

## **GOLF DATA**

To compare the average distances traveled by three brand's of golf balls, ten balls were randomly selected from each of the three brands and the distance traveled by each ball was recorded.

Brand A: 251.2, 245.1, 248, 251.1, 260.5, 250, 253.9, 244.6, 254.6, 248.8 Brand B: 263.2, 262.9, 265, 254.5, 264.3, 257, 262.8, 264.4, 260.6, 255.9 Brand C: 269.7, 263.2, 277.5, 267.4, 270.5, 265.5, 270.7, 272.9, 275.6, 266.5

|          |          | 2 🐴 📲 📺 🗏 🤅 | 15 30    |         |        |               |     |
|----------|----------|-------------|----------|---------|--------|---------------|-----|
| valuuuus | var00001 | var00002    | var00003 | var     | var    | var           | var |
| 1        | 251.20   | 263.20      | 269.70   |         |        |               |     |
| 2        | 245.10   | 262.90      | 263.20   |         |        |               |     |
| 3        | 248.00   | 265.00      | 277.50   |         |        |               |     |
| 4        | 251.10   | 254.50      | 267.40   |         |        |               |     |
| 5        | 260.50   | 264.30      | 270.50   |         |        |               |     |
| 6        | 250.00   | 257.00      | 265.50   |         |        |               |     |
| 7        | 253.90   | 262.80      | 270.70   |         |        |               |     |
| 8        | 244.60   | 264.40      | 272.90   |         |        |               |     |
| 9        | 254.60   | 260.60      | 275.60   |         | 🔶 Тур  | e in data.    |     |
| 10       | 248.80   | 255.90      | 266.50   |         | 🔸 Clic | k Variable Vi | ew. |
| 11       |          |             |          |         |        |               |     |
| 12       |          |             |          |         |        |               |     |
| 13       |          |             |          |         |        |               |     |
| 14       |          |             |          |         |        |               |     |
| 15       |          |             |          |         |        |               |     |
| 16       |          |             |          |         |        |               |     |
| 17       |          |             |          |         |        |               |     |
| 18       |          |             |          | 100-202 |        |               |     |



| Edit    | View Data 1 | ransform Ar | nalyze Graphs | ; Utilities W | /indow Help |        |                  |     |     |     |     |          |     |      |
|---------|-------------|-------------|---------------|---------------|-------------|--------|------------------|-----|-----|-----|-----|----------|-----|------|
|         | s 💷 🗠       | ~ 5         | - 2 44        | ₩ 🖬 🗄         | 1           | 0      |                  |     |     |     |     |          |     |      |
| brand_3 | 3           |             |               |               |             |        |                  |     |     |     |     |          |     |      |
|         | brand_1     | brand_2     | brand_3       | var           | var         | var    | var              | var | var | var | var | var      | var |      |
| 1       | 251.20      | 263.20      | 269.70        |               |             |        |                  |     |     |     |     |          |     |      |
| 2       | 245.10      | 262.90      | 263.20        |               |             | 0      |                  | 0   |     |     |     |          | -   | 1    |
| 3       | 248.00      | 265.00      | 277.50        |               |             |        |                  |     |     |     | 1   |          |     |      |
| 4       | 251.10      | 254.50      | 267.40        |               |             |        |                  |     |     |     |     |          |     |      |
| 5       | 260.50      | 264.30      | 270.50        |               |             |        |                  |     |     |     |     |          |     |      |
| 6       | 250.00      | 257.00      | 265.50        |               |             |        |                  |     |     |     |     |          |     |      |
| 7       | 253.90      | 262.80      | 270.70        |               |             |        |                  |     |     |     |     |          |     |      |
| 8       | 244.60      | 264.40      | 272.90        |               |             | 0      | 2                | 0   | 2   | 2   | 2   | 0        | 0   |      |
| 9       | 254.60      | 260.60      | 275.60        |               |             |        |                  |     |     |     |     |          |     |      |
| 10      | 248.80      | 255.90      | 266.50        |               |             |        |                  |     |     |     | 1   | 3        |     |      |
| 11      |             |             |               |               |             |        |                  |     |     |     |     |          |     |      |
| 12      | 2           | 2           |               |               |             |        |                  |     |     |     |     |          |     |      |
| 13      | 1           | 2           | 2             |               |             |        |                  |     |     |     |     |          |     |      |
| 14      | 2           | 2           | 5             |               |             |        |                  |     |     |     |     |          |     |      |
| 15      | 2           | 2           | 2             |               |             |        |                  |     |     |     |     |          |     |      |
| 16      |             |             |               |               |             | 2      |                  | 0   |     |     |     |          | 0   |      |
| 17      |             |             |               |               |             |        |                  |     |     |     |     |          |     |      |
| 18      | 1           | 20          |               |               |             |        |                  |     |     |     | 1   |          |     |      |
| 19      |             | -           |               |               |             | 2      |                  |     |     |     |     |          |     |      |
| 20      |             |             |               |               |             |        |                  |     |     |     |     |          |     |      |
| 21      | 7           | 2           | 2             |               |             |        |                  |     |     |     |     |          |     |      |
| 22      |             |             |               |               |             |        |                  |     |     |     |     |          |     |      |
| 23      | × .         | ×           |               |               |             |        |                  |     |     |     |     |          |     |      |
| 24      |             |             |               |               |             | 2      |                  | 0   |     |     |     |          | 0   |      |
| 25      | × .         |             | × .           |               |             |        |                  |     |     |     |     |          |     |      |
| 26      |             | 1           |               |               | 2           | 2      | 1                | -   | 1   | 1   | Ŭ   | <u> </u> |     |      |
| 27      |             | -           |               |               |             | 2      |                  |     |     |     |     |          |     |      |
| 28      | × .         | 2           |               |               |             |        |                  |     |     |     |     |          |     |      |
| 29      | 2           | 3           | 3             |               |             |        |                  |     |     |     |     |          |     |      |
| 30      | 2           | 2           | 5             |               |             |        |                  |     |     |     |     |          |     |      |
| 31      |             |             |               |               |             |        |                  |     |     |     |     |          |     |      |
| 32      |             |             |               |               |             | 0      | 2                | 0   | 2   | 2   | 2   | 0        | 0   |      |
| > Data  | View & Vari | able View / |               |               |             | 1      |                  | 12  | 1.  | 1.  | 1   | 1        | 1   |      |
|         | A           |             |               |               |             | Specie | Processor is re- | adv |     |     |     |          |     | 1000 |

