



## Constructing the MDM from raw data

The range of options for data input is the same as for HLM2 and HLM3. We will use SPSS file input in our example.

### Level-1 file

The level-1 file, NYS1.SAV, has 1,079 observations collected from interviewing annually 239 eleven-year-old youths beginning at 1976 for five consecutive years. Therefore,  $T = 5$ . The variables and the  $T$  indicator variables are:

ATTIT      a 9-item scale assessing attitudes favorable to deviant behavior.

Subjects were asked how wrong (very wrong, wrong, a little bit wrong, not wrong at all) they believe it is for someone their age to, for example, damage and destroy property, use marijuana, use alcohol, sell hard drugs, or steal.

The measure was positively skewed, so a logarithmic transformation was performed to reduce the skewness.

EXPO      Exposure to deviant peers.

Subjects were asked how wrong their best friends thought the nine deviant behaviors surveyed in the ATTIT scale were.

AGE      age of the participant

AGE11      age of participant at a specific time minus 11

AGE13      age of participant at a specific time minus 13

AGE11s      AGE11\* AGE11

AGE13s      AGE13\* AGE13

IND1      indicator for measure at time 1

IND2      indicator for measure at time 2

IND3      indicator for measure at time 3

IND4      indicator for measure at time 4

IND5      indicator for measure at time 5

The five indicators were created to facilitate use of HMLM. Data for the first two children are shown in Fig. 1.

Child 15 had data at all five years. Child 33, however, did not have data for the fourth year.

	<b>id</b>	<b>attit</b>	<b>age</b>	<b>age11</b>	<b>age13</b>	<b>age11s</b>	<b>age13s</b>	<b>Indicators for the repeated measures</b>	<b>ind1</b>	<b>ind2</b>	<b>ind3</b>	<b>ind4</b>	<b>ind5</b>
<b>16</b>	15	.44	11.00	.00	-2.00	.00	4.00	1.0	.00	.00	.00	.00	.00
<b>17</b>	15	.44	12.00	1.00	-1.00	1.00	1.00	.00	1.0	.00	.00	.00	.00
<b>18</b>	15	.89	13.00	2.00	.00	4.00	.00	.00	.00	1.0	.00	.00	.00
<b>19</b>	15	.75	14.00	3.00	1.00	9.00	1.00	.00	.00	.00	1.0	.00	.00
<b>20</b>	15	.80	15.00	4.00	2.00	16.00	4.00	.00	.00	.00	.00	.00	1.0
<b>21</b>	33	.20	11.00	.00	-2.00	.00	4.00	1.0	.00	.00	.00	.00	.00
<b>22</b>	33	.64	12.00	1.00	-1.00	1.00	1.00	.00	1.0	.00	.00	.00	.00
<b>23</b>	33	.69	13.00	2.00	.00	4.00	.00	.00	.00	1.0	.00	.00	.00
<b>24</b>	33	.11	15.00	4.00	2.00	16.00	4.00	.00	.00	.00	.00	.00	1.0

**Figure 1      Two children in the NYS1.SAV data set**

## Level-2 file

The level-2 data file, NYSB.SAV, consists of three variables on 239 youths. The file has the same structure as that for HLM2. The variables are:

- |          |  |
|----------|--|
| FEMALE   | an indicator for gender (1 = female, 0 = male)       |
| MINORITY | an indicator for ethnicity (1 = minority, 0 = other) |
| INCOME   | income   |

The construction of the MDM involves three major steps:

1. Select type of input data.
2. Supply the program with the appropriate data-defining information.
3. Check whether the data have been properly read into the program.

Select **HMLM** as the **MDM** type at the **Select MDM type** dialog box and inform WHLM the type of data input.

While the structure of HMLM input files is almost the same as in HLM2, there is one important difference: the indicator variables. In order to create these, one first needs to know *the maximum number of level-1 records per level-2 group; this determines the number of*

*indicators.* We shall call them the number of "occasions." (This is the number of time points in a repeated measures study or the number of outcome variables in a cross-sectional multivariate study. Also note that each person does not need to have this number of occasions.) Then create the indicator variables so that a given variable takes on the value of 1.0 if the given occasion is at this time point, 0.0 otherwise. Looking at Figure 1, we see that IND1 is 1 if AGE11 is 0, IND2 is 1 if AGE11 is 1, IND3 is 1 if AGE11 is 2, and so on. Fig 10.2 shows the **Choose variables – HMLM** dialog box where the indicator variables are checked before the MDM file is created. This dialog box can be opened from the **Level-1 specification** section in the **Make MDM – HMLM** dialog box.

	ID <input checked="" type="checkbox"/>	in SSM <input type="checkbox"/>	indicator <input type="checkbox"/>		ID <input type="checkbox"/>	in SSM <input type="checkbox"/>	indicator <input type="checkbox"/>
ID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ATTIT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGE11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGE13	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGE11S	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGE13S	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IND1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IND2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IND3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IND4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IND5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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**Figure 2      Choose variables – HMLM dialog box**