

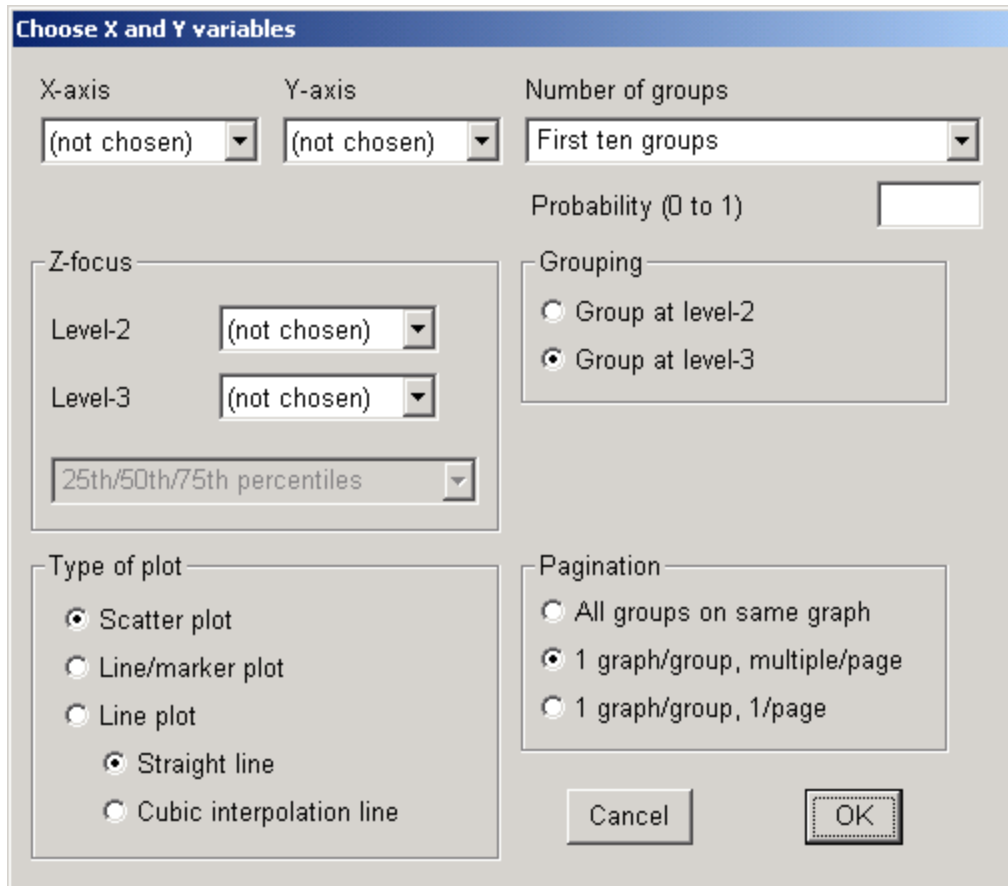


## Three-level applications

Graphing with 3-level data is very similar to the 2-level graphing. The only two differences are that users can (a) group the plots at either level 2 or 3, and (b) choose exclusively a level-2 or level-3 classifying or conditioning variable. To illustrate these two differences, we will use EG.MDM. We will prepare line plots of the mathematics test score, MATH, to detect trends over the course of the six-year study, grouped by the level-3 units, schools, and classified by a level-3 variable, the socioeconomic composition of schools. The same logic applies to the sets of three-level model-based graphing procedure.