|   | a 🔍 🔊   |         | Reports<br>Descriptive Statistic |       |              |      |       |         |          |          |        |     |     |   |
|---|---------|---------|----------------------------------|-------|--------------|------|-------|---------|----------|----------|--------|-----|-----|---|
| 11 : brand_   | 3       |         | Custom Tables                    | •     | Descriptives |      |       |         |          |          |        |     |     |   |
|   | brand 1 | brand 2 | Compare Means                    |       | Explore      | var  | var   | var     | var      | var      | var    | var | var | T |
| 1   | 251.20  | 263.2   | Mixed Models                     | eir   | Ratio        |      |       |         |          |          |        |     |     |   |
| 2   | 245.10  | 262.9   | Correlate                        | •1    |              |      |       |         |          |          | 1      | 1   | 2   |   |
| 3   | 248.00  | 265.C   | Regression                       | •     |              |      |       |         |          |          |        |     |     |   |
| 4   | 251.10  | 254.5   | Loglinear                        | •     |              |      |       |         |          |          |        |     |     |   |
| 5   | 260.50  | 264.3   | Classify                         | +     |              |      |       |         |          |          |        |     |     |   |
| 6   | 250.00  | 257.C   | Data Reduction                   | +     |              |      |       |         |          |          |        |     |     |   |
| 7   | 253.90  | 262.6   | Scale                            | *     |              |      |       |         | 2        |          |        | 2   |     |   |
| 8   | 244.60  | 264.4   | Time Series                      | s i   |              |      |       |         |          |          |        |     |     |   |
| 9   | 254.60  | 260.6   | Survival                         |       |              |      |       |         |          |          |        |     |     |   |
| 10  | 248.80  | 255.9   | Multiple Response                |       |              |      |       |         | 5        | 6        | 0      | S   |     |   |
| 11  |         |         |                                  | 11227 |              | - 🌏  | Click | Anal    | VZe      |          |        |     |     |   |
| 12  |         |         |                                  |       |              |      | Cher  | . / mai | y 20.    |          |        |     |     |   |
| 13  | 1       |         | 1                                |       |              | - 📀  | Selec | t Des   | criptiv  | e Statis | stics. |     |     |   |
| 14  |         |         |                                  |       |              |      | 0.1   |         |          |          |        |     |     |   |
| 15  |         |         |                                  |       |              | · ** | Selec | ct Des  | criptive | es.      |        |     |     |   |
| 16  |         |         |                                  |       |              |      |       |         | · ·      | 2        | 0      | 2   | 0   |   |
| 17  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 18  | -       |         |                                  |       |              |      |       |         |          |          |        | 1   |     |   |
| 19  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 20  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 21  | 2       | 1       | 1                                |       |              |      |       |         |          |          |        |     |     |   |
| 22  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 23  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 24  |         |         |                                  |       | 0            |      |       |         |          | 2        |        |     | -   |   |
| 25  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 26  |         |         | 1                                |       | 1            |      |       |         |          |          | 1      |     | 1   |   |
| 27  |         |         |                                  |       |              |      |       |         |          |          |        | 1   | ×   |   |
| 28  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| 29  | -       | 1       | 1                                |       |              |      |       | _       | -        |          |        | -   |     |   |
| 30  | 2       |         |                                  |       |              |      |       |         | 1        |          | 1      |     |     |   |
| 31  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |
| the second se |         |         | -                                |       | 0            |      |       |         | 2        | 2        | -      | 2   | 2   |   |
| 32  |         |         |                                  |       |              |      |       |         |          |          |        |     |     |   |

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|------------------------|-------------------|----------------------|-----------|----------|---------|---------|------------|-----|----------|-----|-----|---|
| 🖬 🗿 🔍 🗠 🗠              | 🔤 🔚 🗗             | M * 🖬 🗏              | 1 III 🔊   | <b>1</b> |         |         |            |     |          |     |     |   |
|                        |                   |                      |           |          |         |         |            |     |          |     |     |   |
| brand_1 br             | and_2 bran        | d_3 var              | var       | var      | var     | var     | var        | var | Var      | var | var |   |
| 1 251.20               | 263.20 26         | 69.70                |           | 1        |         |         |            | -   |          |     |     |   |
| 2 2 Descrip            | tives             |                      |           | ×        |         |         |            | 2   |          |     | 1   |   |
| 3 2                    |                   | Variable(s):         |           | OK 1     |         | 5       | <i>U</i> . | 8   | <i>.</i> | -   | 1   | - |
| 4                      |                   | brand_1              |           | Butte    |         | -       | -          | -   | -        | -   | -   | - |
| 6                      |                   | brand_2     brand_3  |           | Faste    |         |         |            |     |          |     |     | - |
| 7                      |                   |                      |           | Reset    | -       | S       | <i>S</i>   | 5.  | 6        | -   |     |   |
| 8 2                    |                   |                      |           | Cancel   |         |         |            |     |          | 1   |     |   |
| 9 2                    |                   |                      |           | Help     |         |         |            |     |          |     |     |   |
| 10 1                   |                   | 1                    |           |          |         |         | 1          |     |          | 1   | 1   |   |
| 11 Saves               | andardized values | s as variables       |           | Options  |         | 5       | <i>U</i> . | 8   | <i>.</i> | -   | 1   | - |
| 12                     |                   |                      |           | -        |         | -       | -          | -   | -        | -   | -   | - |
| 14                     |                   | ·                    |           | -        |         |         |            |     |          |     |     | - |
| 15                     |                   |                      |           |          | 6       | S       | <i>S</i>   | 5.  | 6        | -   |     |   |
| 16 .                   |                   |                      |           |          |         |         |            |     |          | 1   |     |   |
| 17 .                   |                   | 2                    |           |          |         |         |            |     |          |     |     |   |
| 18 .                   | 2                 |                      |           |          |         |         | 1          |     |          | 1   | 1   |   |
| 19 .                   | 100               |                      |           | 0        |         | 5       | <i>U</i> . | 8   | <i>.</i> | -   | S   | - |
| 20 .                   |                   |                      |           |          |         |         |            |     |          | -   | -   | - |
| 22                     | - * 1             | Move all t           | hree v    | ariable  | s to Va | ariable | (s) box    |     |          |     | -   |   |
| 23                     |                   | Click Opti           | one       |          |         |         |            |     |          | -   | 1   | + |
| 24                     |                   | спек Ори             | ons.      |          |         |         |            |     |          |     |     |   |
| 25 .                   |                   |                      |           |          |         |         |            |     |          |     |     |   |
| 26 .                   |                   |                      |           |          |         |         |            |     |          |     |     |   |
| 2/ .                   |                   |                      |           |          |         |         |            | 5   |          | 3   |     | - |
| 20                     |                   |                      |           |          |         |         |            |     |          |     |     | - |
| 30                     |                   |                      |           |          |         |         |            |     |          |     | -   |   |
| 31                     |                   |                      |           |          |         |         |            |     |          | -   |     |   |
| 32                     |                   |                      |           |          |         |         |            |     |          | 1   |     |   |
| N Bata View & Variable | View /            | - T. I.              |           |          | •       |         | 1          |     |          | 1   | 1   | + |

