Imputation of Cognitive Function Variables in the Mexican Health and Aging Study 2001-2021, Version 2

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November 21, 2023

"The MHAS (Mexican Health and Aging Study) is partly sponsored by the National Institutes of Health/National Institute on Aging (grant number NIH R01AG018016) and the *Instituto Nacional de Estadística y Geografía* (INEGI) in Mexico. Data files and documentation are public use and available at www.MHASweb.org"

Suggested citation for this document:

MHAS (2023). Imputation of the Cognitive Function Variables in the Mexican Health and Aging Study 2001-2021. Version 2. [PDF document] Website: Retrieved from www.MHASweb.org on (date).

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I. Summary

This document describes and explains the methods and procedures used to impute non-response for cognitive variables in the Mexican Health and Aging Study (MHAS) 2001, 2003, 2012, 2015, 2018, and 2021. The MHAS, similar to other epidemiological studies, collects cognitive assessment data from participants to investigate normal and abnormal changes in cognition. However, participants are often unable or unwilling to complete a full cognitive evaluation. Missing cognitive data is an inherent problem in cognitive research that uses large studies like the MHAS, with results that may be biased when analyses exclude participants with incomplete information for cognition. This document describes the procedures for the imputation of missing values for cognitive items for the 2001 to 2018 observation waves using demographic and health charcteristics, as well as the prior wave cognitive scores for 2003, 2015, and 2018. New to this document is a description of the imputation of missing values for the 2021 observation wave. Imputations were completed for both direct and proxy interviews separately. To compare the effect of imputation versus deletion of observations with missing data, we compared the main statistics for all cognitive items among three groups: cases where all data were observed, cases where missing data were imputed, and all cases combined. Details about the rationale for imputation of cognitive function variables in the MHAS are also documented in Downer et al. 2021.

II. Cognition Functioning Variables in the MHAS

Measures of cognitive function have been included in the MHAS surveys since the baseline in 2001. For participants with a direct interview, the MHAS uses parts of the screening portion of the Cross-Cultural Cognitive Examination (CCCE) for direct interviews (Glosser et al. 1993). The majority of the battery has been preserved across waves. However, a few changes have been introduced to include new tasks (e.g., backwards counting in 2012), and to measure new domains previously not included in the battery (Michaels-Obregón A, Mejía-Arango S, Wong R 2020). For proxy interviews, an adapted version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) has been used since the baseline (Glosser et al. 1993; Jorm 1994). It is essential for the study to maintain comparability across waves to facilitate any cross-waves comparison and to provide the means to analyze cognitive function trajectories.

Missing and incomplete data is an inherent problem in population-based studies of older adults. In general, older adults who are unable or unwilling to complete an entire cognitive evaluation are older, in worse health, and report having memory problems. Similarly, older adults that are unable or unwilling to complete portions of the evaluation have lower performance on non-missing cognitive assessments than older adults with no missing data (Downer et al. 2021). While excluding the observations with missing data from their analysis sample is an approach that many investigators follow, and this is easier than other methods, the practice might produce biased results.

The objective of the imputation was to assign values for observations with missing cognitive function measures, both for those who completed a direct interview and a proxy interview. To impute the cognition measures we adopted the method of sequence of regressions with a SAS-based Imputation and Variance Estimation software (IVEware), developed by Survey Research Center, Institute for Social Research at the University of Michigan (Raghunathan et al., 2000; Raghunathan, 2001).

In this document we describe the methods and procedures used to impute the missing values for cognitive function variables in the MHAS 2001, 2003, 2012, 2015, 2018, and 2021. This document accompanies the databases that contain the constructed (imputed) variables for the MHAS users. The Appendix includes flowcharts that describe the imputation process for the cognitive function variables for Direct Interviews (Appendix A) and Proxy Interviews (Appendix B), the descriptive tables of imputed and non-imputed data by wave (Appendix C), the codebooks (Appendix D), and the SAS program codes for the imputation of the variables for Direct Interviews (Appendix E) and Proxy Interviews (Appendix F).

Note: Version 2 of this document adds the imputation of wave 5 (2021). In addition to the new wave, the imputation of wave 5 also accounts for modifications in the 2021 questionnaire and data. These modifications includes the additional of a new variables, 'Visual scanning score: Number of incorrect figures' (e10_i_21), and the replacement of **Serial 7s** task, with the **Serial 3** task. In this new measure the respondent was asked to substract, starting from 20, by 3 five times. For more information about the MHAS Congitive Function Measures Scoring across waves please refer to the descriptive document "The Mexican Health and Aging Study: Cognitive Function Measures Scoring and Classification Across Waves" available here.

