

Appendix 2.A Factor Analysis Results

Maryland High School Assessment

Factor Analysis Study

March 17, 2004

Educational Testing Service

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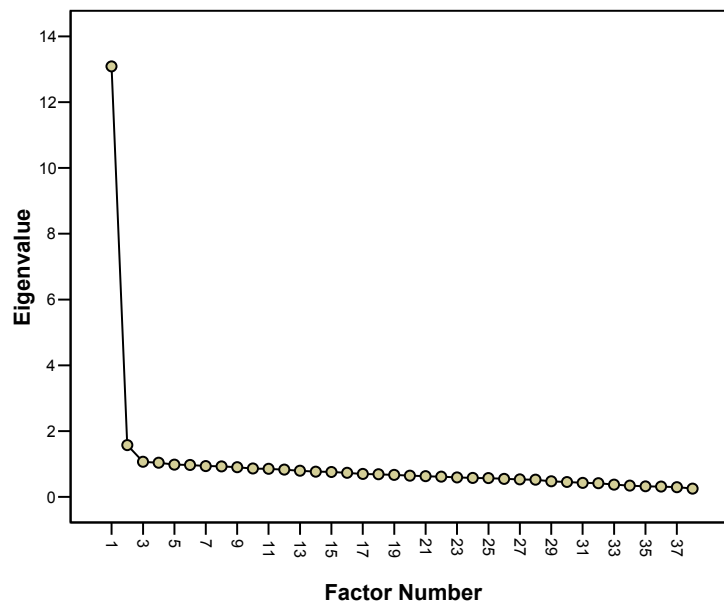
Factor analysis techniques were employed to investigate the dimensionality of the HSA content area tests. A random sample of 5000 students from the May 2004 administration was used for the analysis.

Given the ordinal nature of the item scores, matrices consisting of tetrachoric and polychoric correlations were produced for each subject area using PRELIS (Joreskog & Sorbom, 1993) and then analyzed within SPSS. The eigenvalues, percentage of variation accounted for, and the associated scree plots were provided.

Algebra

The Algebra factor analysis shows an initial eigenvalue of 13.091 for the first factor, which accounts for 34.45% of the variance. The next three factors have eigenvalues just slightly greater than one, for instance, the second factor's eigenvalue drops to 1.575, accounting for only 4.144% of the variance. The scree plot for this factor analysis is provided below; it appears as if one dominant factor is present.

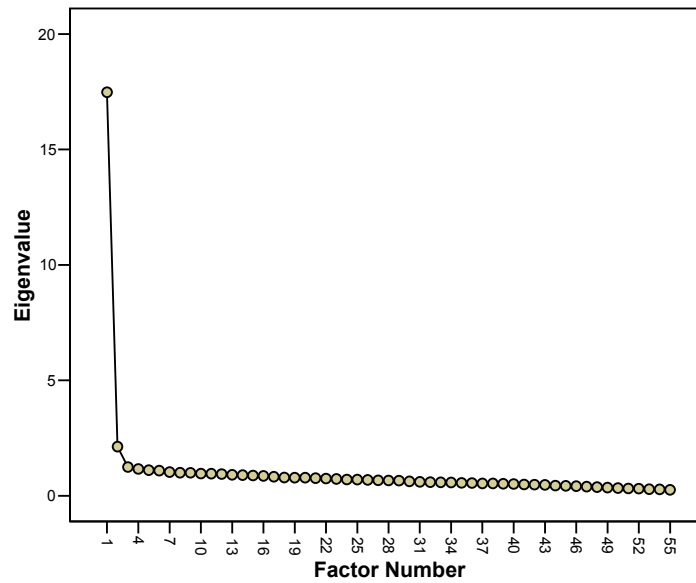
Figure 2.A.1 Algebra Scree Plot



Biology

The Biology factor analysis shows an initial eigenvalue of 17.480 for the first factor, which accounts for 31.783% of the variance. The next seven factors have eigenvalues greater than one. For instance, the second factor's eigenvalue drops to 2.130, accounting for only 3.872% of the variance while the third factor accounts for 2.26% of the variance with an eigenvalue of 1.245. The scree plot below gives a visual of this factor analysis; it appears as if one dominant factor is present.