### To prepare line plots with level-3 grouping

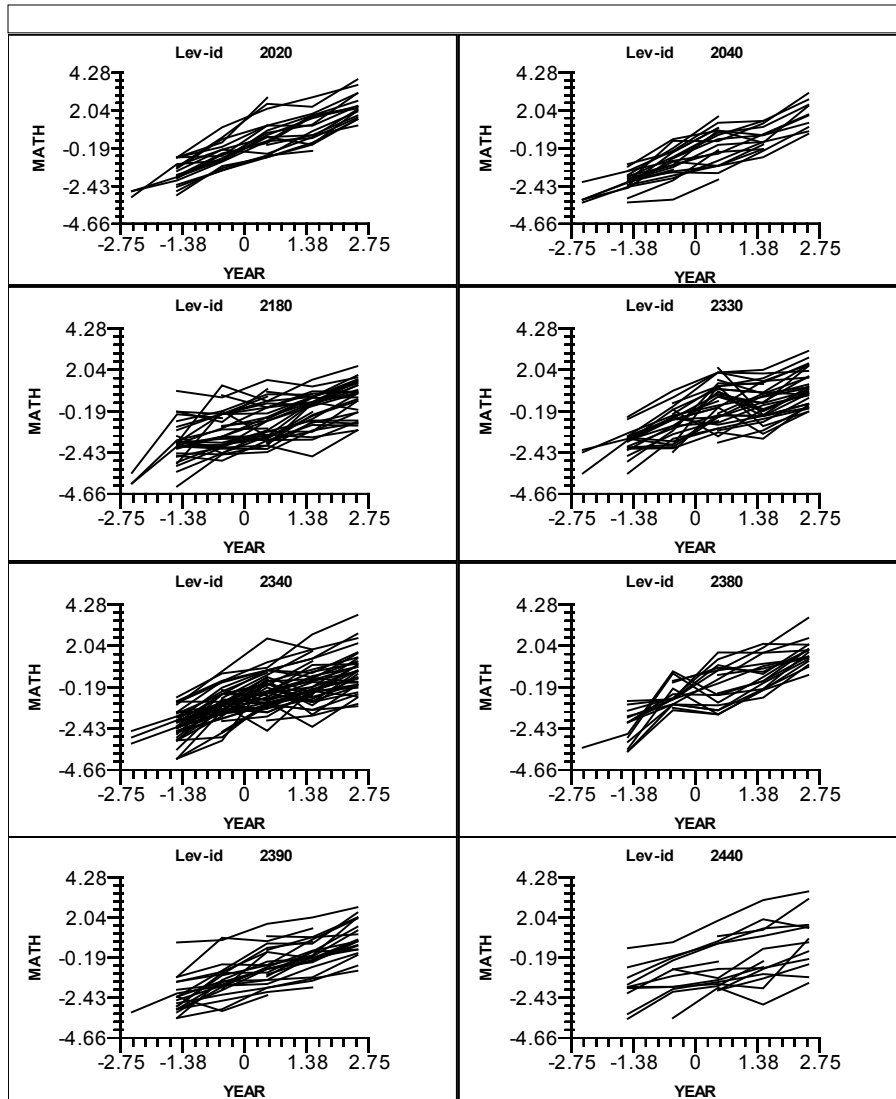
1. From the HLM window, open the **File** menu.
2. Choose **Create a new model using an existing MDM file** to open an **Open MDM File** dialog box. Open EG.MDM.
3. Open the **File** menu, choose **Graph Data...line plots, scatter plots** to open a **Choose X and Y variables** dialog box (see Figure 33).
4. Select YEAR from the **X-axis** drop-down list box.
5. Select MATH from the **Y-axis** drop-down list box.
6. Select number of groups. In this example, we want to include a random sample of 20 percent of the schools in the display. Select **Random sample of spec'd prob** from the **Number of groups** drop-down list box. Enter 0.2 into the textbox for **Probability (0 to 1)** to indicate that 10 percent or a proportion of .1 of the schools will be used.
7. Select type of plot and method of interpolation (see Step 7 in Section 18.1.3 for explanations). For our example, we want a line plot with no markers that is graphed with the linear interpolation method. Click the selection button for **Straight line**.
8. Select type of grouping at level 2 or level 3. In this example, we want to have the trajectories for individual schools (**Group at level 3**). Click **Group at level-3** selection button (default) in the **Grouping** section.
9. Select type of pagination. We want separate plots for individual schools and choose **1 graph/group, multiple page** option accordingly.
- 10.



