

## The Mixed Procedure

| Model Information         |                     |
|---------------------------|---------------------|
| Data Set                  | WORK.MYDATA3        |
| Dependent Variable        | height              |
| Covariance Structure      | Variance Components |
| Estimation Method         | REML                |
| Residual Variance Method  | Profile             |
| Fixed Effects SE Method   | Model-Based         |
| Degrees of Freedom Method | Containment         |

| Class Level Information |        |                      |
|-------------------------|--------|----------------------|
| Class                   | Levels | Values               |
| blocks                  | 3      | 1 2 3                |
| geo_num                 | 10     | 1 2 3 4 5 6 7 8 9 10 |
| origin                  | 2      | Intro Nat            |

| Dimensions            |     |
|-----------------------|-----|
| Covariance Parameters | 3   |
| Columns in X          | 31  |
| Columns in Z          | 33  |
| Subjects              | 1   |
| Max Obs per Subject   | 108 |

| Number of Observations          |     |
|---------------------------------|-----|
| Number of Observations Read     | 240 |
| Number of Observations Used     | 108 |
| Number of Observations Not Used | 132 |

| Iteration History |             |                 |            |
|-------------------|-------------|-----------------|------------|
| Iteration         | Evaluations | -2 Res Log Like | Criterion  |
| 0                 | 1           | 351.63910974    |            |
| 1                 | 3           | 351.31761634    | 0.00001455 |
| 2                 | 1           | 351.31619620    | 0.00000009 |
| 3                 | 1           | 351.31618760    | 0.00000000 |

Convergence criteria met.

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| Covariance Parameter Estimates |          |
|--------------------------------|----------|
| Cov Parm                       | Estimate |
| blocks                         | 0.04763  |
| blocks*geo_num                 | 0        |
| Residual                       | 2.0595   |

| Fit Statistics           |       |
|--------------------------|-------|
| -2 Res Log Likelihood    | 351.3 |
| AIC (Smaller is Better)  | 355.3 |
| AICC (Smaller is Better) | 355.5 |
| BIC (Smaller is Better)  | 353.5 |

| Type 3 Tests of Fixed Effects |        |        |         |        |
|-------------------------------|--------|--------|---------|--------|
| Effect                        | Num DF | Den DF | F Value | Pr > F |
| geo_num                       | 9      | 10     | 7.19    | 0.0024 |
| origin                        | 1      | 78     | 2.82    | 0.0974 |
| geo_num*origin                | 7      | 78     | 2.63    | 0.0171 |

| Least Squares Means |        |         |          |                |    |         |         |
|---------------------|--------|---------|----------|----------------|----|---------|---------|
| Effect              | origin | geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num             |        | 1       | Non-est  | .              | .  | .       | .       |
| geo_num             |        | 2       | 9.5918   | 0.4590         | 10 | 20.90   | <.0001  |
| geo_num             |        | 3       | 6.4918   | 0.4590         | 10 | 14.14   | <.0001  |
| geo_num             |        | 4       | 7.9935   | 0.5406         | 10 | 14.79   | <.0001  |
| geo_num             |        | 5       | 7.0049   | 0.5127         | 10 | 13.66   | <.0001  |
| geo_num             |        | 6       | 8.5668   | 0.5244         | 10 | 16.34   | <.0001  |
| geo_num             |        | 7       | Non-est  | .              | .  | .       | .       |
| geo_num             |        | 8       | 7.2205   | 0.4964         | 10 | 14.54   | <.0001  |
| geo_num             |        | 9       | 9.2564   | 0.5035         | 10 | 18.38   | <.0001  |
| geo_num             |        | 10      | 9.2627   | 0.5035         | 10 | 18.39   | <.0001  |
| origin              | Intro  |         | Non-est  | .              | .  | .       | .       |
| origin              | Nat    |         | Non-est  | .              | .  | .       | .       |
| geo_num*origin      | Nat    | 1       | 9.8167   | 0.4330         | 78 | 22.67   | <.0001  |
| geo_num*origin      | Intro  | 2       | 8.5913   | 0.5293         | 78 | 16.23   | <.0001  |
| geo_num*origin      | Nat    | 2       | 10.5923  | 0.7469         | 78 | 14.18   | <.0001  |
| geo_num*origin      | Intro  | 3       | 7.8413   | 0.5293         | 78 | 14.82   | <.0001  |