| steat |         |             |                 |             |          |         | _          |              |          |          |     |     | _   | - |
|-------|---------|-------------|-----------------|-------------|----------|---------|------------|--------------|----------|----------|-----|-----|-----|---|
|       | 3 🗳 🔽   | n en p      | - 1 <u>2</u> #4 |             |          | 0       |            |              |          |          | _   |     |     |   |
| :     |         |             |                 |             |          |         |            |              |          |          |     |     |     |   |
|       | brand_1 | orand_2     | brand_3         | var         | var      | var     | Var        | var          | var      | var      | var | var | var |   |
| 1     | 251.20  | 263.20      | 269.70          | )           |          |         |            |              |          |          |     |     | _   |   |
| 2     | Desci   | iptives     |                 |             |          | x       |            |              | -        | -        | -   | -   |     | _ |
| 3     |         | a           | 0.15            | Variabla(e) | Dec.     | г ок Г  | -          | -            | 8        | 8        |     |     |     | _ |
| 4     |         | Descriptiv  | es: Options     |             | X        |         | <u> </u>   |              |          |          |     |     |     | _ |
| 0     |         | 🔽 Mean      |                 | Sum -       | Continue | Paste   | -          |              |          |          |     |     |     | - |
| 7     |         | Dispersio   | n               |             | Cancel   | Reset   | -          |              |          |          |     |     |     | - |
| 8     |         | 🔽 Std. d    | leviation 🔽     | Minimum     | Cancer   | Cancel  |            |              | -        | -        |     |     |     | - |
| 9     |         | I Variar    | nce 🔽           | Maximum     | Help     | Heb     | -          |              | 0        | 0        | 0   | 0   | 2   | - |
| 10    |         | Rapo        | • F             | S.E. mean   |          | nop     | -          | 3            | 3        | 3        | 3   | 3   | 3   | - |
| 11    | □ Save  | in riding   | • /             | o.c. moun   |          | Options |            |              |          |          |     |     |     | - |
| 12    |         | Distributi  | on              |             |          |         |            |              |          |          |     |     |     | - |
| 13    |         | F Kurto:    | sis 🔽           | Skewness    |          | -       |            |              |          |          |     |     |     |   |
| 14    |         | - Display 0 | )rder           |             |          |         |            |              |          |          |     |     |     |   |
| 15    | -       | Varia       | ble list        |             |          |         |            |              |          |          |     |     | 1   |   |
| 16    |         | C Alpha     | abetic          |             |          |         |            |              | 2        | 2        | 2   | 2   |     |   |
| 17    | ×:      | C Asce      | nding means     |             |          |         |            |              |          |          |     |     |     |   |
| 18    |         | C Desc      | ending means    |             |          |         | ĵ          |              |          |          |     |     |     |   |
| 19    |         |             |                 |             |          |         |            | -            |          |          |     |     |     |   |
| 20    |         |             |                 | -           |          |         |            | <b>C</b> 1 1 |          | 1.5      |     |     |     | _ |
| 21    |         |             |                 |             |          |         | - <b>*</b> | Спеск а      | n desn   | red tter | ns. |     |     | _ |
| 22    |         |             |                 |             |          | 2       | -          | Click Co     | ontinue  |          |     |     |     | _ |
| 24    |         |             |                 |             |          |         |            | Chick C      | Jintinat |          |     | _   | -   | - |
| 25    |         |             |                 |             | 2        | 2       | 2          |              | 0        | 0        | 2   | 2   | 2   | - |
| 26    |         |             |                 |             |          | S       | 3          |              | 8        | 8        | 8   | 8   |     | - |
| 27    |         |             |                 |             |          |         |            |              |          |          |     |     |     | - |
| 28    |         |             |                 |             |          |         |            |              |          |          |     |     |     | - |
| 29    |         |             |                 |             |          | -       |            |              | -        | -        |     |     | -   | - |
| 30    |         |             |                 |             |          |         |            |              |          |          |     |     |     | - |
| 31    |         |             | · · · ·         | 1           | 1        | 1       |            | 1            | 2        | 2        | 2   | 2   | 1   | - |
| 32    |         |             |                 |             |          |         |            |              |          |          |     |     |     |   |
|       |         |             |                 |             |          | 1       |            | a të         | 0        | 0        | 1   | 1   | 1   |   |

| 2 DOI | an          |                 |                 |              | elatel 💷 | പരം     |           |                 |     |     |     |     |     | - |
|-------|-------------|-----------------|-----------------|--------------|----------|---------|-----------|-----------------|-----|-----|-----|-----|-----|---|
|       |             |                 |                 |              |          |         |           |                 |     |     | -   |     |     |   |
| ;     |             |                 |                 |              | -        |         | 1         | <b>F</b>        |     |     |     | 1   |     |   |
|       | brand_1     | brand_2         | brand_3         | var          | var      | var     | var       | var             | var | var | var | var | var |   |
| 1     | 251.20      | 263.20          | 269.70          |              |          |         |           | -               |     |     |     |     |     |   |
| 2     | 2 De        | scriptives      |                 |              |          |         | <li></li> | -               |     |     |     |     |     |   |
| 3     |             |                 |                 | Variable(s): |          | OK      | 1         | d               | -   |     | a   |     |     |   |
| 4     |             |                 |                 | 🔶 brand_1    | 1        |         | !         |                 |     |     |     |     |     |   |
| 5     |             |                 |                 | 🔶 brand_3    | 2        | Paste   |           |                 |     |     |     |     |     |   |
| 6     |             |                 | _               | 🔹 🕏 brand_3  | 3        | Reset   | 1         |                 |     |     |     |     |     |   |
|       |             |                 |                 |              |          | Cancel  | i         |                 |     |     |     |     |     | _ |
| 8     |             |                 |                 |              |          | Cancer  |           | 0               | 0   |     | 0   | 0   | 0   |   |
| 10    |             |                 |                 |              |          | Help    | I         | 8               | 0   | 8   | 8   | -   |     |   |
| 10    | 1 -         |                 |                 |              |          | Ontinna | 1         | -               |     |     | -   |     |     | _ |
| 12    | 1.5         | ave standardize | ed values as va | nables       |          | opuons  |           | 10              | 3   | 2   |     |     | 1   |   |
| 13    |             |                 |                 | -            | 1        | 1       | _         | -               |     |     | -   |     |     | - |
| 14    |             |                 |                 |              |          | -       |           |                 |     |     | -   | -   |     | - |
| 15    |             |                 |                 |              |          | -       |           | 2               |     |     | 3   | -   | -   | - |
| 16    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     | - |
| 17    |             |                 |                 | 2            | -        | 2       |           | 2               | 2   | 2   | 2   | - 2 | -   | - |
| 18    |             |                 |                 | 3            | 3        |         |           | 1               |     | 3   | S.  | 3   | 3   | - |
| 19    |             |                 |                 |              | 1        |         | 🔶 Cli     | $\sim k \cap K$ | _   |     | 0   | -   | -   | - |
| 20    |             |                 |                 |              |          |         |           | CR OIX.         |     |     |     |     | -   | _ |
| 21    | 1           | 1               | 1               |              |          |         |           |                 |     |     |     | -   | -   |   |
| 22    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     |   |
| 23    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     | _ |
| 24    |             |                 |                 |              |          |         | 0         | 0               |     |     | 2   |     |     |   |
| 25    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     |   |
| 26    |             | )               | )               | 1            | 8        | 8       |           |                 |     |     | S   | S   | 8   |   |
| 27    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     |   |
| 28    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     |   |
| 29    |             | 1               | 1               |              |          |         |           |                 |     |     |     |     |     |   |
| 30    |             |                 |                 |              |          |         |           |                 |     |     |     |     |     |   |
| 31    |             |                 |                 |              |          |         |           |                 |     |     |     | -   |     |   |
| 32    |             | ;               | :               |              | 2        | 2       | -         | 2               | 2   | -   | 2   | 2   | 2   | _ |
| ▶ \Da | ta View 🖌 🗸 | ariable View /  |                 | ·            |          |         | 4         | 1               |     |     |     |     |     |   |



