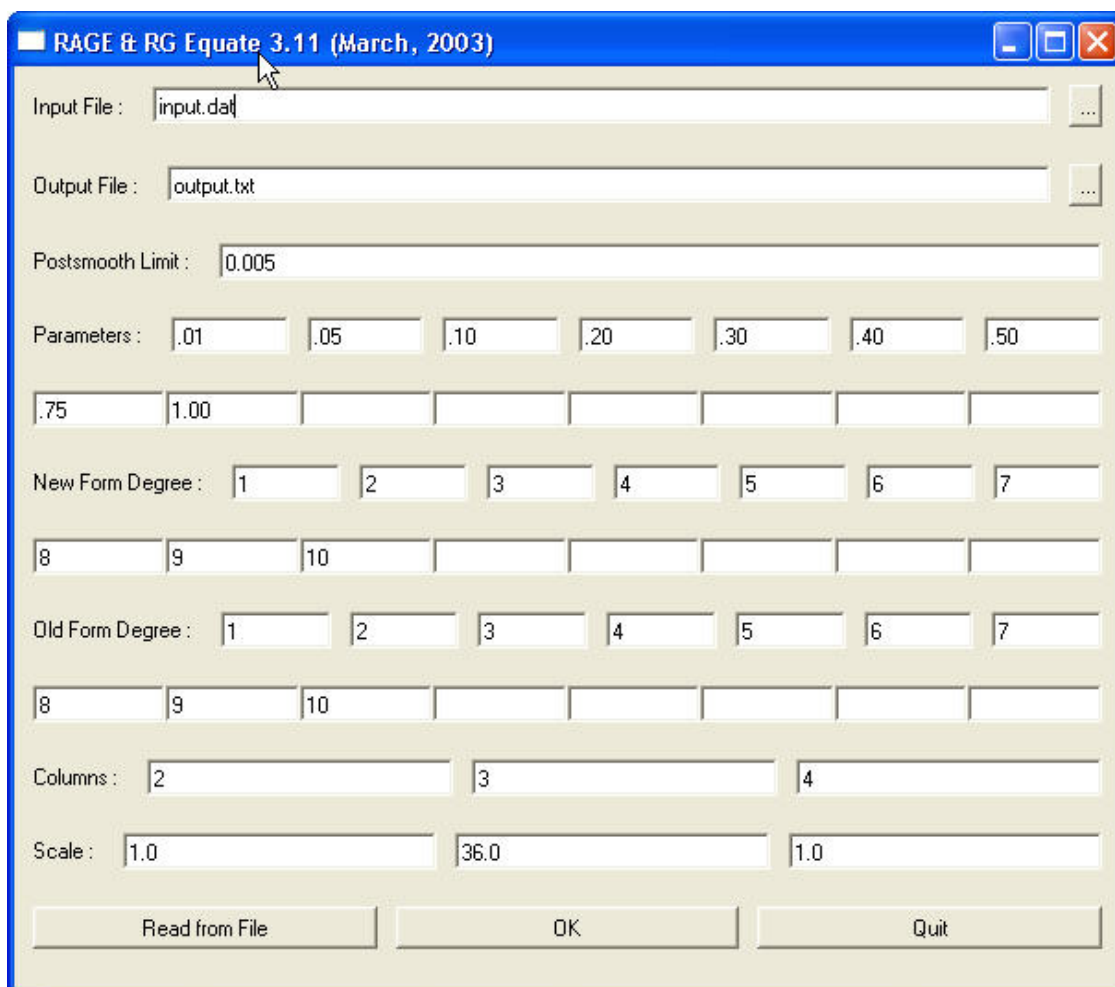


Figure 1: RAGE-RGEQUATE window

In the folder that was downloaded, there is a control file and data file as described below. To run the program click the “Read From File” button to read in the control file or just type in all information needed to run the program through the GUI. And then click OK to compute the result. The result window should pop up in a second. The data file and control file can be used to reproduce many of the equating results in Chapters 2 and 3 of Kolen and Brennan (2004). These sample data and control files are given as follows.