III. Imputation of Cognitive Functioning Variables

The first step before the imputation of missing cognitive data can be performed is to determine if the data is Missing at Random (MAR) or Missing Not At Random (MNAR). However, there is no empirical way to definitively determine if data is MAR or MNAR because the likelihood that the value is missing depends upon the missing value itself (Daniel et al. 2012). Therefore, an investigator must assume that data is MAR. The plausibility of this assumption depends upon what variables are observed in the data, and if these variables are associated with the reason for the data to be missing.

The second step is to thoroughly investigate the potential reasons for why a participant is missing data. For example, participants who cannot hold a pencil because of paralysis may be unable to complete an assessment that requires them to hold a pencil. In this instance, the reason for missingness may not be related to the participant's level of cognitive functioning unless the physical limitation is due to a stroke or other brain injury. Conversely, a participant may refuse to attempt an assessment because they think the task is too difficult for them to complete. Missingness because a participant refuses is more likely to be related to cognitive function because participants with poor cognition may not want to show their inability to complete challenging assessments (Herzog AR et al. 1997).

Direct Interviews

The flowcharts included in Appendix A illustrate the imputation process of cognitive functioning variables by wave for Direct Interviews only. In each wave, imputations were performed for participants who completed a direct MHAS interview, regardless of their interview status in another wave. Values were imputed to replace missing values due to don't know (DK) responses, refusals (RF), and any not applicable (SKIP) responses. We used as regressors a combination of relevant demographic variables (age, sex, education, number of informants in household, and

community size), as well as self-reported current health status, past health, and vision and hearing problems. Other variables were used as auxiliary in making imputation decisions, such as if the individual reported inability to read, problems to hold a pencil, and the kind of problem reported. Due to a significant time gap between the 2003 and 2012 waves of MHAS, we treated MHAS 2001 and MHAS 2012 as baselines in the imputation procedure. Moreover, in 2003 we included the imputed cognitive measures scores from the previous wave (2001) to impute missing cognition measures. Similarly, in 2015, 2018, and 2021 we included the prior wave cognition measure in the imputation regressions for each of the follow-up cohorts.

There were two imputation steps. First, the wave-specific demographic variables and self-reported health status to be used as independent variables in the cognition imputation regressions were imputed when necessary. Second, the complete wave-specific demographic variables, self-reported health status and prior-wave cognitive scores, if applicable, were included in the imputation regressions for cognition measures. We imputed separately the missing values at each wave across MHAS 2001, 2003, 2012, 2015, 2018, and 2021. For more detailed information please refer to the flowcharts in Appendix A.

Appendix B includes a series of tables with descriptive statistics of cognition measures for Direct Interviews, before and after imputation by wave. Appendix C includes the final data file contents by wave, listing all the imputed variables, the “Flag” variables, and all the “Derived” constructed items using imputed variables by domain. The “Flag” variable is a categorical variable that indicates for each observation if the value of the corresponding cognition variable was imputed or not.

The IVEware program codes used in the imputation procedure are included in Appendix D.

Proxy Interviews

The MHAS makes every effort to obtain interviews directly with respondents themselves. In cases where the respondent is absent, is in the hospital, or is not healthy enough to attempt or complete the interview, a proxy interview is sought with a knowledgeable informant. Between 6 and 9% of the interviews in the study are completed through proxy respondents. During proxy interviews, the cognitive function of participants is assessed using a shortened version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE). Different from Direct interview, the number of missing information in the items of the IQCODE is signiticantly lower. Despite this, we also imputed missing values for the Proxy Interview using a similar procedure to what was used

for the Direct Interviews. The flowcharts included in Appendix B illustrate the imputation process of cognitive functioning variables for Proxy Interviews only. The imputation process was the same for all waves.

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IV. Appendix A. Flowcharts of Imputation Process – Direct Interviews

