## Fish species based on market value

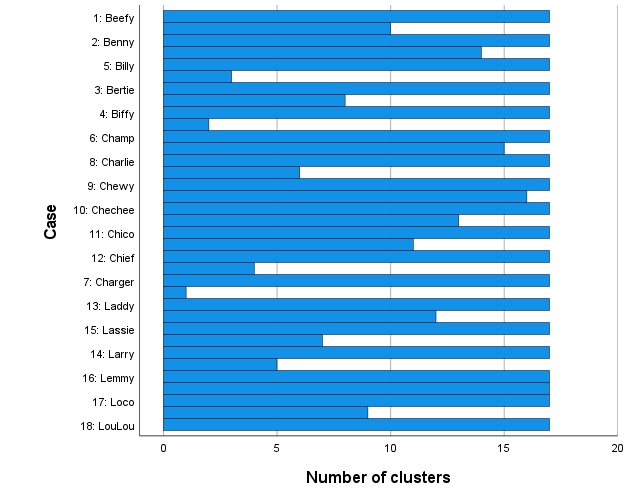
**Cluster**

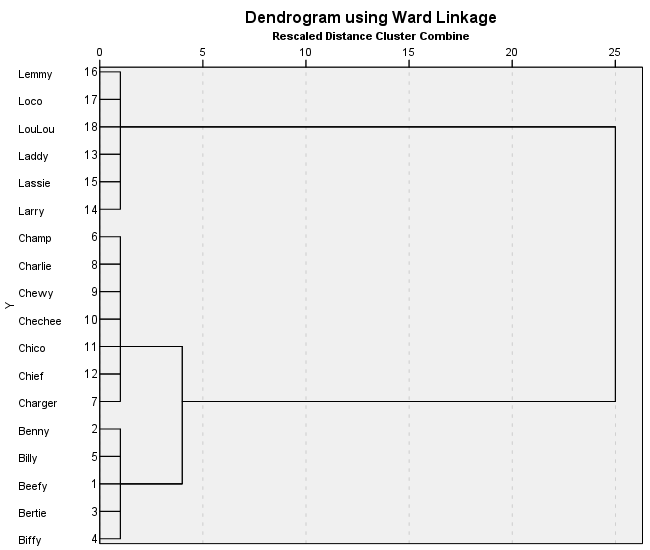
|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:00:11 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav |
| Active Dataset | DataSet1 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 18 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER Weight.kilos Height.cms /METHOD WARD /MEASURE=SEUCLID /ID=Name /PRINT SCHEDULE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.28 |
| Elapsed Time | 00:00:00.18 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a,b | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 18 | 100.0 | 0 | .0 | 18 | 100.0 |
| a. Squared Euclidean Distance used | | | | | |
| b. Ward Linkage | | | | | |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 16 | 17 | .112 | 0 | 0 | 9 |
| 2 | 9 | 10 | .330 | 0 | 0 | 5 |
| 3 | 6 | 8 | .549 | 0 | 0 | 12 |
| 4 | 2 | 5 | .815 | 0 | 0 | 8 |
| 5 | 9 | 11 | 1.679 | 2 | 0 | 7 |
| 6 | 13 | 15 | 2.991 | 0 | 0 | 11 |
| 7 | 9 | 12 | 4.749 | 5 | 0 | 12 |
| 8 | 1 | 2 | 6.892 | 0 | 4 | 15 |
| 9 | 16 | 18 | 9.317 | 1 | 0 | 13 |
| 10 | 3 | 4 | 16.531 | 0 | 0 | 15 |
| 11 | 13 | 14 | 24.022 | 6 | 0 | 13 |
| 12 | 6 | 9 | 34.561 | 3 | 7 | 14 |
| 13 | 13 | 16 | 49.276 | 11 | 9 | 17 |
| 14 | 6 | 7 | 67.473 | 12 | 0 | 16 |
| 15 | 1 | 3 | 98.032 | 8 | 10 | 16 |
| 16 | 1 | 6 | 1001.275 | 15 | 14 | 17 |
| 17 | 1 | 13 | 8167.574 | 16 | 13 | 0 |





**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:00:47 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav |
| Active Dataset | DataSet1 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 18 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER Weight.kilos Height.cms /METHOD WARD /MEASURE=SEUCLID /ID=Name /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.13 |
| Elapsed Time | 00:00:00.17 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 18 | 100.0 | 0 | .0 | 18 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 1:Beefy | 2:Benny | 3:Bertie | 4:Biffy | 5:Billy | 6:Champ | 7:Charger |
| 1:Beefy | .000 | 4.229 | 50.255 | 10.831 | 2.465 | 186.913 | 378.279 |
| 2:Benny | 4.229 | .000 | 44.093 | 10.126 | .532 | 170.920 | 370.471 |
| 3:Bertie | 50.255 | 44.093 | .000 | 14.427 | 51.371 | 381.317 | 668.463 |
| 4:Biffy | 10.831 | 10.126 | 14.427 | .000 | 12.580 | 264.138 | 499.942 |
| 5:Billy | 2.465 | .532 | 51.371 | 12.580 | .000 | 162.664 | 353.916 |
| 6:Champ | 186.913 | 170.920 | 381.317 | 264.138 | 162.664 | .000 | 45.835 |
| 7:Charger | 378.279 | 370.471 | 668.463 | 499.942 | 353.916 | 45.835 | .000 |
| 8:Charlie | 205.011 | 188.622 | 407.607 | 286.021 | 179.859 | .438 | 38.178 |
| 9:Chewy | 279.912 | 265.370 | 520.333 | 378.451 | 253.585 | 11.274 | 12.490 |
| 10:Chechee | 259.222 | 246.143 | 494.083 | 355.210 | 234.482 | 8.251 | 15.239 |
| 11:Chico | 305.761 | 292.360 | 558.929 | 410.214 | 279.460 | 18.000 | 7.027 |
| 12:Chief | 232.713 | 219.860 | 456.432 | 323.549 | 208.947 | 4.276 | 22.201 |
| 13:Laddy | 1111.838 | 1155.089 | 786.577 | 949.505 | 1172.755 | 2207.621 | 2774.927 |
| 14:Larry | 973.047 | 1019.713 | 685.471 | 828.202 | 1034.078 | 2012.492 | 2543.775 |
| 15:Lassie | 1150.654 | 1188.522 | 806.134 | 979.331 | 1208.547 | 2257.922 | 2842.793 |
| 16:Lemmy | 1195.368 | 1253.432 | 887.847 | 1041.465 | 1267.110 | 2327.452 | 2880.872 |
| 17:Loco | 1163.771 | 1221.554 | 862.122 | 1012.580 | 1234.868 | 2283.211 | 2830.828 |
| 18:LouLou | 1155.809 | 1206.014 | 837.224 | 996.669 | 1221.925 | 2271.814 | 2834.215 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 8:Charlie | 9:Chewy | 10:Chechee | 11:Chico | 12:Chief | 13:Laddy | 14:Larry |
| 1:Beefy | 205.011 | 279.912 | 259.222 | 305.761 | 232.713 | 1111.838 | 973.047 |
| 2:Benny | 188.622 | 265.370 | 246.143 | 292.360 | 219.860 | 1155.089 | 1019.713 |
| 3:Bertie | 407.607 | 520.333 | 494.083 | 558.929 | 456.432 | 786.577 | 685.471 |
| 4:Biffy | 286.021 | 378.451 | 355.210 | 410.214 | 323.549 | 949.505 | 828.202 |
| 5:Billy | 179.859 | 253.585 | 234.482 | 279.460 | 208.947 | 1172.755 | 1034.078 |
| 6:Champ | .438 | 11.274 | 8.251 | 18.000 | 4.276 | 2207.621 | 2012.492 |
| 7:Charger | 38.178 | 12.490 | 15.239 | 7.027 | 22.201 | 2774.927 | 2543.775 |
| 8:Charlie | .000 | 7.406 | 5.178 | 13.062 | 2.343 | 2269.424 | 2071.143 |
| 9:Chewy | 7.406 | .000 | .435 | .810 | 2.178 | 2507.403 | 2294.805 |
| 10:Chechee | 5.178 | .435 | .000 | 1.999 | .746 | 2444.459 | 2234.079 |
| 11:Chico | 13.062 | .810 | 1.999 | .000 | 5.188 | 2582.741 | 2365.353 |
| 12:Chief | 2.343 | 2.178 | .746 | 5.188 | .000 | 2361.795 | 2155.683 |
| 13:Laddy | 2269.424 | 2507.403 | 2444.459 | 2582.741 | 2361.795 | .000 | 7.080 |
| 14:Larry | 2071.143 | 2294.805 | 2234.079 | 2365.353 | 2155.683 | 7.080 | .000 |
| 15:Lassie | 2320.725 | 2565.003 | 2501.930 | 2642.702 | 2417.764 | 2.624 | 16.705 |
| 16:Lemmy | 2389.993 | 2624.924 | 2559.380 | 2698.324 | 2476.261 | 12.972 | 14.248 |
| 17:Loco | 2345.123 | 2577.596 | 2512.623 | 2650.230 | 2430.320 | 12.672 | 11.689 |
| 18:LouLou | 2334.127 | 2571.344 | 2507.041 | 2645.986 | 2423.949 | 2.878 | 7.864 |

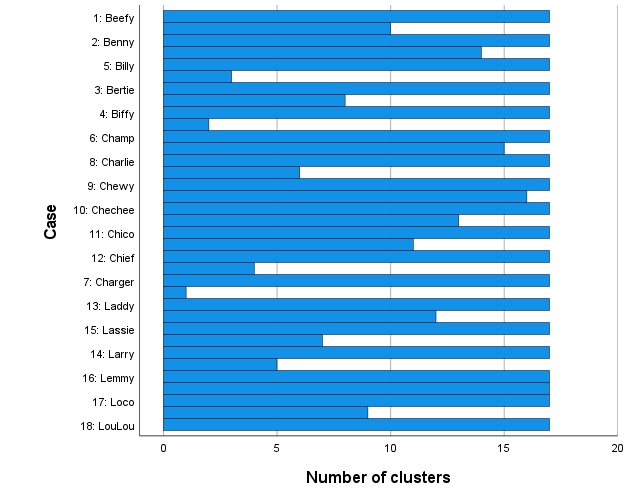
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 15:Lassie | | 16:Lemmy | | 17:Loco | | 18:LouLou | |
| 1:Beefy | 1150.654 | | 1195.368 | | 1163.771 | | 1155.809 | |
| 2:Benny | 1188.522 | | 1253.432 | | 1221.554 | | 1206.014 | |
| 3:Bertie | 806.134 | | 887.847 | | 862.122 | | 837.224 | |
| 4:Biffy | 979.331 | | 1041.465 | | 1012.580 | | 996.669 | |
| 5:Billy | 1208.547 | | 1267.110 | | 1234.868 | | 1221.925 | |
| 6:Champ | 2257.922 | | 2327.452 | | 2283.211 | | 2271.814 | |
| 7:Charger | 2842.793 | | 2880.872 | | 2830.828 | | 2834.215 | |
| 8:Charlie | 2320.725 | | 2389.993 | | 2345.123 | | 2334.127 | |
| 9:Chewy | 2565.003 | | 2624.924 | | 2577.596 | | 2571.344 | |
| 10:Chechee | 2501.930 | | 2559.380 | | 2512.623 | | 2507.041 | |
| 11:Chico | 2642.702 | | 2698.324 | | 2650.230 | | 2645.986 | |
| 12:Chief | 2417.764 | | 2476.261 | | 2430.320 | | 2423.949 | |
| 13:Laddy | 2.624 | | 12.972 | | 12.672 | | 2.878 | |
| 14:Larry | 16.705 | | 14.248 | | 11.689 | | 7.864 | |
| 15:Lassie | .000 | | 24.958 | | 25.376 | | 9.659 | |
| 16:Lemmy | 24.958 | | .000 | | .225 | | 3.663 | |
| 17:Loco | 25.376 | | .225 | | .000 | | 3.726 | |
| 18:LouLou | 9.659 | | 3.663 | | 3.726 | | .000 | |
|  |  |  | |  | |  | |  | |  |  |

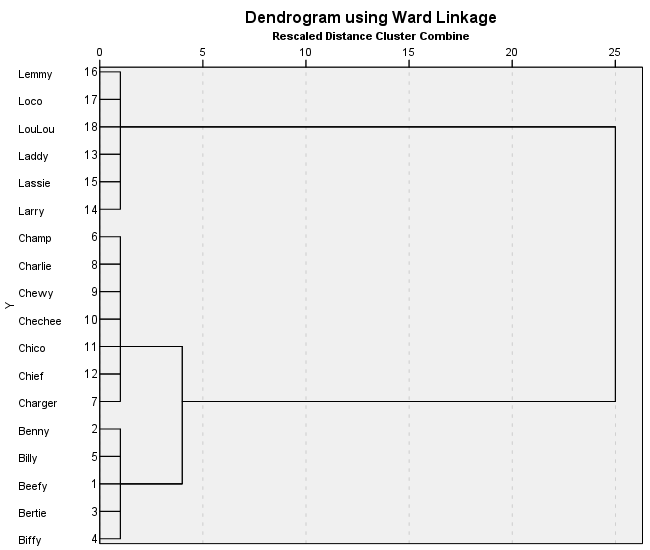
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 16 | 17 | .112 | 0 | 0 | 9 |
| 2 | 9 | 10 | .330 | 0 | 0 | 5 |
| 3 | 6 | 8 | .549 | 0 | 0 | 12 |
| 4 | 2 | 5 | .815 | 0 | 0 | 8 |
| 5 | 9 | 11 | 1.679 | 2 | 0 | 7 |
| 6 | 13 | 15 | 2.991 | 0 | 0 | 11 |
| 7 | 9 | 12 | 4.749 | 5 | 0 | 12 |
| 8 | 1 | 2 | 6.892 | 0 | 4 | 15 |
| 9 | 16 | 18 | 9.317 | 1 | 0 | 13 |
| 10 | 3 | 4 | 16.531 | 0 | 0 | 15 |
| 11 | 13 | 14 | 24.022 | 6 | 0 | 13 |
| 12 | 6 | 9 | 34.561 | 3 | 7 | 14 |
| 13 | 13 | 16 | 49.276 | 11 | 9 | 17 |
| 14 | 6 | 7 | 67.473 | 12 | 0 | 16 |
| 15 | 1 | 3 | 98.032 | 8 | 10 | 16 |
| 16 | 1 | 6 | 1001.275 | 15 | 14 | 17 |
| 17 | 1 | 13 | 8167.574 | 16 | 13 | 0 |





**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:07:27 |
| Comments | |  |
| Input | Active Dataset | DataSet2 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 20 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER Case\_No V1 V2 V3 V4 V5 V6 /METHOD BAVERAGE /MEASURE=SEUCLID /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.08 |
| Elapsed Time | 00:00:00.16 |

[DataSet2]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 20 | 100.0 | 0 | .0 | 20 | 100.0 |
| a. Average Linkage (Between Groups) | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | .000 | 65.000 | 12.000 | 40.000 | 85.000 | 28.000 | 41.000 | 54.000 |
| 2 | 65.000 | .000 | 69.000 | 35.000 | 16.000 | 63.000 | 64.000 | 113.000 |
| 3 | 12.000 | 69.000 | .000 | 44.000 | 87.000 | 20.000 | 27.000 | 28.000 |
| 4 | 40.000 | 35.000 | 44.000 | .000 | 45.000 | 24.000 | 31.000 | 52.000 |
| 5 | 85.000 | 16.000 | 87.000 | 45.000 | .000 | 53.000 | 46.000 | 99.000 |
| 6 | 28.000 | 63.000 | 20.000 | 24.000 | 53.000 | .000 | 3.000 | 12.000 |
| 7 | 41.000 | 64.000 | 27.000 | 31.000 | 46.000 | 3.000 | .000 | 11.000 |
| 8 | 54.000 | 113.000 | 28.000 | 52.000 | 99.000 | 12.000 | 11.000 | .000 |
| 9 | 112.000 | 57.000 | 100.000 | 56.000 | 21.000 | 44.000 | 33.000 | 70.000 |
| 10 | 129.000 | 82.000 | 105.000 | 41.000 | 58.000 | 49.000 | 40.000 | 57.000 |
| 11 | 160.000 | 85.000 | 134.000 | 88.000 | 39.000 | 72.000 | 53.000 | 88.000 |
| 12 | 128.000 | 135.000 | 92.000 | 76.000 | 95.000 | 40.000 | 29.000 | 26.000 |
| 13 | 209.000 | 124.000 | 161.000 | 115.000 | 80.000 | 99.000 | 76.000 | 97.000 |
| 14 | 215.000 | 180.000 | 179.000 | 103.000 | 132.000 | 95.000 | 82.000 | 85.000 |
| 15 | 209.000 | 218.000 | 163.000 | 143.000 | 158.000 | 91.000 | 78.000 | 67.000 |
| 16 | 273.000 | 224.000 | 227.000 | 149.000 | 162.000 | 133.000 | 112.000 | 115.000 |
| 17 | 265.000 | 280.000 | 219.000 | 193.000 | 196.000 | 129.000 | 106.000 | 97.000 |
| 18 | 345.000 | 280.000 | 295.000 | 213.000 | 210.000 | 189.000 | 168.000 | 171.000 |
| 19 | 380.000 | 333.000 | 316.000 | 232.000 | 265.000 | 212.000 | 189.000 | 174.000 |
| 20 | 430.000 | 333.000 | 368.000 | 306.000 | 235.000 | 250.000 | 215.000 | 234.000 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1 | 112.000 | 129.000 | 160.000 | 128.000 | 209.000 | 215.000 | 209.000 | 273.000 |
| 2 | 57.000 | 82.000 | 85.000 | 135.000 | 124.000 | 180.000 | 218.000 | 224.000 |
| 3 | 100.000 | 105.000 | 134.000 | 92.000 | 161.000 | 179.000 | 163.000 | 227.000 |
| 4 | 56.000 | 41.000 | 88.000 | 76.000 | 115.000 | 103.000 | 143.000 | 149.000 |
| 5 | 21.000 | 58.000 | 39.000 | 95.000 | 80.000 | 132.000 | 158.000 | 162.000 |
| 6 | 44.000 | 49.000 | 72.000 | 40.000 | 99.000 | 95.000 | 91.000 | 133.000 |
| 7 | 33.000 | 40.000 | 53.000 | 29.000 | 76.000 | 82.000 | 78.000 | 112.000 |
| 8 | 70.000 | 57.000 | 88.000 | 26.000 | 97.000 | 85.000 | 67.000 | 115.000 |
| 9 | .000 | 25.000 | 8.000 | 40.000 | 33.000 | 63.000 | 81.000 | 81.000 |
| 10 | 25.000 | .000 | 29.000 | 25.000 | 28.000 | 20.000 | 64.000 | 38.000 |
| 11 | 8.000 | 29.000 | .000 | 38.000 | 13.000 | 57.000 | 67.000 | 63.000 |
| 12 | 40.000 | 25.000 | 38.000 | .000 | 35.000 | 27.000 | 17.000 | 39.000 |
| 13 | 33.000 | 28.000 | 13.000 | 35.000 | .000 | 40.000 | 56.000 | 38.000 |
| 14 | 63.000 | 20.000 | 57.000 | 27.000 | 40.000 | .000 | 40.000 | 6.000 |
| 15 | 81.000 | 64.000 | 67.000 | 17.000 | 56.000 | 40.000 | .000 | 44.000 |
| 16 | 81.000 | 38.000 | 63.000 | 39.000 | 38.000 | 6.000 | 44.000 | .000 |
| 17 | 105.000 | 88.000 | 85.000 | 35.000 | 74.000 | 46.000 | 20.000 | 36.000 |
| 18 | 105.000 | 78.000 | 79.000 | 67.000 | 54.000 | 38.000 | 52.000 | 28.000 |
| 19 | 156.000 | 89.000 | 124.000 | 76.000 | 77.000 | 31.000 | 57.000 | 17.000 |
| 20 | 126.000 | 135.000 | 88.000 | 112.000 | 65.000 | 91.000 | 93.000 | 63.000 |