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| Least Squares Means |        |         |          |                |    |         |         |
|---------------------|--------|---------|----------|----------------|----|---------|---------|
| Effect              | origin | geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num*origin      | Nat    | 3       | 5.1423   | 0.7469         | 78 | 6.88    | <.0001  |
| geo_num*origin      | Intro  | 4       | 8.1197   | 0.6596         | 78 | 12.31   | <.0001  |
| geo_num*origin      | Nat    | 4       | 7.8673   | 0.8541         | 78 | 9.21    | <.0001  |
| geo_num*origin      | Intro  | 5       | 7.9673   | 0.8541         | 78 | 9.33    | <.0001  |
| geo_num*origin      | Nat    | 5       | 6.0425   | 0.5632         | 78 | 10.73   | <.0001  |
| geo_num*origin      | Intro  | 6       | 8.7006   | 0.8541         | 78 | 10.19   | <.0001  |
| geo_num*origin      | Nat    | 6       | 8.4330   | 0.6049         | 78 | 13.94   | <.0001  |
| geo_num*origin      | Intro  | 7       | 9.1302   | 0.4509         | 78 | 20.25   | <.0001  |
| geo_num*origin      | Intro  | 8       | 8.0340   | 0.8541         | 78 | 9.41    | <.0001  |
| geo_num*origin      | Nat    | 8       | 6.4071   | 0.5017         | 78 | 12.77   | <.0001  |
| geo_num*origin      | Intro  | 9       | 9.4340   | 0.8541         | 78 | 11.05   | <.0001  |
| geo_num*origin      | Nat    | 9       | 9.0788   | 0.5293         | 78 | 17.15   | <.0001  |
| geo_num*origin      | Intro  | 10      | 8.9913   | 0.5293         | 78 | 16.99   | <.0001  |
| geo_num*origin      | Nat    | 10      | 9.5340   | 0.8541         | 78 | 11.16   | <.0001  |

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| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num                            |        | 1       |         | 2        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 3        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 4        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 5        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 6        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 8        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 9        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 1       |         | 10       | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 2       |         | 3        | 3.1000   | 0.6214         | 10 | 4.99    | 0.0005  |
| geo_num                            |        | 2       |         | 4        | 1.5983   | 0.6840         | 10 | 2.34    | 0.0416  |
| geo_num                            |        | 2       |         | 5        | 2.5869   | 0.6621         | 10 | 3.91    | 0.0029  |
| geo_num                            |        | 2       |         | 6        | 1.0250   | 0.6712         | 10 | 1.53    | 0.1577  |
| geo_num                            |        | 2       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 2       |         | 8        | 2.3713   | 0.6496         | 10 | 3.65    | 0.0045  |
| geo_num                            |        | 2       |         | 9        | 0.3354   | 0.6550         | 10 | 0.51    | 0.6197  |
| geo_num                            |        | 2       |         | 10       | 0.3292   | 0.6550         | 10 | 0.50    | 0.6262  |
| geo_num                            |        | 3       |         | 4        | -1.5017  | 0.6840         | 10 | -2.20   | 0.0528  |
| geo_num                            |        | 3       |         | 5        | -0.5131  | 0.6621         | 10 | -0.77   | 0.4563  |
| geo_num                            |        | 3       |         | 6        | -2.0750  | 0.6712         | 10 | -3.09   | 0.0114  |
| geo_num                            |        | 3       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 3       |         | 8        | -0.7287  | 0.6496         | 10 | -1.12   | 0.2881  |
| geo_num                            |        | 3       |         | 9        | -2.7646  | 0.6550         | 10 | -4.22   | 0.0018  |
| geo_num                            |        | 3       |         | 10       | -2.7708  | 0.6550         | 10 | -4.23   | 0.0017  |
| geo_num                            |        | 4       |         | 5        | 0.9886   | 0.7212         | 10 | 1.37    | 0.2004  |
| geo_num                            |        | 4       |         | 6        | -0.5733  | 0.7295         | 10 | -0.79   | 0.4501  |
| geo_num                            |        | 4       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 4       |         | 8        | 0.7730   | 0.7095         | 10 | 1.09    | 0.3015  |
| geo_num                            |        | 4       |         | 9        | -1.2629  | 0.7146         | 10 | -1.77   | 0.1076  |
| geo_num                            |        | 4       |         | 10       | -1.2691  | 0.7146         | 10 | -1.78   | 0.1061  |
| geo_num                            |        | 5       |         | 6        | -1.5619  | 0.7090         | 10 | -2.20   | 0.0522  |
| geo_num                            |        | 5       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 5       |         | 8        | -0.2156  | 0.6886         | 10 | -0.31   | 0.7606  |
| geo_num                            |        | 5       |         | 9        | -2.2515  | 0.6937         | 10 | -3.25   | 0.0088  |
| geo_num                            |        | 5       |         | 10       | -2.2578  | 0.6937         | 10 | -3.25   | 0.0087  |