Figure 1. Flowchart of Imputation Process in 2001

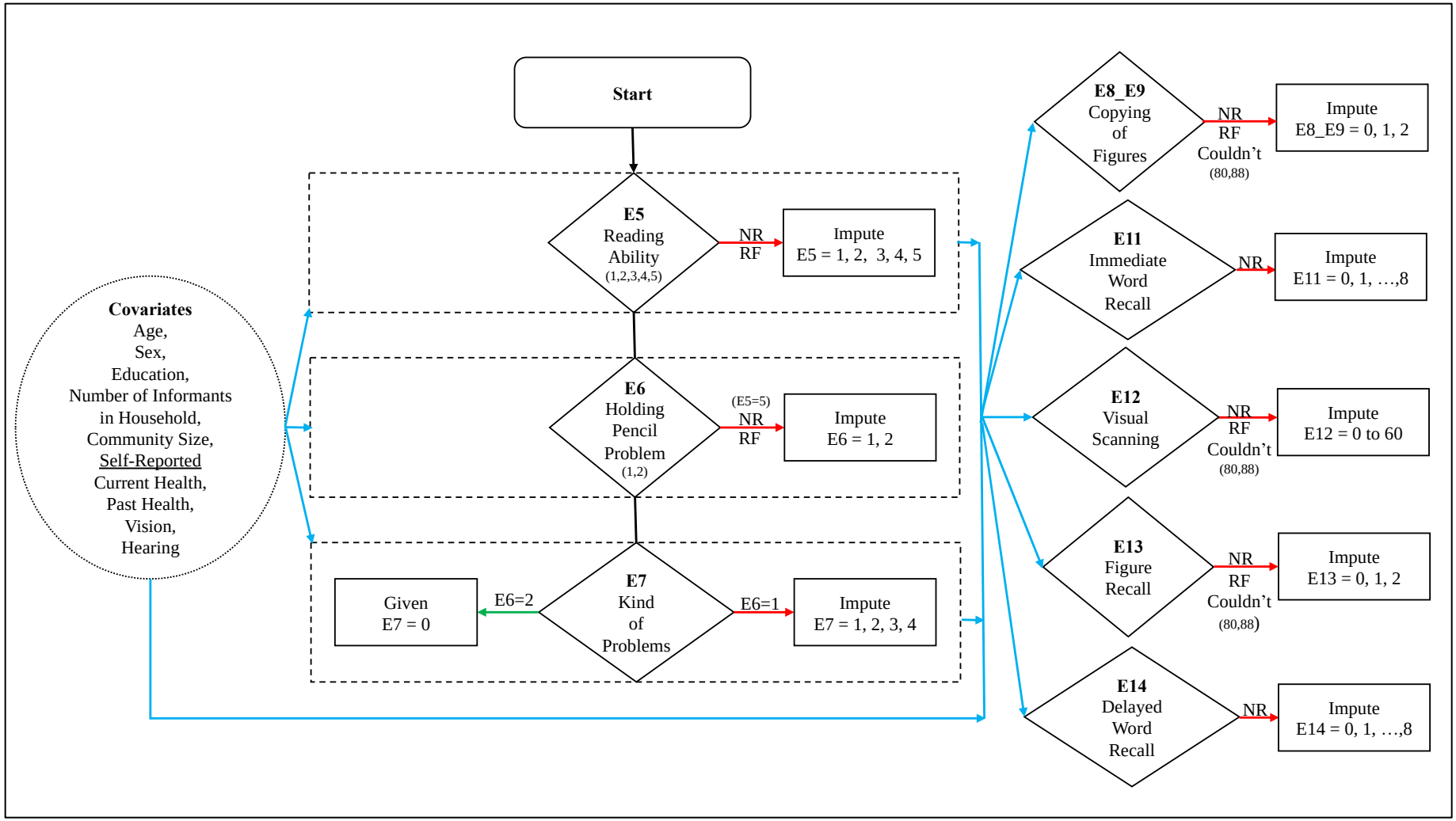


