Eysenck’s Experiment Data

Taken from Howell, 2010, p. 319

SAS Program:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Analyze ANOVA data from Howell, p. 319

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*;

\* Import data from Excel

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*;

**proc** **print**;

**proc** **glm**;

class label;

model words = label;

**proc** **glm**;

class iv;

model words = iv;

**proc** **sort**; by label;

**proc** **means**;

var words; by label;

**proc** **univariate** plot;

var words; by label;

**run**;

SAS Output:

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 Obs Words IV label

 1 11 3 adject

 2 13 3 adject

 3 8 3 adject

 4 6 3 adject

 5 14 3 adject

 6 11 3 adject

 7 13 3 adject

 8 13 3 adject

 9 10 3 adject

 10 11 3 adject

 11 9 1 count

 12 8 1 count

 13 6 1 count

 14 8 1 count

 15 10 1 count

 16 4 1 count

 17 6 1 count

 18 5 1 count

 19 7 1 count

 20 7 1 count

 21 12 4 image

 22 11 4 image

 23 16 4 image

 24 11 4 image

 25 9 4 image

 26 23 4 image

 27 12 4 image

 28 10 4 image

 29 19 4 image

 30 11 4 image

 31 10 5 intent

 32 19 5 intent

 33 14 5 intent

 34 5 5 intent

 35 10 5 intent

 36 11 5 intent

 37 14 5 intent

 38 15 5 intent

 39 11 5 intent

 40 11 5 intent

 41 7 2 rhyme

 42 9 2 rhyme

 43 6 2 rhyme

 44 6 2 rhyme

 45 6 2 rhyme

 46 11 2 rhyme

 47 6 2 rhyme

 48 3 2 rhyme

 49 8 2 rhyme

 50 7 2 rhyme

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 The GLM Procedure

 Class Level Information

 Class Levels Values

 label 5 adject count image intent rhyme

 Number of Observations Read 50

 Number of Observations Used 50

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 The GLM Procedure

Dependent Variable: Words Words

 Sum of

 Source DF Squares Mean Square F Value Pr > F

 Model 4 351.5200000 87.8800000 9.08 <.0001

 Error 45 435.3000000 9.6733333

 Corrected Total 49 786.8200000

 R-Square Coeff Var Root MSE Words Mean

 0.446760 30.91648 3.110198 10.06000

 Source DF Type I SS Mean Square F Value Pr > F

 label 4 351.5200000 87.8800000 9.08 <.0001

 Source DF Type III SS Mean Square F Value Pr > F

 label 4 351.5200000 87.8800000 9.08 <.0001

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 The GLM Procedure

 Class Level Information

 Class Levels Values

 IV 5 1 2 3 4 5

 Number of Observations Read 50

 Number of Observations Used 50

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 The GLM Procedure

Dependent Variable: Words Words

 Sum of

 Source DF Squares Mean Square F Value Pr > F

 Model 4 351.5200000 87.8800000 9.08 <.0001

 Error 45 435.3000000 9.6733333

 Corrected Total 49 786.8200000

 R-Square Coeff Var Root MSE Words Mean

 0.446760 30.91648 3.110198 10.06000

 Source DF Type I SS Mean Square F Value Pr > F

 IV 4 351.5200000 87.8800000 9.08 <.0001

 Source DF Type III SS Mean Square F Value Pr > F

 IV 4 351.5200000 87.8800000 9.08 <.0001

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------------------------------------------ label=adject ------------------------------------------

 The MEANS Procedure

 Analysis Variable : Words Words

 N Mean Std Dev Minimum Maximum

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 10 11.0000000 2.4944383 6.0000000 14.0000000

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

------------------------------------------ label=count -------------------------------------------

 Analysis Variable : Words Words

 N Mean Std Dev Minimum Maximum

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

 10 7.0000000 1.8257419 4.0000000 10.0000000

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

------------------------------------------ label=image -------------------------------------------

 Analysis Variable : Words Words

 N Mean Std Dev Minimum Maximum

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

 10 13.4000000 4.5018515 9.0000000 23.0000000

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

------------------------------------------ label=intent ------------------------------------------

 Analysis Variable : Words Words

 N Mean Std Dev Minimum Maximum

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 10 12.0000000 3.7416574 5.0000000 19.0000000

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

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------------------------------------------ label=rhyme -------------------------------------------

 The MEANS Procedure

 Analysis Variable : Words Words

 N Mean Std Dev Minimum Maximum

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

 10 6.9000000 2.1317703 3.0000000 11.0000000

 ƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒƒ

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------------------------------------------ label=adject ------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Moments

 N 10 Sum Weights 10

 Mean 11 Sum Observations 110

 Std Deviation 2.49443826 Variance 6.22222222

 Skewness -0.9127449 Kurtosis 0.37349672

 Uncorrected SS 1266 Corrected SS 56

 Coeff Variation 22.6767114 Std Error Mean 0.78881064

 Basic Statistical Measures

 Location Variability

 Mean 11.00000 Std Deviation 2.49444

 Median 11.00000 Variance 6.22222

 Mode 11.00000 Range 8.00000

 Interquartile Range 3.00000

 Note: The mode displayed is the smallest of 2 modes with a count of 3.

