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Background

The CAMD AD clinical trial dataset is a unique resource for the AD research and clinical trials communities. In the most recent dataset available (June, 2012), data from 6,178 patients participating in 22 clinical trials (mostly placebo arms) are available for retrospective data analyses. However, a data dictionary and data analytic syntax has yet to be developed for SPSS users. Given the importance and complexity of these data, it is essential to promote efficient database generation. The goal of this project was to initiate the development of a set of syntax files to help facilitate the review and analysis of the CAMD AD data for SPSS users and to apply this syntax to summarize important features of the datasets using SPSS as a statistical tool.

Method

For this initial component of the project, the demographic data file (entitled "DM") and neuropsychological test data including the Mini-Mental State Examination (MMSE) and the Alzheimer's Disease Assessment Scale – Cognitive subscale (ADAS-cog) (entitled "QS") were reviewed using SPSS 20 in order to develop syntax designed to help facilitate data management and analyses in SPSS as well as to summarize these 2 datasets descriptively. SPSS syntax files were created and applied to these DM and QS files, including necessary data variable recoding and labeling and value labeling. Excel files with instructions on using the SPSS syntax and summarizing the variable coding were also developed as an aid.

Results

"DM" Dataset: The SPSS syntax file created for the DM file contains commands to recode several string variables into numeric variables in order to facilitate analyses and data exploration, including sex, race, and country of origin as data from 44 countries in addition to the USA are represented in the CAMD AD dataset. Syntax for the DM file was created to recode each country into a numeric variable based on the UN/ISO country numeric codes. Table 1 shows that 10 studies included US sites only, 8 included US and various "International" sites, and 3 included International sites only. One study did not identify origin of patients. Each subject was identified by a Universal Subject ID string variable across all studies. Age ranged from 69-82 years across studies and 20/22 studies included more women than men. There were 91 instances of missing data for age, which was coded as "999" in the dataset. Nineteen studies included patients in mild to moderate range and three studies included patients with Mild Cognitive Impairment (MCI). The vast majority of subjects enrolled in these studies were white (mean = 93%)

Results (cont.)

Table 1: Study Features and Demographic Summary of CAMD Studies that contain Neuropsychological Test Data

Study ID	N	Tests Included *	Study Population	Region	Sex (M/F)	% White	Mean Age	Min. Age	Max. Age
1000	102	1,2	AD	USA	42/60	93.1	74.78	55	89
1009	164	1,2	AD	Int'l	73/91	99.4	74.21	60	86
1013	716	1,2	AD	USA/Int'l	358/361	91.4	78.03	51	89
1014	634	1,2	AD	USA/CAN	282/362	92.4	74.78	50	89
1055	140	1,2	AD	USA/Int'l	58/82	98.6	73.34	45	87
1056	491	1,2	AD	USA/Int'l	218/276	92.1	72.71	52	89
1057	498	1,2	AD	USA/Int'l	193/307	88.4	74.17	50	89
1058	166	1,2	AD	USA/Int'l	68/98	76.5	72.54	50	88
1105	325	1,2	AD	USA	160/166	96.6	73.06	50	89
1107	145	2	AD	Int'l	57/89	94.5	73.88	48	89
1131	56	1,2	AD	USA	23/34	91.2	74.86	52	88
1132	410	1,2	MCI	USA	233/179	93.9	69.74	45	89
1133	162	1,2	AD	USA	63/99	94.4	72.62	56	88
1134	67	2	AD	USA	19/86	95.2	82.15	65	89
1135	274	1,2	AD	Missing	123/151	99.3	70.82	50	89
1136	144	2	AD	Int'l	59/85	100.0	72.88	51	88
1137	212	1,2,3,4	AD	USA	107/109	95.4	75.69	54	89
1138	196	1,2,3,4	AD	USA	86/116	90.6	76.51	51	89
1139	160	2,5	AD	USA/Int'l	54/113	88.6	77.53	50	89
1140	137	1,2	MCI	USA	79/58	94.9	72.69	55	89
1141	490	1	MCI	USA/Int'l	220/272	97.6	69.94	50	89
1142	398	1,2	AD	USA	180/229	86.8	75.93	54	89