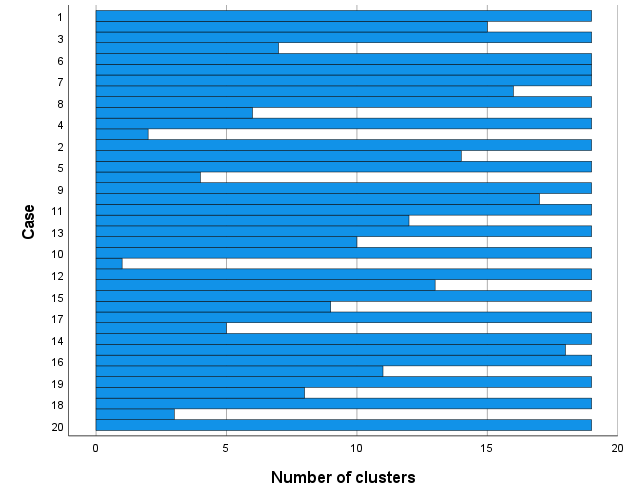
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | |
| Case | Squared Euclidean Distance | | | |
| 17 | 18 | 19 | 20 |
| 1 | 265.000 | 345.000 | 380.000 | 430.000 |
| 2 | 280.000 | 280.000 | 333.000 | 333.000 |
| 3 | 219.000 | 295.000 | 316.000 | 368.000 |
| 4 | 193.000 | 213.000 | 232.000 | 306.000 |
| 5 | 196.000 | 210.000 | 265.000 | 235.000 |
| 6 | 129.000 | 189.000 | 212.000 | 250.000 |
| 7 | 106.000 | 168.000 | 189.000 | 215.000 |
| 8 | 97.000 | 171.000 | 174.000 | 234.000 |
| 9 | 105.000 | 105.000 | 156.000 | 126.000 |
| 10 | 88.000 | 78.000 | 89.000 | 135.000 |
| 11 | 85.000 | 79.000 | 124.000 | 88.000 |
| 12 | 35.000 | 67.000 | 76.000 | 112.000 |
| 13 | 74.000 | 54.000 | 77.000 | 65.000 |
| 14 | 46.000 | 38.000 | 31.000 | 91.000 |
| 15 | 20.000 | 52.000 | 57.000 | 93.000 |
| 16 | 36.000 | 28.000 | 17.000 | 63.000 |
| 17 | .000 | 60.000 | 53.000 | 77.000 |
| 18 | 60.000 | .000 | 25.000 | 35.000 |
| 19 | 53.000 | 25.000 | .000 | 74.000 |
| 20 | 77.000 | 35.000 | 74.000 | .000 |
|  |  |  |  |  |  |  |  |  |

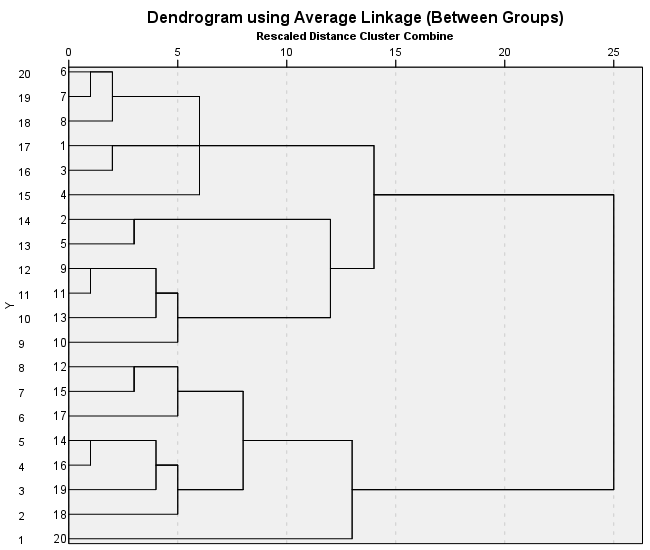
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Average Linkage (Between Groups)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 6 | 7 | 3.000 | 0 | 0 | 4 |
| 2 | 14 | 16 | 6.000 | 0 | 0 | 9 |
| 3 | 9 | 11 | 8.000 | 0 | 0 | 8 |
| 4 | 6 | 8 | 11.500 | 1 | 0 | 13 |
| 5 | 1 | 3 | 12.000 | 0 | 0 | 13 |
| 6 | 2 | 5 | 16.000 | 0 | 0 | 16 |
| 7 | 12 | 15 | 17.000 | 0 | 0 | 11 |
| 8 | 9 | 13 | 23.000 | 3 | 0 | 10 |
| 9 | 14 | 19 | 24.000 | 2 | 0 | 12 |
| 10 | 9 | 10 | 27.333 | 8 | 0 | 16 |
| 11 | 12 | 17 | 27.500 | 7 | 0 | 15 |
| 12 | 14 | 18 | 30.333 | 9 | 0 | 15 |
| 13 | 1 | 6 | 33.000 | 5 | 4 | 14 |
| 14 | 1 | 4 | 38.200 | 13 | 0 | 18 |
| 15 | 12 | 14 | 49.750 | 11 | 12 | 17 |
| 16 | 2 | 9 | 68.250 | 6 | 10 | 18 |
| 17 | 12 | 20 | 77.857 | 15 | 0 | 19 |
| 18 | 1 | 2 | 83.667 | 14 | 16 | 19 |
| 19 | 1 | 12 | 149.750 | 18 | 17 | 0 |





Warning # 5281. Command name: GET FILESPSS Statistics is running in Unicode encoding mode. This file is encoded ina locale-specific (code page) encoding. The defined width of any stringvariables are automatically tripled in order to avoid possible data loss. Youcan use ALTER TYPE to set the width of string variables to the width of thelongest observed value for each string variable.

**Alter Type**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:10:08 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| Syntax | | ALTER TYPE ALL(A=AMIN). |
| Resources | Processor Time | 00:00:00.00 |
| Elapsed Time | 00:00:00.05 |

C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav

|  |  |  |
| --- | --- | --- |
| **Altered Types** | | |
| Case | A9 | AMIN |
| Species | A30 | AMIN |

**Quick Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:17:53 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav |
| Active Dataset | DataSet3 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 150 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any clustering variable used. |
| Syntax | | QUICK CLUSTER Sepal.Length Sepal.Width Petal.Length Petal.Width /MISSING=LISTWISE /CRITERIA=CLUSTER(3) MXITER(20) CONVERGE(0) /METHOD=KMEANS(NOUPDATE) /PRINT ID(Species) INITIAL. |
| Resources | Processor Time | 00:00:00.02 |
| Elapsed Time | 00:00:00.01 |
| Workspace Required | 848 bytes |

[DataSet3] C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Sepal.Length | 7.7 | 5.7 | 4.9 |
| Sepal.Width | 3.8 | 4.4 | 2.5 |
| Petal.Length | 6.7 | 1.5 | 4.5 |
| Petal.Width | 2.2 | .4 | 1.7 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Iteration History**a | | | |
| Iteration | Change in Cluster Centers | | |
| 1 | 2 | 3 |
| 1 | 1.226 | 1.205 | 1.141 |
| 2 | .175 | .000 | .121 |
| 3 | .070 | .000 | .047 |
| 4 | .050 | .000 | .033 |
| 5 | .000 | .000 | .000 |
| a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 5. The minimum distance between initial centers is 3.824. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Final Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Sepal.Length | 6.9 | 5.0 | 5.9 |
| Sepal.Width | 3.1 | 3.4 | 2.7 |
| Petal.Length | 5.7 | 1.5 | 4.4 |
| Petal.Width | 2.1 | .2 | 1.4 |

|  |  |  |
| --- | --- | --- |
| **Number of Cases in each Cluster** | | |
| Cluster | 1 | 38.000 |
| 2 | 50.000 |
| 3 | 62.000 |
| Valid | | 150.000 |
| Missing | | .000 |

**Quick Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:20:36 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav |
| Active Dataset | DataSet4 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 42 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any clustering variable used. |
| Syntax | | QUICK CLUSTER headcirumference length Birthweight Gestation /MISSING=LISTWISE /CRITERIA=CLUSTER(3) MXITER(30) CONVERGE(0) /METHOD=KMEANS(NOUPDATE) /SAVE CLUSTER DISTANCE /PRINT INITIAL. |
| Resources | Processor Time | 00:00:00.00 |
| Elapsed Time | 00:00:00.01 |
| Workspace Required | 848 bytes |
| Variables Created or Modified | QCL\_1 | Cluster Number of Case |
| QCL\_2 | Distance of Case from its Classification Cluster Center |

[DataSet4] C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Head circumference at birth | 12 | 13 | 13 |
| Length of baby at birth (inches) | 17 | 19 | 22 |
| Weight of baby at birth (lbs) | 5.8 | 5.5 | 10.0 |
| Gestational age at birth (weeks) | 33 | 39 | 44 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Iteration History**a | | | |
| Iteration | Change in Cluster Centers | | |
| 1 | 2 | 3 |
| 1 | 1.677 | 1.878 | 2.299 |
| 2 | .522 | .118 | .000 |
| 3 | .389 | .111 | .000 |
| 4 | .000 | .000 | .000 |
| a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 4. The minimum distance between initial centers is 6.410. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Final Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Head circumference at birth | 12 | 13 | 14 |
| Length of baby at birth (inches) | 18 | 20 | 21 |
| Weight of baby at birth (lbs) | 5.4 | 7.2 | 9.1 |
| Gestational age at birth (weeks) | 35 | 39 | 42 |

|  |  |  |
| --- | --- | --- |
| **Number of Cases in each Cluster** | | |
| Cluster | 1 | 7.000 |
| 2 | 27.000 |
| 3 | 8.000 |
| Valid | | 42.000 |
| Missing | | .000 |

**Quick Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:22:29 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav |
| Active Dataset | DataSet4 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 42 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any clustering variable used. |
| Syntax | | QUICK CLUSTER headcirumference length Birthweight Gestation /MISSING=LISTWISE /CRITERIA=CLUSTER(3) MXITER(30) CONVERGE(0) /METHOD=KMEANS(NOUPDATE) /SAVE CLUSTER DISTANCE /PRINT INITIAL ANOVA. |
| Resources | Processor Time | 00:00:00.00 |
| Elapsed Time | 00:00:00.01 |
| Workspace Required | 944 bytes |
| Variables Created or Modified | QCL\_3 | Cluster Number of Case |
| QCL\_4 | Distance of Case from its Classification Cluster Center |

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Head circumference at birth | 12 | 13 | 13 |
| Length of baby at birth (inches) | 17 | 19 | 22 |
| Weight of baby at birth (lbs) | 5.8 | 5.5 | 10.0 |
| Gestational age at birth (weeks) | 33 | 39 | 44 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Iteration History**a | | | |
| Iteration | Change in Cluster Centers | | |
| 1 | 2 | 3 |
| 1 | 1.677 | 1.878 | 2.299 |
| 2 | .522 | .118 | .000 |
| 3 | .389 | .111 | .000 |
| 4 | .000 | .000 | .000 |
| a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 4. The minimum distance between initial centers is 6.410. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Final Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Head circumference at birth | 12 | 13 | 14 |
| Length of baby at birth (inches) | 18 | 20 | 21 |
| Weight of baby at birth (lbs) | 5.4 | 7.2 | 9.1 |
| Gestational age at birth (weeks) | 35 | 39 | 42 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | | |
|  | Cluster | | Error | | F | Sig. |
| Mean Square | df | Mean Square | df |
| Head circumference at birth | 4.908 | 2 | .367 | 39 | 13.381 | <.001 |
| Length of baby at birth (inches) | 12.536 | 2 | .659 | 39 | 19.012 | <.001 |
| Weight of baby at birth (lbs) | 24.772 | 2 | .589 | 39 | 42.094 | <.001 |
| Gestational age at birth (weeks) | 106.724 | 2 | 1.873 | 39 | 56.995 | <.001 |
| The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal. | | | | | | |

|  |  |  |
| --- | --- | --- |
| **Number of Cases in each Cluster** | | |
| Cluster | 1 | 7.000 |
| 2 | 27.000 |
| 3 | 8.000 |
| Valid | | 42.000 |
| Missing | | .000 |

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:31:08 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. Cluster analysis Classification of different fish species based on Market value.sav |
| Active Dataset | DataSet6 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 12 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER Price /METHOD WARD /MEASURE=SEUCLID /ID=Fish\_species /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.08 |
| Elapsed Time | 00:00:00.15 |

[DataSet6] C:\Users\admin\Downloads\26. Cluster analysis Classification of different fish species based on Market value.sav

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 12 | 100.0 | 0 | .0 | 12 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | |
| Case | Squared Euclidean Distance | | | | | |
| 1:Carps | 2:Nile tilapia | 3:Silver barb | 4:Catfish | 5:Red Tilapia | 6:Giant Gorami |
| 1:Carps | .000 | .022 | .194 | .548 | 1.742 | 3.133 |
| 2:Nile tilapia | .022 | .000 | .084 | .348 | 1.369 | 2.624 |
| 3:Silver barb | .194 | .084 | .000 | .090 | .774 | 1.769 |
| 4:Catfish | .548 | .348 | .090 | .000 | .336 | 1.061 |
| 5:Red Tilapia | 1.742 | 1.369 | .774 | .336 | .000 | .202 |
| 6:Giant Gorami | 3.133 | 2.624 | 1.769 | 1.061 | .202 | .000 |
| 7:Sea bass | 3.648 | 3.098 | 2.161 | 1.369 | .348 | .020 |
| 8:Snakehead fish | 4.884 | 4.244 | 3.133 | 2.161 | .792 | .194 |
| 9:Crab | 6.250 | 5.523 | 4.244 | 3.098 | 1.392 | .533 |
| 10:Tiger prawn | 15.761 | 14.592 | 12.461 | 10.433 | 7.023 | 4.840 |
| 11:Giant Prawn | 47.748 | 45.698 | 41.861 | 38.069 | 31.248 | 26.420 |
| 12:Marble goby | 97.023 | 94.090 | 88.548 | 82.992 | 72.761 | 65.286 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | |
| Case | Squared Euclidean Distance | | | | |
| 7:Sea bass | 8:Snakehead fish | 9:Crab | 10:Tiger prawn | 11:Giant Prawn |
| 1:Carps | 3.648 | 4.884 | 6.250 | 15.761 | 47.748 |
| 2:Nile tilapia | 3.098 | 4.244 | 5.523 | 14.592 | 45.698 |
| 3:Silver barb | 2.161 | 3.133 | 4.244 | 12.461 | 41.861 |
| 4:Catfish | 1.369 | 2.161 | 3.098 | 10.433 | 38.069 |
| 5:Red Tilapia | .348 | .792 | 1.392 | 7.023 | 31.248 |
| 6:Giant Gorami | .020 | .194 | .533 | 4.840 | 26.420 |
| 7:Sea bass | .000 | .090 | .348 | 4.244 | 25.000 |
| 8:Snakehead fish | .090 | .000 | .084 | 3.098 | 22.090 |
| 9:Crab | .348 | .084 | .000 | 2.161 | 19.448 |
| 10:Tiger prawn | 4.244 | 3.098 | 2.161 | .000 | 8.644 |
| 11:Giant Prawn | 25.000 | 22.090 | 19.448 | 8.644 | .000 |
| 12:Marble goby | 63.044 | 58.370 | 54.022 | 34.574 | 8.644 |

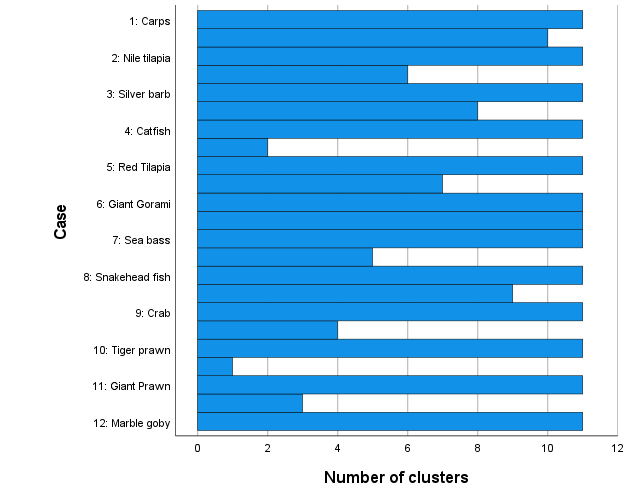
|  |  |  |
| --- | --- | --- |
| **Proximity Matrix** | | |
| Case | Squared Euclidean Distance | |
| 12:Marble goby | |
| 1:Carps | 97.023 | |
| 2:Nile tilapia | 94.090 | |
| 3:Silver barb | 88.548 | |
| 4:Catfish | 82.992 | |
| 5:Red Tilapia | 72.761 | |
| 6:Giant Gorami | 65.286 | |
| 7:Sea bass | 63.044 | |
| 8:Snakehead fish | 58.370 | |
| 9:Crab | 54.022 | |
| 10:Tiger prawn | 34.574 | |
| 11:Giant Prawn | 8.644 | |
| 12:Marble goby | .000 | |
|  |  |  | |  |  |  |  |

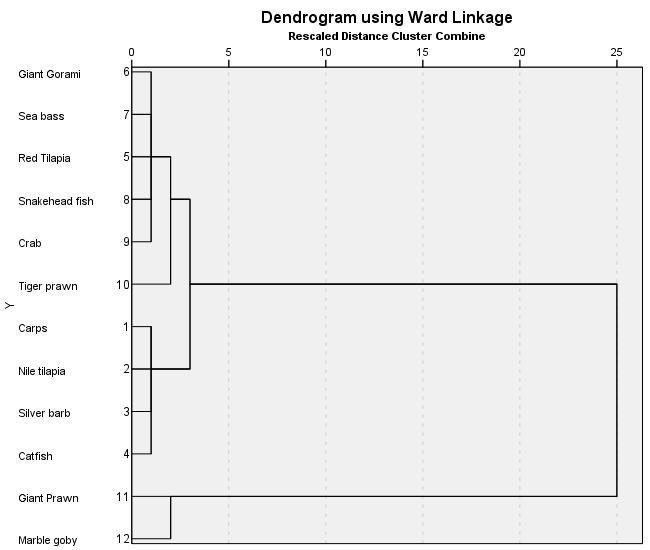
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 6 | 7 | .010 | 0 | 0 | 5 |
| 2 | 1 | 2 | .021 | 0 | 0 | 6 |
| 3 | 8 | 9 | .063 | 0 | 0 | 7 |
| 4 | 3 | 4 | .108 | 0 | 0 | 6 |
| 5 | 5 | 6 | .288 | 0 | 1 | 7 |
| 6 | 1 | 3 | .554 | 2 | 4 | 10 |
| 7 | 5 | 8 | 1.122 | 5 | 3 | 8 |
| 8 | 5 | 10 | 4.549 | 7 | 0 | 10 |
| 9 | 11 | 12 | 8.871 | 0 | 0 | 11 |
| 10 | 1 | 5 | 17.974 | 6 | 8 | 11 |
| 11 | 1 | 11 | 96.842 | 10 | 9 | 0 |