Figure 2. Flowchart of Imputation Process in 2003

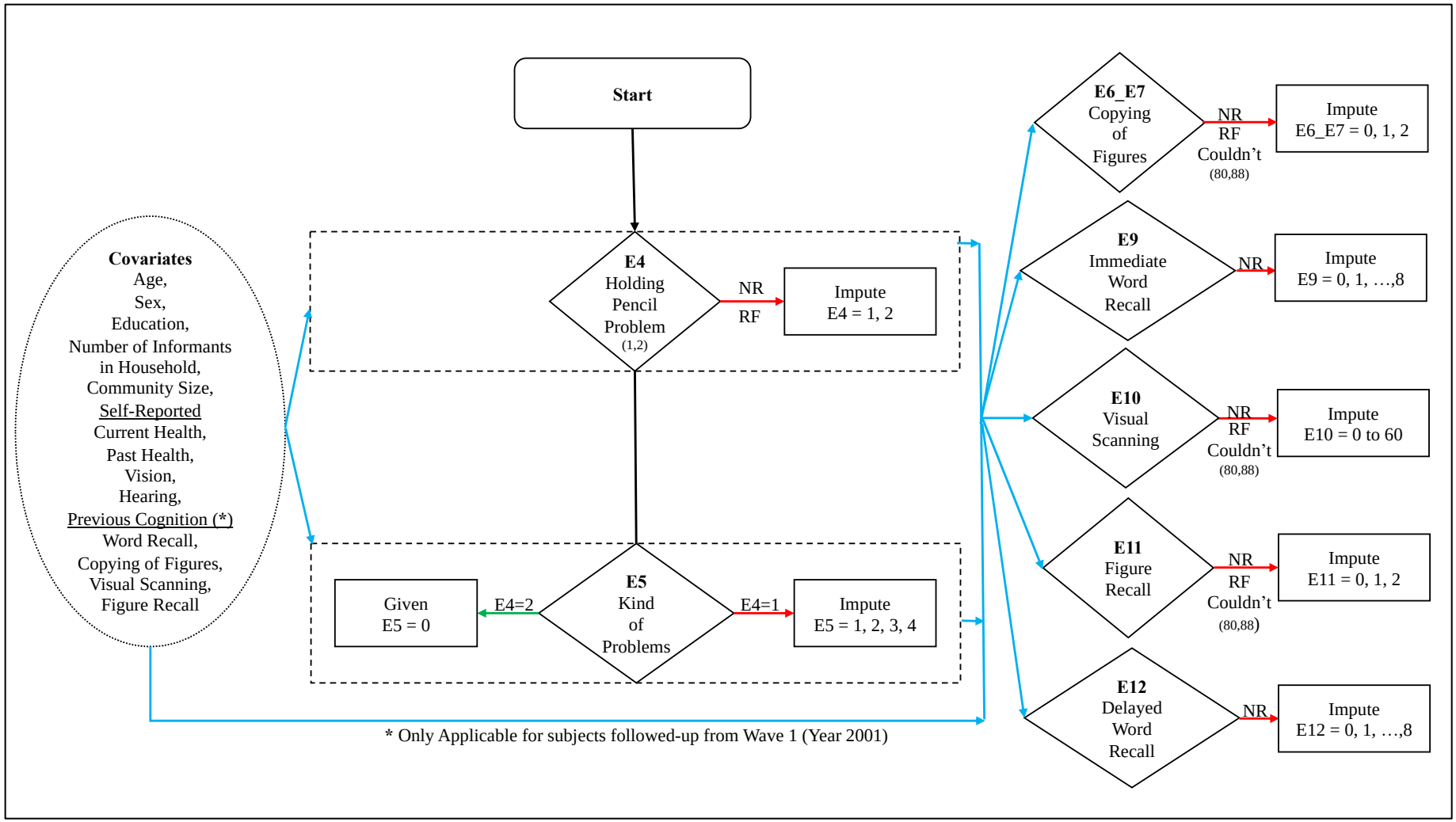


Figure 3. Flowchart of Imputation