* 1=ADAS-Cog, 2=MMSE, 3=ADCS-ADL, 4=NPI, 5=SIB

"QS" Dataset: Review of the QS file indicates that all but 1 study included the MMSE and ADAS-Cog. Two studies also included the ADCS-ADL and NPI, and one study included the Severe Impairment Battery (SIB) (Table 1). In the most recent update, the QS dataset contains 2,894,595 rows of data. Review of the cognitive data for the MMSE and ADAS-Cog revealed several important features of the datasets that must be accounted for prior to analyses. Table 2 summarizes some of these characteristics of the MMSE and ADAS-Cog datasets for each study describing the number and type of subtests.

The MMSE data contains 44 potential unique variables, including MMSE Total Score. Review of the MMSE dataset across studies revealed several differences in terms of the type and amount of data captured. Twelve studies included item-level scores (IS) for all subtests (5 studies did not include IS for Serial 7s). One study included WORLD Backwards instead of Serial 7s. Additionally, four studies included MMSE Total Score only. These findings have implications for analyses that may attempt to model cognitive changes on MMSE at the item level, as some items have been shown to be more sensitive to change than others (Fillenbaum et al. 1994).

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Results (cont.)

The ADAS-Cog data included in the QS file includes 129 potential variables, but does not include an ADAS-Cog Total Score. Nine studies include both Subscale Scores (SS) and Item-level Scores for all ADAS-Cog subtests. One study included Subscale Scores only, and seven included Subscale Scores as well as Item-Level Scores for Word Recall only. All studies included the standard 11 subscales of the ADAS-Cog. Eight studies also included Delayed Word Recall, and 2 studies included Executive Maze and Number Cancellation tasks. Syntax was created in SPSS to enable easier computation of ADAS-Cog Total Scores taking into account these differences in data available. Inclusion of Item-level ADAS-Cog scores may be of use in more detailed analysis of responsiveness of the ADAS-Cog in AD and MCI populations.

Table 2: Summary of MMSE and ADAS-Cog Available Score Information and Comments on Data Features by Study

Study ID	MMSE Scores Comments	ADAS-Cog Subtests	ADAS-Cog Scores Comments
1000	SS	11	SS, WR Trial Scores must be derived from IS
1009	SS	11 + DWR	SS, IS
1013	IS	11 + DWR	SS, IS
1014	IS	11 + DWR	SS, IS
1055	TS only	11	SS
1056	TS only	11	SS, IS for WR
1057	TS only	11	SS, IS for WR
1058	TS only	11	SS, IS for WR
1105	IS	11 + DWR	SS, IS (except WRecog)
1107	SS	N/A	N/A
1131	IS, except 7s	11	SS, IS
1132	IS, except 7s	11 + DWR	SS, IS
1133	IS, except 7s	11 + DWR	SS, IS for WR
1134	IS, except 7s	N/A	N/A
1135	IS, except 7s	11	SS, IS for WR
1136	SS	N/A	N/A
1137	SS, some missing	11	SS, IS (except WR and WRecog)
1138	IS	11	SS, IS
1139	IS	N/A	N/A
1140	IS	11	SS, IS
1141	N/A	11 + DWR, EFM, NC	SS, IS
1142	IS, WORLD	11 + DWR, EFM, NC	SS, IS

SS=Subscale Scores; IS=Item-level Scores; TS=Total Score; 11=Standard 11 Subscale ADAS-Cog; WR=Word Recall; WRecog=Word Recognition; DWR=Delayed Word Recall; EFM=Executive Function Maze; NC=Number Cancellation

Summary

An initial review and description of the CAMD AD demographic and neuropsychological test data reveals important study level characteristic that need to be taken into consideration before merging or analyzing these data. Developing an openly shared common data dictionary and set of syntax files should help facilitate consistent and efficient analyses of the CAMD AD datasets among SPSS users and ultimately help AD researchers to better mine these important and rich data sets. The dictionary and syntax are available by contacting Dr. Lisle Kingery at Lkingery@cogstate.com

References

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