

Constructing the MDM file for HCM2 using SPSS input

Chapter 12 in Hierarchical Linear Models presents a series of analyses of data from a study of neighborhood and school contribution to educational attainment in Scotland (Garner & Raudenbush, 1991). We use the data from the study, provided along with the HLM software, to illustrate the operation of the HCM2 program.

In constructing the MDM file, there are the same range of options for data input as for HLM2. Similar to HLM3, HCM2 requires two IDs, one for each higher-level unit, and the IDs have to be sorted. The two higher-level units in our example are neighborhoods and schools. Whereas the user can choose either higher-level unit as the row or column factor, we adopt the convention that the data are arranged such that the level with more units becomes the row factor and the level with fewer units becomes the column factor. Thus, we will designate the neighborhood (N = 542) as the row factor and school (N = 17) as the column factor.

Data input requires a level-1 file (student-level file), a level-2 row-factor (neighborhood-level) file, and a level-2 column-factor (school-level) file.

Level-1 file

The level-1 or within-cell file, **attainw.sav** has 2,310 students and 8 variables. The two IDs are NEIGHID for neighborhoods and SCHID for schools. The variables are:

- ATTAIN, a measure of educational attainment
- P7VRQ, denoting primary 7 verbal reasoning quotient
- P7READ, denoting primary 7 reading test scores
- DADOCC, indicating the father's occupation scaled on the Hope-Goldthorpe scale in conjunction with the Registrar General's social-class index (Willms, 1986)
- DADUNEMP, an indicator for father's unemployment status (1 if unemployed, 0 otherwise)
- DADED, an indicator for father's educational level (1 if schooling past the age of 15, 0 otherwise)
- MOMED, an indicator for mother's educational level (1 if schooling past the age of 15, 0 otherwise)
- MALE, an indicator for student gender (1 if male, 0 if female)

Data for the first 15 observations in the data set **attainw.sav** are shown below. Note that there are five students from Neighborhood 26 and one from Neighborhood 27 attended School 20. These first six observations provided information about two neighborhood-by-school combinations or cells. One of the

next nine students living in Neighborhood 29 attended School 18 and the other eight went to School 20. They provided data for two cross-classified neighborhood-by-school cells (see Table 12.1 in Hierarchical Linear Models, p. 374, for a display of the organization of the data by counts in each neighborhood-by-school cell).

	neighid	schid	attain	p7vrq	p7read	dadocc	dadunemp
1	26.00	20.00	-1.33	-1.03	-.87	-3.45	.00
2	26.00	20.00	-1.33	-10.03	-27.87	-3.45	.00
3	26.00	20.00	1.52	1.97	11.13	-9.09	.00
4	26.00	20.00	.56	2.97	6.13	2.32	.00
5	26.00	20.00	1.52	17.97	17.13	16.20	.00
6	27.00	20.00	-.13	3.97	-.87	-3.45	.00
7	29.00	18.00	.03	8.97	6.13	16.20	.00
8	29.00	20.00	-1.33	-17.03	-23.87	-3.45	.00
9	29.00	20.00	-1.33	-8.03	-4.87	-3.45	.00
10	29.00	20.00	.16	1.97	-4.87	-11.49	.00
11	29.00	20.00	.56	-.03	-5.87	-3.45	.00
12	29.00	20.00	.16	4.97	11.13	-11.49	.00
13	29.00	20.00	.74	-4.03	.13	-3.45	.00
14	29.00	20.00	-1.33	-15.03	-25.87	-3.45	.00
15	29.00	20.00	-.36	-8.03	-13.87	-3.45	.00

Level-2 row-factor data file

For our neighborhood example, the level-2 row-factor (neighborhood) level file, **attainr.sav**, consists data on 1 variable for 542 neighborhoods. The variable is DEPRIVE (a scale measuring social deprivation, which incorporates information on the poverty concentration, health, and housing stock of a local community). The data from the first 4 neighborhoods, as contained in **attainr.sav**, are shown below.