**Figure 33** Choose X and Y variables dialog box

11. Click **OK**. The following graph will appear.

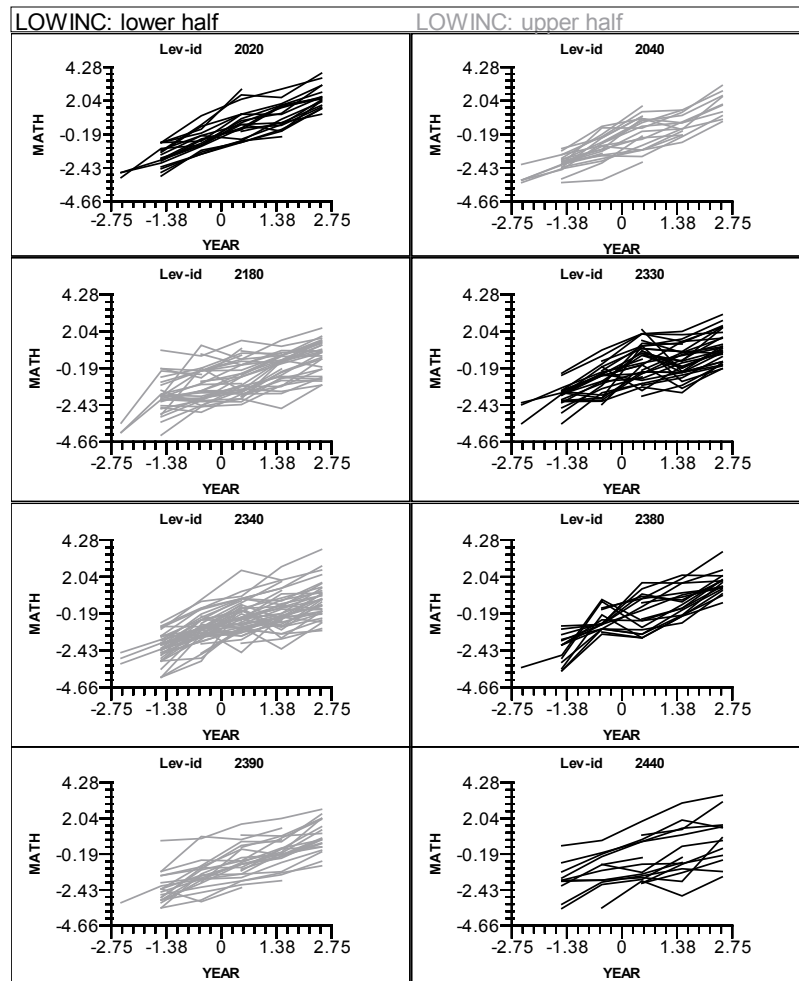
The eight line plots indicate the collection of students' growth trajectories of mathematics achievement within individual schools. The schools varied in their number of students. There was a generally positive average rate of growth across all schools.



**Figure 34** Line plots of MATH against YEAR for eight schools

**To include a level-3 classification variable**

12. Now we want to look at the trajectories as classified by the socioeconomic composition of the study body of a school. On the menu of the graph dialog box, click **Graph Settings**. Choose the level-3 variable LOWINC, the percent of students from low income families, as a **Z-focus** variable. As LOWINC is a non-dichotomous variable we have an additional choice that was not needed for our earlier dichotomous z-foci. In this case, we choose **Above/Below 50th percentile** from the combo box immediately below where we chose the LOWINC as the grouping variable.
13. Click **OK**. The following graph will appear.



**Figure 35** Line plots of MATHACH against YEAR for eight schools by LOWINC

This shows us that schools with a greater percent of students from low income families (upper half) tend to have lower mathematics achievement than do schools with less percent of poor students. Compared to their peers in School 2020, for instance, students in School 2330 generally have lower achievement across the six years.