Construct a scatter plot for the following data set:

 $\begin{array}{l}(3.6, 13), (4.7, 19), (1.4, 9), (5.5, 15), (4.8, 27), (4.3, 14),\\(3.0, 6), (4.2, 11), (6.0, 24), (6.8, 26), (4.1, 18), (3.2, 9),\\(4.0, 8), (1.9, 6), (0.4, 7), (4.9, 14), (5.6, 18), (5.6, 20) \,.\end{array}$ 

| SPSS      | 5 Data [Datas | Set1] - SPSS | Data Editor  |                |              |              |     |     |
|-----------|---------------|--------------|--------------|----------------|--------------|--------------|-----|-----|
| File Edit | View Data     | Transform A  | nalyze Grapł | ns Utilities A | Add-ons Wind | ow Help      |     |     |
| ۵ 🗠       | 🔒 🖭 🖷         | 🔶 🌦 🖟        | M 📲          | nt 🗄 🕸         | 🖪 🖗          |              |     |     |
| 19 : y    |               |              |              |                |              |              |     |     |
|           | x             | Y            | var          | var            | var          | var          | var | var |
| 1         | 3.60          | 13.00        |              |                |              |              |     |     |
| 2         | 4.70          | 19.00        |              |                |              |              |     |     |
| 3         | 1.40          | 9.00         |              |                |              |              |     |     |
| 4         | 5.50          | 15.00        | ~            | Type in d      | ata          | 1            |     |     |
| 5         | 4.80          | 27.00        |              | Type III u     | iata.        |              |     |     |
| 6         | 4.30          | 14.00        |              | Click Var      | hable View.  |              |     |     |
| 7         | 3.00          | 6.00         | >            | Change t       | he names of  | f the variab | le. |     |
| 8         | 4.20          | 11.00        | >            | Click Dat      | ta View.     |              |     |     |
| 9         | 6.00          | 24.00        | >            | Click Gra      | aphs.        |              |     |     |
| 10        | 6.80          | 26.00        |              | Select Sc      | atter/Dot Pl | ot.          |     |     |
| 11        | 4.10          | 18.00        |              |                |              |              |     |     |
| 12        | 3.20          | 9.00         |              |                |              |              |     |     |
| 13        | 4.00          | 8.00         |              |                |              |              |     |     |
| 14        | 1.90          | 6.00         |              |                |              |              |     |     |
| 15        | .40           | 7.00         |              |                |              |              |     |     |
| 16        | 4.90          | 14.00        |              |                |              |              |     |     |
| 17        | 5.60          | 18.00        |              |                |              |              |     |     |
| 18        | 5.60          | 20.00        |              |                |              |              |     |     |
| 19        |               |              |              |                |              |              |     |     |
| 20        |               |              |              |                |              |              |     |     |
|           |               |              |              |                |              |              |     |     |
|           |               |              |              |                |              |              |     |     |

| SPSS      | Data [Datas | Set11 - SPSS | Data Editor  |                |             |         |        |        |   |
|-----------|-------------|--------------|--------------|----------------|-------------|---------|--------|--------|---|
| File Edit | View Data   | Transform A  | nalyze Graph | ns Utilities A | dd-ons Wind | ow Help |        |        |   |
|           | a 🖬 📥       | 🔶 🏪 🖪        | AA •=        | rta 🖽 🗗        | 💷 🖼 🙆       |         |        |        |   |
|           |             |              |              |                |             |         |        |        |   |
| 19:y      | ,           |              |              |                |             |         |        | ,      |   |
|           | Х           | γ            | var          | var            | var         | var     | var    | var    |   |
| 1         | 3.60        | 13.00        |              |                |             |         |        |        |   |
| 2         | 4.70        | 19.00        |              |                |             |         |        |        |   |
| 3         | 1.40        | 9.00         |              |                |             |         |        |        |   |
| 4         | 5.50        | 15.00        |              | 🔶 Click 🛛      | Define.     |         |        |        |   |
| 5         | 4.80        | 27.00        | _            |                |             |         |        |        |   |
| 6         | 4.30        | 14.00        |              |                |             |         |        |        |   |
| 7         | 3.00        | 6.00         |              |                |             |         |        |        |   |
| 8         | 4.20        | 11.00        |              |                |             |         |        |        |   |
| 9         | 6.00        | 24.00        |              |                |             |         |        |        |   |
| 10        | 6.80        | 26.00        |              |                |             |         |        |        |   |
| 11        | 4.10        | 18.00        | 6            |                |             |         |        |        | 5 |
| 12        | 3.20        | 9.00         | S            | catter/Dot     |             |         |        | X      |   |
| 13        | 4.00        | 8.00         |              |                |             |         |        | Define |   |
| 14        | 1.90        | 6.00         |              | Simple         | 🔍 Ma        | trix    | Simple |        |   |
| 15        | .40         | 7.00         |              | Scatter        | ±€ Sca      | atter   | Dot    | Cancel |   |
| 16        | 4.90        | 14.00        |              | Overlay        | 3 D         |         |        | Help   |   |
| 17        | 5.60        | 18.00        | L            | Scatter        | Sea         | atter   |        |        |   |
| 18        | 5.60        | 20.00        |              |                | 1           | 1       |        |        |   |
| 19        |             |              |              |                |             |         |        |        |   |
|           |             |              |              |                |             | 1       |        |        |   |

