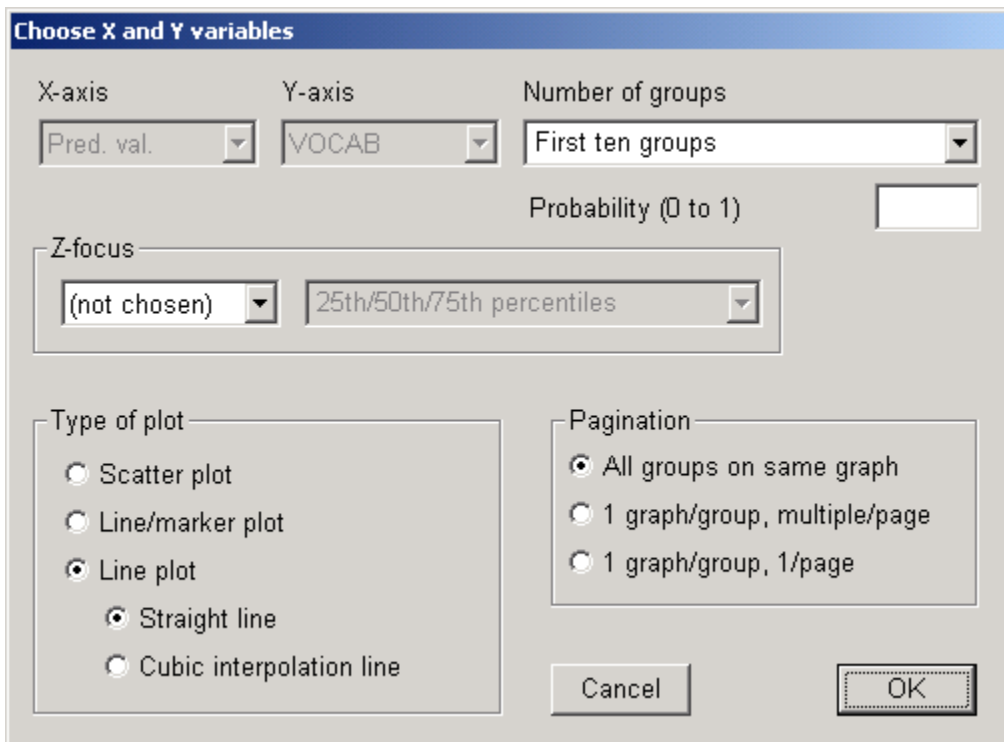


## Level-1 residual vs predicted value

Users can graphically assess the assumptions of constant error variance and linearity and probe for outlying cases by examining a scatter plot of level-1 residuals and predicted values. Using the same data and model of the previous two sections, we now plot the level-1 residual against its predicted value.

### To prepare a level-1 residuals by predicted values scatter plot

- After the model is run, select **Graph Equations...Level-1 residual vs predicted value** from the **File** menu, which will give us the following dialog box.



The dialog box titled "Choose X and Y variables" contains the following settings:

