Table 1. *Descriptive Statistics.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Categories of Variables* | *Item Wording/Variable Label* | *Grade* | *N* | *M* | *SD* |
| Items | I enjoy math | 7 | 3060 | 0.69 | 0.46 |
| 10 | 2259 | 0.63 | 0.48 |
| 12 | 1560 | 0.55 | 0.50 |
| Math is useful in everyday problems | 7 | 3001 | 0.70 | 0.46 |
| 10 | 2238 | 0.63 | 0.48 |
| 12 | 1547 | 0.64 | 0.48 |
| Math helps a person think logically | 7 | 2998 | 0.64 | 0.48 |
| 10 | 2232 | 0.66 | 0.47 |
| 12 | 1544 | 0.68 | 0.47 |
| It is important to know math to get a good job | 7 | 3008 | 0.76 | 0.43 |
| 10 | 2239 | 0.67 | 0.47 |
| 12 | 1538 | 0.59 | 0.49 |
| I will use math in many ways as an adult | 7 | 3010 | 0.74 | 0.44 |
| 10 | 2248 | 0.65 | 0.48 |
| 12 | 1540 | 0.64 | 0.48 |
| I enjoy science | 7 | 3042 | 0.61 | 0.49 |
| 10 | 2250 | 0.58 | 0.49 |
| 12 | 1540 | 0.53 | 0.50 |
| Science is useful in everyday problems | 7 | 2988 | 0.40 | 0.49 |
| 10 | 2235 | 0.43 | 0.50 |
| 12 | 1530 | 0.46 | 0.50 |
| Science helps a person think logically | 7 | 2992 | 0.49 | 0.50 |
| 10 | 2234 | 0.51 | 0.50 |
| 12 | 1531 | 0.54 | 0.50 |
| It is important to know science to get a good job | 7 | 3012 | 0.40 | 0.49 |
| 10 | 2238 | 0.42 | 0.49 |
| 12 | 1532 | 0.37 | 0.48 |
| I will use science in many ways as an adult | 7 | 3043 | 0.46 | 0.50 |
| 10 | 2250 | 0.42 | 0.49 |
| 12 | 1539 | 0.42 | 0.49 |
| Covariates | Gender | N/A | 3116 | 0.48 | 0.50 |
| Ethnicity | N/A | 2958 | 0.23 | 0.42 |
| Distal outcomes | Mathematics achievement | 12 | 1168 | 68.74 | 15.00 |
| STEM career attainment | N/A | 1912 | 0.08 | 0.27 |
| Interest in social issues | 12 | 1629 | 0.34 | 0.47 |
| Science opinions and knowledge | 12 | 2317 | 0.53 | 0.50 |

Table 2. *Latent Class Analysis Fit Statistics for Grades 7, 10, and 12*.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Grade* | *Classes* | *Log Likelihood* | *# of Parameters* | *BIC* | *ABIC* | *VLMR p-value* | *BLRT p-value* | *Entropy* |
| 7 | 1 | -19319.60 | 10 | 38719.49 | 38687.72 | --- | --- | --- |
| 2 | -17198.43 | 21 | 34565.46 | 34498.74 | 0.00 | 0.00 | 0.80 |
| 3 | -16782.26 | 32 | 33821.44 | 33719.76 | 0.00 | 0.00 | 0.75 |
| 4 | -16587.89 | 43 | 33521.03 | 33384.40 | 0.00 | 0.00 | 0.69 |
| 5 | -16479.34 | 54 | 33392.24 | 33220.66 | 0.00 | 0.00 | 0.73 |
| 10 | 1 | -14929.94 | 10 | 29937.12 | 29905.35 | --- | --- | --- |
| 2 | -12538.67 | 21 | 25239.55 | 25172.83 | 0.00 | 0.00 | 0.86 |
| 3 | -12014.10 | 32 | 24275.37 | 24173.71 | 0.00 | 0.00 | 0.83 |
| 4 | -11775.68 | 43 | 23883.50 | 23746.88 | 0.00 | 0.00 | 0.78 |
| 5 | -11694.37 | 54 | 23805.84 | 23634.28 | 0.00 | 0.00 | 0.79 |
| 12 | 1 | -10339.03 | 10 | 20751.59 | 20719.83 | --- | --- | --- |
| 2 | -8392.68 | 21 | 16939.79 | 16873.08 | 0.00 | 0.00 | 0.86 |
| 3 | -7928.52 | 32 | 16092.39 | 15990.73 | 0.00 | 0.00 | 0.86 |
| 4 | -7742.22 | 43 | 15800.68 | 15664.08 | 0.00 | 0.00 | 0.81 |
| 5 | -7661.56 | 54 | 15720.25 | 15548.70 | 0.00 | 0.00 | 0.84 |