Process in 2012

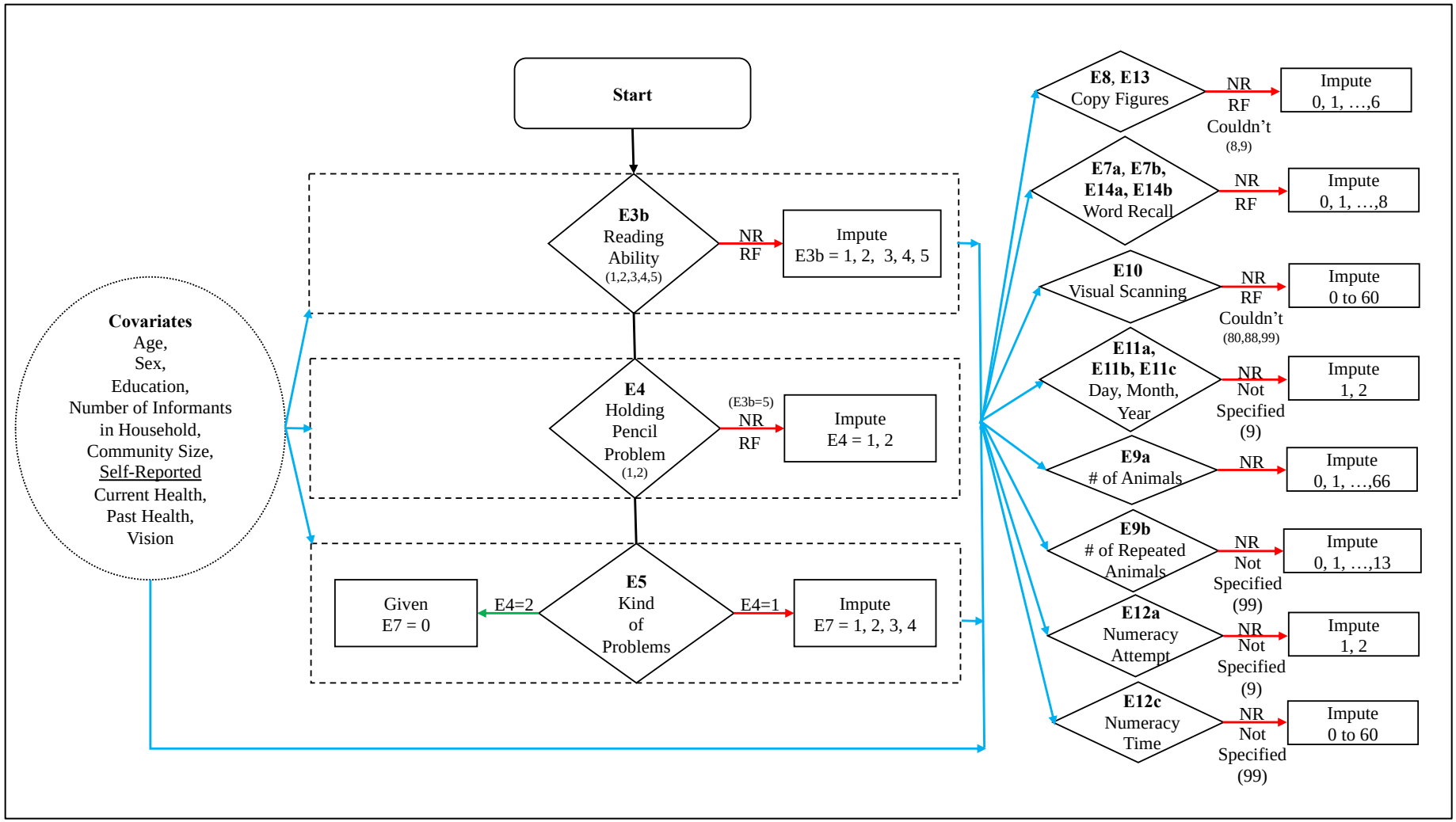


Figure 4. Flowchart of Imputation Process in 2015