 Tests for Location: Mu0=0

 Test -Statistic- -----p Value------

 Student's t t 13.94505 Pr > |t| <.0001

 Sign M 5 Pr >= |M| 0.0020

 Signed Rank S 27.5 Pr >= |S| 0.0020

 Quantiles (Definition 5)

 Quantile Estimate

 100% Max 14.0

 99% 14.0

 95% 14.0

 90% 13.5

 75% Q3 13.0

 50% Median 11.0

 25% Q1 10.0

 10% 7.0

 5% 6.0

 1% 6.0

 0% Min 6.0

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------------------------------------------ label=adject ------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Extreme Observations

 ----Lowest---- ----Highest---

 Value Obs Value Obs

 6 4 11 10

 8 3 13 2

 10 9 13 7

 11 10 13 8

 11 6 14 5

 Stem Leaf # Boxplot

 14 0 1 |

 13 000 3 +-----+

 12 | |

 11 000 3 \*--+--\*

 10 0 1 +-----+

 9 |

 8 0 1 |

 7 |

 6 0 1 |

 ----+----+----+----+

 Normal Probability Plot

 14.5+ ++\*+

 | \* \* +\*++

 | ++++

 | \* \*+\*+++

 10.5+ \* ++++

 | ++++

 | ++\*+

 | ++++

 6.5+ ++++ \*

 +----+----+----+----+----+----+----+----+----+----+

 -2 -1 0 +1 +2

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------------------------------------------ label=count -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Moments

 N 10 Sum Weights 10

 Mean 7 Sum Observations 70

 Std Deviation 1.82574186 Variance 3.33333333

 Skewness 0 Kurtosis -0.45

 Uncorrected SS 520 Corrected SS 30

 Coeff Variation 26.0820265 Std Error Mean 0.57735027

 Basic Statistical Measures

 Location Variability

 Mean 7.000000 Std Deviation 1.82574

 Median 7.000000 Variance 3.33333

 Mode 6.000000 Range 6.00000

 Interquartile Range 2.00000

 Note: The mode displayed is the smallest of 3 modes with a count of 2.

 Tests for Location: Mu0=0

 Test -Statistic- -----p Value------

 Student's t t 12.12436 Pr > |t| <.0001

 Sign M 5 Pr >= |M| 0.0020

 Signed Rank S 27.5 Pr >= |S| 0.0020

 Quantiles (Definition 5)

 Quantile Estimate

 100% Max 10.0

 99% 10.0

 95% 10.0

 90% 9.5

 75% Q3 8.0

 50% Median 7.0

 25% Q1 6.0

 10% 4.5

 5% 4.0

 1% 4.0

 0% Min 4.0

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------------------------------------------ label=count -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Extreme Observations

 ----Lowest---- ----Highest---

 Value Obs Value Obs

 4 16 7 20

 5 18 8 12

 6 17 8 14

 6 13 9 11

 7 20 10 15

 Stem Leaf # Boxplot

 10 0 1 |

 9 0 1 |

 8 00 2 +-----+

 7 00 2 \*--+--\*

 6 00 2 +-----+

 5 0 1 |

 4 0 1 |

 ----+----+----+----+

 Normal Probability Plot

 10.5+ \* +++++

 | \*++++++

 | \* +\*+++

 7.5+ \*+\*++++

 | \* +\*+++

 | \*++++

 4.5+ +\*++++

 +----+----+----+----+----+----+----+----+----+----+

 -2 -1 0 +1 +2

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------------------------------------------ label=image -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Moments

 N 10 Sum Weights 10

 Mean 13.4 Sum Observations 134

 Std Deviation 4.50185147 Variance 20.2666667

 Skewness 1.37991471 Kurtosis 1.04789369

 Uncorrected SS 1978 Corrected SS 182.4

 Coeff Variation 33.5959065 Std Error Mean 1.42361043

 Basic Statistical Measures

 Location Variability

 Mean 13.40000 Std Deviation 4.50185

 Median 11.50000 Variance 20.26667

 Mode 11.00000 Range 14.00000

 Interquartile Range 5.00000

 Tests for Location: Mu0=0

 Test -Statistic- -----p Value------

 Student's t t 9.412687 Pr > |t| <.0001

 Sign M 5 Pr >= |M| 0.0020

 Signed Rank S 27.5 Pr >= |S| 0.0020

 Quantiles (Definition 5)

 Quantile Estimate

 100% Max 23.0

 99% 23.0

 95% 23.0

 90% 21.0

 75% Q3 16.0

 50% Median 11.5

 25% Q1 11.0

 10% 9.5

 5% 9.0

 1% 9.0

 0% Min 9.0

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------------------------------------------ label=image -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Extreme Observations