| SPSS      | Data [DataS | et1] - SPSS Dat | a Editor                                 |
|-----------|-------------|-----------------|--|
| File Edit | View Data   | Transform Analy | ze Graphs Utilities Add-ons Window Help  |
| 🗁 🖬 d     | à 🖪 🔶       | 🔿 🗽 🖟 d         | A ∉直 冊亞馬 ≫ @                             |
| 19 : y    |             |                 |  |
| Í T       | х           | Y               | var var var var var var var var          |
| 1         | 3.60        | 13.00           |  |
| 2         | 4.70        | 19.00           | Simple Scatterplot                       |
| 3         | 1.40        | 9.00            | Y Aviet                                  |
| 4         | 5.50        | 15.00           |  |
| 5         | 4.80        | 27.00           | Paste                                    |
| 6         | 4.30        | 14.00           | X Axis:                                  |
| 7         | 3.00        | 6.00            |  |
| 8         | 4.20        | 11.00           | Set Markers by:                          |
| 9         | 6.00        | 24.00           | Нер                                      |
| 10        | 6.80        | 26.00           |  |
| 11        | 4.10        | 18.00           | Label Cases by:                          |
| 12        | 3.20        | 9.00            |  |
| 13        | 4.00        | 8.00            | Panel by                                 |
| 14        | 1.90        | 6.00            | Rows:                                    |
| 15        | .40         | 7.00            |  |
| 16        | 4.90        | 14.00           |  |
| 17        | 5.60        | 18.00           |  |
| 18        | 5.60        | 20.00           | Move x and y to the corresponding boxes. |
| 19        |             |                 | Click OK.                                |
| 20        |             |                 |  |
| 21        |             |                 | Nest variables (no empty columns)        |
| 22        |             |                 |  |
| 23        |             |                 | Template                                 |
| 24        |             |                 | Use chart specifications from:           |
| 25        |             |                 | File                                     |
| 26        |             |                 |  |
| 27        |             |                 | Titles Dptions                           |
| 28        |             |                 |  |
|           |             |                 |  |
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| SPSS  | Data [Datas | Set1] - SPSS | Data Editor             |
|-------|-------------|--------------|-------------------------|
|       |             |              |                         |
| 🖻 🖬 I | 兽 🖭 🐢       | 🕐 🏪 🖗        | A # # II 型 际 🔌 🔕        |
| 1 : x |             | 3.6          |                         |
|       | х           | у            | var var var var var var |
| 1     | 3.60        | 13.00        |                         |
| 2     | 4.70        | 19.00        | Sort Cases              |
| 3     | 1.40        | 9.00         |                         |
| 4     | 5.50        | 15.00        | Sort by: OK             |
| 5     | 4.80        | 27.00        | 🗸 🗸 - Ascending         |
| 6     | 4.30        | 14.00        |                         |
| 7     | 3.00        | 6.00         | Reset                   |
| 8     | 4.20        | 11.00        | Sort Order Cancel       |
| 9     | 6.00        | 24.00        | Ascending               |
| 10    | 6.80        | 26.00        | O Descending            |
| 11    | 4.10        | 18.00        |                         |
| 12    | 3.20        | 9.00         | Click Data.             |
| 13    | 4.00        | 8.00         | Select Sort Cases.      |
| 14    | 1.90        | 6.00         | Choose Sort by x.       |
| 15    | .40         | 7.00         | Click OK                |
| 16    | 4.90        | 14.00        |                         |
| 17    | 5.60        | 18.00        |                         |
| 18    | 5.60        | 20.00        |                         |
| 19    |             |              |                         |
| 201   |             |              |                         |

| File       Edit       View       Data       Transform       Analyze       Graphs       Utilities       Add-ons       Window       Help         Image: Second   | 🛃 *SPS    | S Data [Data | aSet1] - SPS | 6 Data Edito | r              |               |             |        |     |
|---|-----------|--------------|--------------|--------------|----------------|---------------|-------------|--------|-----|
| Image: Second | File Edit | View Data    | Transform A  | nalyze Grapł | ns Utilities A | dd-ons Windo  | ow Help     |        |     |
| 19:y         x       y       var       var       var       var       var       var       var         1       .40       7.00   | 🗁 🖪       | 🖽 🖷          | 🔸 🔶 🔓        | <b>M</b> •   | i 🗄 🕀          | 🛒 📎 🥥         |             |        |     |
| x         y         var   | 19 : y    |              |              |              |                |               |             |        |     |
| 1       .40       7.00       Image: constraint of the second s                             |           | х            | Y            | var          | var            | var           | var         | var    | var |
| 2       1.40       9.00       Image: stress of the stre                             | 1         | .40          | 7.00         |              |                |               |             |        |     |
| 3       1.90       6.00         4       3.00       6.00         5       3.20       9.00         6       3.60       13.00         7       4.00       8.00         8       4.10       18.00         9       4.20       11.00         10       4.30       14.00         11       4.70       19.00         12       4.80       27.00         13       4.90       14.00         14       5.50       15.00  | 2         | 1.40         | 9.00         |              |                |               |             |        |     |
| 4       3.00       6.00       Image: stress of the stre                             | 3         | 1.90         | 6.00         |              |                |               |             |        |     |
| 5       3.20       9.00   | 4         | 3.00         | 6.00         |              |                |               |             |        |     |
| 6       3.60       13.00       13.00         7       4.00       8.00       10       10         8       4.10       18.00       11       18.00         9       4.20       11.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         10       4.30       14.00       14.00         12       4.80       27.00       10         13       4.90       14.00       10         14       5.50       15.00       15.00   | 5         | 3.20         | 9.00         |              |                |               |             |        |     |
| 7       4.00       8.00       8.00       8.00       8.00         8       4.10       18.00       9       4.20       11.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         10       4.30       14.00       14.00       14.85.         11       4.70       19.00       14.80       27.00         12       4.80       27.00       14.00       14.00         13       4.90       14.00       14.00       14.00         14       5.50       15.00       15.00       15.00   | 6         | 3.60         | 13.00        |              |                |               |             |        |     |
| 8       4.10       18.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         10       4.30       14.00       three groups by 3.8 and 4.85.         11       4.70       19.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         12       4.80       27.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         13       4.90       14.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         13       5.50       15.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         14       5.50       18.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.  | 7         | 4.00         | 8.00         |              |                |               |             |        |     |
| 9       4.20       11.00       It is appropriate to classify x values into three groups by 3.8 and 4.85.         10       4.30       14.00       three groups by 3.8 and 4.85.         11       4.70       19.00       10         12       4.80       27.00       10         13       4.90       14.00       10         14       5.50       15.00       10         15       5.60       18.00       10   | 8         | 4.10         | 18.00        |              |                |               |             |        |     |
| 10     4.30     14.00     three groups by 3.8 and 4.85.       11     4.70     19.00   | 9         | 4.20         | 11.00        | 🔶 I          | t is appropi   | iate to class | ify x value | s into |     |
| 11       4.70       19.00         12       4.80       27.00         13       4.90       14.00         14       5.50       15.00         15       5.60       18.00   | 10        | 4.30         | 14.00        | t            | hree groups    | s by 3.8 and  | 4.85.       |        |     |
| 12     4.80     27.00       13     4.90     14.00       14     5.50     15.00       15     5.60     18.00   | 11        | 4.70         | 19.00        |              |                |               |             |        |     |
| 13         4.90         14.00           14         5.50         15.00           15         5.60         18.00   | 12        | 4.80         | 27.00        |              |                |               |             |        |     |
| 14         5.50         15.00           15         5.60         18.00         Image: Comparison of the second s  | 13        | 4.90         | 14.00        |              |                |               |             |        |     |
| 15 5.60 18.00   | 14        | 5.50         | 15.00        |              |                |               |             |        |     |
|   | 15        | 5.60         | 18.00        |              |                |               |             |        |     |
| 16 5.60 20.00   | 16        | 5.60         | 20.00        |              |                |               |             |        |     |
| 17 6.00 24.00   | 17        | 6.00         | 24.00        |              |                |               |             |        |     |
| 18 6.80 26.00   | 18        | 6.80         | 26.00        |              |                |               |             |        |     |
| 19  | 19        |              |              |              |                |               |             |        |     |
| 20  | 20        |              |              |              |                |               |             |        |     |