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| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num                            |        | 6       |         | 7        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 6       |         | 8        | 1.3463   | 0.6974         | 10 | 1.93    | 0.0824  |
| geo_num                            |        | 6       |         | 9        | -0.6896  | 0.7024         | 10 | -0.98   | 0.3494  |
| geo_num                            |        | 6       |         | 10       | -0.6958  | 0.7024         | 10 | -0.99   | 0.3452  |
| geo_num                            |        | 7       |         | 8        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 7       |         | 9        | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 7       |         | 10       | Non-est  | .              | .  | .       | .       |
| geo_num                            |        | 8       |         | 9        | -2.0359  | 0.6818         | 10 | -2.99   | 0.0137  |
| geo_num                            |        | 8       |         | 10       | -2.0421  | 0.6818         | 10 | -3.00   | 0.0135  |
| geo_num                            |        | 9       |         | 10       | -0.00625 | 0.6870         | 10 | -0.01   | 0.9929  |
| origin                             | Intro  |         | Nat     |          | Non-est  | .              | .  | .       | .       |
| geo_num*origin                     | Nat    | 1       | Intro   | 2        | 1.2253   | 0.6602         | 78 | 1.86    | 0.0672  |
| geo_num*origin                     | Nat    | 1       | Nat     | 2        | -0.7756  | 0.8448         | 78 | -0.92   | 0.3614  |
| geo_num*origin                     | Nat    | 1       | Intro   | 3        | 1.9753   | 0.6602         | 78 | 2.99    | 0.0037  |
| geo_num*origin                     | Nat    | 1       | Nat     | 3        | 4.6744   | 0.8448         | 78 | 5.53    | <.0001  |
| geo_num*origin                     | Nat    | 1       | Intro   | 4        | 1.6969   | 0.7687         | 78 | 2.21    | 0.0302  |
| geo_num*origin                     | Nat    | 1       | Nat     | 4        | 1.9494   | 0.9409         | 78 | 2.07    | 0.0416  |
| geo_num*origin                     | Nat    | 1       | Intro   | 5        | 1.8494   | 0.9409         | 78 | 1.97    | 0.0529  |
| geo_num*origin                     | Nat    | 1       | Nat     | 5        | 3.7742   | 0.6877         | 78 | 5.49    | <.0001  |
| geo_num*origin                     | Nat    | 1       | Intro   | 6        | 1.1160   | 0.9409         | 78 | 1.19    | 0.2392  |
| geo_num*origin                     | Nat    | 1       | Nat     | 6        | 1.3837   | 0.7223         | 78 | 1.92    | 0.0591  |
| geo_num*origin                     | Nat    | 1       | Intro   | 7        | 0.6864   | 0.5992         | 78 | 1.15    | 0.2555  |
| geo_num*origin                     | Nat    | 1       | Intro   | 8        | 1.7827   | 0.9409         | 78 | 1.89    | 0.0618  |
| geo_num*origin                     | Nat    | 1       | Nat     | 8        | 3.4096   | 0.6383         | 78 | 5.34    | <.0001  |
| geo_num*origin                     | Nat    | 1       | Intro   | 9        | 0.3827   | 0.9409         | 78 | 0.41    | 0.6853  |
| geo_num*origin                     | Nat    | 1       | Nat     | 9        | 0.7378   | 0.6602         | 78 | 1.12    | 0.2672  |
| geo_num*origin                     | Nat    | 1       | Intro   | 10       | 0.8253   | 0.6602         | 78 | 1.25    | 0.2150  |
| geo_num*origin                     | Nat    | 1       | Nat     | 10       | 0.2827   | 0.9409         | 78 | 0.30    | 0.7646  |
| geo_num*origin                     | Intro  | 2       | Nat     | 2        | -2.0010  | 0.9129         | 78 | -2.19   | 0.0314  |
| geo_num*origin                     | Intro  | 2       | Intro   | 3        | 0.7500   | 0.7175         | 78 | 1.05    | 0.2991  |
| geo_num*origin                     | Intro  | 2       | Nat     | 3        | 3.4490   | 0.9129         | 78 | 3.78    | 0.0003  |
| geo_num*origin                     | Intro  | 2       | Intro   | 4        | 0.4716   | 0.8184         | 78 | 0.58    | 0.5661  |
| geo_num*origin                     | Intro  | 2       | Nat     | 4        | 0.7240   | 1.0025         | 78 | 0.72    | 0.4723  |
| geo_num*origin                     | Intro  | 2       | Intro   | 5        | 0.6240   | 1.0025         | 78 | 0.62    | 0.5355  |
| geo_num*origin                     | Intro  | 2       | Nat     | 5        | 2.5488   | 0.7429         | 78 | 3.43    | 0.0010  |