## MA Practical 4 Q4

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:40:57 |
| Comments | |  |
| Input | Active Dataset | DataSet2 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 20 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER V1 V2 V3 V4 V5 V6 /METHOD WARD /MEASURE=SEUCLID /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.08 |
| Elapsed Time | 00:00:00.16 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 20 | 100.0 | 0 | .0 | 20 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | .000 | 64.000 | 8.000 | 31.000 | 69.000 | 3.000 | 5.000 | 5.000 |
| 2 | 64.000 | .000 | 68.000 | 31.000 | 7.000 | 47.000 | 39.000 | 77.000 |
| 3 | 8.000 | 68.000 | .000 | 43.000 | 83.000 | 11.000 | 11.000 | 3.000 |
| 4 | 31.000 | 31.000 | 43.000 | .000 | 44.000 | 20.000 | 22.000 | 36.000 |
| 5 | 69.000 | 7.000 | 83.000 | 44.000 | .000 | 52.000 | 42.000 | 90.000 |
| 6 | 3.000 | 47.000 | 11.000 | 20.000 | 52.000 | .000 | 2.000 | 8.000 |
| 7 | 5.000 | 39.000 | 11.000 | 22.000 | 42.000 | 2.000 | .000 | 10.000 |
| 8 | 5.000 | 77.000 | 3.000 | 36.000 | 90.000 | 8.000 | 10.000 | .000 |
| 9 | 48.000 | 8.000 | 64.000 | 31.000 | 5.000 | 35.000 | 29.000 | 69.000 |
| 10 | 48.000 | 18.000 | 56.000 | 5.000 | 33.000 | 33.000 | 31.000 | 53.000 |
| 11 | 60.000 | 4.000 | 70.000 | 39.000 | 3.000 | 47.000 | 37.000 | 79.000 |
| 12 | 7.000 | 35.000 | 11.000 | 12.000 | 46.000 | 4.000 | 4.000 | 10.000 |
| 13 | 65.000 | 3.000 | 61.000 | 34.000 | 16.000 | 50.000 | 40.000 | 72.000 |
| 14 | 46.000 | 36.000 | 58.000 | 3.000 | 51.000 | 31.000 | 33.000 | 49.000 |
| 15 | 13.000 | 49.000 | 19.000 | 22.000 | 58.000 | 10.000 | 14.000 | 18.000 |
| 16 | 48.000 | 28.000 | 58.000 | 5.000 | 41.000 | 33.000 | 31.000 | 51.000 |
| 17 | 9.000 | 55.000 | 23.000 | 24.000 | 52.000 | 8.000 | 6.000 | 16.000 |
| 18 | 56.000 | 24.000 | 70.000 | 17.000 | 41.000 | 45.000 | 47.000 | 71.000 |
| 19 | 56.000 | 44.000 | 60.000 | 7.000 | 69.000 | 43.000 | 45.000 | 53.000 |
| 20 | 69.000 | 9.000 | 79.000 | 50.000 | 10.000 | 54.000 | 46.000 | 90.000 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1 | 48.000 | 48.000 | 60.000 | 7.000 | 65.000 | 46.000 | 13.000 | 48.000 |
| 2 | 8.000 | 18.000 | 4.000 | 35.000 | 3.000 | 36.000 | 49.000 | 28.000 |
| 3 | 64.000 | 56.000 | 70.000 | 11.000 | 61.000 | 58.000 | 19.000 | 58.000 |
| 4 | 31.000 | 5.000 | 39.000 | 12.000 | 34.000 | 3.000 | 22.000 | 5.000 |
| 5 | 5.000 | 33.000 | 3.000 | 46.000 | 16.000 | 51.000 | 58.000 | 41.000 |
| 6 | 35.000 | 33.000 | 47.000 | 4.000 | 50.000 | 31.000 | 10.000 | 33.000 |
| 7 | 29.000 | 31.000 | 37.000 | 4.000 | 40.000 | 33.000 | 14.000 | 31.000 |
| 8 | 69.000 | 53.000 | 79.000 | 10.000 | 72.000 | 49.000 | 18.000 | 51.000 |
| 9 | .000 | 24.000 | 4.000 | 31.000 | 17.000 | 38.000 | 45.000 | 32.000 |
| 10 | 24.000 | .000 | 28.000 | 21.000 | 19.000 | 4.000 | 39.000 | 2.000 |
| 11 | 4.000 | 28.000 | .000 | 37.000 | 9.000 | 48.000 | 51.000 | 38.000 |
| 12 | 31.000 | 21.000 | 37.000 | .000 | 34.000 | 23.000 | 8.000 | 23.000 |
| 13 | 17.000 | 19.000 | 9.000 | 34.000 | .000 | 39.000 | 52.000 | 29.000 |
| 14 | 38.000 | 4.000 | 48.000 | 23.000 | 39.000 | .000 | 39.000 | 2.000 |
| 15 | 45.000 | 39.000 | 51.000 | 8.000 | 52.000 | 39.000 | .000 | 43.000 |
| 16 | 32.000 | 2.000 | 38.000 | 23.000 | 29.000 | 2.000 | 43.000 | .000 |
| 17 | 41.000 | 39.000 | 49.000 | 10.000 | 58.000 | 37.000 | 16.000 | 35.000 |
| 18 | 24.000 | 14.000 | 30.000 | 31.000 | 29.000 | 22.000 | 43.000 | 24.000 |
| 19 | 56.000 | 8.000 | 60.000 | 27.000 | 41.000 | 6.000 | 41.000 | 8.000 |
| 20 | 5.000 | 35.000 | 7.000 | 48.000 | 16.000 | 55.000 | 68.000 | 47.000 |

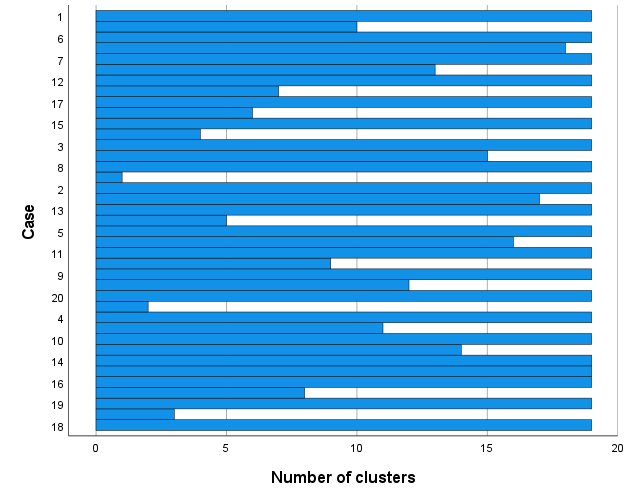
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | |
| Case | Squared Euclidean Distance | | | |
| 17 | 18 | 19 | 20 |
| 1 | 9.000 | 56.000 | 56.000 | 69.000 |
| 2 | 55.000 | 24.000 | 44.000 | 9.000 |
| 3 | 23.000 | 70.000 | 60.000 | 79.000 |
| 4 | 24.000 | 17.000 | 7.000 | 50.000 |
| 5 | 52.000 | 41.000 | 69.000 | 10.000 |
| 6 | 8.000 | 45.000 | 43.000 | 54.000 |
| 7 | 6.000 | 47.000 | 45.000 | 46.000 |
| 8 | 16.000 | 71.000 | 53.000 | 90.000 |
| 9 | 41.000 | 24.000 | 56.000 | 5.000 |
| 10 | 39.000 | 14.000 | 8.000 | 35.000 |
| 11 | 49.000 | 30.000 | 60.000 | 7.000 |
| 12 | 10.000 | 31.000 | 27.000 | 48.000 |
| 13 | 58.000 | 29.000 | 41.000 | 16.000 |
| 14 | 37.000 | 22.000 | 6.000 | 55.000 |
| 15 | 16.000 | 43.000 | 41.000 | 68.000 |
| 16 | 35.000 | 24.000 | 8.000 | 47.000 |
| 17 | .000 | 59.000 | 49.000 | 68.000 |
| 18 | 59.000 | .000 | 24.000 | 31.000 |
| 19 | 49.000 | 24.000 | .000 | 73.000 |
| 20 | 68.000 | 31.000 | 73.000 | .000 |
|  |  |  |  |  |  |  |  |  |

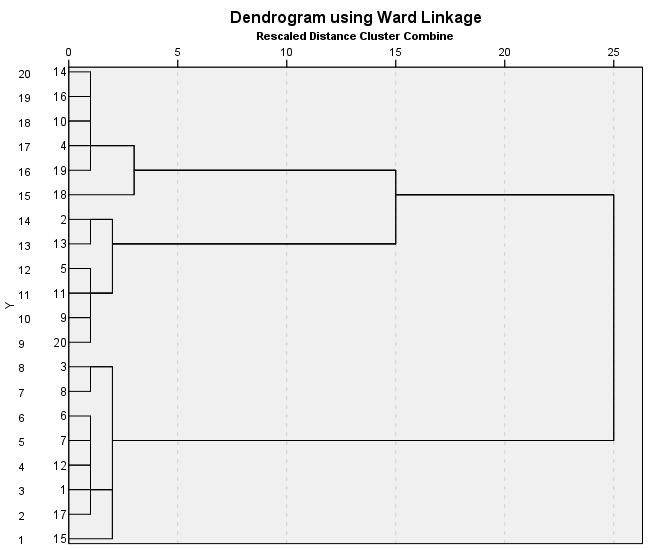
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 14 | 16 | 1.000 | 0 | 0 | 6 |
| 2 | 6 | 7 | 2.000 | 0 | 0 | 7 |
| 3 | 2 | 13 | 3.500 | 0 | 0 | 15 |
| 4 | 5 | 11 | 5.000 | 0 | 0 | 11 |
| 5 | 3 | 8 | 6.500 | 0 | 0 | 16 |
| 6 | 10 | 14 | 8.167 | 0 | 1 | 9 |
| 7 | 6 | 12 | 10.500 | 2 | 0 | 10 |
| 8 | 9 | 20 | 13.000 | 0 | 0 | 11 |
| 9 | 4 | 10 | 15.583 | 0 | 6 | 12 |
| 10 | 1 | 6 | 18.500 | 0 | 7 | 13 |
| 11 | 5 | 9 | 23.000 | 4 | 8 | 15 |
| 12 | 4 | 19 | 27.750 | 9 | 0 | 17 |
| 13 | 1 | 17 | 33.100 | 10 | 0 | 14 |
| 14 | 1 | 15 | 41.333 | 13 | 0 | 16 |
| 15 | 2 | 5 | 51.833 | 3 | 11 | 18 |
| 16 | 1 | 3 | 64.500 | 14 | 5 | 19 |
| 17 | 4 | 18 | 79.667 | 12 | 0 | 18 |
| 18 | 2 | 4 | 172.667 | 15 | 17 | 19 |
| 19 | 1 | 2 | 328.600 | 16 | 18 | 0 |





## Children’s reading and cognitive performance

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:44:09 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. cluster\_children the data on children\_s reading and cognitive performance again.sav |
| Active Dataset | DataSet1 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 20 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER age mem\_span iq read\_ab /METHOD BAVERAGE /MEASURE=SEUCLID /ID=Name /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:01.31 |
| Elapsed Time | 00:00:00.77 |

[DataSet1] C:\Users\admin\Downloads\26. cluster\_children the data on children\_s reading and cognitive performance again.sav

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 20 | 100.0 | 0 | .0 | 20 | 100.0 |
| a. Average Linkage (Between Groups) | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 1:Oscar | 2:Susie | 3:Kimberly | 4:Louise | 5:Ronald | 6:Charlie | 7:Gertrude |
| 1:Oscar | .000 | .000 | 49.460 | 123.290 | 123.290 | 18.420 | 172.340 |
| 2:Susie | .000 | .000 | 49.460 | 123.290 | 123.290 | 18.420 | 172.340 |
| 3:Kimberly | 49.460 | 49.460 | .000 | 326.690 | 326.690 | 12.000 | 402.740 |
| 4:Louise | 123.290 | 123.290 | 326.690 | .000 | .000 | 225.050 | 4.650 |
| 5:Ronald | 123.290 | 123.290 | 326.690 | .000 | .000 | 225.050 | 4.650 |
| 6:Charlie | 18.420 | 18.420 | 12.000 | 225.050 | 225.050 | .000 | 289.780 |
| 7:Gertrude | 172.340 | 172.340 | 402.740 | 4.650 | 4.650 | 289.780 | .000 |
| 8:Beatrice | 124.810 | 124.810 | 328.250 | .240 | .240 | 225.170 | 4.690 |
| 9:Queenie | 124.810 | 124.810 | 328.250 | .240 | .240 | 225.170 | 4.690 |
| 10:Thomas | 124.810 | 124.810 | 328.250 | .240 | .240 | 225.170 | 4.690 |
| 11:Harry | 41.903 | 41.903 | 176.373 | 26.423 | 26.423 | 101.393 | 52.373 |
| 12:Daisy | 15.200 | 15.200 | 107.780 | 65.490 | 65.490 | 50.340 | 103.380 |
| 13:Ethel | 33.360 | 33.360 | 14.500 | 258.890 | 258.890 | 3.620 | 329.340 |
| 14:Angus | 45.890 | 45.890 | 180.850 | 28.440 | 28.440 | 102.970 | 54.250 |
| 15:Morris | 109.500 | 109.500 | 299.760 | 3.690 | 3.690 | 198.480 | 12.940 |
| 16:John | 20.940 | 20.940 | 30.340 | 200.850 | 200.850 | 5.460 | 263.400 |
| 17:Noel | 93.320 | 93.320 | 270.060 | 8.530 | 8.530 | 173.340 | 22.460 |
| 18:Fred | 16.140 | 16.140 | 81.640 | 106.890 | 106.890 | 31.640 | 153.780 |
| 19:Peter | 16.140 | 16.140 | 81.640 | 106.890 | 106.890 | 31.640 | 153.780 |
| 20:Ian | 39.690 | 39.690 | 160.370 | 42.080 | 42.080 | 87.050 | 72.170 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 8:Beatrice | 9:Queenie | 10:Thomas | 11:Harry | 12:Daisy | 13:Ethel | 14:Angus |
| 1:Oscar | 124.810 | 124.810 | 124.810 | 41.903 | 15.200 | 33.360 | 45.890 |
| 2:Susie | 124.810 | 124.810 | 124.810 | 41.903 | 15.200 | 33.360 | 45.890 |
| 3:Kimberly | 328.250 | 328.250 | 328.250 | 176.373 | 107.780 | 14.500 | 180.850 |
| 4:Louise | .240 | .240 | .240 | 26.423 | 65.490 | 258.890 | 28.440 |
| 5:Ronald | .240 | .240 | .240 | 26.423 | 65.490 | 258.890 | 28.440 |
| 6:Charlie | 225.170 | 225.170 | 225.170 | 101.393 | 50.340 | 3.620 | 102.970 |
| 7:Gertrude | 4.690 | 4.690 | 4.690 | 52.373 | 103.380 | 329.340 | 54.250 |
| 8:Beatrice | .000 | .000 | .000 | 26.223 | 65.090 | 258.250 | 27.240 |
| 9:Queenie | .000 | .000 | .000 | 26.223 | 65.090 | 258.250 | 27.240 |
| 10:Thomas | .000 | .000 | .000 | 26.223 | 65.090 | 258.250 | 27.240 |
| 11:Harry | 26.223 | 26.223 | 26.223 | .000 | 9.083 | 121.423 | 1.302 |
| 12:Daisy | 65.090 | 65.090 | 65.090 | 9.083 | .000 | 64.240 | 9.770 |
| 13:Ethel | 258.250 | 258.250 | 258.250 | 121.423 | 64.240 | .000 | 121.490 |
| 14:Angus | 27.240 | 27.240 | 27.240 | 1.302 | 9.770 | 121.490 | .000 |
| 15:Morris | 2.610 | 2.610 | 2.610 | 16.853 | 49.580 | 225.660 | 16.410 |
| 16:John | 199.690 | 199.690 | 199.690 | 82.373 | 37.020 | 4.340 | 81.410 |
| 17:Noel | 7.330 | 7.330 | 7.330 | 10.263 | 37.080 | 196.680 | 9.770 |
| 18:Fred | 105.650 | 105.650 | 105.650 | 27.213 | 6.060 | 37.100 | 26.570 |
| 19:Peter | 105.650 | 105.650 | 105.650 | 27.213 | 6.060 | 37.100 | 26.570 |
| 20:Ian | 40.880 | 40.880 | 40.880 | 3.022 | 6.050 | 101.530 | 3.000 |

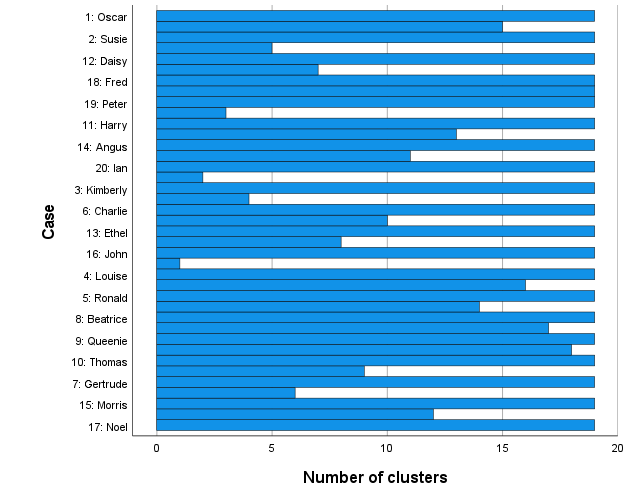
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | |
| 15:Morris | | 16:John | | 17:Noel | 18:Fred | | 19:Peter | | 20:Ian | |
| 1:Oscar | 109.500 | | 20.940 | | 93.320 | 16.140 | | 16.140 | | 39.690 | |
| 2:Susie | 109.500 | | 20.940 | | 93.320 | 16.140 | | 16.140 | | 39.690 | |
| 3:Kimberly | 299.760 | | 30.340 | | 270.060 | 81.640 | | 81.640 | | 160.370 | |
| 4:Louise | 3.690 | | 200.850 | | 8.530 | 106.890 | | 106.890 | | 42.080 | |
| 5:Ronald | 3.690 | | 200.850 | | 8.530 | 106.890 | | 106.890 | | 42.080 | |
| 6:Charlie | 198.480 | | 5.460 | | 173.340 | 31.640 | | 31.640 | | 87.050 | |
| 7:Gertrude | 12.940 | | 263.400 | | 22.460 | 153.780 | | 153.780 | | 72.170 | |
| 8:Beatrice | 2.610 | | 199.690 | | 7.330 | 105.650 | | 105.650 | | 40.880 | |
| 9:Queenie | 2.610 | | 199.690 | | 7.330 | 105.650 | | 105.650 | | 40.880 | |
| 10:Thomas | 2.610 | | 199.690 | | 7.330 | 105.650 | | 105.650 | | 40.880 | |
| 11:Harry | 16.853 | | 82.373 | | 10.263 | 27.213 | | 27.213 | | 3.022 | |
| 12:Daisy | 49.580 | | 37.020 | | 37.080 | 6.060 | | 6.060 | | 6.050 | |
| 13:Ethel | 225.660 | | 4.340 | | 196.680 | 37.100 | | 37.100 | | 101.530 | |
| 14:Angus | 16.410 | | 81.410 | | 9.770 | 26.570 | | 26.570 | | 3.000 | |
| 15:Morris | .000 | | 169.740 | | 1.380 | 82.520 | | 82.520 | | 26.170 | |
| 16:John | 169.740 | | .000 | | 144.340 | 16.420 | | 16.420 | | 65.010 | |
| 17:Noel | 1.380 | | 144.340 | | .000 | 64.420 | | 64.420 | | 16.290 | |
| 18:Fred | 82.520 | | 16.420 | | 64.420 | .000 | | .000 | | 16.410 | |
| 19:Peter | 82.520 | | 16.420 | | 64.420 | .000 | | .000 | | 16.410 | |
| 20:Ian | 26.170 | | 65.010 | | 16.290 | 16.410 | | 16.410 | | .000 | |
|  |  |  | |  | | |  | |  | |  | |  |

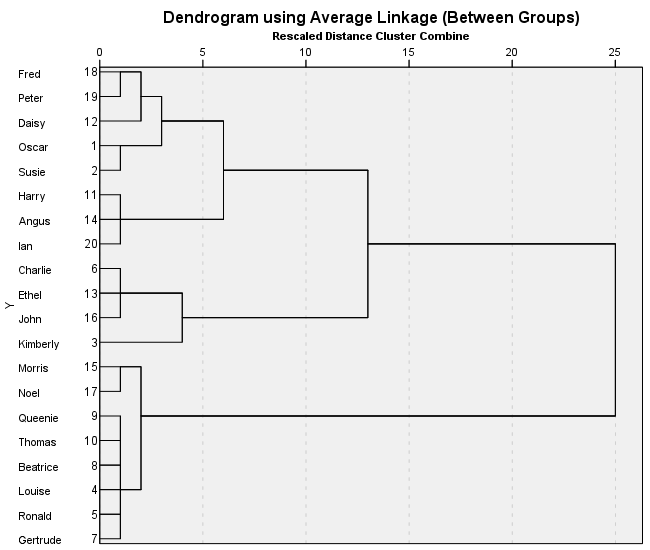
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Average Linkage (Between Groups)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 18 | 19 | .000 | 0 | 0 | 13 |
| 2 | 9 | 10 | .000 | 0 | 0 | 3 |
| 3 | 8 | 9 | .000 | 0 | 2 | 6 |
| 4 | 4 | 5 | .000 | 0 | 0 | 6 |
| 5 | 1 | 2 | .000 | 0 | 0 | 15 |
| 6 | 4 | 8 | .240 | 4 | 3 | 11 |
| 7 | 11 | 14 | 1.302 | 0 | 0 | 9 |
| 8 | 15 | 17 | 1.380 | 0 | 0 | 14 |
| 9 | 11 | 20 | 3.011 | 7 | 0 | 17 |
| 10 | 6 | 13 | 3.620 | 0 | 0 | 12 |
| 11 | 4 | 7 | 4.674 | 6 | 0 | 14 |
| 12 | 6 | 16 | 4.900 | 10 | 0 | 16 |
| 13 | 12 | 18 | 6.060 | 0 | 1 | 15 |
| 14 | 4 | 15 | 7.472 | 11 | 8 | 19 |
| 15 | 1 | 12 | 15.827 | 5 | 13 | 17 |
| 16 | 3 | 6 | 18.947 | 0 | 12 | 18 |
| 17 | 1 | 11 | 28.017 | 15 | 9 | 18 |
| 18 | 1 | 3 | 69.362 | 17 | 16 | 19 |
| 19 | 1 | 4 | 134.827 | 18 | 14 | 0 |





## Hierarchical cluster analysis small clusters

Warning # 5281. Command name: GET FILESPSS Statistics is running in Unicode encoding mode. This file is encoded ina locale-specific (code page) encoding. The defined width of any stringvariables are automatically tripled in order to avoid possible data loss. Youcan use ALTER TYPE to set the width of string variables to the width of thelongest observed value for each string variable.