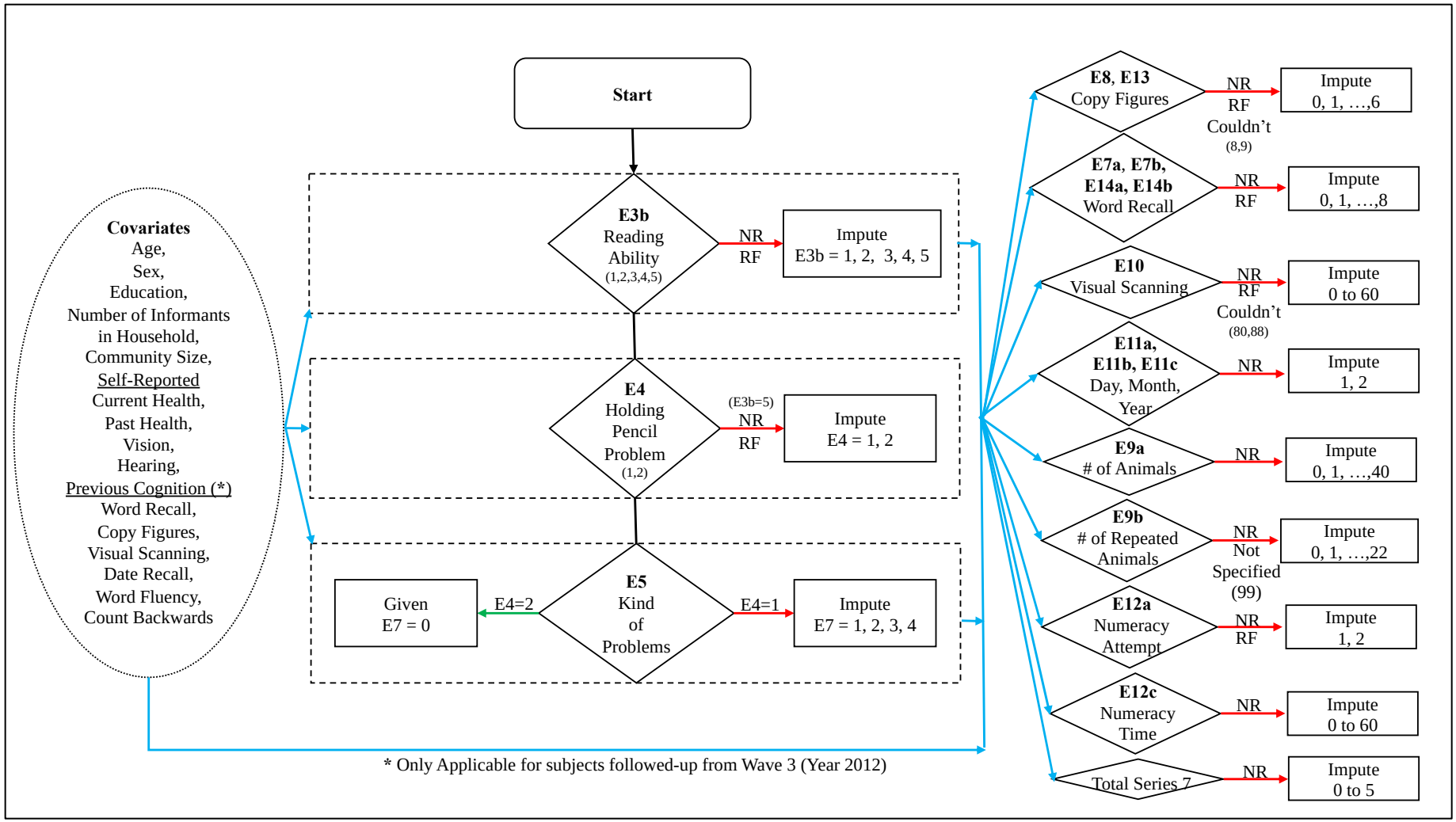


Figure 5. Flowchart of Imputation Process in 2018