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| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num*origin                     | Intro  | 2       | Intro   | 6        | -0.1093  | 1.0025         | 78 | -0.11   | 0.9135  |
| geo_num*origin                     | Intro  | 2       | Nat     | 6        | 0.1583   | 0.7750         | 78 | 0.20    | 0.8387  |
| geo_num*origin                     | Intro  | 2       | Intro   | 7        | -0.5389  | 0.6702         | 78 | -0.80   | 0.4238  |
| geo_num*origin                     | Intro  | 2       | Intro   | 8        | 0.5574   | 1.0025         | 78 | 0.56    | 0.5798  |
| geo_num*origin                     | Intro  | 2       | Nat     | 8        | 2.1842   | 0.6974         | 78 | 3.13    | 0.0024  |
| geo_num*origin                     | Intro  | 2       | Intro   | 9        | -0.8426  | 1.0025         | 78 | -0.84   | 0.4032  |
| geo_num*origin                     | Intro  | 2       | Nat     | 9        | -0.4875  | 0.7175         | 78 | -0.68   | 0.4989  |
| geo_num*origin                     | Intro  | 2       | Intro   | 10       | -0.4000  | 0.7175         | 78 | -0.56   | 0.5788  |
| geo_num*origin                     | Intro  | 2       | Nat     | 10       | -0.9426  | 1.0025         | 78 | -0.94   | 0.3500  |
| geo_num*origin                     | Nat    | 2       | Intro   | 3        | 2.7510   | 0.9129         | 78 | 3.01    | 0.0035  |
| geo_num*origin                     | Nat    | 2       | Nat     | 3        | 5.4500   | 1.0148         | 78 | 5.37    | <.0001  |
| geo_num*origin                     | Nat    | 2       | Intro   | 4        | 2.4726   | 0.9942         | 78 | 2.49    | 0.0150  |
| geo_num*origin                     | Nat    | 2       | Nat     | 4        | 2.7250   | 1.0961         | 78 | 2.49    | 0.0151  |
| geo_num*origin                     | Nat    | 2       | Intro   | 5        | 2.6250   | 1.0961         | 78 | 2.39    | 0.0190  |
| geo_num*origin                     | Nat    | 2       | Nat     | 5        | 4.5498   | 0.9330         | 78 | 4.88    | <.0001  |
| geo_num*origin                     | Nat    | 2       | Intro   | 6        | 1.8917   | 1.0961         | 78 | 1.73    | 0.0883  |
| geo_num*origin                     | Nat    | 2       | Nat     | 6        | 2.1593   | 0.9588         | 78 | 2.25    | 0.0271  |
| geo_num*origin                     | Nat    | 2       | Intro   | 7        | 1.4621   | 0.8570         | 78 | 1.71    | 0.0920  |
| geo_num*origin                     | Nat    | 2       | Intro   | 8        | 2.5583   | 1.0961         | 78 | 2.33    | 0.0222  |
| geo_num*origin                     | Nat    | 2       | Nat     | 8        | 4.1852   | 0.8972         | 78 | 4.66    | <.0001  |
| geo_num*origin                     | Nat    | 2       | Intro   | 9        | 1.1583   | 1.0961         | 78 | 1.06    | 0.2939  |
| geo_num*origin                     | Nat    | 2       | Nat     | 9        | 1.5135   | 0.9129         | 78 | 1.66    | 0.1014  |
| geo_num*origin                     | Nat    | 2       | Intro   | 10       | 1.6010   | 0.9129         | 78 | 1.75    | 0.0834  |
| geo_num*origin                     | Nat    | 2       | Nat     | 10       | 1.0583   | 1.0961         | 78 | 0.97    | 0.3372  |
| geo_num*origin                     | Intro  | 3       | Nat     | 3        | 2.6990   | 0.9129         | 78 | 2.96    | 0.0041  |
| geo_num*origin                     | Intro  | 3       | Intro   | 4        | -0.2784  | 0.8184         | 78 | -0.34   | 0.7347  |
| geo_num*origin                     | Intro  | 3       | Nat     | 4        | -0.02596 | 1.0025         | 78 | -0.03   | 0.9794  |
| geo_num*origin                     | Intro  | 3       | Intro   | 5        | -0.1260  | 1.0025         | 78 | -0.13   | 0.9003  |
| geo_num*origin                     | Intro  | 3       | Nat     | 5        | 1.7988   | 0.7429         | 78 | 2.42    | 0.0178  |
| geo_num*origin                     | Intro  | 3       | Intro   | 6        | -0.8593  | 1.0025         | 78 | -0.86   | 0.3940  |
| geo_num*origin                     | Intro  | 3       | Nat     | 6        | -0.5917  | 0.7750         | 78 | -0.76   | 0.4475  |
| geo_num*origin                     | Intro  | 3       | Intro   | 7        | -1.2889  | 0.6702         | 78 | -1.92   | 0.0581  |
| geo_num*origin                     | Intro  | 3       | Intro   | 8        | -0.1926  | 1.0025         | 78 | -0.19   | 0.8481  |
| geo_num*origin                     | Intro  | 3       | Nat     | 8        | 1.4342   | 0.6974         | 78 | 2.06    | 0.0431  |
| geo_num*origin                     | Intro  | 3       | Intro   | 9        | -1.5926  | 1.0025         | 78 | -1.59   | 0.1162  |