	neighid	deprive
1	26.00	-.55
2	27.00	.15
3	28.00	-.51
4	29.00	-.08

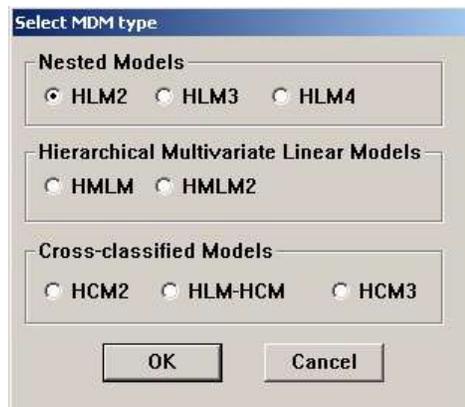
Level-2 column-factor data file

For our neighborhood example, the level-2 column-factor (neighborhood) file, **attainco.sav**, has 17 schools and 1 variable. The variable is DUMMY, a dummy

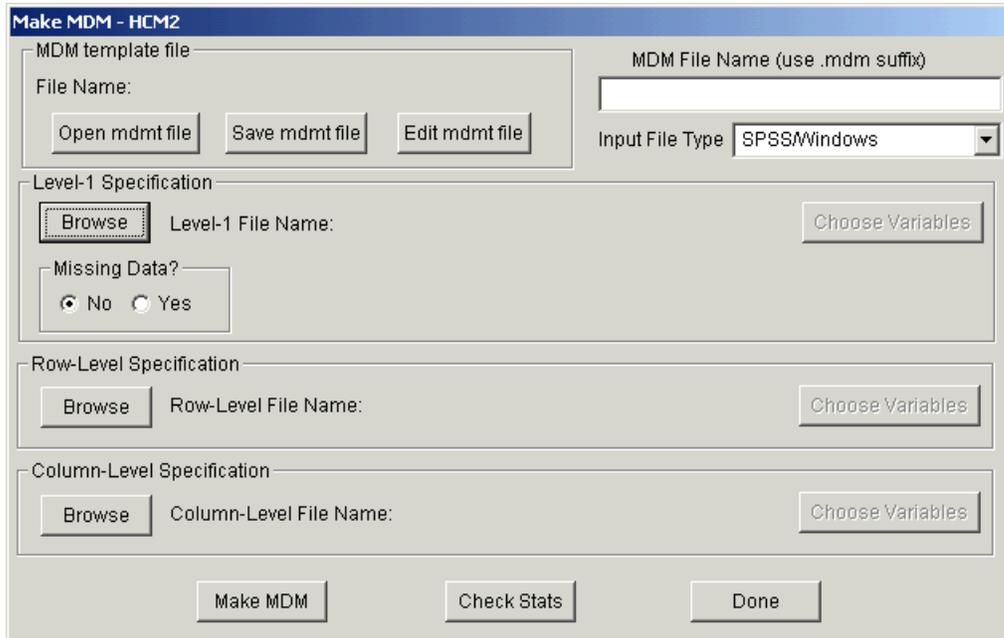
variable. Data for the first 4 schools are shown below.

	schid	dummy
1	1.00	1.00
2	2.00	1.00
3	3.00	1.00
4	5.00	1.00

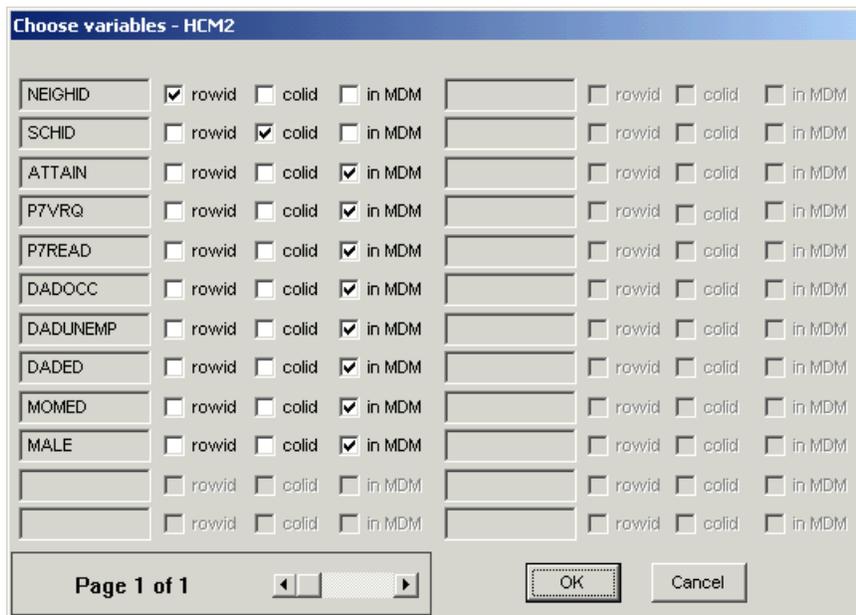
The steps for the construction of the MDM for HCM2 are similar to the ones described earlier. Select **File, Make new MDM file, Stat package** input from the main WHLM window. Select **HCM2** in the **Select MDM type** dialog box as shown.