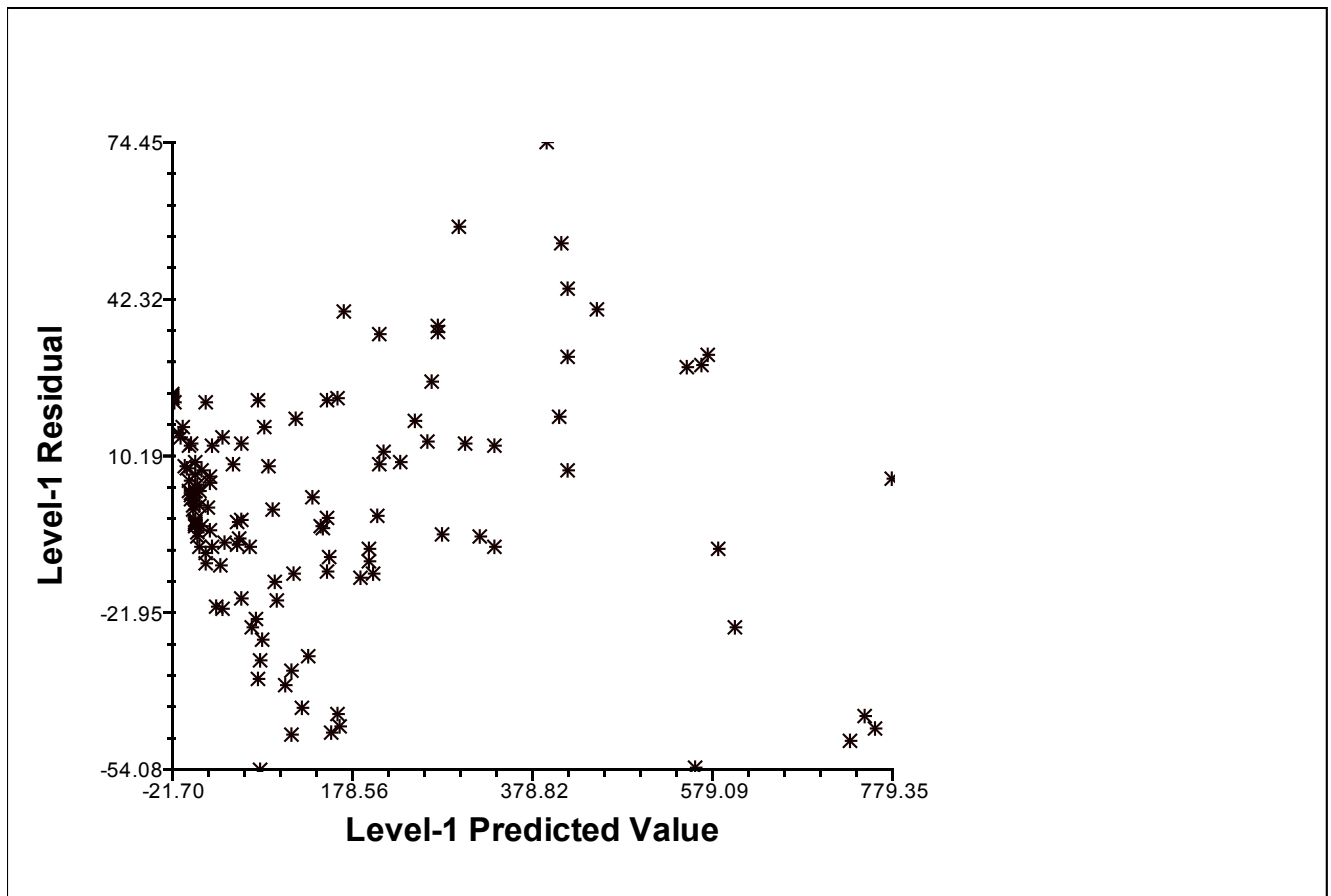
- X-axis: Pred. val.
- Y-axis: VOCAB
- Number of groups: First ten groups
- Probability (0 to 1): (empty field)
- Z-focus: (not chosen) and 25th/50th/75th percentiles
- Type of plot:
  - Scatter plot
  - Line/marker plot
  - Line plot
    - Straight line
    - Cubic interpolation line
- Pagination:
  - All groups on same graph
  - 1 graph/group, multiple/page
  - 1 graph/group, 1/page

Buttons: Cancel, OK

Figure 29 Choose X and Y variables

Note that the **X-axis** variable, **Pred. val.** and **Y-axis** variable, **Level-1 residuals** have been pre-selected.

- Select **All groups (n=22)** in the **Number of groups** to include all the 22 children in the display.
- Click the selection button for **Scatter plot** in the **Type of plot** section to request a scatter plot of the predicted values by level-1 residuals.
- Select **All groups on same graph** in the **Pagination** section to display all the residuals pooled across the level-2 units. To examine the residuals for individual children, choose either of the other pagination options.
- Click **OK**.



**Figure 30** Plot of level-1 residuals by predicted values

The plot suggests that there is a tendency for the residual scatter to get narrower at the smallest predicted values and to get wider around the interval between 150 and 170. The residuals seem to follow a slightly curvilinear trend as well. They may suggest that there is a specification error in the model.

- (Optional) Users can choose to include a level-2 classification variable when examining the level-1 residuals.