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| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num*origin                     | Intro  | 3       | Nat     | 9        | -1.2375  | 0.7175         | 78 | -1.72   | 0.0886  |
| geo_num*origin                     | Intro  | 3       | Intro   | 10       | -1.1500  | 0.7175         | 78 | -1.60   | 0.1130  |
| geo_num*origin                     | Intro  | 3       | Nat     | 10       | -1.6926  | 1.0025         | 78 | -1.69   | 0.0953  |
| geo_num*origin                     | Nat    | 3       | Intro   | 4        | -2.9774  | 0.9942         | 78 | -2.99   | 0.0037  |
| geo_num*origin                     | Nat    | 3       | Nat     | 4        | -2.7250  | 1.0961         | 78 | -2.49   | 0.0151  |
| geo_num*origin                     | Nat    | 3       | Intro   | 5        | -2.8250  | 1.0961         | 78 | -2.58   | 0.0118  |
| geo_num*origin                     | Nat    | 3       | Nat     | 5        | -0.9002  | 0.9330         | 78 | -0.96   | 0.3376  |
| geo_num*origin                     | Nat    | 3       | Intro   | 6        | -3.5583  | 1.0961         | 78 | -3.25   | 0.0017  |
| geo_num*origin                     | Nat    | 3       | Nat     | 6        | -3.2907  | 0.9588         | 78 | -3.43   | 0.0010  |
| geo_num*origin                     | Nat    | 3       | Intro   | 7        | -3.9879  | 0.8570         | 78 | -4.65   | <.0001  |
| geo_num*origin                     | Nat    | 3       | Intro   | 8        | -2.8917  | 1.0961         | 78 | -2.64   | 0.0101  |
| geo_num*origin                     | Nat    | 3       | Nat     | 8        | -1.2648  | 0.8972         | 78 | -1.41   | 0.1626  |
| geo_num*origin                     | Nat    | 3       | Intro   | 9        | -4.2917  | 1.0961         | 78 | -3.92   | 0.0002  |
| geo_num*origin                     | Nat    | 3       | Nat     | 9        | -3.9365  | 0.9129         | 78 | -4.31   | <.0001  |
| geo_num*origin                     | Nat    | 3       | Intro   | 10       | -3.8490  | 0.9129         | 78 | -4.22   | <.0001  |
| geo_num*origin                     | Nat    | 3       | Nat     | 10       | -4.3917  | 1.0961         | 78 | -4.01   | 0.0001  |
| geo_num*origin                     | Intro  | 4       | Nat     | 4        | 0.2524   | 1.0771         | 78 | 0.23    | 0.8153  |
| geo_num*origin                     | Intro  | 4       | Intro   | 5        | 0.1524   | 1.0771         | 78 | 0.14    | 0.8878  |
| geo_num*origin                     | Intro  | 4       | Nat     | 5        | 2.0772   | 0.8412         | 78 | 2.47    | 0.0157  |
| geo_num*origin                     | Intro  | 4       | Intro   | 6        | -0.5809  | 1.0771         | 78 | -0.54   | 0.5912  |
| geo_num*origin                     | Intro  | 4       | Nat     | 6        | -0.3133  | 0.8693         | 78 | -0.36   | 0.7195  |
| geo_num*origin                     | Intro  | 4       | Intro   | 7        | -1.0105  | 0.7773         | 78 | -1.30   | 0.1974  |
| geo_num*origin                     | Intro  | 4       | Intro   | 8        | 0.08575  | 1.0771         | 78 | 0.08    | 0.9367  |
| geo_num*origin                     | Intro  | 4       | Nat     | 8        | 1.7126   | 0.8005         | 78 | 2.14    | 0.0355  |
| geo_num*origin                     | Intro  | 4       | Intro   | 9        | -1.3143  | 1.0771         | 78 | -1.22   | 0.2261  |
| geo_num*origin                     | Intro  | 4       | Nat     | 9        | -0.9591  | 0.8184         | 78 | -1.17   | 0.2448  |
| geo_num*origin                     | Intro  | 4       | Intro   | 10       | -0.8716  | 0.8184         | 78 | -1.06   | 0.2902  |
| geo_num*origin                     | Intro  | 4       | Nat     | 10       | -1.4143  | 1.0771         | 78 | -1.31   | 0.1930  |
| geo_num*origin                     | Nat    | 4       | Intro   | 5        | -0.1000  | 1.1717         | 78 | -0.09   | 0.9322  |
| geo_num*origin                     | Nat    | 4       | Nat     | 5        | 1.8248   | 1.0208         | 78 | 1.79    | 0.0777  |
| geo_num*origin                     | Nat    | 4       | Intro   | 6        | -0.8333  | 1.1717         | 78 | -0.71   | 0.4791  |
| geo_num*origin                     | Nat    | 4       | Nat     | 6        | -0.5657  | 1.0445         | 78 | -0.54   | 0.5896  |
| geo_num*origin                     | Nat    | 4       | Intro   | 7        | -1.2629  | 0.9519         | 78 | -1.33   | 0.1884  |
| geo_num*origin                     | Nat    | 4       | Intro   | 8        | -0.1667  | 1.1717         | 78 | -0.14   | 0.8873  |
| geo_num*origin                     | Nat    | 4       | Nat     | 8        | 1.4602   | 0.9883         | 78 | 1.48    | 0.1436  |