### Input Data

A sample input data file is given below. For each line: the first entry is the raw score; the second entry is the frequency for the new form; the third entry is the frequency for the old form; and the fourth entry is the raw-to-scale score equivalent for the old form.

|   |   |    |     |
|---|---|----|-----|
| 0 | 0 | 0  | 0.5 |
| 1 | 1 | 1  | 0.5 |
| 2 | 1 | 3  | 0.5 |
| 3 | 3 | 13 | 0.5 |
| 4 | 9 | 42 | 0.5 |

|    |     |     |         |
|----|-----|-----|---------|
| 5  | 18  | 59  | 0.69    |
| 6  | 59  | 95  | 1.6562  |
| 7  | 67  | 131 | 3.1082  |
| 8  | 91  | 158 | 4.6971  |
| 9  | 144 | 161 | 6.1207  |
| 10 | 149 | 194 | 7.4732  |
| 11 | 192 | 164 | 8.9007  |
| 12 | 192 | 166 | 10.3392 |
| 13 | 192 | 197 | 11.6388 |
| 14 | 201 | 177 | 12.8254 |
| 15 | 204 | 158 | 14.0157 |
| 16 | 217 | 169 | 15.2127 |
| 17 | 181 | 132 | 16.3528 |
| 18 | 184 | 158 | 17.3824 |
| 19 | 170 | 151 | 18.3403 |
| 20 | 201 | 134 | 19.2844 |
| 21 | 147 | 137 | 20.1839 |
| 22 | 163 | 122 | 20.9947 |
| 23 | 147 | 110 | 21.7    |
| 24 | 140 | 116 | 22.322  |
| 25 | 147 | 132 | 22.9178 |
| 26 | 126 | 104 | 23.5183 |
| 27 | 113 | 104 | 24.1314 |
| 28 | 100 | 114 | 24.7525 |
| 29 | 106 | 97  | 25.2915 |
| 30 | 107 | 107 | 25.7287 |
| 31 | 91  | 88  | 26.1534 |
| 32 | 83  | 80  | 26.648  |
| 33 | 73  | 79  | 27.2385 |
| 34 | 72  | 70  | 27.9081 |
| 35 | 75  | 61  | 28.6925 |
| 36 | 50  | 48  | 29.7486 |
| 37 | 37  | 47  | 31.201  |
| 38 | 38  | 29  | 32.6914 |
| 39 | 23  | 32  | 34.1952 |
| 40 | 15  | 12  | 35.4615 |

## Input Control

Listed on the next page is a sample control file. Each piece of information in the control file can be found in the GUI interface of this program. In entering control files, a “#” is used to indicate a comment. The lines that are not comments are required. Note that the first line is a title for the run. The “Limit” line is used to control the range of postsMOOTHING. Setting it at “.005” indicates the smoothing is conducted between the .5<sup>th</sup> and 99.5<sup>th</sup> percentiles. The line labeled “Parameter” gives the postsMOOTHING “S” parameters.

In the line labeled “New” the maximum value of the “C” parameter is listed for presMOOTHING for the new form. In the line labeled “Old” list the maximum value of the “C” parameter for presMOOTHING for the old form. If other values are listed in the “Old” or “New” lines, the program will pair these with values in the “Old” form parameters listed to create supplemental output. This supplemental output will be of interest when after an initial run, it is decided to use on value of “C” for the new form and a different value of C for the old form. The program, by

default, calculates presmoothing results for 12 pairs of “C” values (“C”=1 through 12 with the same “C” values for both new form and old form. The lines labeled "New" and "Old" parameters allow researchers to get supplement output with any desired pairs of “C” values. If the number of “C” values listed is smaller for one form than the other, the last C value will be replicated to make the numbers match. For example, if as in the example that follows, the following “New” and “Old” lines are used:

New 1 2 4 6 8 12

Old 1 2 3

(They are referred in the program window as New Form Degree and Old Form Degree.)

then the pairs of C values (new, old) are:

1,1

2,2

4,3

6,3

8,3

12,3

This is helpful when the researcher wants to fix one “C” value for one form and change “C” values for the other.

The “Columns” line gives the columns in the input file for the new form frequencies, the old form frequencies, and the raw-to-scale score equivalents for the old form. The “Scale” line indicates the minimum, maximum, and increment value for scale scores. The “input” line lists the filename for the input file. The “Output” line lists the filename for the output file.