| sps 🔹     | S Data [Data | Set1] - SPSS | 6 Data Edito | or             |              |                               |       |        |   |
|-----------|--------------|--------------|--------------|----------------|--------------|-------------------------------|-------|--------|---|
| File Edit | View Data    | Transform A  | nalyze Grap  | hs Utilities A | dd-ons Windo | ow Help                       |       |        |   |
| 🗁 🔛       | 🔒 📴 🔶        | 🔶 🐜 🕼        | M • 🗐        | 🛉 🗄 🏚          | 🖪 🖗 🖪        |                               |       |        |   |
| 19 : у    |              |              |              |                |              |                               |       |        |   |
|           | х            | Y            | var          | var            | var          | var                           | var   | var    |   |
| 1         | .40          | 7.00         |              |                |              |                               |       |        |   |
| 2         | 1.40         | 9.00         |              | Click Data     |              |                               |       |        |   |
| 3         | 1.90         | 6.00         |              | Select Sort    | Casas        |                               |       |        |   |
| 4         | 3.00         | 6.00         |              |                | Cases.       |                               |       |        |   |
| 5         | 3.20         | 9.00         | · · · ·      | Choose So:     | rt by y.     |                               |       |        |   |
| 6         | 3.60         | 13.00        |              |                |              |                               |       |        |   |
| 7         | 4.00         | 8.00         | Sort         | Cases          |              |                               |       |        | Ì |
| 8         | 4.10         | 18.00        |              | curre          |              |                               |       |        | 1 |
| 9         | 4.20         | 11.00        | 🤣 x          |                |              | Sort by:                      |       | _ ОК   |   |
| 10        | 4.30         | 14.00        |              |                |              | 🧳 y Ascer                     | nding | Deste  |   |
| 11        | 4.70         | 19.00        |              |                |              |                               |       | Faste  |   |
| 12        | 4.80         | 27.00        |              |                |              |                               |       | Reset  |   |
| 13        | 4.90         | 14.00        |              |                |              | CSort Order-                  |       | Cancel |   |
| 14        | 5.50         | 15.00        |              |                |              | <ul> <li>Ascending</li> </ul> | 9     |        |   |
| 15        | 5.60         | 18.00        |              |                |              | O Descendi                    | ng    | Help   |   |
| 16        | 5.60         | 20.00        |              |                |              |                               |       |        |   |
| 17        | 6.00         | 24.00        |              |                |              |                               |       |        |   |
| 18        | 6.80         | 26.00        |              |                |              |                               |       |        |   |
| 19        |              |              |              |                |              |                               |       |        |   |
| 20        |              |              |              |                |              |                               |       |        |   |
|           |              |              |              |                |              |                               |       |        |   |

| 🔄 *SPS    | S Data [Data | aSet1] - SPS | S Data Edito | )r             |               |              |          |     |
|-----------|--------------|--------------|--------------|----------------|---------------|--------------|----------|-----|
| File Edit | View Data    | Transform A  | nalyze Grap  | hs Utilities A | Add-ons Windo | ow Help      |          |     |
| 🖻 🖪       | 🖽 🔶          | 🔸 🔶 🔓        | м 🖷          | i 🗄 🕮          | 🖪 🖗 🖉         |              |          |     |
| 19 : у    |              |              |              |                |               |              |          |     |
|           | х            | γ            | var          | var            | var           | var          | var      | Var |
| 1         | 1.90         | 6.00         |              |                |               |              |          |     |
| 2         | 3.00         | 6.00         |              |                |               |              |          |     |
| 3         | .40          | 7.00         |              |                |               |              |          |     |
| 4         | 4.00         | 8.00         |              |                |               |              |          |     |
| 5         | 1.40         | 9.00         |              |                |               |              |          |     |
| 6         | 3.20         | 9.00         |              |                |               |              |          |     |
| 7         | 4.20         | 11.00        |              |                |               |              |          |     |
| 8         | 3.60         | 13.00        |              |                |               |              |          |     |
| 9         | 4.30         | 14.00        | *            | It is appro    | priate to cla | issify y val | ues into |     |
| 10        | 4.90         | 14.00        |              | two group      | s by 13.5 oi  | : 14.5.      |          |     |
| 11        | 5.50         | 15.00        |              |                |               |              |          |     |
| 12        | 4.10         | 18.00        |              |                |               |              |          |     |
| 13        | 5.60         | 18.00        |              |                |               |              |          |     |
| 14        | 4.70         | 19.00        |              |                |               |              |          |     |
| 15        | 5.60         | 20.00        |              |                |               |              |          |     |
| 16        | 6.00         | 24.00        |              |                |               |              |          |     |
| 17        | 6.80         | 26.00        |              |                |               |              |          |     |
| 18        | 4.80         | 27.00        |              |                |               |              |          |     |
| 19        |              |              |              |                |               |              |          |     |
| 20        |              |              |              |                |               |              |          |     |



Classify 18 data points into 6 cells:

(3.6, 13), (4.7, 19), (1.4, 9), (5.5, 15), (4.8, 27), (4.3, 14), (3.0, 6), (4.2, 11), (6.0, 24), (6.8, 26), (4.1, 18), (3.2, 9), (4.0, 8), (1.9, 6), (0.4, 7), (4.9, 14), (5.6, 18), (5.6, 20).

|                | $x \leq 3.8$ | $3.8 < x \le 4.85$ | x > 4.85 |    |
|----------------|--------------|--------------------|----------|----|
| <i>y</i> ≤13.5 | 6            | 2                  | 0        | 8  |
| <i>y</i> >13.5 | 0            | 4                  | 6        | 10 |
|                | 6            | 6                  | 6        | 18 |
|                |              |                    |          |    |



## CHI-SQUARE TEST EXAMPLE

A study to decide whether an association exists between family income and education attainment of householder yielded the following data:

|                   | No HS Degree | HS Degree | College Degree |
|-------------------|--------------|-----------|----------------|
| Under 25000       | 65           | 63        | 14             |
| [ 25000 , 50000 ) | 35           | 84        | 38             |
| [ 50000 , 75000 ) | 11           | 44        | 43             |
| 75000 or more     | 4            | 23        | 72             |

## CHI-SQUARE TEST EXAMPLE

## Question:

Do the data provide sufficient evidence to conclude that an association exists between family income and education attainment of householder?