**Alter Type**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:45:32 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| Syntax | | ALTER TYPE ALL(A=AMIN). |
| Resources | Processor Time | 00:00:00.02 |
| Elapsed Time | 00:00:00.03 |

C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav

|  |  |  |
| --- | --- | --- |
| **Altered Types** | | |
| Name | A21 | AMIN |

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:46:07 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav |
| Active Dataset | DataSet2 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 18 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER Weight.kilos Height.cms /METHOD WARD /MEASURE=SEUCLID /ID=Name /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.31 |
| Elapsed Time | 00:00:00.19 |

[DataSet2] C:\Users\admin\Downloads\26b. Hierarchical cluster analysis small-cluster.sav

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 18 | 100.0 | 0 | .0 | 18 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 1:Beefy | 2:Benny | 3:Bertie | 4:Biffy | 5:Billy | 6:Champ | 7:Charger |
| 1:Beefy | .000 | 4.229 | 50.255 | 10.831 | 2.465 | 186.913 | 378.279 |
| 2:Benny | 4.229 | .000 | 44.093 | 10.126 | .532 | 170.920 | 370.471 |
| 3:Bertie | 50.255 | 44.093 | .000 | 14.427 | 51.371 | 381.317 | 668.463 |
| 4:Biffy | 10.831 | 10.126 | 14.427 | .000 | 12.580 | 264.138 | 499.942 |
| 5:Billy | 2.465 | .532 | 51.371 | 12.580 | .000 | 162.664 | 353.916 |
| 6:Champ | 186.913 | 170.920 | 381.317 | 264.138 | 162.664 | .000 | 45.835 |
| 7:Charger | 378.279 | 370.471 | 668.463 | 499.942 | 353.916 | 45.835 | .000 |
| 8:Charlie | 205.011 | 188.622 | 407.607 | 286.021 | 179.859 | .438 | 38.178 |
| 9:Chewy | 279.912 | 265.370 | 520.333 | 378.451 | 253.585 | 11.274 | 12.490 |
| 10:Chechee | 259.222 | 246.143 | 494.083 | 355.210 | 234.482 | 8.251 | 15.239 |
| 11:Chico | 305.761 | 292.360 | 558.929 | 410.214 | 279.460 | 18.000 | 7.027 |
| 12:Chief | 232.713 | 219.860 | 456.432 | 323.549 | 208.947 | 4.276 | 22.201 |
| 13:Laddy | 1111.838 | 1155.089 | 786.577 | 949.505 | 1172.755 | 2207.621 | 2774.927 |
| 14:Larry | 973.047 | 1019.713 | 685.471 | 828.202 | 1034.078 | 2012.492 | 2543.775 |
| 15:Lassie | 1150.654 | 1188.522 | 806.134 | 979.331 | 1208.547 | 2257.922 | 2842.793 |
| 16:Lemmy | 1195.368 | 1253.432 | 887.847 | 1041.465 | 1267.110 | 2327.452 | 2880.872 |
| 17:Loco | 1163.771 | 1221.554 | 862.122 | 1012.580 | 1234.868 | 2283.211 | 2830.828 |
| 18:LouLou | 1155.809 | 1206.014 | 837.224 | 996.669 | 1221.925 | 2271.814 | 2834.215 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 8:Charlie | 9:Chewy | 10:Chechee | 11:Chico | 12:Chief | 13:Laddy | 14:Larry |
| 1:Beefy | 205.011 | 279.912 | 259.222 | 305.761 | 232.713 | 1111.838 | 973.047 |
| 2:Benny | 188.622 | 265.370 | 246.143 | 292.360 | 219.860 | 1155.089 | 1019.713 |
| 3:Bertie | 407.607 | 520.333 | 494.083 | 558.929 | 456.432 | 786.577 | 685.471 |
| 4:Biffy | 286.021 | 378.451 | 355.210 | 410.214 | 323.549 | 949.505 | 828.202 |
| 5:Billy | 179.859 | 253.585 | 234.482 | 279.460 | 208.947 | 1172.755 | 1034.078 |
| 6:Champ | .438 | 11.274 | 8.251 | 18.000 | 4.276 | 2207.621 | 2012.492 |
| 7:Charger | 38.178 | 12.490 | 15.239 | 7.027 | 22.201 | 2774.927 | 2543.775 |
| 8:Charlie | .000 | 7.406 | 5.178 | 13.062 | 2.343 | 2269.424 | 2071.143 |
| 9:Chewy | 7.406 | .000 | .435 | .810 | 2.178 | 2507.403 | 2294.805 |
| 10:Chechee | 5.178 | .435 | .000 | 1.999 | .746 | 2444.459 | 2234.079 |
| 11:Chico | 13.062 | .810 | 1.999 | .000 | 5.188 | 2582.741 | 2365.353 |
| 12:Chief | 2.343 | 2.178 | .746 | 5.188 | .000 | 2361.795 | 2155.683 |
| 13:Laddy | 2269.424 | 2507.403 | 2444.459 | 2582.741 | 2361.795 | .000 | 7.080 |
| 14:Larry | 2071.143 | 2294.805 | 2234.079 | 2365.353 | 2155.683 | 7.080 | .000 |
| 15:Lassie | 2320.725 | 2565.003 | 2501.930 | 2642.702 | 2417.764 | 2.624 | 16.705 |
| 16:Lemmy | 2389.993 | 2624.924 | 2559.380 | 2698.324 | 2476.261 | 12.972 | 14.248 |
| 17:Loco | 2345.123 | 2577.596 | 2512.623 | 2650.230 | 2430.320 | 12.672 | 11.689 |
| 18:LouLou | 2334.127 | 2571.344 | 2507.041 | 2645.986 | 2423.949 | 2.878 | 7.864 |

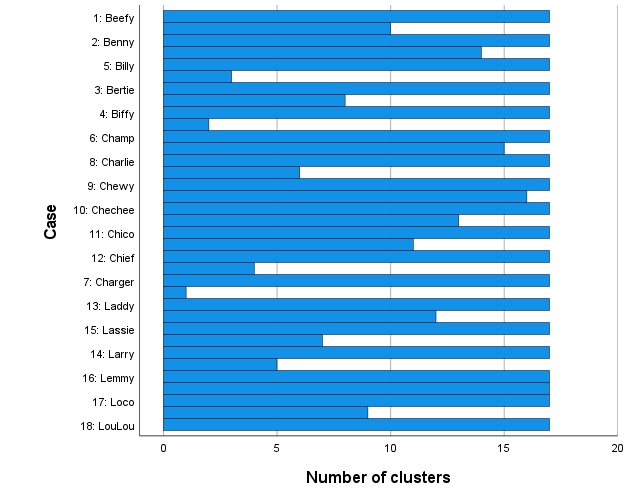
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | |
| 15:Lassie | | 16:Lemmy | | 17:Loco | | 18:LouLou | |
| 1:Beefy | 1150.654 | | 1195.368 | | 1163.771 | | 1155.809 | |
| 2:Benny | 1188.522 | | 1253.432 | | 1221.554 | | 1206.014 | |
| 3:Bertie | 806.134 | | 887.847 | | 862.122 | | 837.224 | |
| 4:Biffy | 979.331 | | 1041.465 | | 1012.580 | | 996.669 | |
| 5:Billy | 1208.547 | | 1267.110 | | 1234.868 | | 1221.925 | |
| 6:Champ | 2257.922 | | 2327.452 | | 2283.211 | | 2271.814 | |
| 7:Charger | 2842.793 | | 2880.872 | | 2830.828 | | 2834.215 | |
| 8:Charlie | 2320.725 | | 2389.993 | | 2345.123 | | 2334.127 | |
| 9:Chewy | 2565.003 | | 2624.924 | | 2577.596 | | 2571.344 | |
| 10:Chechee | 2501.930 | | 2559.380 | | 2512.623 | | 2507.041 | |
| 11:Chico | 2642.702 | | 2698.324 | | 2650.230 | | 2645.986 | |
| 12:Chief | 2417.764 | | 2476.261 | | 2430.320 | | 2423.949 | |
| 13:Laddy | 2.624 | | 12.972 | | 12.672 | | 2.878 | |
| 14:Larry | 16.705 | | 14.248 | | 11.689 | | 7.864 | |
| 15:Lassie | .000 | | 24.958 | | 25.376 | | 9.659 | |
| 16:Lemmy | 24.958 | | .000 | | .225 | | 3.663 | |
| 17:Loco | 25.376 | | .225 | | .000 | | 3.726 | |
| 18:LouLou | 9.659 | | 3.663 | | 3.726 | | .000 | |
|  |  |  | |  | |  | |  | |  |  |

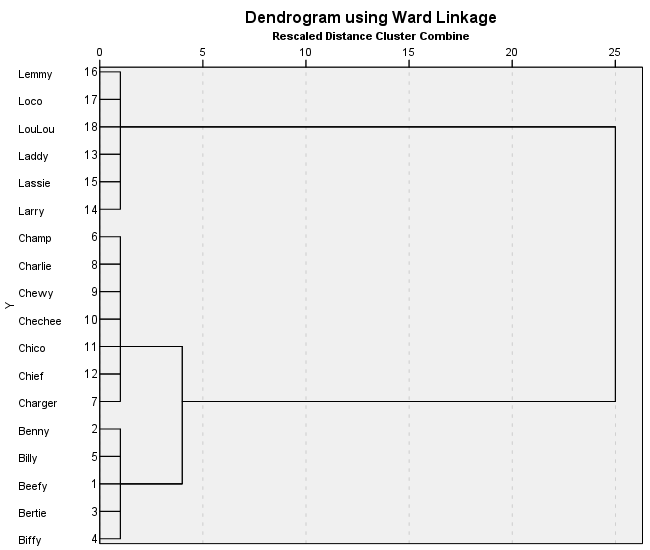
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

|  |
| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 16 | 17 | .112 | 0 | 0 | 9 |
| 2 | 9 | 10 | .330 | 0 | 0 | 5 |
| 3 | 6 | 8 | .549 | 0 | 0 | 12 |
| 4 | 2 | 5 | .815 | 0 | 0 | 8 |
| 5 | 9 | 11 | 1.679 | 2 | 0 | 7 |
| 6 | 13 | 15 | 2.991 | 0 | 0 | 11 |
| 7 | 9 | 12 | 4.749 | 5 | 0 | 12 |
| 8 | 1 | 2 | 6.892 | 0 | 4 | 15 |
| 9 | 16 | 18 | 9.317 | 1 | 0 | 13 |
| 10 | 3 | 4 | 16.531 | 0 | 0 | 15 |
| 11 | 13 | 14 | 24.022 | 6 | 0 | 13 |
| 12 | 6 | 9 | 34.561 | 3 | 7 | 14 |
| 13 | 13 | 16 | 49.276 | 11 | 9 | 17 |
| 14 | 6 | 7 | 67.473 | 12 | 0 | 16 |
| 15 | 1 | 3 | 98.032 | 8 | 10 | 16 |
| 16 | 1 | 6 | 1001.275 | 15 | 14 | 17 |
| 17 | 1 | 13 | 8167.574 | 16 | 13 | 0 |





## IRIS K-Means

Warning # 5281. Command name: GET FILESPSS Statistics is running in Unicode encoding mode. This file is encoded ina locale-specific (code page) encoding. The defined width of any stringvariables are automatically tripled in order to avoid possible data loss. Youcan use ALTER TYPE to set the width of string variables to the width of thelongest observed value for each string variable.

**Alter Type**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:47:28 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| Syntax | | ALTER TYPE ALL(A=AMIN). |
| Resources | Processor Time | 00:00:00.00 |
| Elapsed Time | 00:00:00.14 |

C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav

|  |  |  |
| --- | --- | --- |
| **Altered Types** | | |
| Case | A9 | AMIN |
| Species | A30 | AMIN |

**Quick Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:48:10 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav |
| Active Dataset | DataSet3 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 150 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any clustering variable used. |
| Syntax | | QUICK CLUSTER Sepal.Length Sepal.Width Petal.Length Petal.Width /MISSING=LISTWISE /CRITERIA=CLUSTER(3) MXITER(50) CONVERGE(0) /METHOD=KMEANS(NOUPDATE) /PRINT ID(Species) INITIAL ANOVA CLUSTER DISTAN. |
| Resources | Processor Time | 00:00:00.02 |
| Elapsed Time | 00:00:00.01 |
| Workspace Required | 944 bytes |

[DataSet3] C:\Users\admin\Downloads\26. K means cluster iris-cluster.sav

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Sepal.Length | 7.7 | 5.7 | 4.9 |
| Sepal.Width | 3.8 | 4.4 | 2.5 |
| Petal.Length | 6.7 | 1.5 | 4.5 |
| Petal.Width | 2.2 | .4 | 1.7 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Iteration History**a | | | |
| Iteration | Change in Cluster Centers | | |
| 1 | 2 | 3 |
| 1 | 1.226 | 1.205 | 1.141 |
| 2 | .175 | .000 | .121 |
| 3 | .070 | .000 | .047 |
| 4 | .050 | .000 | .033 |
| 5 | .000 | .000 | .000 |
| a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 5. The minimum distance between initial centers is 3.824. | | | |

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| --- | --- | --- | --- |
| **Cluster Membership** | | | |
| Case Number | Species | Cluster | Distance |
| 1 | setosa | 2 | .141 |
| 2 | setosa | 2 | .448 |
| 3 | setosa | 2 | .417 |
| 4 | setosa | 2 | .525 |
| 5 | setosa | 2 | .189 |
| 6 | setosa | 2 | .677 |
| 7 | setosa | 2 | .415 |
| 8 | setosa | 2 | .066 |
| 9 | setosa | 2 | .807 |
| 10 | setosa | 2 | .376 |
| 11 | setosa | 2 | .482 |
| 12 | setosa | 2 | .254 |
| 13 | setosa | 2 | .501 |
| 14 | setosa | 2 | .913 |
| 15 | setosa | 2 | 1.014 |
| 16 | setosa | 2 | 1.205 |
| 17 | setosa | 2 | .654 |
| 18 | setosa | 2 | .144 |
| 19 | setosa | 2 | .824 |
| 20 | setosa | 2 | .389 |
| 21 | setosa | 2 | .463 |
| 22 | setosa | 2 | .329 |
| 23 | setosa | 2 | .640 |
| 24 | setosa | 2 | .383 |
| 25 | setosa | 2 | .487 |
| 26 | setosa | 2 | .452 |
| 27 | setosa | 2 | .209 |
| 28 | setosa | 2 | .215 |
| 29 | setosa | 2 | .211 |
| 30 | setosa | 2 | .408 |
| 31 | setosa | 2 | .414 |
| 32 | setosa | 2 | .426 |
| 33 | setosa | 2 | .716 |
| 34 | setosa | 2 | .920 |
| 35 | setosa | 2 | .350 |
| 36 | setosa | 2 | .350 |
| 37 | setosa | 2 | .527 |
| 38 | setosa | 2 | .257 |
| 39 | setosa | 2 | .761 |
| 40 | setosa | 2 | .115 |
| 41 | setosa | 2 | .185 |
| 42 | setosa | 2 | 1.248 |
| 43 | setosa | 2 | .669 |
| 44 | setosa | 2 | .387 |
| 45 | setosa | 2 | .602 |
| 46 | setosa | 2 | .482 |
| 47 | setosa | 2 | .410 |
| 48 | setosa | 2 | .472 |
| 49 | setosa | 2 | .405 |
| 50 | setosa | 2 | .150 |
| 51 | versicolor | 3 | 1.227 |
| 52 | versicolor | 3 | .684 |
| 53 | versicolor | 1 | 1.019 |
| 54 | versicolor | 3 | .732 |
| 55 | versicolor | 3 | .639 |
| 56 | versicolor | 3 | .269 |
| 57 | versicolor | 3 | .765 |
| 58 | versicolor | 3 | 1.584 |
| 59 | versicolor | 3 | .756 |
| 60 | versicolor | 3 | .860 |
| 61 | versicolor | 3 | 1.536 |
| 62 | versicolor | 3 | .324 |
| 63 | versicolor | 3 | .808 |
| 64 | versicolor | 3 | .397 |
| 65 | versicolor | 3 | .873 |
| 66 | versicolor | 3 | .873 |
| 67 | versicolor | 3 | .412 |
| 68 | versicolor | 3 | .536 |
| 69 | versicolor | 3 | .637 |
| 70 | versicolor | 3 | .713 |
| 71 | versicolor | 3 | .709 |
| 72 | versicolor | 3 | .463 |
| 73 | versicolor | 3 | .694 |
| 74 | versicolor | 3 | .437 |
| 75 | versicolor | 3 | .546 |
| 76 | versicolor | 3 | .743 |
| 77 | versicolor | 3 | .988 |
| 78 | versicolor | 1 | .846 |
| 79 | versicolor | 3 | .220 |
| 80 | versicolor | 3 | 1.024 |
| 81 | versicolor | 3 | .864 |
| 82 | versicolor | 3 | .976 |
| 83 | versicolor | 3 | .558 |
| 84 | versicolor | 3 | .734 |
| 85 | versicolor | 3 | .575 |
| 86 | versicolor | 3 | .688 |
| 87 | versicolor | 3 | .927 |
| 88 | versicolor | 3 | .615 |
| 89 | versicolor | 3 | .508 |
| 90 | versicolor | 3 | .629 |
| 91 | versicolor | 3 | .488 |
| 92 | versicolor | 3 | .383 |
| 93 | versicolor | 3 | .492 |
| 94 | versicolor | 3 | 1.549 |
| 95 | versicolor | 3 | .386 |
| 96 | versicolor | 3 | .443 |
| 97 | versicolor | 3 | .345 |
| 98 | versicolor | 3 | .372 |
| 99 | versicolor | 3 | 1.661 |
| 100 | versicolor | 3 | .384 |
| 101 | virginica | 1 | .777 |
| 102 | virginica | 3 | .854 |
| 103 | virginica | 1 | .306 |
| 104 | virginica | 1 | .653 |
| 105 | virginica | 1 | .385 |
| 106 | virginica | 1 | 1.142 |
| 107 | virginica | 3 | 1.071 |
| 108 | virginica | 1 | .786 |
| 109 | virginica | 1 | .655 |
| 110 | virginica | 1 | .844 |
| 111 | virginica | 1 | .746 |
| 112 | virginica | 1 | .753 |
| 113 | virginica | 1 | .260 |
| 114 | virginica | 3 | .889 |
| 115 | virginica | 3 | 1.202 |
| 116 | virginica | 1 | .683 |
| 117 | virginica | 1 | .510 |
| 118 | virginica | 1 | 1.478 |
| 119 | virginica | 1 | 1.530 |
| 120 | virginica | 3 | .826 |
| 121 | virginica | 1 | .270 |
| 122 | virginica | 3 | .819 |
| 123 | virginica | 1 | 1.311 |
| 124 | virginica | 3 | .743 |
| 125 | virginica | 1 | .276 |
| 126 | virginica | 1 | .528 |
| 127 | virginica | 3 | .625 |
| 128 | virginica | 3 | .702 |
| 129 | virginica | 1 | .546 |
| 130 | virginica | 1 | .594 |
| 131 | virginica | 1 | .731 |
| 132 | virginica | 1 | 1.438 |
| 133 | virginica | 1 | .561 |
| 134 | virginica | 3 | .815 |
| 135 | virginica | 1 | 1.121 |
| 136 | virginica | 1 | .953 |
| 137 | virginica | 1 | .733 |
| 138 | virginica | 1 | .579 |
| 139 | virginica | 3 | .610 |
| 140 | virginica | 1 | .348 |
| 141 | virginica | 1 | .389 |
| 142 | virginica | 1 | .684 |
| 143 | virginica | 3 | .854 |
| 144 | virginica | 1 | .310 |
| 145 | virginica | 1 | .509 |
| 146 | virginica | 1 | .612 |
| 147 | virginica | 3 | .897 |
| 148 | virginica | 1 | .653 |
| 149 | virginica | 1 | .836 |
| 150 | virginica | 3 | .835 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Final Cluster Centers** | | | |
|  | Cluster | | |
| 1 | 2 | 3 |
| Sepal.Length | 6.9 | 5.0 | 5.9 |
| Sepal.Width | 3.1 | 3.4 | 2.7 |
| Petal.Length | 5.7 | 1.5 | 4.4 |
| Petal.Width | 2.1 | .2 | 1.4 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Distances between Final Cluster Centers** | | | |
| Cluster | 1 | 2 | 3 |
| 1 |  | 5.018 | 1.797 |
| 2 | 5.018 |  | 3.357 |
| 3 | 1.797 | 3.357 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | | |
|  | Cluster | | Error | | F | Sig. |
| Mean Square | df | Mean Square | df |
| Sepal.Length | 36.888 | 2 | .193 | 147 | 190.979 | <.001 |
| Sepal.Width | 6.399 | 2 | .106 | 147 | 60.649 | <.001 |
| Petal.Length | 219.109 | 2 | .178 | 147 | 1233.690 | <.001 |
| Petal.Width | 38.864 | 2 | .060 | 147 | 646.184 | <.001 |
| The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal. | | | | | | |

|  |  |  |
| --- | --- | --- |
| **Number of Cases in each Cluster** | | |
| Cluster | 1 | 38.000 |
| 2 | 50.000 |
| 3 | 62.000 |
| Valid | | 150.000 |
| Missing | | .000 |