## The Mixed Procedure

| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num*origin                     | Nat    | 4       | Intro   | 9        | -1.5667  | 1.1717         | 78 | -1.34   | 0.1851  |
| geo_num*origin                     | Nat    | 4       | Nat     | 9        | -1.2115  | 1.0025         | 78 | -1.21   | 0.2305  |
| geo_num*origin                     | Nat    | 4       | Intro   | 10       | -1.1240  | 1.0025         | 78 | -1.12   | 0.2656  |
| geo_num*origin                     | Nat    | 4       | Nat     | 10       | -1.6667  | 1.1717         | 78 | -1.42   | 0.1589  |
| geo_num*origin                     | Intro  | 5       | Nat     | 5        | 1.9248   | 1.0208         | 78 | 1.89    | 0.0631  |
| geo_num*origin                     | Intro  | 5       | Intro   | 6        | -0.7333  | 1.1717         | 78 | -0.63   | 0.5332  |
| geo_num*origin                     | Intro  | 5       | Nat     | 6        | -0.4657  | 1.0445         | 78 | -0.45   | 0.6569  |
| geo_num*origin                     | Intro  | 5       | Intro   | 7        | -1.1629  | 0.9519         | 78 | -1.22   | 0.2255  |
| geo_num*origin                     | Intro  | 5       | Intro   | 8        | -0.06667 | 1.1717         | 78 | -0.06   | 0.9548  |
| geo_num*origin                     | Intro  | 5       | Nat     | 8        | 1.5602   | 0.9883         | 78 | 1.58    | 0.1184  |
| geo_num*origin                     | Intro  | 5       | Intro   | 9        | -1.4667  | 1.1717         | 78 | -1.25   | 0.2144  |
| geo_num*origin                     | Intro  | 5       | Nat     | 9        | -1.1115  | 1.0025         | 78 | -1.11   | 0.2710  |
| geo_num*origin                     | Intro  | 5       | Intro   | 10       | -1.0240  | 1.0025         | 78 | -1.02   | 0.3102  |
| geo_num*origin                     | Intro  | 5       | Nat     | 10       | -1.5667  | 1.1717         | 78 | -1.34   | 0.1851  |
| geo_num*origin                     | Nat    | 5       | Intro   | 6        | -2.6581  | 1.0208         | 78 | -2.60   | 0.0110  |
| geo_num*origin                     | Nat    | 5       | Nat     | 6        | -2.3905  | 0.7986         | 78 | -2.99   | 0.0037  |
| geo_num*origin                     | Nat    | 5       | Intro   | 7        | -3.0877  | 0.6973         | 78 | -4.43   | <.0001  |