- $\rm H_0:$  There is no association between family income and education attainment of householder.
- H<sub>a</sub>: There exists association between family income and education attainment of householder.

| Ele Edit View D | 5 Data Editor<br>Data Transform Analyze | e Graphs Utilities S-PI | US Window Help  |                    |       |              | 1         | - 5 × |
|-----------------|---|-------------------------|---|--------------------|-------|--------------|-----------|-------|
|                 | v                                       | ?   #4  *[[前  🎟]        | 1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1.<br>1 |                    |       |              |           |       |
|                 |   |                         |   |                    |       |              |           |       |
| 12:             |   |                         |   |                    | r     |              | ,         |       |
|                 | row                                     | column                  | freqency  | var                | var   | var          | var       | 1     |
| 1               | 1.00                                    | 1.00                    | 65.00   |                    |       |              |           |       |
| 2               | 2.00                                    | 1.00                    | 35.00   |                    |       |              |           |       |
| 3               | 3.00                                    | 1.00                    | 11.00   |                    |       |              |           |       |
| 4               | 4.00                                    | 1.00                    | 4.00  |                    |       |              |           |       |
| 5               | 1.00                                    | 2.00                    | 63.00   |                    |       |              |           |       |
| 6               | 2.00                                    | 2.00                    | 84.00   |                    |       |              |           |       |
| 7               | 3.00                                    | 2.00                    | 44.00   |                    |       |              |           |       |
| 8               | 4.00                                    | 2.00                    | 23.00   |                    |       |              |           |       |
| 9               | 1.00                                    | 3.00                    | 14.00   |                    |       |              |           |       |
| 10              | 2.00                                    | 3.00                    | 38.00   |                    |       |              |           |       |
| 11              | 3.00                                    | 3.00                    | 43.00   |                    |       |              |           |       |
| 12              | 4.00                                    | 3.00                    | 72.00   |                    |       |              |           |       |
| 13              |   |                         |   |                    |       |              |           |       |
| 14              | • •                                     | · • •                   |   |                    |       |              |           |       |
| 15              | Variation Name                          | in data.                |   |                    | .1    | a) and Error | (         |       |
| 16              | V Nam                                   | e the variable          | les as Row (  | mcome), Co         | degre | e) and Freq  | (count).  |       |
| 17              | Variable View                           |                         |   |                    |       |              |           | Ţ     |
| Lata view       |   |                         | SP55 I  | Processor is ready |       |              | Weight On |       |
|                 |   |                         |   |                    |       |              |           |       |

| ≥⊫⊜      | Insert            | Variable  | 12 M 1   |         |        |     |     |     |          |     |     |     |
|----------|-------------------|-----------|----------|---------|--------|-----|-----|-----|----------|-----|-----|-----|
| 2 : freq | Insert<br>Go to ( | Cases     |          |         | 1      |     | r   | r   |          |     |     |     |
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| 1        | Sort Ca<br>Transp | ases      | 65.00    |         |        |     |     |     |          |     |     |     |
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| 9        | 1.00              | 3.00      | 14.00    |         |        |     |     |     |          |     |     |     |
| 10       | 2.00              | 3.00      | 38.00    |         |        |     |     |     |          |     |     |     |
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| 12       | 4.00              | 3.00      | 72.00    |         |        |     |     |     |          |     |     |     |
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| 4               | - Counts                             | Continue                 | Reset       |            |         |          |     |     |     |
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| 8               | Percentages                          | Residuals                |             |            |         |          |     |     |     |
| 9               | Row                                  | Unstandardized           |             |            |         |          |     |     |     |
| 11              | Column                               | Standardized             |             |            |         |          |     |     |     |
| 12              | I Total                              | 🗖 Adj. standardized      |             |            |         |          |     |     |     |
| 13 □ □          | isplay clustered bar charts          |                          |             |            |         |          |     |     |     |
| 14 🗖 9          | unnress tables                       |                          |             |            |         |          |     |     |     |
| 15              |                                      |                          |             |            |         |          |     |     |     |
| 16              | Statis                               | stics Lells Forma        | <u></u>     |            |         |          |     |     |     |
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| 23              | * Check                              | Observed, Ex             | cpected, RC | w, Con     | imn and | i Iotal. |     |     |     |
| 24              |                                      | Continue.                |             |            |         |          | _   |     |     |
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| 14          | Conspiray clustered bar or                | ians                             |                  |         |       |      |       |           |       |
| 15          | Suppress tables                           |                                  |                  |         |       |      |       |           |       |
| 16          |   | Statistics Cells Format.         |                  |         |       |      |       |           |       |
| 17          |   |                                  |                  |         |       |      |       |           |       |
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| ** *- 🕮 🗖 🛼                        | D.       |         |              |                         |             |             |            |            |        |          |  |   |    |
| E E Output                         |          |         |              |                         |             |             |            |            |        |          |  |   | •  |
| Crosstabs                          |          |         | 10.010       |                         |             |             |            |            |        |          |  |   |    |
| - R Notes                          | 🔶 Ci     | ross    | tabs         |                         |             |             |            |            |        |          |  |   |    |
| Case Processing Summa              |          |         |              |                         |             |             |            |            |        |          |  |   |    |
| Chi-Square Tests                   |          |         |              |                         | 0           |             |            |            |        |          |  |   |    |
|                                    |          |         |              |                         | Case Proces | sing Sum    | nary       |            |        |          |  |   |    |
|                                    |          |         |              | 170.00                  | . 1         | Ca          | ses        | -          |        | 87       |  |   |    |
|                                    |          |         |              | Vali                    | 1<br>Demont | Mis         | sing       |            | Tota   | Descent  |  |   |    |
|                                    | L H      | ROW*    | COLUMN       | 496                     | 100.0%      | N 0         | Perce      | mi r<br>0% | 496    | 100.0%   |  |   |    |
|                                    | 1 2      |         |              |                         |             |             |            |            |        |          |  |   |    |
|                                    |          |         |              |                         |             |             |            |            |        |          |  |   |    |
|                                    |          |         |              | DOW                     | COLUMNIC    | oootobulo   | ion        |            |        |          |  |   |    |
|                                    |          |         |              | ROW                     | COLUMIN CI  | usstannia   |            |            |        | _        |  |   |    |
|                                    |          |         |              |                         |             | COL         | JMN        |            |        |          |  |   |    |
|                                    | L H      | ROW     | 1.00 0       | Count                   | 1.00        | 2.          | 63         | 3.00       | l otal | 12       |  |   |    |
|                                    |          |         | E            | Expected Count          | 3           | 2.9         | 61.3       | 47.8       | 142    | .0       |  |   |    |
|                                    |          |         | 9            | % within ROW            | 45.1        | 3% 4        | 4.4%       | 9.9%       | 100.0  | 96       |  |   |    |
|                                    |          |         | 9            | % within COLUM          | 4N 56.5     | 5% 2        | 9.4%       | 8.4%       | 28.6   | %        |  |   |    |
|                                    |          |         | 9            | % of Total              | 13.1        | % 1         | 2.7%       | 2.8%       | 28.6   | %        |  |   |    |
|                                    |          |         | 2.00 0       | Jount<br>Expected Count |             | 35          | 84         | 38         | 157    | 0        |  |   |    |
|                                    |          |         |              | 5 within ROW            | 22.         | 396 5       | 3.5%       | 24.2%      | 100.0  | %        |  |   |    |
|                                    |          |         | 9            | % within COLU!          | 4N 30.4     | 1% 3        | 9.3%       | 22.8%      | 31.7   | %        |  |   |    |
|                                    |          |         | 9            | % of Total              | 7.1         | % 1         | 6.9%       | 7.7%       | 31.7   | 96       |  |   |    |
|                                    |          |         | 3.00 0       | Count                   |             | 11          | 44         | 43         |        | 38       |  |   |    |
|                                    |          |         | E            | Expected Count          | 2           | 2.7         | 42.3       | 33.0       | 98     | .0       |  |   |    |
|                                    |          |         |              | % within ROW            | 11.3        | 2% 4        | 4.9%       | 43.9%      | 100.0  | %        |  |   |    |
|                                    |          |         | 9            | % of Total              | 9.0<br>2.1  | 296         | 3.0%       | 25.7%      | 19.6   | 70<br>96 |  |   |    |
|                                    |          |         | 4.00 0       | Count                   |             | 4           | 23         | 72         | 10.0   | 39       |  |   |    |
|                                    |          |         | E            | Expected Count          | 2           | 3.0         | 42.7       | 33.3       | 99     | .0       |  |   | -1 |
| 4                                  |          |         |              | Y millelie DOW          | 1           |             | - 204 I    | 70 700     | 400.0  | or I     |  | • | Č. |
|                                    |          |         |              |                         |             | 5PSS Proces | or is read | ły         |        |          |  |   | 1  |
|                                    |          |         |              |                         |             |             |            |            |        |          |  |   |    |
|                                    |          |         |              |                         |             |             |            |            |        |          |  |   |    |