 ----Lowest---- ----Highest---

 Value Obs Value Obs

 9 25 12 21

 10 28 12 27

 11 30 16 23

 11 24 19 29

 11 22 23 26

 Stem Leaf # Boxplot

 22 0 1 |

 20 |

 18 0 1 |

 16 0 1 +-----+

 14 | |

 12 00 2 | + |

 10 0000 4 \*-----\*

 8 0 1 |

 ----+----+----+----+

 Normal Probability Plot

 23+ \* ++++

 | +++++

 | \*++++

 | +\*+++

 | ++++

 | ++++\* \*

 | \* \*++\* \*

 9+ \* ++++

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 -2 -1 0 +1 +2

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------------------------------------------ label=intent ------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Moments

 N 10 Sum Weights 10

 Mean 12 Sum Observations 120

 Std Deviation 3.74165739 Variance 14

 Skewness 0.06363363 Kurtosis 1.17274052

 Uncorrected SS 1566 Corrected SS 126

 Coeff Variation 31.1804782 Std Error Mean 1.18321596

 Basic Statistical Measures

 Location Variability

 Mean 12.00000 Std Deviation 3.74166

 Median 11.00000 Variance 14.00000

 Mode 11.00000 Range 14.00000

 Interquartile Range 4.00000

 Tests for Location: Mu0=0

 Test -Statistic- -----p Value------

 Student's t t 10.14185 Pr > |t| <.0001

 Sign M 5 Pr >= |M| 0.0020

 Signed Rank S 27.5 Pr >= |S| 0.0020

 Quantiles (Definition 5)

 Quantile Estimate

 100% Max 19.0

 99% 19.0

 95% 19.0

 90% 17.0

 75% Q3 14.0

 50% Median 11.0

 25% Q1 10.0

 10% 7.5

 5% 5.0

 1% 5.0

 0% Min 5.0

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------------------------------------------ label=intent ------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Extreme Observations

 ----Lowest---- ----Highest---

 Value Obs Value Obs

 5 34 11 40

 10 35 14 33

 10 31 14 37

 11 40 15 38

 11 39 19 32

 Stem Leaf # Boxplot

 18 0 1 |

 16 |

 14 000 3 +-----+

 12 | + |

 10 00000 5 \*-----\*

 8 |

 6 |

 4 0 1 |

 ----+----+----+----+

 Normal Probability Plot

 19+ \* +++++

 | ++++++

 | \* +\*++\*

 | ++++++

 | \* \* +\*++\* \*

 | +++++

 | ++++++

 5+ +++++ \*

 +----+----+----+----+----+----+----+----+----+----+

 -2 -1 0 +1 +2

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------------------------------------------ label=rhyme -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Moments

 N 10 Sum Weights 10

 Mean 6.9 Sum Observations 69

 Std Deviation 2.13177026 Variance 4.54444444

 Skewness 0.24773653 Kurtosis 1.34066118

 Uncorrected SS 517 Corrected SS 40.9

 Coeff Variation 30.8952212 Std Error Mean 0.67412495

 Basic Statistical Measures

 Location Variability

 Mean 6.900000 Std Deviation 2.13177

 Median 6.500000 Variance 4.54444

 Mode 6.000000 Range 8.00000

 Interquartile Range 2.00000

 Tests for Location: Mu0=0

 Test -Statistic- -----p Value------

 Student's t t 10.23549 Pr > |t| <.0001

 Sign M 5 Pr >= |M| 0.0020

 Signed Rank S 27.5 Pr >= |S| 0.0020

 Quantiles (Definition 5)

 Quantile Estimate

 100% Max 11.0

 99% 11.0

 95% 11.0

 90% 10.0

 75% Q3 8.0

 50% Median 6.5

 25% Q1 6.0

 10% 4.5

 5% 3.0

 1% 3.0

 0% Min 3.0

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------------------------------------------ label=rhyme -------------------------------------------

 The UNIVARIATE Procedure

 Variable: Words (Words)

 Extreme Observations

 ----Lowest---- ----Highest---

 Value Obs Value Obs

 3 48 7 41

 6 47 7 50

 6 45 8 49

 6 44 9 42

 6 43 11 46

 Stem Leaf # Boxplot

 11 0 1 |

 10 |

 9 0 1 |

 8 0 1 +-----+

 7 00 2 | |

 6 0000 4 \*--+--\*

 5 |

 4 |

 3 0 1 |

 ----+----+----+----+

 Normal Probability Plot

 11.5+ \* ++++

 | +++++

 | \*++++

 | +\*++

 7.5+ \*++\*+

 | \* \* \*++\*+

 | ++++

 | +++++

 3.5+ +++\*+

 +----+----+----+----+----+----+----+----+----+----+

 -2 -1 0 +1 +2

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 The UNIVARIATE Procedure

 Variable: Words (Words)

 Schematic Plots

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 24 +

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 22 + |

 | |

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 | |

 20 + |

 | |

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 18 + | |

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 16 + +-----+ |

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 14 + | | | +-----+

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 | +-----+ | | | |

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 12 + | | | | | + |

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 10 + +-----+ | | +-----+ |

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 8 + | +-----+ | +-----+

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 6 + | +-----+ | +-----+

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 4 + | |

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 2 +

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 label adject count image intent rhyme