Using the **Browse** buttons to the left of the **Make MDM – HCM2** dialog box, select **attainw.sav**, **attainr.sav**, and **attainco.sav** as the level-1, row-level, and column-level data files respectively as shown below. Note that the program can handle missing data at level 1 or within-cell only. Here **attainw.sav** contains missing data, and the radio button next to the **Yes** option in the **Missing Data?** group box is checked to indicate this.



Next, select the variables to be included in the MD file at level-1 by clicking the **Choose Variables** button in the **Level-1 Specification** group box. The rowed, NEIGHID, is selected by checking the box next to rowid. The colid, SCHID, is indicated in a similar way. All other variables in the level-1 data file are then selected for inclusion in the MDM file. The completed **Choose variables – HCM2** dialog box for **attainw.sav** is shown below.



From the row-factor data file **attainr.sav**, only one variable – DEPRIVE – is

selected, while NEIGHID is again indicated as the rowid.

Variable	rowid	colid	in MDM	Target	rowid	colid	in MDM
NEIGHID	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DEPRIVE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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OK Cancel

Finally, the column-factor data file is considered. The variable SCHID is indicated as the column ID, and a variable – DUMMY – is selected for inclusion in the MDM file. The variable DUMMY will not be used in the analysis; it is included in the data file simply because HLM expects at least one variable other than ID variable(s) at each level of the model.

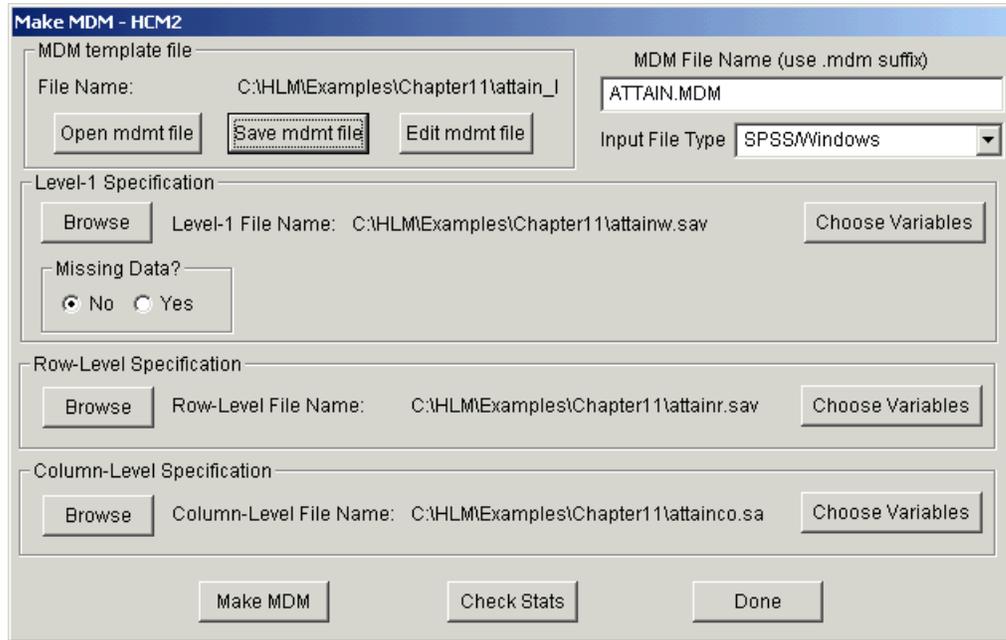
Variable	rowid	colid	in MDM	Target	rowid	colid	in MDM
SCHID	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DUMMY	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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OK Cancel

After assigning a name to the MDM file to be created (**attain.mdm** in this case), a log of the input responses used to create the MDM file is saved to the MDM

template file **attain.mdmt** by using the Save mdm file button in the **MDM template file** group box of the **Make MDM – HCM2** dialog box. The completed dialog box is shown below.



Finally, the **Make MDM** button is clicked to create the MDM file. Once the program has run, click the **Check Stats** button to check that data have been processed correctly by HLM. Then click **Done** to return to the main WHLM window, where a model for these data can now be specified. Also see an [example of an HCM model](#).