## Birth weight

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:50:39 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav |
| Active Dataset | DataSet1 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 42 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER headcirumference length Birthweight Gestation /METHOD WARD /MEASURE=SEUCLID /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM VICICLE. |
| Resources | Processor Time | 00:00:01.22 |
| Elapsed Time | 00:00:00.78 |

[DataSet1] C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 42 | 100.0 | 0 | .0 | 42 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | .000 | 6.560 | 6.360 | 6.690 | 6.000 | 22.000 | 20.360 | 20.090 | 32.890 | 49.840 | 45.840 | 39.690 |
| 2 | 6.560 | .000 | 6.840 | 5.090 | 8.560 | 23.760 | 17.000 | 19.610 | 36.890 | 47.440 | 49.360 | 38.410 |
| 3 | 6.360 | 6.840 | .000 | 6.610 | 2.360 | 9.160 | 11.440 | 10.090 | 17.210 | 23.560 | 22.840 | 18.490 |
| 4 | 6.690 | 5.090 | 6.610 | .000 | 2.690 | 11.290 | 5.490 | 7.560 | 20.000 | 34.250 | 33.810 | 23.760 |
| 5 | 6.000 | 8.560 | 2.360 | 2.690 | .000 | 6.000 | 6.360 | 6.090 | 12.890 | 23.840 | 21.840 | 15.690 |
| 6 | 22.000 | 23.760 | 9.160 | 11.290 | 6.000 | .000 | 3.560 | 1.490 | 1.490 | 7.440 | 6.240 | 3.090 |
| 7 | 20.360 | 17.000 | 11.440 | 5.490 | 6.360 | 3.560 | .000 | .810 | 7.290 | 16.840 | 17.560 | 9.610 |
| 8 | 20.090 | 19.610 | 10.090 | 7.560 | 6.090 | 1.490 | .810 | .000 | 3.960 | 12.610 | 12.250 | 7.000 |
| 9 | 32.890 | 36.890 | 17.210 | 20.000 | 12.890 | 1.490 | 7.290 | 3.960 | .000 | 5.250 | 3.210 | 2.160 |
| 10 | 49.840 | 47.440 | 23.560 | 34.250 | 23.840 | 7.440 | 16.840 | 12.610 | 5.250 | .000 | 1.360 | 1.810 |
| 11 | 45.840 | 49.360 | 22.840 | 33.810 | 21.840 | 6.240 | 17.560 | 12.250 | 3.210 | 1.360 | .000 | 2.250 |
| 12 | 39.690 | 38.410 | 18.490 | 23.760 | 15.690 | 3.090 | 9.610 | 7.000 | 2.160 | 1.810 | 2.250 | .000 |
| 13 | 35.640 | 32.760 | 17.040 | 18.410 | 13.640 | 2.040 | 4.960 | 3.250 | 1.810 | 3.960 | 5.000 | 1.250 |
| 14 | 31.440 | 33.840 | 16.360 | 17.250 | 11.440 | 1.040 | 5.240 | 2.810 | .250 | 6.000 | 4.560 | 2.010 |
| 15 | 41.640 | 42.760 | 25.040 | 22.410 | 17.640 | 4.040 | 6.960 | 5.250 | 1.810 | 7.960 | 7.000 | 3.250 |
| 16 | 53.250 | 45.410 | 29.010 | 29.240 | 25.250 | 8.250 | 10.210 | 9.040 | 6.440 | 4.890 | 8.290 | 3.640 |
| 17 | 51.250 | 50.610 | 27.810 | 31.840 | 23.250 | 6.250 | 13.410 | 10.440 | 3.040 | 2.490 | 2.690 | 1.040 |
| 18 | 56.290 | 59.490 | 31.410 | 40.000 | 28.290 | 8.890 | 19.890 | 14.760 | 4.000 | 2.250 | 1.010 | 2.960 |
| 19 | 41.090 | 38.690 | 25.810 | 19.000 | 17.090 | 5.690 | 5.090 | 5.360 | 5.000 | 12.250 | 12.610 | 5.560 |
| 20 | 48.890 | 48.890 | 27.210 | 30.000 | 22.890 | 5.490 | 11.290 | 7.960 | 2.000 | 3.250 | 3.210 | 2.160 |
| 21 | 41.040 | 40.240 | 25.160 | 20.250 | 17.040 | 4.640 | 5.640 | 5.010 | 3.250 | 10.000 | 9.760 | 4.210 |
| 22 | 65.250 | 67.810 | 40.610 | 44.440 | 35.250 | 12.250 | 20.610 | 15.840 | 5.640 | 6.090 | 5.090 | 6.440 |
| 23 | 82.690 | 85.090 | 50.610 | 63.000 | 48.690 | 21.290 | 35.490 | 28.560 | 13.000 | 6.250 | 5.810 | 10.760 |
| 24 | 60.210 | 58.290 | 37.250 | 35.760 | 30.210 | 10.010 | 13.890 | 11.640 | 5.360 | 7.210 | 7.890 | 5.040 |
| 25 | 63.960 | 63.000 | 38.640 | 40.290 | 31.960 | 11.160 | 18.000 | 15.210 | 6.090 | 5.640 | 5.960 | 4.010 |
| 26 | 65.610 | 66.250 | 39.690 | 43.240 | 33.610 | 11.810 | 20.250 | 16.560 | 6.040 | 5.090 | 4.810 | 4.360 |
| 27 | 70.410 | 67.690 | 42.250 | 46.560 | 38.410 | 14.210 | 21.290 | 17.240 | 8.160 | 5.010 | 6.490 | 6.640 |
| 28 | 59.250 | 62.610 | 37.810 | 37.840 | 29.250 | 10.250 | 17.410 | 14.440 | 5.040 | 8.490 | 6.690 | 5.040 |
| 29 | 73.840 | 71.440 | 43.560 | 50.250 | 39.840 | 15.440 | 24.840 | 20.610 | 9.250 | 4.000 | 5.360 | 5.810 |
| 30 | 58.040 | 53.240 | 38.160 | 31.250 | 30.040 | 11.640 | 10.640 | 10.010 | 8.250 | 13.000 | 14.760 | 9.210 |
| 31 | 108.240 | 105.040 | 68.760 | 81.250 | 66.240 | 33.840 | 48.440 | 42.410 | 24.250 | 12.000 | 14.160 | 17.610 |
| 32 | 82.440 | 76.840 | 53.360 | 52.250 | 46.440 | 20.040 | 24.240 | 21.810 | 13.250 | 11.000 | 13.560 | 11.010 |
| 33 | 83.250 | 78.610 | 53.810 | 53.840 | 47.250 | 20.250 | 25.410 | 22.440 | 13.040 | 10.490 | 12.690 | 11.040 |
| 34 | 81.000 | 81.960 | 52.960 | 54.890 | 45.000 | 19.000 | 27.760 | 23.890 | 11.090 | 10.040 | 9.640 | 9.490 |
| 35 | 82.440 | 76.840 | 53.360 | 52.250 | 46.440 | 20.040 | 24.240 | 21.810 | 13.250 | 11.000 | 13.560 | 11.010 |
| 36 | 75.210 | 73.290 | 50.250 | 46.760 | 41.210 | 17.010 | 20.890 | 18.640 | 10.360 | 12.210 | 12.890 | 10.040 |
| 37 | 115.640 | 115.640 | 74.960 | 91.250 | 73.640 | 39.240 | 57.040 | 49.210 | 28.250 | 15.000 | 15.960 | 22.410 |
| 38 | 108.840 | 108.360 | 73.840 | 78.810 | 66.840 | 33.240 | 44.560 | 39.250 | 22.210 | 16.360 | 17.000 | 19.250 |
| 39 | 102.840 | 100.440 | 70.560 | 71.250 | 62.840 | 30.440 | 37.840 | 33.610 | 20.250 | 17.000 | 18.360 | 18.810 |
| 40 | 164.640 | 164.640 | 121.960 | 128.250 | 114.640 | 68.240 | 82.040 | 74.210 | 51.250 | 42.000 | 42.960 | 49.410 |
| 41 | 156.290 | 163.490 | 125.410 | 118.000 | 108.290 | 66.890 | 75.890 | 70.760 | 50.000 | 54.250 | 51.010 | 52.960 |
| 42 | 143.610 | 148.090 | 108.250 | 108.360 | 95.610 | 55.410 | 67.690 | 61.840 | 39.960 | 37.810 | 36.090 | 39.240 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 1 | 35.640 | 31.440 | 41.640 | 53.250 | 51.250 | 56.290 | 41.090 | 48.890 | 41.040 | 65.250 | 82.690 | 60.210 |
| 2 | 32.760 | 33.840 | 42.760 | 45.410 | 50.610 | 59.490 | 38.690 | 48.890 | 40.240 | 67.810 | 85.090 | 58.290 |
| 3 | 17.040 | 16.360 | 25.040 | 29.010 | 27.810 | 31.410 | 25.810 | 27.210 | 25.160 | 40.610 | 50.610 | 37.250 |
| 4 | 18.410 | 17.250 | 22.410 | 29.240 | 31.840 | 40.000 | 19.000 | 30.000 | 20.250 | 44.440 | 63.000 | 35.760 |
| 5 | 13.640 | 11.440 | 17.640 | 25.250 | 23.250 | 28.290 | 17.090 | 22.890 | 17.040 | 35.250 | 48.690 | 30.210 |
| 6 | 2.040 | 1.040 | 4.040 | 8.250 | 6.250 | 8.890 | 5.690 | 5.490 | 4.640 | 12.250 | 21.290 | 10.010 |
| 7 | 4.960 | 5.240 | 6.960 | 10.210 | 13.410 | 19.890 | 5.090 | 11.290 | 5.640 | 20.610 | 35.490 | 13.890 |
| 8 | 3.250 | 2.810 | 5.250 | 9.040 | 10.440 | 14.760 | 5.360 | 7.960 | 5.010 | 15.840 | 28.560 | 11.640 |
| 9 | 1.810 | .250 | 1.810 | 6.440 | 3.040 | 4.000 | 5.000 | 2.000 | 3.250 | 5.640 | 13.000 | 5.360 |
| 10 | 3.960 | 6.000 | 7.960 | 4.890 | 2.490 | 2.250 | 12.250 | 3.250 | 10.000 | 6.090 | 6.250 | 7.210 |
| 11 | 5.000 | 4.560 | 7.000 | 8.290 | 2.690 | 1.010 | 12.610 | 3.210 | 9.760 | 5.090 | 5.810 | 7.890 |
| 12 | 1.250 | 2.010 | 3.250 | 3.640 | 1.040 | 2.960 | 5.560 | 2.160 | 4.210 | 6.440 | 10.760 | 5.040 |
| 13 | .000 | 1.160 | 2.000 | 2.090 | 2.490 | 5.610 | 3.210 | 1.810 | 2.360 | 6.890 | 14.410 | 4.090 |
| 14 | 1.160 | .000 | 1.160 | 5.490 | 3.090 | 5.250 | 3.250 | 2.250 | 2.000 | 6.690 | 15.250 | 5.010 |
| 15 | 2.000 | 1.160 | .000 | 4.090 | 2.490 | 5.610 | 1.210 | 1.810 | .360 | 4.890 | 14.410 | 2.090 |
| 16 | 2.090 | 5.490 | 4.090 | .000 | 3.000 | 6.840 | 4.640 | 2.440 | 4.090 | 6.000 | 12.240 | 2.360 |
| 17 | 2.490 | 3.090 | 2.490 | 3.000 | .000 | 1.440 | 5.240 | 1.040 | 3.690 | 3.000 | 6.840 | 2.160 |
| 18 | 5.610 | 5.250 | 5.610 | 6.840 | 1.440 | .000 | 11.000 | 2.000 | 8.250 | 2.040 | 3.000 | 4.560 |
| 19 | 3.210 | 3.250 | 1.210 | 4.640 | 5.240 | 11.000 | .000 | 5.000 | .250 | 9.840 | 22.000 | 3.960 |
| 20 | 1.810 | 2.250 | 1.810 | 2.440 | 1.040 | 2.000 | 5.000 | .000 | 3.250 | 1.640 | 7.000 | 1.360 |
| 21 | 2.360 | 2.000 | .360 | 4.090 | 3.690 | 8.250 | .250 | 3.250 | .000 | 7.290 | 18.250 | 2.810 |
| 22 | 6.890 | 6.690 | 4.890 | 6.000 | 3.000 | 2.040 | 9.840 | 1.640 | 7.290 | .000 | 3.440 | 1.960 |
| 23 | 14.410 | 15.250 | 14.410 | 12.240 | 6.840 | 3.000 | 22.000 | 7.000 | 18.250 | 3.440 | .000 | 8.760 |
| 24 | 4.090 | 5.010 | 2.090 | 2.360 | 2.160 | 4.560 | 3.960 | 1.360 | 2.810 | 1.960 | 8.760 | .000 |
| 25 | 5.360 | 6.040 | 3.360 | 3.810 | 1.010 | 2.690 | 5.890 | 2.090 | 4.440 | 2.210 | 6.290 | 1.090 |
| 26 | 6.210 | 6.490 | 4.210 | 4.960 | 1.160 | 1.640 | 7.840 | 2.040 | 5.890 | 1.360 | 4.240 | 1.640 |
| 27 | 6.690 | 8.810 | 6.690 | 3.560 | 3.360 | 3.360 | 10.760 | 2.160 | 8.610 | 1.160 | 3.560 | 2.000 |
| 28 | 6.490 | 5.090 | 2.490 | 7.000 | 2.000 | 3.440 | 5.240 | 3.040 | 3.690 | 3.000 | 8.840 | 2.160 |
| 29 | 7.960 | 10.000 | 7.960 | 4.890 | 2.490 | 2.250 | 12.250 | 3.250 | 10.000 | 2.090 | 2.250 | 3.210 |
| 30 | 5.360 | 7.000 | 3.360 | 3.090 | 6.690 | 11.250 | 3.250 | 4.250 | 3.000 | 6.290 | 17.250 | 1.810 |
| 31 | 22.760 | 26.000 | 22.760 | 16.290 | 11.890 | 9.250 | 29.250 | 14.250 | 26.000 | 9.490 | 3.250 | 13.410 |
| 32 | 10.160 | 13.000 | 8.160 | 4.490 | 6.090 | 8.250 | 10.250 | 5.250 | 9.000 | 3.690 | 8.250 | 2.010 |
| 33 | 10.490 | 13.090 | 8.490 | 5.000 | 6.000 | 7.440 | 11.240 | 5.040 | 9.690 | 3.000 | 6.840 | 2.160 |
| 34 | 11.440 | 11.640 | 7.440 | 8.250 | 4.250 | 4.490 | 11.290 | 5.090 | 9.240 | 2.250 | 4.890 | 2.810 |
| 35 | 10.160 | 13.000 | 8.160 | 4.490 | 6.090 | 8.250 | 10.250 | 5.250 | 9.000 | 3.690 | 8.250 | 2.010 |
| 36 | 9.090 | 10.010 | 5.090 | 5.360 | 5.160 | 7.560 | 6.960 | 4.360 | 5.810 | 2.960 | 9.760 | 1.000 |
| 37 | 28.560 | 31.000 | 28.560 | 22.690 | 16.290 | 11.250 | 37.250 | 18.250 | 33.000 | 11.890 | 3.250 | 18.610 |
| 38 | 22.000 | 23.560 | 18.000 | 15.290 | 11.690 | 10.010 | 23.610 | 12.210 | 20.760 | 6.090 | 4.810 | 8.890 |
| 39 | 18.960 | 21.000 | 14.960 | 11.890 | 11.490 | 11.250 | 19.250 | 10.250 | 17.000 | 5.090 | 7.250 | 6.210 |
| 40 | 51.560 | 54.000 | 45.560 | 39.690 | 37.290 | 32.250 | 54.250 | 35.250 | 50.000 | 22.890 | 18.250 | 29.610 |
| 41 | 53.610 | 51.250 | 39.610 | 44.840 | 39.440 | 38.000 | 45.000 | 38.000 | 42.250 | 26.040 | 31.000 | 28.560 |
| 42 | 42.290 | 41.610 | 32.290 | 33.760 | 27.560 | 25.160 | 38.560 | 27.960 | 35.410 | 17.360 | 17.360 | 21.000 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 1 | 63.960 | 65.610 | 70.410 | 59.250 | 73.840 | 58.040 | 108.240 | 82.440 | 83.250 | 81.000 | 82.440 | 75.210 |
| 2 | 63.000 | 66.250 | 67.690 | 62.610 | 71.440 | 53.240 | 105.040 | 76.840 | 78.610 | 81.960 | 76.840 | 73.290 |
| 3 | 38.640 | 39.690 | 42.250 | 37.810 | 43.560 | 38.160 | 68.760 | 53.360 | 53.810 | 52.960 | 53.360 | 50.250 |
| 4 | 40.290 | 43.240 | 46.560 | 37.840 | 50.250 | 31.250 | 81.250 | 52.250 | 53.840 | 54.890 | 52.250 | 46.760 |
| 5 | 31.960 | 33.610 | 38.410 | 29.250 | 39.840 | 30.040 | 66.240 | 46.440 | 47.250 | 45.000 | 46.440 | 41.210 |
| 6 | 11.160 | 11.810 | 14.210 | 10.250 | 15.440 | 11.640 | 33.840 | 20.040 | 20.250 | 19.000 | 20.040 | 17.010 |
| 7 | 18.000 | 20.250 | 21.290 | 17.410 | 24.840 | 10.640 | 48.440 | 24.240 | 25.410 | 27.760 | 24.240 | 20.890 |
| 8 | 15.210 | 16.560 | 17.240 | 14.440 | 20.610 | 10.010 | 42.410 | 21.810 | 22.440 | 23.890 | 21.810 | 18.640 |
| 9 | 6.090 | 6.040 | 8.160 | 5.040 | 9.250 | 8.250 | 24.250 | 13.250 | 13.040 | 11.090 | 13.250 | 10.360 |
| 10 | 5.640 | 5.090 | 5.010 | 8.490 | 4.000 | 13.000 | 12.000 | 11.000 | 10.490 | 10.040 | 11.000 | 12.210 |
| 11 | 5.960 | 4.810 | 6.490 | 6.690 | 5.360 | 14.760 | 14.160 | 13.560 | 12.690 | 9.640 | 13.560 | 12.890 |
| 12 | 4.010 | 4.360 | 6.640 | 5.040 | 5.810 | 9.210 | 17.610 | 11.010 | 11.040 | 9.490 | 11.010 | 10.040 |
| 13 | 5.360 | 6.210 | 6.690 | 6.490 | 7.960 | 5.360 | 22.760 | 10.160 | 10.490 | 11.440 | 10.160 | 9.090 |
| 14 | 6.040 | 6.490 | 8.810 | 5.090 | 10.000 | 7.000 | 26.000 | 13.000 | 13.090 | 11.640 | 13.000 | 10.010 |
| 15 | 3.360 | 4.210 | 6.690 | 2.490 | 7.960 | 3.360 | 22.760 | 8.160 | 8.490 | 7.440 | 8.160 | 5.090 |
| 16 | 3.810 | 4.960 | 3.560 | 7.000 | 4.890 | 3.090 | 16.290 | 4.490 | 5.000 | 8.250 | 4.490 | 5.360 |
| 17 | 1.010 | 1.160 | 3.360 | 2.000 | 2.490 | 6.690 | 11.890 | 6.090 | 6.000 | 4.250 | 6.090 | 5.160 |
| 18 | 2.690 | 1.640 | 3.360 | 3.440 | 2.250 | 11.250 | 9.250 | 8.250 | 7.440 | 4.490 | 8.250 | 7.560 |
| 19 | 5.890 | 7.840 | 10.760 | 5.240 | 12.250 | 3.250 | 29.250 | 10.250 | 11.240 | 11.290 | 10.250 | 6.960 |
| 20 | 2.090 | 2.040 | 2.160 | 3.040 | 3.250 | 4.250 | 14.250 | 5.250 | 5.040 | 5.090 | 5.250 | 4.360 |
| 21 | 4.440 | 5.890 | 8.610 | 3.690 | 10.000 | 3.000 | 26.000 | 9.000 | 9.690 | 9.240 | 9.000 | 5.810 |
| 22 | 2.210 | 1.360 | 1.160 | 3.000 | 2.090 | 6.290 | 9.490 | 3.690 | 3.000 | 2.250 | 3.690 | 2.960 |
| 23 | 6.290 | 4.240 | 3.560 | 8.840 | 2.250 | 17.250 | 3.250 | 8.250 | 6.840 | 4.890 | 8.250 | 9.760 |
| 24 | 1.090 | 1.640 | 2.000 | 2.160 | 3.210 | 1.810 | 13.410 | 2.010 | 2.160 | 2.810 | 2.010 | 1.000 |
| 25 | .000 | .250 | 2.490 | 1.010 | 1.640 | 5.440 | 9.240 | 3.040 | 3.010 | 1.360 | 3.040 | 2.090 |
| 26 | .250 | .000 | 2.040 | 1.160 | 1.090 | 6.890 | 7.690 | 3.490 | 3.160 | 1.010 | 3.490 | 2.640 |
| 27 | 2.490 | 2.040 | .000 | 5.360 | 1.010 | 5.610 | 7.210 | 1.810 | 1.360 | 3.010 | 1.810 | 3.000 |
| 28 | 1.010 | 1.160 | 5.360 | .000 | 4.490 | 6.690 | 13.890 | 6.090 | 6.000 | 2.250 | 6.090 | 3.160 |
| 29 | 1.640 | 1.090 | 1.010 | 4.490 | .000 | 9.000 | 4.000 | 3.000 | 2.490 | 2.040 | 3.000 | 4.210 |
| 30 | 5.440 | 6.890 | 5.610 | 6.690 | 9.000 | .000 | 23.000 | 4.000 | 4.690 | 8.240 | 4.000 | 2.810 |
| 31 | 9.240 | 7.690 | 7.210 | 13.890 | 4.000 | 23.000 | .000 | 9.000 | 7.890 | 6.440 | 9.000 | 12.410 |
| 32 | 3.040 | 3.490 | 1.810 | 6.090 | 3.000 | 4.000 | 9.000 | .000 | .090 | 2.640 | .000 | 1.010 |
| 33 | 3.010 | 3.160 | 1.360 | 6.000 | 2.490 | 4.690 | 7.890 | .090 | .000 | 2.250 | .090 | 1.160 |
| 34 | 1.360 | 1.010 | 3.010 | 2.250 | 2.040 | 8.240 | 6.440 | 2.640 | 2.250 | .000 | 2.640 | 1.810 |
| 35 | 3.040 | 3.490 | 1.810 | 6.090 | 3.000 | 4.000 | 9.000 | .000 | .090 | 2.640 | .000 | 1.010 |
| 36 | 2.090 | 2.640 | 3.000 | 3.160 | 4.210 | 2.810 | 12.410 | 1.010 | 1.160 | 1.810 | 1.010 | .000 |
| 37 | 13.840 | 11.290 | 10.410 | 18.290 | 7.000 | 30.000 | 1.000 | 14.000 | 12.290 | 9.840 | 14.000 | 17.610 |
| 38 | 6.960 | 5.810 | 5.490 | 9.690 | 4.360 | 15.760 | 3.160 | 4.560 | 3.690 | 2.640 | 4.560 | 5.890 |
| 39 | 6.640 | 6.090 | 4.010 | 9.490 | 5.000 | 10.000 | 7.000 | 2.000 | 1.490 | 3.040 | 2.000 | 3.210 |
| 40 | 28.840 | 26.290 | 21.410 | 33.290 | 22.000 | 37.000 | 14.000 | 19.000 | 17.290 | 18.840 | 19.000 | 22.610 |
| 41 | 28.690 | 27.640 | 29.360 | 27.440 | 30.250 | 33.250 | 29.250 | 22.250 | 21.440 | 18.490 | 22.250 | 19.560 |
| 42 | 18.890 | 17.440 | 19.000 | 19.560 | 17.810 | 28.410 | 14.010 | 14.610 | 13.560 | 10.210 | 14.610 | 14.000 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | |
| Case | Squared Euclidean Distance | | | | | |
| 37 | 38 | 39 | 40 | 41 | 42 |
| 1 | 115.640 | 108.840 | 102.840 | 164.640 | 156.290 | 143.610 |
| 2 | 115.640 | 108.360 | 100.440 | 164.640 | 163.490 | 148.090 |
| 3 | 74.960 | 73.840 | 70.560 | 121.960 | 125.410 | 108.250 |
| 4 | 91.250 | 78.810 | 71.250 | 128.250 | 118.000 | 108.360 |
| 5 | 73.640 | 66.840 | 62.840 | 114.640 | 108.290 | 95.610 |
| 6 | 39.240 | 33.240 | 30.440 | 68.240 | 66.890 | 55.410 |
| 7 | 57.040 | 44.560 | 37.840 | 82.040 | 75.890 | 67.690 |
| 8 | 49.210 | 39.250 | 33.610 | 74.210 | 70.760 | 61.840 |
| 9 | 28.250 | 22.210 | 20.250 | 51.250 | 50.000 | 39.960 |
| 10 | 15.000 | 16.360 | 17.000 | 42.000 | 54.250 | 37.810 |
| 11 | 15.960 | 17.000 | 18.360 | 42.960 | 51.010 | 36.090 |
| 12 | 22.410 | 19.250 | 18.810 | 49.410 | 52.960 | 39.240 |
| 13 | 28.560 | 22.000 | 18.960 | 51.560 | 53.610 | 42.290 |
| 14 | 31.000 | 23.560 | 21.000 | 54.000 | 51.250 | 41.610 |
| 15 | 28.560 | 18.000 | 14.960 | 45.560 | 39.610 | 32.290 |
| 16 | 22.690 | 15.290 | 11.890 | 39.690 | 44.840 | 33.760 |
| 17 | 16.290 | 11.690 | 11.490 | 37.290 | 39.440 | 27.560 |
| 18 | 11.250 | 10.010 | 11.250 | 32.250 | 38.000 | 25.160 |
| 19 | 37.250 | 23.610 | 19.250 | 54.250 | 45.000 | 38.560 |
| 20 | 18.250 | 12.210 | 10.250 | 35.250 | 38.000 | 27.960 |
| 21 | 33.000 | 20.760 | 17.000 | 50.000 | 42.250 | 35.410 |
| 22 | 11.890 | 6.090 | 5.090 | 22.890 | 26.040 | 17.360 |
| 23 | 3.250 | 4.810 | 7.250 | 18.250 | 31.000 | 17.360 |
| 24 | 18.610 | 8.890 | 6.210 | 29.610 | 28.560 | 21.000 |
| 25 | 13.840 | 6.960 | 6.640 | 28.840 | 28.690 | 18.890 |
| 26 | 11.290 | 5.810 | 6.090 | 26.290 | 27.640 | 17.440 |
| 27 | 10.410 | 5.490 | 4.010 | 21.410 | 29.360 | 19.000 |
| 28 | 18.290 | 9.690 | 9.490 | 33.290 | 27.440 | 19.560 |
| 29 | 7.000 | 4.360 | 5.000 | 22.000 | 30.250 | 17.810 |
| 30 | 30.000 | 15.760 | 10.000 | 37.000 | 33.250 | 28.410 |
| 31 | 1.000 | 3.160 | 7.000 | 14.000 | 29.250 | 14.010 |
| 32 | 14.000 | 4.560 | 2.000 | 19.000 | 22.250 | 14.610 |
| 33 | 12.290 | 3.690 | 1.490 | 17.290 | 21.440 | 13.560 |
| 34 | 9.840 | 2.640 | 3.040 | 18.840 | 18.490 | 10.210 |
| 35 | 14.000 | 4.560 | 2.000 | 19.000 | 22.250 | 14.610 |
| 36 | 17.610 | 5.890 | 3.210 | 22.610 | 19.560 | 14.000 |
| 37 | .000 | 4.960 | 10.000 | 13.000 | 31.250 | 15.210 |
| 38 | 4.960 | .000 | 1.360 | 7.960 | 14.010 | 5.090 |
| 39 | 10.000 | 1.360 | .000 | 9.000 | 13.250 | 6.810 |
| 40 | 13.000 | 7.960 | 9.000 | .000 | 12.250 | 6.210 |
| 41 | 31.250 | 14.010 | 13.250 | 12.250 | .000 | 3.160 |
| 42 | 15.210 | 5.090 | 6.810 | 6.210 | 3.160 | .000 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