Table 3. *Item Probability Profiles by Grade Level*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Positive* | *Qualified Positive* | *Indifferent* | *Dim* |
| **Grade 7** | **26%** | **27%** | **29%** | **18%** |
| I enjoy math | 0.85 | 0.73 | 0.66 | 0.44 |
| Math is useful in everyday problems | 0.96 | 0.88 | 0.62 | 0.20 |
| Math helps a person think logically | 0.97 | 0.71 | 0.58 | 0.17 |
| It is important to know math to get a good job | 0.98 | 0.91 | 0.70 | 0.32 |
| I will use math in many ways as an adult | 0.99 | 0.88 | 0.71 | 0.20 |
| I enjoy science | 0.87 | 0.42 | 0.73 | 0.35 |
| Science is useful in everyday problems | 0.90 | 0.10 | 0.46 | 0.07 |
| Science helps a person think logically | 0.94 | 0.25 | 0.56 | 0.11 |
| It is important to know science to get a good job | 0.87 | 0.08 | 0.50 | 0.07 |
| I will use science in many ways as an adult | 0.92 | 0.11 | 0.63 | 0.08 |
| **Grade 10** | **32%** | **23%** | **24%** | **21%** |
| I enjoy math | 0.82 | 0.75 | 0.52 | 0.32 |
| Math is useful in everyday problems | 0.94 | 0.86 | 0.45 | 0.14 |
| Math helps a person think logically | 0.95 | 0.81 | 0.57 | 0.16 |
| It is important to know math to get a good job | 0.96 | 0.87 | 0.54 | 0.16 |
| I will use math in many ways as an adult | 0.96 | 0.92 | 0.43 | 0.10 |
| I enjoy science | 0.89 | 0.37 | 0.67 | 0.20 |
| Science is useful in everyday problems | 0.90 | 0.11 | 0.44 | 0.03 |
| Science helps a person think logically | 0.93 | 0.28 | 0.58 | 0.04 |
| It is important to know science to get a good job | 0.91 | 0.09 | 0.42 | 0.02 |
| I will use science in many ways as an adult | 0.92 | 0.06 | 0.42 | 0.02 |
| **Grade 12** | **35%** | **21%** | **24%** | **20%** |
| I enjoy math | 0.80 | 0.64 | 0.40 | 0.19 |
| Math is useful in everyday problems | 0.96 | 0.88 | 0.46 | 0.04 |
| Math helps a person think logically | 0.98 | 0.79 | 0.61 | 0.11 |
| It is important to know math to get a good job | 0.89 | 0.81 | 0.38 | 0.06 |
| I will use math in many ways as an adult | 0.96 | 0.93 | 0.39 | 0.05 |
| I enjoy science | 0.89 | 0.28 | 0.60 | 0.10 |
| Science is useful in everyday problems | 0.93 | 0.14 | 0.45 | 0.00 |
| Science helps a person think logically | 0.97 | 0.29 | 0.58 | 0.04 |
| It is important to know science to get a good job | 0.81 | 0.06 | 0.32 | 0.00 |
| I will use science in many ways as an adult | 0.89 | 0.05 | 0.43 | 0.00 |