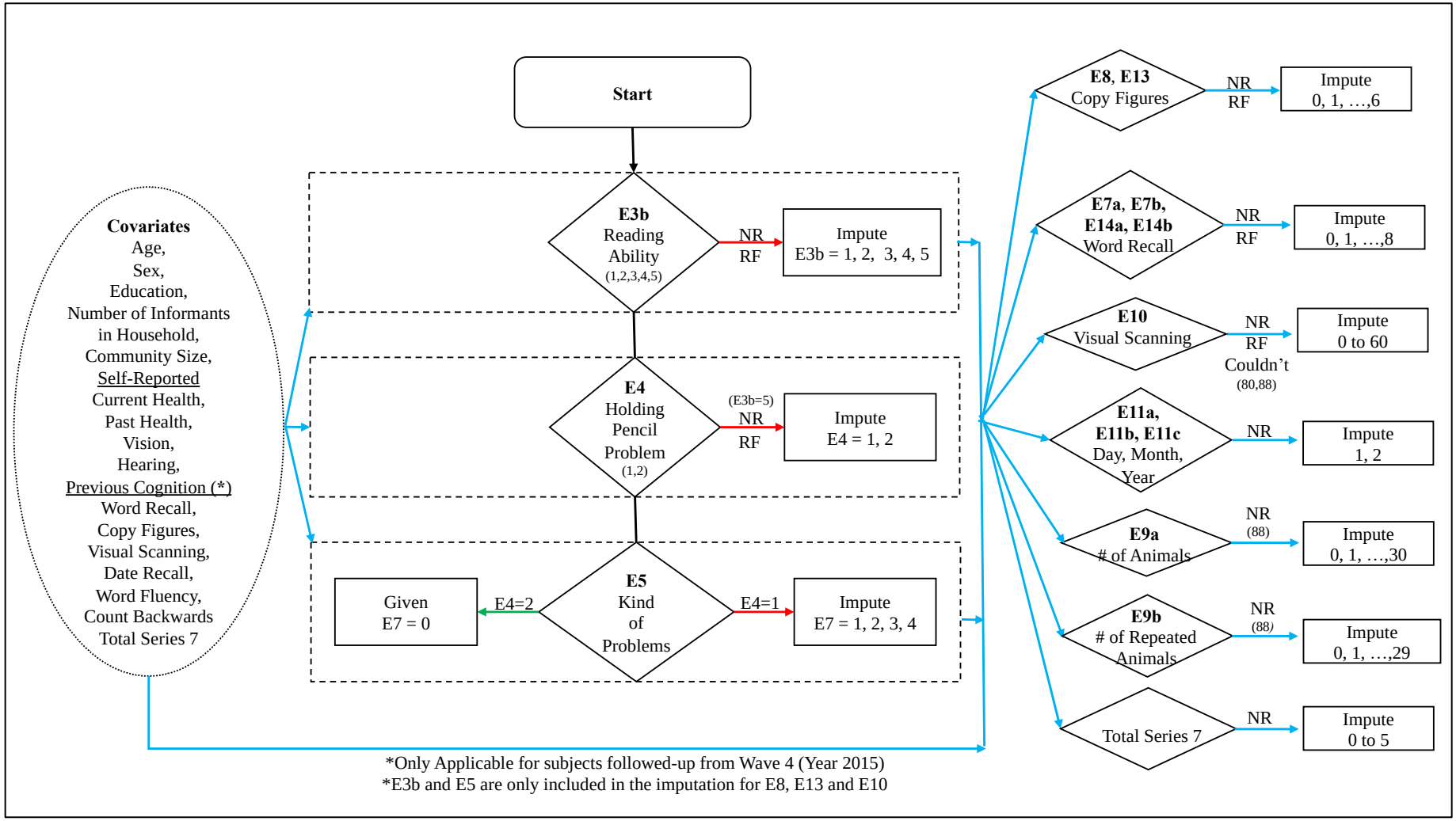
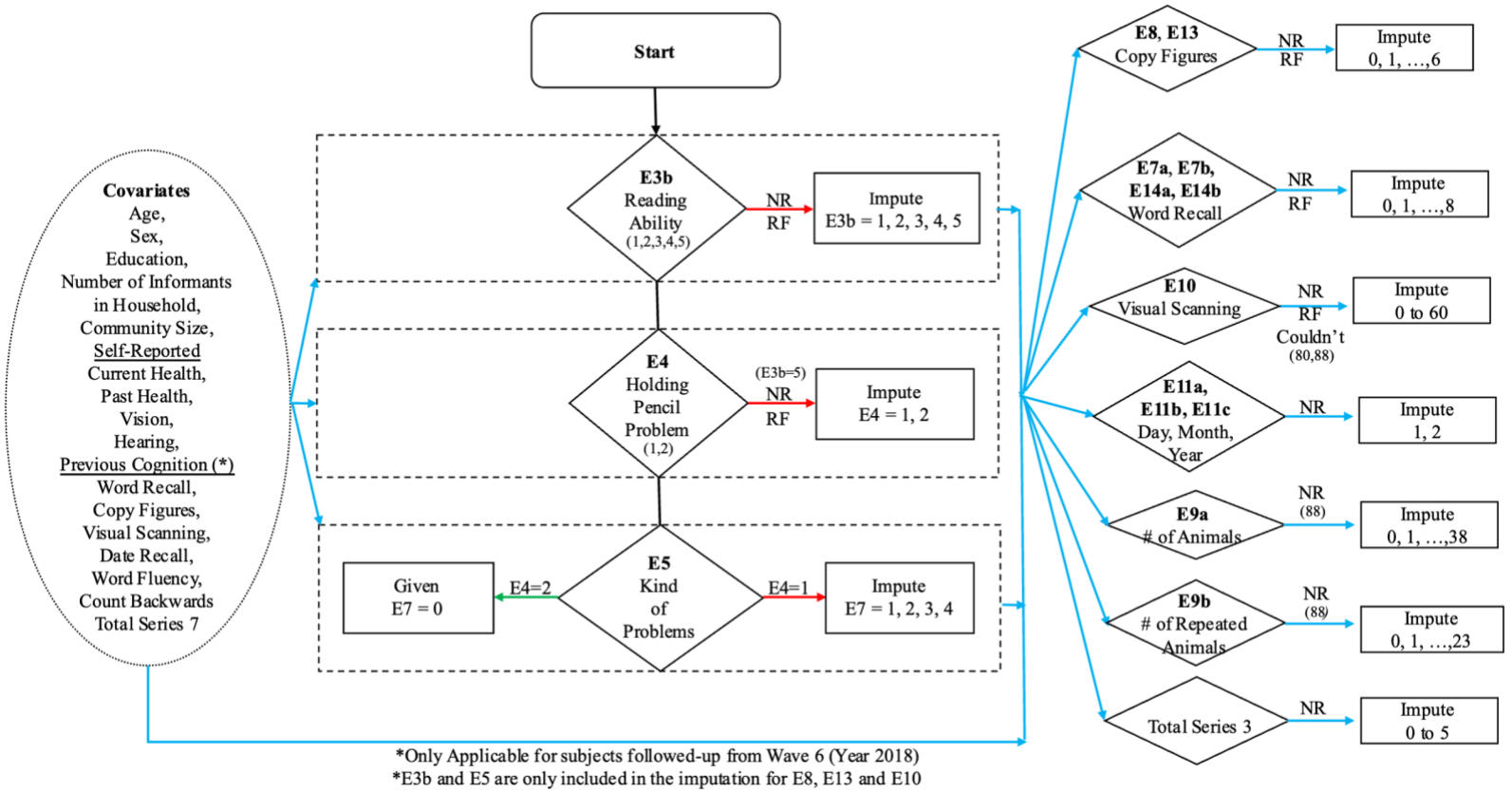
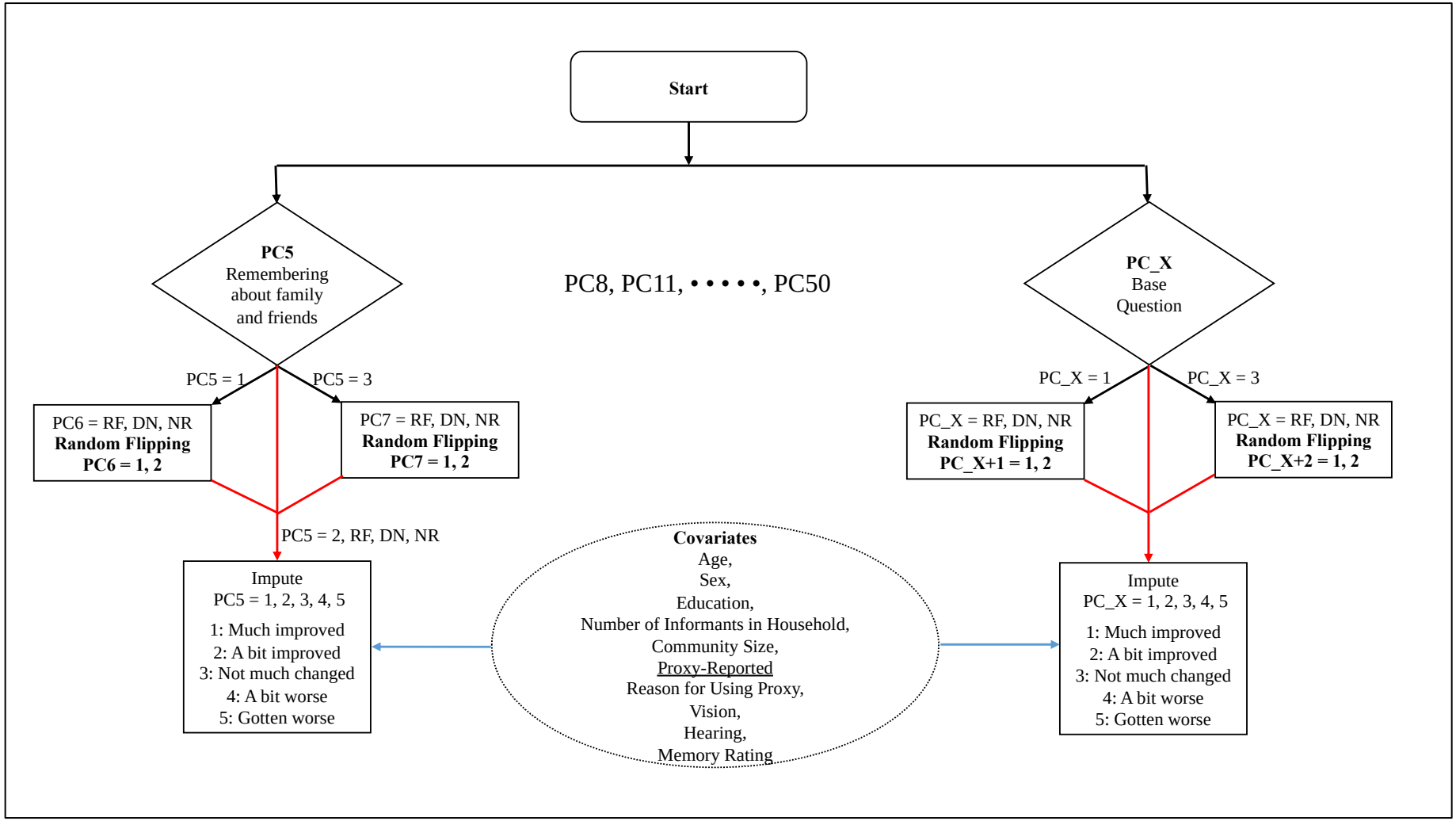