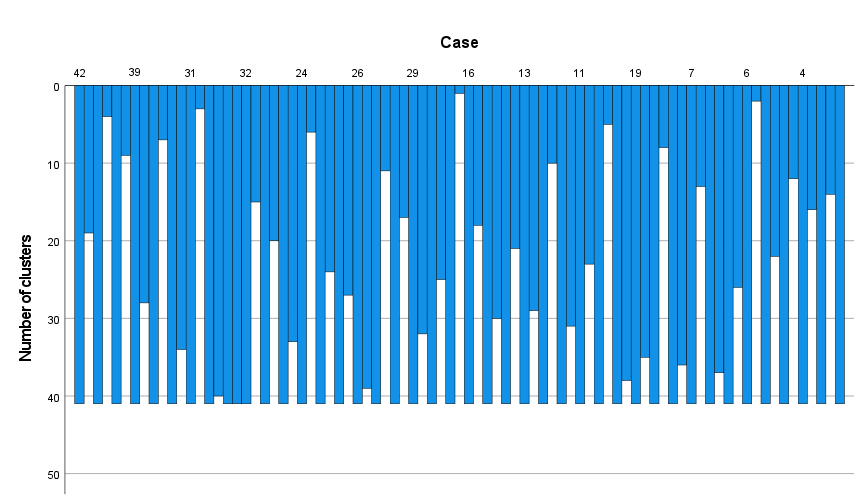
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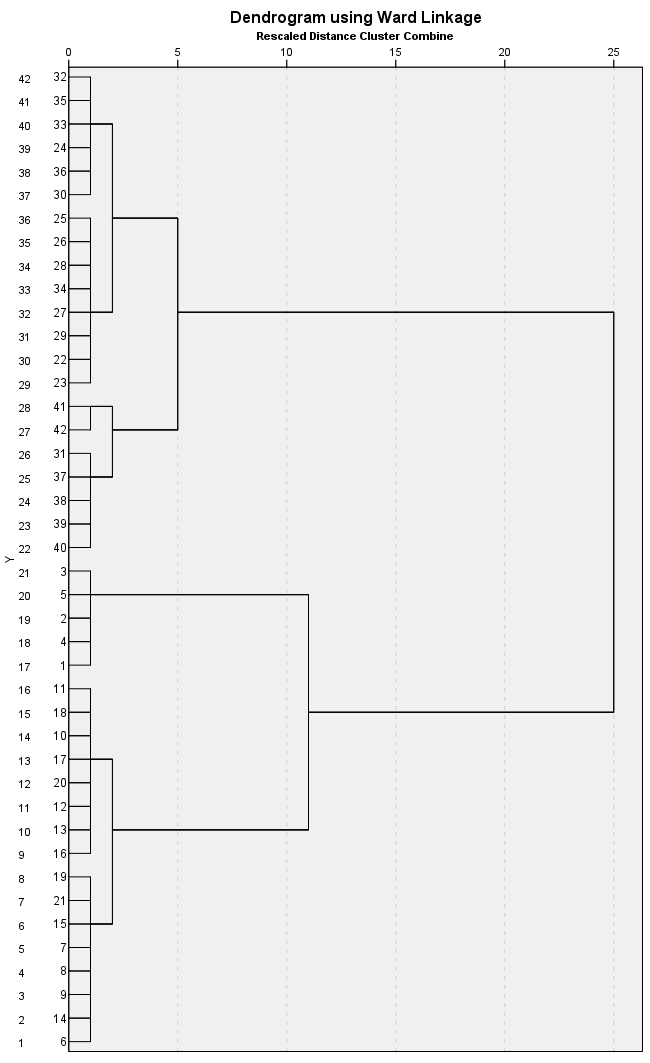
|  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |
| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 32 | 35 | .000 | 0 | 0 | 2 |
| 2 | 32 | 33 | .060 | 1 | 0 | 27 |
| 3 | 25 | 26 | .185 | 0 | 0 | 15 |
| 4 | 19 | 21 | .310 | 0 | 0 | 7 |
| 5 | 9 | 14 | .435 | 0 | 0 | 16 |
| 6 | 7 | 8 | .840 | 0 | 0 | 29 |
| 7 | 15 | 19 | 1.322 | 0 | 4 | 34 |
| 8 | 31 | 37 | 1.822 | 0 | 0 | 35 |
| 9 | 24 | 36 | 2.322 | 0 | 0 | 22 |
| 10 | 27 | 29 | 2.827 | 0 | 0 | 17 |
| 11 | 11 | 18 | 3.332 | 0 | 0 | 19 |
| 12 | 17 | 20 | 3.852 | 0 | 0 | 21 |
| 13 | 12 | 13 | 4.477 | 0 | 0 | 21 |
| 14 | 38 | 39 | 5.157 | 0 | 0 | 33 |
| 15 | 25 | 28 | 5.838 | 3 | 0 | 18 |
| 16 | 6 | 9 | 6.640 | 0 | 5 | 29 |
| 17 | 22 | 27 | 7.555 | 0 | 10 | 25 |
| 18 | 25 | 34 | 8.508 | 15 | 0 | 31 |
| 19 | 10 | 11 | 9.543 | 0 | 11 | 32 |
| 20 | 3 | 5 | 10.723 | 0 | 0 | 30 |
| 21 | 12 | 17 | 12.026 | 13 | 12 | 24 |
| 22 | 24 | 30 | 13.399 | 9 | 0 | 27 |
| 23 | 41 | 42 | 14.979 | 0 | 0 | 38 |
| 24 | 12 | 16 | 16.724 | 21 | 0 | 32 |
| 25 | 22 | 23 | 18.681 | 17 | 0 | 31 |
| 26 | 2 | 4 | 21.226 | 0 | 0 | 28 |
| 27 | 24 | 32 | 23.934 | 22 | 2 | 36 |
| 28 | 1 | 2 | 27.503 | 0 | 26 | 30 |
| 29 | 6 | 7 | 31.759 | 16 | 6 | 34 |
| 30 | 1 | 3 | 36.018 | 28 | 20 | 40 |
| 31 | 22 | 25 | 40.354 | 25 | 18 | 36 |
| 32 | 10 | 12 | 44.906 | 19 | 24 | 37 |
| 33 | 38 | 40 | 50.332 | 14 | 0 | 35 |
| 34 | 6 | 15 | 55.877 | 29 | 7 | 37 |
| 35 | 31 | 38 | 63.558 | 8 | 33 | 38 |
| 36 | 22 | 24 | 71.903 | 31 | 27 | 39 |
| 37 | 6 | 10 | 87.505 | 34 | 32 | 40 |
| 38 | 31 | 41 | 103.343 | 35 | 23 | 39 |
| 39 | 22 | 31 | 143.067 | 36 | 38 | 41 |
| 40 | 1 | 6 | 231.395 | 30 | 37 | 41 |
| 41 | 1 | 22 | 433.877 | 40 | 39 | 0 |





## Hierarchical clustering organisms body parts

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:50:39 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav |
| Active Dataset | DataSet1 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 42 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER headcirumference length Birthweight Gestation /METHOD WARD /MEASURE=SEUCLID /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM VICICLE. |
| Resources | Processor Time | 00:00:01.22 |
| Elapsed Time | 00:00:00.78 |

[DataSet1] C:\Users\admin\Downloads\26a. Cluster analysis Birthweight\_reduced.sav