| geo_num*origin                     | Nat    | 5       | Intro   | 8        | -1.9915  | 1.0208         | 78 | -1.95   | 0.0547  |
| geo_num*origin                     | Nat    | 5       | Nat     | 8        | -0.3646  | 0.7238         | 78 | -0.50   | 0.6159  |
| geo_num*origin                     | Nat    | 5       | Intro   | 9        | -3.3915  | 1.0208         | 78 | -3.32   | 0.0014  |
| geo_num*origin                     | Nat    | 5       | Nat     | 9        | -3.0363  | 0.7429         | 78 | -4.09   | 0.0001  |
| geo_num*origin                     | Nat    | 5       | Intro   | 10       | -2.9488  | 0.7429         | 78 | -3.97   | 0.0002  |
| geo_num*origin                     | Nat    | 5       | Nat     | 10       | -3.4915  | 1.0208         | 78 | -3.42   | 0.0010  |
| geo_num*origin                     | Intro  | 6       | Nat     | 6        | 0.2676   | 1.0445         | 78 | 0.26    | 0.7984  |
| geo_num*origin                     | Intro  | 6       | Intro   | 7        | -0.4296  | 0.9519         | 78 | -0.45   | 0.6530  |
| geo_num*origin                     | Intro  | 6       | Intro   | 8        | 0.6667   | 1.1717         | 78 | 0.57    | 0.5710  |
| geo_num*origin                     | Intro  | 6       | Nat     | 8        | 2.2935   | 0.9883         | 78 | 2.32    | 0.0229  |
| geo_num*origin                     | Intro  | 6       | Intro   | 9        | -0.7333  | 1.1717         | 78 | -0.63   | 0.5332  |
| geo_num*origin                     | Intro  | 6       | Nat     | 9        | -0.3782  | 1.0025         | 78 | -0.38   | 0.7070  |
| geo_num*origin                     | Intro  | 6       | Intro   | 10       | -0.2907  | 1.0025         | 78 | -0.29   | 0.7726  |
| geo_num*origin                     | Intro  | 6       | Nat     | 10       | -0.8333  | 1.1717         | 78 | -0.71   | 0.4791  |
| geo_num*origin                     | Nat    | 6       | Intro   | 7        | -0.6972  | 0.7315         | 78 | -0.95   | 0.3434  |
| geo_num*origin                     | Nat    | 6       | Intro   | 8        | 0.3990   | 1.0445         | 78 | 0.38    | 0.7035  |
| geo_num*origin                     | Nat    | 6       | Nat     | 8        | 2.0259   | 0.7565         | 78 | 2.68    | 0.0090  |
| geo_num*origin                     | Nat    | 6       | Intro   | 9        | -1.0010  | 1.0445         | 78 | -0.96   | 0.3408  |