Example data from Kolen and Brennan equating book Table 2.5  
 # Results should be close to results in Table 7.1

```
# postsmoothlimit
Limit                0.005

# Postsmooth Parameter (Maximum number is 15)
Parameter           0.01  0.05  0.10  0.20  0.30  0.40  0.50  0.75  1.00

#New form degree parameter for presmoothing
#Maximum number is 15
#Maximum value is 16
New                  1 2 4 6 8 12

#Old form degree parameter for presmoothing (Maximum number is 15)
#Maximum number is 15
#Maximum value is 16
Old                  1 2 3

# columns to be read
Columns              2 3 4

# scale: min, max, increment
Scale                1.0 36.0 1.0

#input file
Input                win_in.dat

#output file
Output                win_out.txt
```

## Output

The output is divided into sections as listed below. The Table numbers given below indicate where the output can be found in Kolen and Brennan (2004). Note that the values from this program can differ slightly from those in the examples in the Kolen and Brennan (2004) text.

- Run Parameters set by control file and sample sizes.
- Raw-to-Raw Score Conversion for Postsmoothing.
  - Standard errors from Table 3.2
  - Unsmoothed equipercentile equivalents (labeled “NoSmooth”) from Table 2.7
  - Linear equivalents from Table 2.7
  - Postsmoothed equipercentile equivalents from Table 3.7

Note: unsmoothed equivalent for raw score of zero is .5 in output and 0 in book.
- Raw Score Moments for Postsmoothing.
  - Raw score moments for both forms from Table 2.6 and Table 3.8
  - Raw score moments for unsmoothed equipercentile equating from Tables 2.6 and 3.8
  - Moments of equated scores for linear equating from Table 2.6
  - Raw score moments for postsmoothed equipercentile equating from Table 3.8
- Unrounded Raw-to-Scale Score Conversion for Postsmoothing.
  - Unsmoothed equipercentile conversions from Tables 2.8 and 3.10
  - Linear conversions from Table 2.8
  - Postsmoothed conversions from Table 3.10
- Rounded Raw-to-Scale Score Conversion for Postsmoothing.
  - Unsmoothed equipercentile conversions from Tables 2.8 and 3.11
  - Linear conversions from Table 2.8
  - Postsmoothed conversions from Table 3.11
- Scale Score Moments for Postsmoothing:
  - Scale score moments for both forms from Table 2.9 and Table 3.9
  - Scale score moments for unsmoothed equipercentile equating from Tables 2.9 and 3.9
  - Moments of scale scores for linear equating from Table 2.9
  - Scale score moments for postsmoothed equipercentile equating from Table 3.9
- Data for Form Y and Form X:
  - Frequency distributions, percentile ranks, etc. from Table 2.5.
- Moments and Fit Statistics for Presmoothing (Log Linear).
  - Information from Table 3.1
- Raw-to-Raw Score Conversion for Presmoothing.
  - Values for C=6 are from Table 3.2

- Raw Score Moments for Presmoothing:  
Moments for unsmoothed raw score distributions from Tables 2.6 3.3, 3.9  
Moments for C=6 are from Table 3.3
- Unrounded Raw-to-Scale Score Conversion for Presmoothing.  
Values for C=6 are from Table 3.5
- Rounded Raw-to-Scale Score Conversion for Presmoothing.  
Values for C=6 are from Table 3.5
- Scale Score Moments for Presmoothing:  
Scale score moments for both forms from Tables 2.9, 3.4, 3.9  
Scale score moments for unsmoothed equipercentile equating from Tables 2.9, 2.4, 3.9  
Scale score moments for presmoothed equipercentile equating from Table 3.4 for C=6
- Smoothed distribution Data for Form X:  
Relative frequencies for unsmoothed (raw) and smoothed new form distributions
- Smoothed distribution Data for Form Y:  
Relative frequencies for unsmoothed (raw) and smoothed old form distributions
- Raw-to-Raw Score Conversion for Presmoothing.  
Results for selected combinations of C-values
- Raw Score Moments for Presmoothing:  
Moments for unsmoothed raw score distributions from Tables 2.6 3.3, 3.9  
Results for selected combinations of C-values
- Unrounded Raw-to-Scale Score Conversion for Presmoothing.  
Results for selected combinations of C-values
- Rounded Raw-to-Scale Score Conversion for Presmoothing.  
Results for selected combinations of C-values
- Scale Score Moments for Presmoothing:  
Results for selected combinations of C-values

### **Changes:**

3.15

Maximum number of presmoothing parameters is changed from 16 to 15 in order to reduce confusion. Add the limitation that the maximum number of data columns in input file should be 26.

### **References**



Kolen, M. J., & Brennan, R. L. (2004) *Test equating, scaling, and linking: methods and practices* (2nd ed.). New York: Springer-Verlag