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 42 | 100.0 | 0 | .0 | 42 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | .000 | 6.560 | 6.360 | 6.690 | 6.000 | 22.000 | 20.360 | 20.090 | 32.890 | 49.840 | 45.840 | 39.690 |
| 2 | 6.560 | .000 | 6.840 | 5.090 | 8.560 | 23.760 | 17.000 | 19.610 | 36.890 | 47.440 | 49.360 | 38.410 |
| 3 | 6.360 | 6.840 | .000 | 6.610 | 2.360 | 9.160 | 11.440 | 10.090 | 17.210 | 23.560 | 22.840 | 18.490 |
| 4 | 6.690 | 5.090 | 6.610 | .000 | 2.690 | 11.290 | 5.490 | 7.560 | 20.000 | 34.250 | 33.810 | 23.760 |
| 5 | 6.000 | 8.560 | 2.360 | 2.690 | .000 | 6.000 | 6.360 | 6.090 | 12.890 | 23.840 | 21.840 | 15.690 |
| 6 | 22.000 | 23.760 | 9.160 | 11.290 | 6.000 | .000 | 3.560 | 1.490 | 1.490 | 7.440 | 6.240 | 3.090 |
| 7 | 20.360 | 17.000 | 11.440 | 5.490 | 6.360 | 3.560 | .000 | .810 | 7.290 | 16.840 | 17.560 | 9.610 |
| 8 | 20.090 | 19.610 | 10.090 | 7.560 | 6.090 | 1.490 | .810 | .000 | 3.960 | 12.610 | 12.250 | 7.000 |
| 9 | 32.890 | 36.890 | 17.210 | 20.000 | 12.890 | 1.490 | 7.290 | 3.960 | .000 | 5.250 | 3.210 | 2.160 |
| 10 | 49.840 | 47.440 | 23.560 | 34.250 | 23.840 | 7.440 | 16.840 | 12.610 | 5.250 | .000 | 1.360 | 1.810 |
| 11 | 45.840 | 49.360 | 22.840 | 33.810 | 21.840 | 6.240 | 17.560 | 12.250 | 3.210 | 1.360 | .000 | 2.250 |
| 12 | 39.690 | 38.410 | 18.490 | 23.760 | 15.690 | 3.090 | 9.610 | 7.000 | 2.160 | 1.810 | 2.250 | .000 |
| 13 | 35.640 | 32.760 | 17.040 | 18.410 | 13.640 | 2.040 | 4.960 | 3.250 | 1.810 | 3.960 | 5.000 | 1.250 |
| 14 | 31.440 | 33.840 | 16.360 | 17.250 | 11.440 | 1.040 | 5.240 | 2.810 | .250 | 6.000 | 4.560 | 2.010 |
| 15 | 41.640 | 42.760 | 25.040 | 22.410 | 17.640 | 4.040 | 6.960 | 5.250 | 1.810 | 7.960 | 7.000 | 3.250 |
| 16 | 53.250 | 45.410 | 29.010 | 29.240 | 25.250 | 8.250 | 10.210 | 9.040 | 6.440 | 4.890 | 8.290 | 3.640 |
| 17 | 51.250 | 50.610 | 27.810 | 31.840 | 23.250 | 6.250 | 13.410 | 10.440 | 3.040 | 2.490 | 2.690 | 1.040 |
| 18 | 56.290 | 59.490 | 31.410 | 40.000 | 28.290 | 8.890 | 19.890 | 14.760 | 4.000 | 2.250 | 1.010 | 2.960 |
| 19 | 41.090 | 38.690 | 25.810 | 19.000 | 17.090 | 5.690 | 5.090 | 5.360 | 5.000 | 12.250 | 12.610 | 5.560 |
| 20 | 48.890 | 48.890 | 27.210 | 30.000 | 22.890 | 5.490 | 11.290 | 7.960 | 2.000 | 3.250 | 3.210 | 2.160 |
| 21 | 41.040 | 40.240 | 25.160 | 20.250 | 17.040 | 4.640 | 5.640 | 5.010 | 3.250 | 10.000 | 9.760 | 4.210 |
| 22 | 65.250 | 67.810 | 40.610 | 44.440 | 35.250 | 12.250 | 20.610 | 15.840 | 5.640 | 6.090 | 5.090 | 6.440 |
| 23 | 82.690 | 85.090 | 50.610 | 63.000 | 48.690 | 21.290 | 35.490 | 28.560 | 13.000 | 6.250 | 5.810 | 10.760 |
| 24 | 60.210 | 58.290 | 37.250 | 35.760 | 30.210 | 10.010 | 13.890 | 11.640 | 5.360 | 7.210 | 7.890 | 5.040 |
| 25 | 63.960 | 63.000 | 38.640 | 40.290 | 31.960 | 11.160 | 18.000 | 15.210 | 6.090 | 5.640 | 5.960 | 4.010 |
| 26 | 65.610 | 66.250 | 39.690 | 43.240 | 33.610 | 11.810 | 20.250 | 16.560 | 6.040 | 5.090 | 4.810 | 4.360 |
| 27 | 70.410 | 67.690 | 42.250 | 46.560 | 38.410 | 14.210 | 21.290 | 17.240 | 8.160 | 5.010 | 6.490 | 6.640 |
| 28 | 59.250 | 62.610 | 37.810 | 37.840 | 29.250 | 10.250 | 17.410 | 14.440 | 5.040 | 8.490 | 6.690 | 5.040 |
| 29 | 73.840 | 71.440 | 43.560 | 50.250 | 39.840 | 15.440 | 24.840 | 20.610 | 9.250 | 4.000 | 5.360 | 5.810 |
| 30 | 58.040 | 53.240 | 38.160 | 31.250 | 30.040 | 11.640 | 10.640 | 10.010 | 8.250 | 13.000 | 14.760 | 9.210 |
| 31 | 108.240 | 105.040 | 68.760 | 81.250 | 66.240 | 33.840 | 48.440 | 42.410 | 24.250 | 12.000 | 14.160 | 17.610 |
| 32 | 82.440 | 76.840 | 53.360 | 52.250 | 46.440 | 20.040 | 24.240 | 21.810 | 13.250 | 11.000 | 13.560 | 11.010 |
| 33 | 83.250 | 78.610 | 53.810 | 53.840 | 47.250 | 20.250 | 25.410 | 22.440 | 13.040 | 10.490 | 12.690 | 11.040 |
| 34 | 81.000 | 81.960 | 52.960 | 54.890 | 45.000 | 19.000 | 27.760 | 23.890 | 11.090 | 10.040 | 9.640 | 9.490 |
| 35 | 82.440 | 76.840 | 53.360 | 52.250 | 46.440 | 20.040 | 24.240 | 21.810 | 13.250 | 11.000 | 13.560 | 11.010 |
| 36 | 75.210 | 73.290 | 50.250 | 46.760 | 41.210 | 17.010 | 20.890 | 18.640 | 10.360 | 12.210 | 12.890 | 10.040 |
| 37 | 115.640 | 115.640 | 74.960 | 91.250 | 73.640 | 39.240 | 57.040 | 49.210 | 28.250 | 15.000 | 15.960 | 22.410 |
| 38 | 108.840 | 108.360 | 73.840 | 78.810 | 66.840 | 33.240 | 44.560 | 39.250 | 22.210 | 16.360 | 17.000 | 19.250 |
| 39 | 102.840 | 100.440 | 70.560 | 71.250 | 62.840 | 30.440 | 37.840 | 33.610 | 20.250 | 17.000 | 18.360 | 18.810 |
| 40 | 164.640 | 164.640 | 121.960 | 128.250 | 114.640 | 68.240 | 82.040 | 74.210 | 51.250 | 42.000 | 42.960 | 49.410 |
| 41 | 156.290 | 163.490 | 125.410 | 118.000 | 108.290 | 66.890 | 75.890 | 70.760 | 50.000 | 54.250 | 51.010 | 52.960 |
| 42 | 143.610 | 148.090 | 108.250 | 108.360 | 95.610 | 55.410 | 67.690 | 61.840 | 39.960 | 37.810 | 36.090 | 39.240 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 1 | 35.640 | 31.440 | 41.640 | 53.250 | 51.250 | 56.290 | 41.090 | 48.890 | 41.040 | 65.250 | 82.690 | 60.210 |
| 2 | 32.760 | 33.840 | 42.760 | 45.410 | 50.610 | 59.490 | 38.690 | 48.890 | 40.240 | 67.810 | 85.090 | 58.290 |
| 3 | 17.040 | 16.360 | 25.040 | 29.010 | 27.810 | 31.410 | 25.810 | 27.210 | 25.160 | 40.610 | 50.610 | 37.250 |
| 4 | 18.410 | 17.250 | 22.410 | 29.240 | 31.840 | 40.000 | 19.000 | 30.000 | 20.250 | 44.440 | 63.000 | 35.760 |
| 5 | 13.640 | 11.440 | 17.640 | 25.250 | 23.250 | 28.290 | 17.090 | 22.890 | 17.040 | 35.250 | 48.690 | 30.210 |
| 6 | 2.040 | 1.040 | 4.040 | 8.250 | 6.250 | 8.890 | 5.690 | 5.490 | 4.640 | 12.250 | 21.290 | 10.010 |
| 7 | 4.960 | 5.240 | 6.960 | 10.210 | 13.410 | 19.890 | 5.090 | 11.290 | 5.640 | 20.610 | 35.490 | 13.890 |
| 8 | 3.250 | 2.810 | 5.250 | 9.040 | 10.440 | 14.760 | 5.360 | 7.960 | 5.010 | 15.840 | 28.560 | 11.640 |
| 9 | 1.810 | .250 | 1.810 | 6.440 | 3.040 | 4.000 | 5.000 | 2.000 | 3.250 | 5.640 | 13.000 | 5.360 |
| 10 | 3.960 | 6.000 | 7.960 | 4.890 | 2.490 | 2.250 | 12.250 | 3.250 | 10.000 | 6.090 | 6.250 | 7.210 |
| 11 | 5.000 | 4.560 | 7.000 | 8.290 | 2.690 | 1.010 | 12.610 | 3.210 | 9.760 | 5.090 | 5.810 | 7.890 |
| 12 | 1.250 | 2.010 | 3.250 | 3.640 | 1.040 | 2.960 | 5.560 | 2.160 | 4.210 | 6.440 | 10.760 | 5.040 |
| 13 | .000 | 1.160 | 2.000 | 2.090 | 2.490 | 5.610 | 3.210 | 1.810 | 2.360 | 6.890 | 14.410 | 4.090 |
| 14 | 1.160 | .000 | 1.160 | 5.490 | 3.090 | 5.250 | 3.250 | 2.250 | 2.000 | 6.690 | 15.250 | 5.010 |
| 15 | 2.000 | 1.160 | .000 | 4.090 | 2.490 | 5.610 | 1.210 | 1.810 | .360 | 4.890 | 14.410 | 2.090 |
| 16 | 2.090 | 5.490 | 4.090 | .000 | 3.000 | 6.840 | 4.640 | 2.440 | 4.090 | 6.000 | 12.240 | 2.360 |
| 17 | 2.490 | 3.090 | 2.490 | 3.000 | .000 | 1.440 | 5.240 | 1.040 | 3.690 | 3.000 | 6.840 | 2.160 |
| 18 | 5.610 | 5.250 | 5.610 | 6.840 | 1.440 | .000 | 11.000 | 2.000 | 8.250 | 2.040 | 3.000 | 4.560 |
| 19 | 3.210 | 3.250 | 1.210 | 4.640 | 5.240 | 11.000 | .000 | 5.000 | .250 | 9.840 | 22.000 | 3.960 |
| 20 | 1.810 | 2.250 | 1.810 | 2.440 | 1.040 | 2.000 | 5.000 | .000 | 3.250 | 1.640 | 7.000 | 1.360 |
| 21 | 2.360 | 2.000 | .360 | 4.090 | 3.690 | 8.250 | .250 | 3.250 | .000 | 7.290 | 18.250 | 2.810 |
| 22 | 6.890 | 6.690 | 4.890 | 6.000 | 3.000 | 2.040 | 9.840 | 1.640 | 7.290 | .000 | 3.440 | 1.960 |
| 23 | 14.410 | 15.250 | 14.410 | 12.240 | 6.840 | 3.000 | 22.000 | 7.000 | 18.250 | 3.440 | .000 | 8.760 |
| 24 | 4.090 | 5.010 | 2.090 | 2.360 | 2.160 | 4.560 | 3.960 | 1.360 | 2.810 | 1.960 | 8.760 | .000 |
| 25 | 5.360 | 6.040 | 3.360 | 3.810 | 1.010 | 2.690 | 5.890 | 2.090 | 4.440 | 2.210 | 6.290 | 1.090 |
| 26 | 6.210 | 6.490 | 4.210 | 4.960 | 1.160 | 1.640 | 7.840 | 2.040 | 5.890 | 1.360 | 4.240 | 1.640 |
| 27 | 6.690 | 8.810 | 6.690 | 3.560 | 3.360 | 3.360 | 10.760 | 2.160 | 8.610 | 1.160 | 3.560 | 2.000 |
| 28 | 6.490 | 5.090 | 2.490 | 7.000 | 2.000 | 3.440 | 5.240 | 3.040 | 3.690 | 3.000 | 8.840 | 2.160 |
| 29 | 7.960 | 10.000 | 7.960 | 4.890 | 2.490 | 2.250 | 12.250 | 3.250 | 10.000 | 2.090 | 2.250 | 3.210 |
| 30 | 5.360 | 7.000 | 3.360 | 3.090 | 6.690 | 11.250 | 3.250 | 4.250 | 3.000 | 6.290 | 17.250 | 1.810 |
| 31 | 22.760 | 26.000 | 22.760 | 16.290 | 11.890 | 9.250 | 29.250 | 14.250 | 26.000 | 9.490 | 3.250 | 13.410 |
| 32 | 10.160 | 13.000 | 8.160 | 4.490 | 6.090 | 8.250 | 10.250 | 5.250 | 9.000 | 3.690 | 8.250 | 2.010 |
| 33 | 10.490 | 13.090 | 8.490 | 5.000 | 6.000 | 7.440 | 11.240 | 5.040 | 9.690 | 3.000 | 6.840 | 2.160 |
| 34 | 11.440 | 11.640 | 7.440 | 8.250 | 4.250 | 4.490 | 11.290 | 5.090 | 9.240 | 2.250 | 4.890 | 2.810 |
| 35 | 10.160 | 13.000 | 8.160 | 4.490 | 6.090 | 8.250 | 10.250 | 5.250 | 9.000 | 3.690 | 8.250 | 2.010 |
| 36 | 9.090 | 10.010 | 5.090 | 5.360 | 5.160 | 7.560 | 6.960 | 4.360 | 5.810 | 2.960 | 9.760 | 1.000 |
| 37 | 28.560 | 31.000 | 28.560 | 22.690 | 16.290 | 11.250 | 37.250 | 18.250 | 33.000 | 11.890 | 3.250 | 18.610 |
| 38 | 22.000 | 23.560 | 18.000 | 15.290 | 11.690 | 10.010 | 23.610 | 12.210 | 20.760 | 6.090 | 4.810 | 8.890 |
| 39 | 18.960 | 21.000 | 14.960 | 11.890 | 11.490 | 11.250 | 19.250 | 10.250 | 17.000 | 5.090 | 7.250 | 6.210 |
| 40 | 51.560 | 54.000 | 45.560 | 39.690 | 37.290 | 32.250 | 54.250 | 35.250 | 50.000 | 22.890 | 18.250 | 29.610 |
| 41 | 53.610 | 51.250 | 39.610 | 44.840 | 39.440 | 38.000 | 45.000 | 38.000 | 42.250 | 26.040 | 31.000 | 28.560 |
| 42 | 42.290 | 41.610 | 32.290 | 33.760 | 27.560 | 25.160 | 38.560 | 27.960 | 35.410 | 17.360 | 17.360 | 21.000 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | | | | | | |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 1 | 63.960 | 65.610 | 70.410 | 59.250 | 73.840 | 58.040 | 108.240 | 82.440 | 83.250 | 81.000 | 82.440 | 75.210 |
| 2 | 63.000 | 66.250 | 67.690 | 62.610 | 71.440 | 53.240 | 105.040 | 76.840 | 78.610 | 81.960 | 76.840 | 73.290 |
| 3 | 38.640 | 39.690 | 42.250 | 37.810 | 43.560 | 38.160 | 68.760 | 53.360 | 53.810 | 52.960 | 53.360 | 50.250 |
| 4 | 40.290 | 43.240 | 46.560 | 37.840 | 50.250 | 31.250 | 81.250 | 52.250 | 53.840 | 54.890 | 52.250 | 46.760 |
| 5 | 31.960 | 33.610 | 38.410 | 29.250 | 39.840 | 30.040 | 66.240 | 46.440 | 47.250 | 45.000 | 46.440 | 41.210 |
| 6 | 11.160 | 11.810 | 14.210 | 10.250 | 15.440 | 11.640 | 33.840 | 20.040 | 20.250 | 19.000 | 20.040 | 17.010 |
| 7 | 18.000 | 20.250 | 21.290 | 17.410 | 24.840 | 10.640 | 48.440 | 24.240 | 25.410 | 27.760 | 24.240 | 20.890 |
| 8 | 15.210 | 16.560 | 17.240 | 14.440 | 20.610 | 10.010 | 42.410 | 21.810 | 22.440 | 23.890 | 21.810 | 18.640 |
| 9 | 6.090 | 6.040 | 8.160 | 5.040 | 9.250 | 8.250 | 24.250 | 13.250 | 13.040 | 11.090 | 13.250 | 10.360 |
| 10 | 5.640 | 5.090 | 5.010 | 8.490 | 4.000 | 13.000 | 12.000 | 11.000 | 10.490 | 10.040 | 11.000 | 12.210 |
| 11 | 5.960 | 4.810 | 6.490 | 6.690 | 5.360 | 14.760 | 14.160 | 13.560 | 12.690 | 9.640 | 13.560 | 12.890 |
| 12 | 4.010 | 4.360 | 6.640 | 5.040 | 5.810 | 9.210 | 17.610 | 11.010 | 11.040 | 9.490 | 11.010 | 10.040 |
| 13 | 5.360 | 6.210 | 6.690 | 6.490 | 7.960 | 5.360 | 22.760 | 10.160 | 10.490 | 11.440 | 10.160 | 9.090 |
| 14 | 6.040 | 6.490 | 8.810 | 5.090 | 10.000 | 7.000 | 26.000 | 13.000 | 13.090 | 11.640 | 13.000 | 10.010 |
| 15 | 3.360 | 4.210 | 6.690 | 2.490 | 7.960 | 3.360 | 22.760 | 8.160 | 8.490 | 7.440 | 8.160 | 5.090 |
| 16 | 3.810 | 4.960 | 3.560 | 7.000 | 4.890 | 3.090 | 16.290 | 4.490 | 5.000 | 8.250 | 4.490 | 5.360 |
| 17 | 1.010 | 1.160 | 3.360 | 2.000 | 2.490 | 6.690 | 11.890 | 6.090 | 6.000 | 4.250 | 6.090 | 5.160 |
| 18 | 2.690 | 1.640 | 3.360 | 3.440 | 2.250 | 11.250 | 9.250 | 8.250 | 7.440 | 4.490 | 8.250 | 7.560 |
| 19 | 5.890 | 7.840 | 10.760 | 5.240 | 12.250 | 3.250 | 29.250 | 10.250 | 11.240 | 11.290 | 10.250 | 6.960 |
| 20 | 2.090 | 2.040 | 2.160 | 3.040 | 3.250 | 4.250 | 14.250 | 5.250 | 5.040 | 5.090 | 5.250 | 4.360 |
| 21 | 4.440 | 5.890 | 8.610 | 3.690 | 10.000 | 3.000 | 26.000 | 9.000 | 9.690 | 9.240 | 9.000 | 5.810 |
| 22 | 2.210 | 1.360 | 1.160 | 3.000 | 2.090 | 6.290 | 9.490 | 3.690 | 3.000 | 2.250 | 3.690 | 2.960 |
| 23 | 6.290 | 4.240 | 3.560 | 8.840 | 2.250 | 17.250 | 3.250 | 8.250 | 6.840 | 4.890 | 8.250 | 9.760 |
| 24 | 1.090 | 1.640 | 2.000 | 2.160 | 3.210 | 1.810 | 13.410 | 2.010 | 2.160 | 2.810 | 2.010 | 1.000 |
| 25 | .000 | .250 | 2.490 | 1.010 | 1.640 | 5.440 | 9.240 | 3.040 | 3.010 | 1.360 | 3.040 | 2.090 |
| 26 | .250 | .000 | 2.040 | 1.160 | 1.090 | 6.890 | 7.690 | 3.490 | 3.160 | 1.010 | 3.490 | 2.640 |
| 27 | 2.490 | 2.040 | .000 | 5.360 | 1.010 | 5.610 | 7.210 | 1.810 | 1.360 | 3.010 | 1.810 | 3.000 |
| 28 | 1.010 | 1.160 | 5.360 | .000 | 4.490 | 6.690 | 13.890 | 6.090 | 6.000 | 2.250 | 6.090 | 3.160 |
| 29 | 1.640 | 1.090 | 1.010 | 4.490 | .000 | 9.000 | 4.000 | 3.000 | 2.490 | 2.040 | 3.000 | 4.210 |
| 30 | 5.440 | 6.890 | 5.610 | 6.690 | 9.000 | .000 | 23.000 | 4.000 | 4.690 | 8.240 | 4.000 | 2.810 |
| 31 | 9.240 | 7.690 | 7.210 | 13.890 | 4.000 | 23.000 | .000 | 9.000 | 7.890 | 6.440 | 9.000 | 12.410 |
| 32 | 3.040 | 3.490 | 1.810 | 6.090 | 3.000 | 4.000 | 9.000 | .000 | .090 | 2.640 | .000 | 1.010 |
| 33 | 3.010 | 3.160 | 1.360 | 6.000 | 2.490 | 4.690 | 7.890 | .090 | .000 | 2.250 | .090 | 1.160 |
| 34 | 1.360 | 1.010 | 3.010 | 2.250 | 2.040 | 8.240 | 6.440 | 2.640 | 2.250 | .000 | 2.640 | 1.810 |
| 35 | 3.040 | 3.490 | 1.810 | 6.090 | 3.000 | 4.000 | 9.000 | .000 | .090 | 2.640 | .000 | 1.010 |
| 36 | 2.090 | 2.640 | 3.000 | 3.160 | 4.210 | 2.810 | 12.410 | 1.010 | 1.160 | 1.810 | 1.010 | .000 |
| 37 | 13.840 | 11.290 | 10.410 | 18.290 | 7.000 | 30.000 | 1.000 | 14.000 | 12.290 | 9.840 | 14.000 | 17.610 |
| 38 | 6.960 | 5.810 | 5.490 | 9.690 | 4.360 | 15.760 | 3.160 | 4.560 | 3.690 | 2.640 | 4.560 | 5.890 |
| 39 | 6.640 | 6.090 | 4.010 | 9.490 | 5.000 | 10.000 | 7.000 | 2.000 | 1.490 | 3.040 | 2.000 | 3.210 |
| 40 | 28.840 | 26.290 | 21.410 | 33.290 | 22.000 | 37.000 | 14.000 | 19.000 | 17.290 | 18.840 | 19.000 | 22.610 |
| 41 | 28.690 | 27.640 | 29.360 | 27.440 | 30.250 | 33.250 | 29.250 | 22.250 | 21.440 | 18.490 | 22.250 | 19.560 |
| 42 | 18.890 | 17.440 | 19.000 | 19.560 | 17.810 | 28.410 | 14.010 | 14.610 | 13.560 | 10.210 | 14.610 | 14.000 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | |
| Case | Squared Euclidean Distance | | | | | |
| 37 | 38 | 39 | 40 | 41 | 42 |
| 1 | 115.640 | 108.840 | 102.840 | 164.640 | 156.290 | 143.610 |
| 2 | 115.640 | 108.360 | 100.440 | 164.640 | 163.490 | 148.090 |
| 3 | 74.960 | 73.840 | 70.560 | 121.960 | 125.410 | 108.250 |
| 4 | 91.250 | 78.810 | 71.250 | 128.250 | 118.000 | 108.360 |
| 5 | 73.640 | 66.840 | 62.840 | 114.640 | 108.290 | 95.610 |
| 6 | 39.240 | 33.240 | 30.440 | 68.240 | 66.890 | 55.410 |
| 7 | 57.040 | 44.560 | 37.840 | 82.040 | 75.890 | 67.690 |
| 8 | 49.210 | 39.250 | 33.610 | 74.210 | 70.760 | 61.840 |
| 9 | 28.250 | 22.210 | 20.250 | 51.250 | 50.000 | 39.960 |
| 10 | 15.000 | 16.360 | 17.000 | 42.000 | 54.250 | 37.810 |
| 11 | 15.960 | 17.000 | 18.360 | 42.960 | 51.010 | 36.090 |
| 12 | 22.410 | 19.250 | 18.810 | 49.410 | 52.960 | 39.240 |
| 13 | 28.560 | 22.000 | 18.960 | 51.560 | 53.610 | 42.290 |
| 14 | 31.000 | 23.560 | 21.000 | 54.000 | 51.250 | 41.610 |
| 15 | 28.560 | 18.000 | 14.960 | 45.560 | 39.610 | 32.290 |
| 16 | 22.690 | 15.290 | 11.890 | 39.690 | 44.840 | 33.760 |
| 17 | 16.290 | 11.690 | 11.490 | 37.290 | 39.440 | 27.560 |
| 18 | 11.250 | 10.010 | 11.250 | 32.250 | 38.000 | 25.160 |
| 19 | 37.250 | 23.610 | 19.250 | 54.250 | 45.000 | 38.560 |
| 20 | 18.250 | 12.210 | 10.250 | 35.250 | 38.000 | 27.960 |
| 21 | 33.000 | 20.760 | 17.000 | 50.000 | 42.250 | 35.410 |
| 22 | 11.890 | 6.090 | 5.090 | 22.890 | 26.040 | 17.360 |
| 23 | 3.250 | 4.810 | 7.250 | 18.250 | 31.000 | 17.360 |
| 24 | 18.610 | 8.890 | 6.210 | 29.610 | 28.560 | 21.000 |
| 25 | 13.840 | 6.960 | 6.640 | 28.840 | 28.690 | 18.890 |
| 26 | 11.290 | 5.810 | 6.090 | 26.290 | 27.640 | 17.440 |
| 27 | 10.410 | 5.490 | 4.010 | 21.410 | 29.360 | 19.000 |
| 28 | 18.290 | 9.690 | 9.490 | 33.290 | 27.440 | 19.560 |
| 29 | 7.000 | 4.360 | 5.000 | 22.000 | 30.250 | 17.810 |
| 30 | 30.000 | 15.760 | 10.000 | 37.000 | 33.250 | 28.410 |
| 31 | 1.000 | 3.160 | 7.000 | 14.000 | 29.250 | 14.010 |
| 32 | 14.000 | 4.560 | 2.000 | 19.000 | 22.250 | 14.610 |
| 33 | 12.290 | 3.690 | 1.490 | 17.290 | 21.440 | 13.560 |
| 34 | 9.840 | 2.640 | 3.040 | 18.840 | 18.490 | 10.210 |
| 35 | 14.000 | 4.560 | 2.000 | 19.000 | 22.250 | 14.610 |
| 36 | 17.610 | 5.890 | 3.210 | 22.610 | 19.560 | 14.000 |
| 37 | .000 | 4.960 | 10.000 | 13.000 | 31.250 | 15.210 |
| 38 | 4.960 | .000 | 1.360 | 7.960 | 14.010 | 5.090 |
| 39 | 10.000 | 1.360 | .000 | 9.000 | 13.250 | 6.810 |
| 40 | 13.000 | 7.960 | 9.000 | .000 | 12.250 | 6.210 |
| 41 | 31.250 | 14.010 | 13.250 | 12.250 | .000 | 3.160 |
| 42 | 15.210 | 5.090 | 6.810 | 6.210 | 3.160 | .000 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