Table 4. *Latent Transition Probabilities (Unconditional)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Conditional on Grade 7* | Transitioning to Grade 10 | | | |
|  | Positive | Qualified Positive | Indifferent | Dim |
| Positive | 0.52 | 0.18 | 0.20 | 0.10 |
| Qualified Positive | 0.24 | 0.39 | 0.16 | 0.22 |
| Indifferent | 0.26 | 0.14 | 0.37 | 0.23 |
| Dim | 0.13 | 0.17 | 0.21 | 0.50 |
| *Conditional on Grade 10* | Transitioning to Grade 12 | | | |
| Positive | 0.64 | 0.08 | 0.17 | 0.12 |
| Qualified Positive | 0.21 | 0.54 | 0.08 | 0.18 |
| Indifferent | 0.20 | 0.09 | 0.49 | 0.22 |
| Dim | 0.07 | 0.16 | 0.20 | 0.58 |

Table 5. Description of Latent Transition Analysis Trajectories

|  |  |  |
| --- | --- | --- |
|  | *Description* | *Frequency (Percent)* |
| Stay High | Positive at Grade 7, and Positive at Grade 12 | 581 (19%) |
| Stay Medium | Qualified Positive at Grade 7, and Qualified Positive at Grade 12 | 511 (16%) |
| Stay Low | Indifferent or Dim at Grade 7, and Indifferent or Dim at Grade 12 | 762 (25%) |
| Start High and End Low | Positive at Grade 7, and Indifferent or Dim at Grade 12 | 258 (8%) |
| Start High and End Medium | Positive at Grade 7, and Qualified Positive at Grade 12 | 125 (4%) |
| Start Low and End High | Indifferent or Dim at Grade 7, and Positive at Grade 12 | 186 (6%) |
| Start Low and End Medium | Indifferent or Dim at Grade 7, and Qualified Positive at Grade 12 | 115 (4%) |
| Start Medium and End High | Qualified Positive at Grade 7, and Positive at Grade 12 | 212 (7%) |
| Start Medium and End Low | Qualified Positive at Grade 7, and Indifferent or Dim at Grade 12 | 349 (11%) |

Table 6. *Percent of Students Classified in Each Latent Transition Trajectory by Covariates*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *Gender* | | *Ethnicity* | |
| *LTA Trajectory* | Female | Male | URM | Not-URM |
| Stay High | 15 | 22 | 22 | 18 |
| Stay Medium | 20 | 13 | 18 | 15 |
| Stay Low | 23 | 26 | 25 | 24 |
| Start High and End Low | 7 | 9 | 7 | 9 |
| Start High and End Medium | 4 | 4 | 4 | 4 |
| Start Low and End High | 6 | 6 | 6 | 6 |
| Start Low and End Medium | 5 | 3 | 5 | 3 |
| Start Medium and End High | 8 | 6 | 5 | 8 |
| Start Medium and End Low | 12 | 10 | 8 | 13 |

Table 7. Relationship Between LTA Trajectories and Gender

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *Sum of Squares* | *df* | *MS* | *F* | *p-value* |
| *Between Groups* | 87.46 | 1 | 87.46 | 12.33 | < .001 |
| *Within Groups* | 21965.81 | 3097 | 7.09 |  |  |
| *Total* | 22053.27 | 3098 |  |  |  |

Table 8. Relationship Between LTA Trajectories and Ethnicity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *Sum of Squares* | *df* | *MS* | *F* | *p-value* |
| *Between Groups* | 100.86 | 1 | 100.86 | 14.01 | < .001 |
| *Within Groups* | 21203.32 | 2946 | 7.20 |  |  |
| *Total* | 21304.19 | 2947 |  |  |  |

Table 9. Descriptives for LTA Trajectories and Distal Outcomes

Table 9. Relationship Between LTA Trajectories and Grade 12 Mathematics Achievement

Table 10. Relationship Between LTA Trajectories and STEM Career Attainment

Table 10. Relationship Between LTA Trajectories and Interest in Social Issues

Table 11. Relationship Between LTA Trajectories and Science Opinions and Knowledge