## The Mixed Procedure

| Differences of Least Squares Means |        |         |         |          |          |                |    |         |         |
|------------------------------------|--------|---------|---------|----------|----------|----------------|----|---------|---------|
| Effect                             | origin | geo_num | _origin | _geo_num | Estimate | Standard Error | DF | t Value | Pr >  t |
| geo_num*origin                     | Nat    | 6       | Nat     | 9        | -0.6458  | 0.7750         | 78 | -0.83   | 0.4072  |
| geo_num*origin                     | Nat    | 6       | Intro   | 10       | -0.5583  | 0.7750         | 78 | -0.72   | 0.4734  |
| geo_num*origin                     | Nat    | 6       | Nat     | 10       | -1.1010  | 1.0445         | 78 | -1.05   | 0.2951  |
| geo_num*origin                     | Intro  | 7       | Intro   | 8        | 1.0963   | 0.9519         | 78 | 1.15    | 0.2530  |
| geo_num*origin                     | Intro  | 7       | Nat     | 8        | 2.7231   | 0.6487         | 78 | 4.20    | <.0001  |
| geo_num*origin                     | Intro  | 7       | Intro   | 9        | -0.3037  | 0.9519         | 78 | -0.32   | 0.7505  |
| geo_num*origin                     | Intro  | 7       | Nat     | 9        | 0.05140  | 0.6702         | 78 | 0.08    | 0.9391  |
| geo_num*origin                     | Intro  | 7       | Intro   | 10       | 0.1389   | 0.6702         | 78 | 0.21    | 0.8364  |
| geo_num*origin                     | Intro  | 7       | Nat     | 10       | -0.4037  | 0.9519         | 78 | -0.42   | 0.6726  |
| geo_num*origin                     | Intro  | 8       | Nat     | 8        | 1.6269   | 0.9883         | 78 | 1.65    | 0.1037  |
| geo_num*origin                     | Intro  | 8       | Intro   | 9        | -1.4000  | 1.1717         | 78 | -1.19   | 0.2358  |
| geo_num*origin                     | Intro  | 8       | Nat     | 9        | -1.0449  | 1.0025         | 78 | -1.04   | 0.3005  |
| geo_num*origin                     | Intro  | 8       | Intro   | 10       | -0.9574  | 1.0025         | 78 | -0.95   | 0.3426  |
| geo_num*origin                     | Intro  | 8       | Nat     | 10       | -1.5000  | 1.1717         | 78 | -1.28   | 0.2043  |
| geo_num*origin                     | Nat    | 8       | Intro   | 9        | -3.0269  | 0.9883         | 78 | -3.06   | 0.0030  |
| geo_num*origin                     | Nat    | 8       | Nat     | 9        | -2.6717  | 0.6974         | 78 | -3.83   | 0.0003  |
| geo_num*origin                     | Nat    | 8       | Intro   | 10       | -2.5842  | 0.6974         | 78 | -3.71   | 0.0004  |
| geo_num*origin                     | Nat    | 8       | Nat     | 10       | -3.1269  | 0.9883         | 78 | -3.16   | 0.0022  |
| geo_num*origin                     | Intro  | 9       | Nat     | 9        | 0.3551   | 1.0025         | 78 | 0.35    | 0.7241  |
| geo_num*origin                     | Intro  | 9       | Intro   | 10       | 0.4426   | 1.0025         | 78 | 0.44    | 0.6601  |
| geo_num*origin                     | Intro  | 9       | Nat     | 10       | -0.1000  | 1.1717         | 78 | -0.09   | 0.9322  |
| geo_num*origin                     | Nat    | 9       | Intro   | 10       | 0.08750  | 0.7175         | 78 | 0.12    | 0.9033  |
| geo_num*origin                     | Nat    | 9       | Nat     | 10       | -0.4551  | 1.0025         | 78 | -0.45   | 0.6511  |
| geo_num*origin                     | Intro  | 10      | Nat     | 10       | -0.5426  | 1.0025         | 78 | -0.54   | 0.5899  |