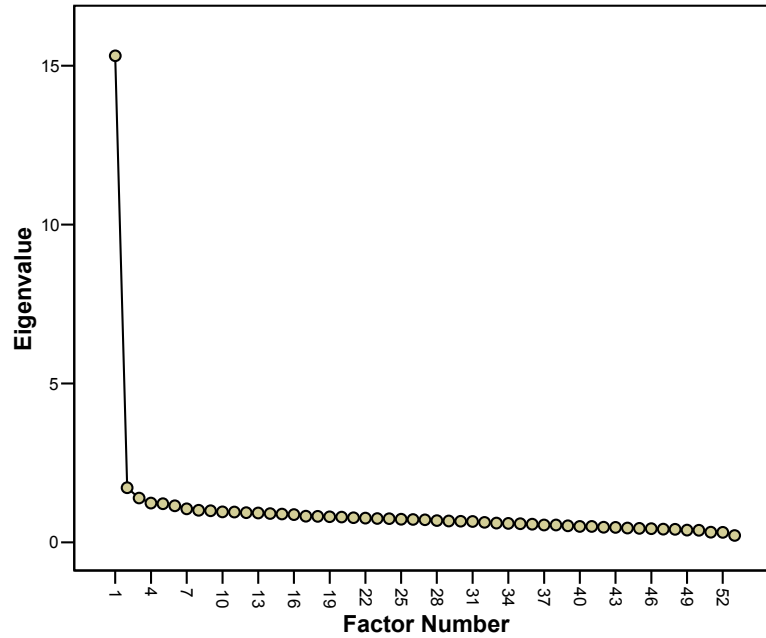
Figure 2.A.2 Biology Scree Plot



English

The English factor analysis shows an initial eigenvalue of 15.312 for the first factor, which accounts for 28.89% of the variance. The next seven factors have eigenvalues just slightly greater than one. For instance, the second factor's eigenvalue drops to 1.718, accounting for only 3.24% of the variance while the third factor's eigenvalue is 1.394, accounting for 2.63% of the variance. The scree plot below gives a visual of this factor analysis; it appears as if one dominant factor is present.

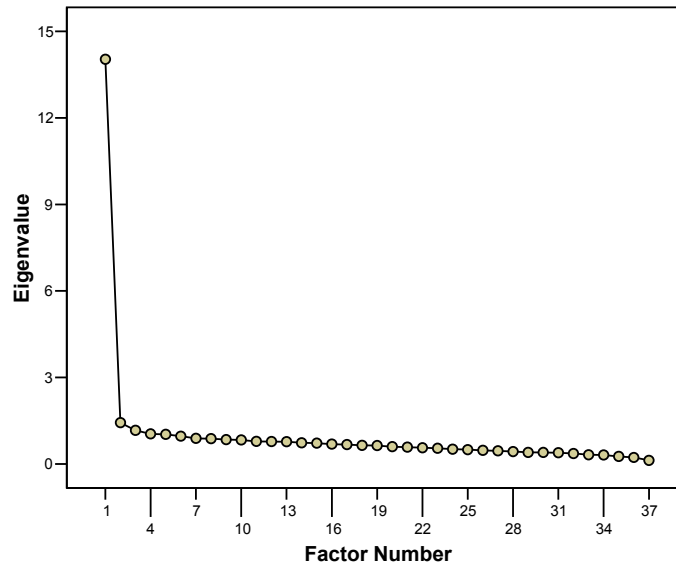
Figure 2.A.3 English I Scree Plot



Geometry

The Geometry factor analysis shows an initial eigenvalue of 14.032 for the first factor, which accounts for 37.924% of the variance. The next four factors have eigenvalues just slightly greater than one. For instance, the second factor's eigenvalue drops to 1.434, accounting for only 3.874% of the variance. The scree plot below gives a visual of this factor analysis; it appears as if one dominant factor is present.

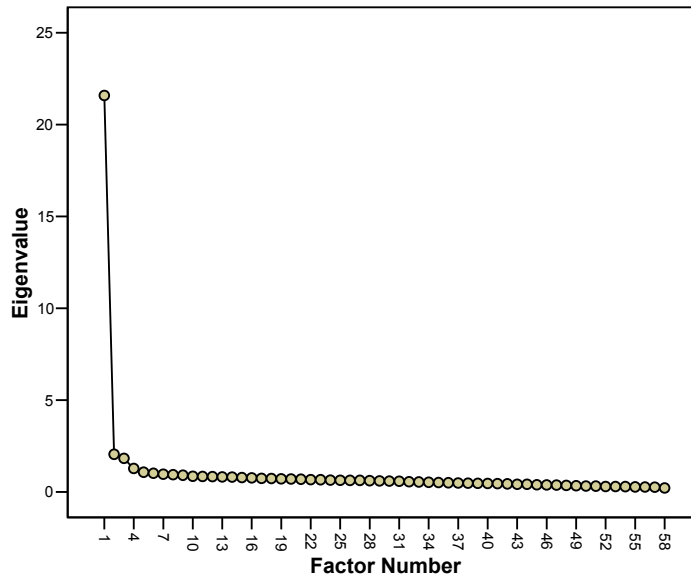
Figure 2.A.4 Geometry Scree Plot



Government

The government factor analysis shows an initial eigenvalue of 21.586 for the first factor, which accounts for 37.217% of the variance. The next five factors have eigenvalues greater than one. For instance, the second factor's eigenvalue drops to 2.053, accounting for only 3.54% of the variance, while the third factor accounts for 3.162% of the variance with an eigenvalue of 1.834. The scree plot below gives a visual of this factor analysis; it appears as if one dominant factor is present.

Figure 2.A.5 Government Scree Plot



Conclusions

All factor analyses indicated one dominant factor underlying the MD HSA data with the first factor accounting for a sizeable percent of the variance, followed by a few other factors accounting for considerably smaller percentage of the variance.