|          |      |                   |        | VAR00002 |        |        |  |
|----------|------|-------------------|--------|----------|--------|--------|--|
|          |      |                   | 1.00   | 2.00     | 3.00   | Total  |  |
| VAR00001 | 1.00 | Count             | 65     | 63       | 14     | 142    |  |
|          |      | Expected Count    | 32.9   | 61.3     | 47.8   | 142.0  |  |
|          |      | % within VAR00001 | 45.8%  | 44.4%    | 9.9%   | 100.0% |  |
|          |      | % within VAR00002 | 56.5%  | 29.4%    | 8.4%   | 28.6%  |  |
|          |      | % of Total        | 13.1%  | 12.7%    | 2.8%   | 28.6%  |  |
|          | 2.00 | Count             | 35     | 84       | 38     | 157    |  |
|          |      | Expected Count    | 36.4   | 67.7     | 52.9   | 157.0  |  |
|          |      | % within VAR00001 | 22.3%  | 53.5%    | 24.2%  | 100.0% |  |
|          |      | % within VAR00002 | 30.4%  | 39.3%    | 22.8%  | 31.7%  |  |
|          |      | % of Total        | 7.1%   | 16.9%    | 7.7%   | 31.7%  |  |
|          | 3.00 | Count             | 11     | 44       | 43     | 98     |  |
|          |      | Expected Count    | 22.7   | 42.3     | 33.0   | 98.0   |  |
|          |      | % within VAR00001 | 11.2%  | 44.9%    | 43.9%  | 100.0% |  |
|          |      | % within VAR00002 | 9.6%   | 20.6%    | 25.7%  | 19.8%  |  |
|          |      | % of Total        | 2.2%   | 8.9%     | 8.7%   | 19.8%  |  |
|          | 4.00 | Count             | 4      | 23       | 72     | 99     |  |
|          |      | Expected Count    | 23.0   | 42.7     | 33.3   | 99.0   |  |
|          |      | % within VAR00001 | 4.0%   | 23.2%    | 72.7%  | 100.0% |  |
|          |      | % within VAR00002 | 3.5%   | 10.7%    | 43.1%  | 20.0%  |  |
|          |      | % of Total        | .8%    | 4.6%     | 14.5%  | 20.0%  |  |
| Total    |      | Count             | 115    | 214      | 167    | 496    |  |
|          |      | Expected Count    | 115.0  | 214.0    | 167.0  | 496.0  |  |
|          |      | % within VAR00001 | 23.2%  | 43.1%    | 33.7%  | 100.0% |  |
|          |      | % within VAR00002 | 100.0% | 100.0%   | 100.0% | 100.0% |  |
|          |      | % of Total        | 23.2%  | 43.1%    | 33.7%  | 100.0% |  |

| Chi-Square Tests <a href="https://www.example.sig.com">https://www.example.sig.com</a> <a href="https://www.example.sig.com">https://wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww</a> |  |                                 |                         |             |  |  |  |  |  |  |  |
|--|--|---------------------------------|-------------------------|-------------|--|--|--|--|--|--|--|
| ValuedfAsymp. Sig.<br>(2-sided)Pearson Chi-Square142.102ª6.000Likelihood Ratio144.6346.000Linear-by-Linear<br>Association125.2251.000N of Valid Cases496496.000a. 0 cells (.0%) have expected count less than 5. The<br>minimum expected count is 22.72000   | Chi-Square Tests                         |                                 |                         |             |  |  |  |  |  |  |  |
| Pearson Chi-Square       142.102 <sup>a</sup> 6       .000         Likelihood Ratio       144.634       6       .000         Linear-by-Linear       125.225       1       .000         N of Valid Cases       496       496       496         a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 22.72.       1       1   |  | Value                           | df                      | Asymp. Sig. |  |  |  |  |  |  |  |
| Likelihood Ratio144.6346.000Linear-by-Linear<br>Association125.2251.000N of Valid Cases496496496a. 0 cells (.0%) have expected count less than 5. The<br>minimum expected count is 22.72.1.000   | Pearson Chi-Square                       | 142.102 <sup>a</sup>            | 6                       | .000        |  |  |  |  |  |  |  |
| Linear-by-Linear       125.225       1       .000         N of Valid Cases       496       496         a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 22.72.  | Likelihood Ratio                         | 144.634                         | 6                       | .000        |  |  |  |  |  |  |  |
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|  | a. 0 cells (.0%) have<br>minimum expecte | e expected co<br>ed count is 22 | ount less thai<br>2.72. | n 5. The    |  |  |  |  |  |  |  |
|  |  |                                 |                         |             |  |  |  |  |  |  |  |
|  |  |                                 |                         |             |  |  |  |  |  |  |  |