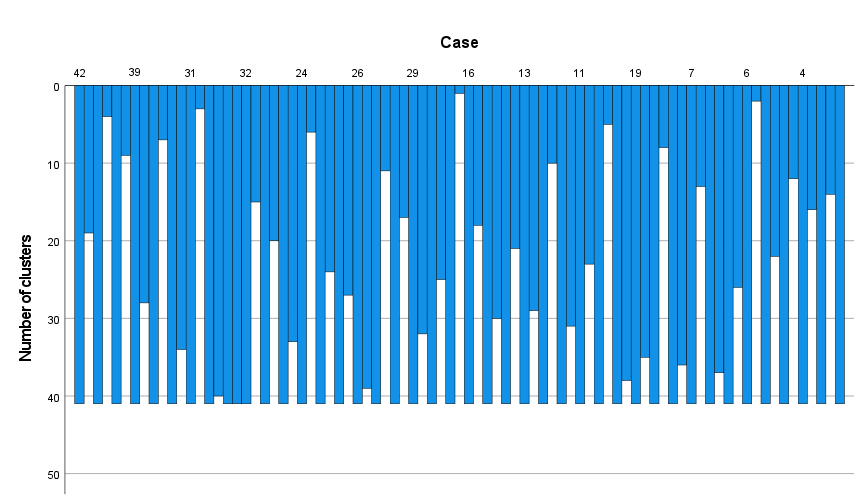
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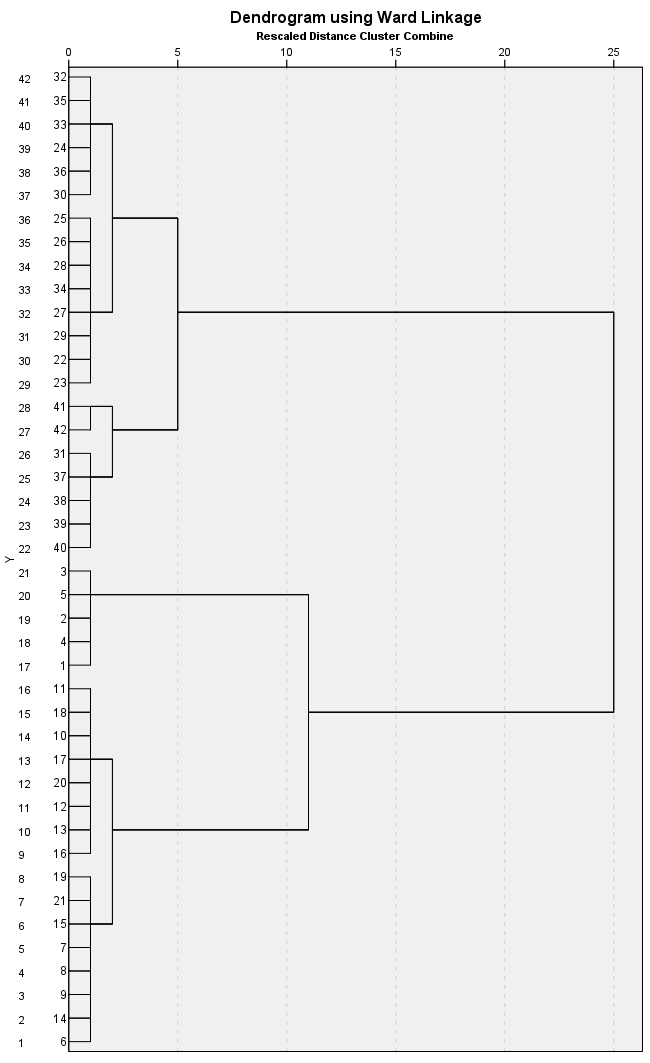
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| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 32 | 35 | .000 | 0 | 0 | 2 |
| 2 | 32 | 33 | .060 | 1 | 0 | 27 |
| 3 | 25 | 26 | .185 | 0 | 0 | 15 |
| 4 | 19 | 21 | .310 | 0 | 0 | 7 |
| 5 | 9 | 14 | .435 | 0 | 0 | 16 |
| 6 | 7 | 8 | .840 | 0 | 0 | 29 |
| 7 | 15 | 19 | 1.322 | 0 | 4 | 34 |
| 8 | 31 | 37 | 1.822 | 0 | 0 | 35 |
| 9 | 24 | 36 | 2.322 | 0 | 0 | 22 |
| 10 | 27 | 29 | 2.827 | 0 | 0 | 17 |
| 11 | 11 | 18 | 3.332 | 0 | 0 | 19 |
| 12 | 17 | 20 | 3.852 | 0 | 0 | 21 |
| 13 | 12 | 13 | 4.477 | 0 | 0 | 21 |
| 14 | 38 | 39 | 5.157 | 0 | 0 | 33 |
| 15 | 25 | 28 | 5.838 | 3 | 0 | 18 |
| 16 | 6 | 9 | 6.640 | 0 | 5 | 29 |
| 17 | 22 | 27 | 7.555 | 0 | 10 | 25 |
| 18 | 25 | 34 | 8.508 | 15 | 0 | 31 |
| 19 | 10 | 11 | 9.543 | 0 | 11 | 32 |
| 20 | 3 | 5 | 10.723 | 0 | 0 | 30 |
| 21 | 12 | 17 | 12.026 | 13 | 12 | 24 |
| 22 | 24 | 30 | 13.399 | 9 | 0 | 27 |
| 23 | 41 | 42 | 14.979 | 0 | 0 | 38 |
| 24 | 12 | 16 | 16.724 | 21 | 0 | 32 |
| 25 | 22 | 23 | 18.681 | 17 | 0 | 31 |
| 26 | 2 | 4 | 21.226 | 0 | 0 | 28 |
| 27 | 24 | 32 | 23.934 | 22 | 2 | 36 |
| 28 | 1 | 2 | 27.503 | 0 | 26 | 30 |
| 29 | 6 | 7 | 31.759 | 16 | 6 | 34 |
| 30 | 1 | 3 | 36.018 | 28 | 20 | 40 |
| 31 | 22 | 25 | 40.354 | 25 | 18 | 36 |
| 32 | 10 | 12 | 44.906 | 19 | 24 | 37 |
| 33 | 38 | 40 | 50.332 | 14 | 0 | 35 |
| 34 | 6 | 15 | 55.877 | 29 | 7 | 37 |
| 35 | 31 | 38 | 63.558 | 8 | 33 | 38 |
| 36 | 22 | 24 | 71.903 | 31 | 27 | 39 |
| 37 | 6 | 10 | 87.505 | 34 | 32 | 40 |
| 38 | 31 | 41 | 103.343 | 35 | 23 | 39 |
| 39 | 22 | 31 | 143.067 | 36 | 38 | 41 |
| 40 | 1 | 6 | 231.395 | 30 | 37 | 41 |
| 41 | 1 | 22 | 433.877 | 40 | 39 | 0 |





Warning # 5281. Command name: GET FILESPSS Statistics is running in Unicode encoding mode. This file is encoded ina locale-specific (code page) encoding. The defined width of any stringvariables are automatically tripled in order to avoid possible data loss. Youcan use ALTER TYPE to set the width of string variables to the width of thelongest observed value for each string variable.

**Alter Type**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:52:23 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierrarchical cluster analysis organisms body parts.sav |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| Syntax | | ALTER TYPE ALL(A=AMIN). |
| Resources | Processor Time | 00:00:00.00 |
| Elapsed Time | 00:00:00.06 |

C:\Users\admin\Downloads\26b. Hierrarchical cluster analysis organisms body parts.sav

|  |  |  |
| --- | --- | --- |
| **Altered Types** | | |
| organism | A72 | AMIN |

**Cluster**

|  |  |  |
| --- | --- | --- |
| **Notes** | | |
| Output Created | | 27-FEB-2024 15:53:08 |
| Comments | |  |
| Input | Data | C:\Users\admin\Downloads\26b. Hierrarchical cluster analysis organisms body parts.sav |
| Active Dataset | DataSet2 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 21 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| Cases Used | Statistics are based on cases with no missing values for any variable used. |
| Syntax | | CLUSTER spine milk aquatic photosyn roots flies warmbld seeds hair\_fur livebrth fixed /METHOD WARD /MEASURE=SEUCLID /ID=organism /PRINT SCHEDULE /PRINT DISTANCE /PLOT DENDROGRAM HICICLE. |
| Resources | Processor Time | 00:00:00.34 |
| Elapsed Time | 00:00:00.23 |

[DataSet2] C:\Users\admin\Downloads\26b. Hierrarchical cluster analysis organisms body parts.sav

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| --- | --- | --- | --- | --- | --- |
| **Case Processing Summary**a | | | | | |
| Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| 21 | 100.0 | 0 | .0 | 21 | 100.0 |
| a. Ward Linkage | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 1:earthworm | 2:cat | 3:mushroom | 4:lobster | 5:dog | 6:squid | 7:oyster |
| 1:earthworm | .000 | 5.000 | 3.000 | 1.000 | 5.000 | 1.000 | 1.000 |
| 2:cat | 5.000 | .000 | 8.000 | 6.000 | .000 | 6.000 | 6.000 |
| 3:mushroom | 3.000 | 8.000 | .000 | 4.000 | 8.000 | 4.000 | 4.000 |
| 4:lobster | 1.000 | 6.000 | 4.000 | .000 | 6.000 | .000 | .000 |
| 5:dog | 5.000 | .000 | 8.000 | 6.000 | .000 | 6.000 | 6.000 |
| 6:squid | 1.000 | 6.000 | 4.000 | .000 | 6.000 | .000 | .000 |
| 7:oyster | 1.000 | 6.000 | 4.000 | .000 | 6.000 | .000 | .000 |
| 8:oak | 4.000 | 9.000 | 1.000 | 5.000 | 9.000 | 5.000 | 5.000 |
| 9:salamander | 1.000 | 4.000 | 4.000 | 2.000 | 4.000 | 2.000 | 2.000 |
| 10:herring | 2.000 | 5.000 | 5.000 | 1.000 | 5.000 | 1.000 | 1.000 |
| 11:anenome | 1.000 | 6.000 | 4.000 | .000 | 6.000 | .000 | .000 |
| 12:kangaroo | 5.000 | .000 | 8.000 | 6.000 | .000 | 6.000 | 6.000 |
| 13:wolf | 5.000 | .000 | 8.000 | 6.000 | .000 | 6.000 | 6.000 |
| 14:bat | 6.000 | 1.000 | 9.000 | 7.000 | 1.000 | 7.000 | 7.000 |
| 15:gecko | 1.000 | 4.000 | 4.000 | 2.000 | 4.000 | 2.000 | 2.000 |
| 16:holly | 4.000 | 9.000 | 1.000 | 5.000 | 9.000 | 5.000 | 5.000 |
| 17:wheat | 4.000 | 9.000 | 1.000 | 5.000 | 9.000 | 5.000 | 5.000 |
| 18:robin | 3.000 | 4.000 | 6.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| 19:ostrich | 2.000 | 3.000 | 5.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| 20:platypus | 4.000 | 1.000 | 7.000 | 5.000 | 1.000 | 5.000 | 5.000 |
| 21:eagle | 3.000 | 4.000 | 6.000 | 4.000 | 4.000 | 4.000 | 4.000 |

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| --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | |
| Case | Squared Euclidean Distance | | | | | |
| 8:oak | 9:salamander | 10:herring | 11:anenome | 12:kangaroo | 13:wolf |
| 1:earthworm | 4.000 | 1.000 | 2.000 | 1.000 | 5.000 | 5.000 |
| 2:cat | 9.000 | 4.000 | 5.000 | 6.000 | .000 | .000 |
| 3:mushroom | 1.000 | 4.000 | 5.000 | 4.000 | 8.000 | 8.000 |
| 4:lobster | 5.000 | 2.000 | 1.000 | .000 | 6.000 | 6.000 |
| 5:dog | 9.000 | 4.000 | 5.000 | 6.000 | .000 | .000 |
| 6:squid | 5.000 | 2.000 | 1.000 | .000 | 6.000 | 6.000 |
| 7:oyster | 5.000 | 2.000 | 1.000 | .000 | 6.000 | 6.000 |
| 8:oak | .000 | 5.000 | 6.000 | 5.000 | 9.000 | 9.000 |
| 9:salamander | 5.000 | .000 | 1.000 | 2.000 | 4.000 | 4.000 |
| 10:herring | 6.000 | 1.000 | .000 | 1.000 | 5.000 | 5.000 |
| 11:anenome | 5.000 | 2.000 | 1.000 | .000 | 6.000 | 6.000 |
| 12:kangaroo | 9.000 | 4.000 | 5.000 | 6.000 | .000 | .000 |
| 13:wolf | 9.000 | 4.000 | 5.000 | 6.000 | .000 | .000 |
| 14:bat | 10.000 | 5.000 | 6.000 | 7.000 | 1.000 | 1.000 |
| 15:gecko | 5.000 | .000 | 1.000 | 2.000 | 4.000 | 4.000 |
| 16:holly | .000 | 5.000 | 6.000 | 5.000 | 9.000 | 9.000 |
| 17:wheat | .000 | 5.000 | 6.000 | 5.000 | 9.000 | 9.000 |
| 18:robin | 7.000 | 2.000 | 3.000 | 4.000 | 4.000 | 4.000 |
| 19:ostrich | 6.000 | 1.000 | 2.000 | 3.000 | 3.000 | 3.000 |
| 20:platypus | 8.000 | 3.000 | 4.000 | 5.000 | 1.000 | 1.000 |
| 21:eagle | 7.000 | 2.000 | 3.000 | 4.000 | 4.000 | 4.000 |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Proximity Matrix** | | | | | | | |
| Case | Squared Euclidean Distance | | | | | | |
| 14:bat | 15:gecko | 16:holly | 17:wheat | 18:robin | 19:ostrich | 20:platypus |
| 1:earthworm | 6.000 | 1.000 | 4.000 | 4.000 | 3.000 | 2.000 | 4.000 |
| 2:cat | 1.000 | 4.000 | 9.000 | 9.000 | 4.000 | 3.000 | 1.000 |
| 3:mushroom | 9.000 | 4.000 | 1.000 | 1.000 | 6.000 | 5.000 | 7.000 |
| 4:lobster | 7.000 | 2.000 | 5.000 | 5.000 | 4.000 | 3.000 | 5.000 |
| 5:dog | 1.000 | 4.000 | 9.000 | 9.000 | 4.000 | 3.000 | 1.000 |
| 6:squid | 7.000 | 2.000 | 5.000 | 5.000 | 4.000 | 3.000 | 5.000 |
| 7:oyster | 7.000 | 2.000 | 5.000 | 5.000 | 4.000 | 3.000 | 5.000 |
| 8:oak | 10.000 | 5.000 | .000 | .000 | 7.000 | 6.000 | 8.000 |
| 9:salamander | 5.000 | .000 | 5.000 | 5.000 | 2.000 | 1.000 | 3.000 |
| 10:herring | 6.000 | 1.000 | 6.000 | 6.000 | 3.000 | 2.000 | 4.000 |
| 11:anenome | 7.000 | 2.000 | 5.000 | 5.000 | 4.000 | 3.000 | 5.000 |
| 12:kangaroo | 1.000 | 4.000 | 9.000 | 9.000 | 4.000 | 3.000 | 1.000 |
| 13:wolf | 1.000 | 4.000 | 9.000 | 9.000 | 4.000 | 3.000 | 1.000 |
| 14:bat | .000 | 5.000 | 10.000 | 10.000 | 3.000 | 4.000 | 2.000 |
| 15:gecko | 5.000 | .000 | 5.000 | 5.000 | 2.000 | 1.000 | 3.000 |
| 16:holly | 10.000 | 5.000 | .000 | .000 | 7.000 | 6.000 | 8.000 |
| 17:wheat | 10.000 | 5.000 | .000 | .000 | 7.000 | 6.000 | 8.000 |
| 18:robin | 3.000 | 2.000 | 7.000 | 7.000 | .000 | 1.000 | 3.000 |
| 19:ostrich | 4.000 | 1.000 | 6.000 | 6.000 | 1.000 | .000 | 2.000 |
| 20:platypus | 2.000 | 3.000 | 8.000 | 8.000 | 3.000 | 2.000 | .000 |
| 21:eagle | 3.000 | 2.000 | 7.000 | 7.000 | .000 | 1.000 | 3.000 |

|  |  |
| --- | --- |
| **Proximity Matrix** | |
| Case | Squared Euclidean Distance |
| 21:eagle |
| 1:earthworm | 3.000 |
| 2:cat | 4.000 |
| 3:mushroom | 6.000 |
| 4:lobster | 4.000 |
| 5:dog | 4.000 |
| 6:squid | 4.000 |
| 7:oyster | 4.000 |
| 8:oak | 7.000 |
| 9:salamander | 2.000 |
| 10:herring | 3.000 |
| 11:anenome | 4.000 |
| 12:kangaroo | 4.000 |
| 13:wolf | 4.000 |
| 14:bat | 3.000 |
| 15:gecko | 2.000 |
| 16:holly | 7.000 |
| 17:wheat | 7.000 |
| 18:robin | .000 |
| 19:ostrich | 1.000 |
| 20:platypus | 3.000 |
| 21:eagle | .000 |
|  |  | |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- |
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| --- |
| This is a dissimilarity matrix |

**Ward Linkage**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Agglomeration Schedule** | | | | | | |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | 18 | 21 | .000 | 0 | 0 | 11 |
| 2 | 16 | 17 | .000 | 0 | 0 | 3 |
| 3 | 8 | 16 | .000 | 0 | 2 | 13 |
| 4 | 9 | 15 | .000 | 0 | 0 | 12 |
| 5 | 12 | 13 | .000 | 0 | 0 | 6 |
| 6 | 5 | 12 | .000 | 0 | 5 | 10 |
| 7 | 7 | 11 | .000 | 0 | 0 | 8 |
| 8 | 6 | 7 | .000 | 0 | 7 | 9 |
| 9 | 4 | 6 | .000 | 0 | 8 | 15 |
| 10 | 2 | 5 | .000 | 0 | 6 | 14 |
| 11 | 18 | 19 | .667 | 1 | 0 | 18 |
| 12 | 9 | 10 | 1.333 | 4 | 0 | 17 |
| 13 | 3 | 8 | 2.083 | 0 | 3 | 19 |
| 14 | 2 | 20 | 2.883 | 10 | 0 | 16 |
| 15 | 1 | 4 | 3.683 | 0 | 9 | 17 |
| 16 | 2 | 14 | 4.550 | 14 | 0 | 20 |
| 17 | 1 | 9 | 6.833 | 15 | 12 | 18 |
| 18 | 1 | 18 | 11.689 | 17 | 11 | 19 |
| 19 | 1 | 3 | 23.933 | 18 | 13 | 20 |
| 20 | 1 | 2 | 41.333 | 19 | 16 | 0 |