Figure 6. Flowchart of Imputation Process in 2021



V. Appendix B. Flowcharts of Imputation Process – Proxy Interviews

Figure 1. Flowchart of Imputation Process (all waves)



VI. Appendix C. Tables

Table 1. Distribution of Total Number of Words Recalled on List A (Wave 1 – MHAS 2001)

Attempt 1	Non-Imputed Cases (n=7,069)			Imputed Cases (n=282)			Total Cases (n=7,351)		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	91	1.29	1.29	8	2.84	2.84	99	1.35	1.35
1	250	3.54	4.82	26	9.22	12.06	276	3.75	5.10
2	800	11.32	16.14	55	19.5	31.56	855	11.63	16.73
3	1604	22.69	38.83	65	23.05	54.61	1669	22.70	39.44
4	1929	27.29	66.12	50	17.73	72.34	1979	26.92	66.36
5	1502	21.25	87.37	31	10.99	83.33	1533	20.85	87.21
6	710	10.04	97.41	28	9.93	93.26	738	10.04	97.25
7	157	2.22	99.63	14	4.96	98.23	171	2.33	99.58
8	26	0.37	100	5	1.77	100	31	0.42	100
Attempt 2									
0	61	0.86	0.86	4	1.42	1.42	65	0.88	0.88
1	56	0.79	1.66	15	5.32	6.74	71	0.97	1.85
2	211	2.98	4.64	29	10.28	17.02	240	3.26	5.11
3	804	11.37	16.01	43	15.25	32.27	847	11.52	16.64
4	1610	22.78	38.79	61	21.63	53.9	1671	22.73	39.37
5	1926	27.25	66.03	45	15.96	69.86	1971	26.81	66.18
6	1503	21.26	87.30	36	12.77	82.62	1539	20.94	87.12
7	664	9.39	96.69	27	9.57	92.2	691	9.40	96.52
8	234	3.31	100	22	7.80	100	256	3.48	100
Attempt 3									
0	94	1.33	1.33	4	1.42	1.42	98	1.33	1.33
1	46	0.65	1.98	8	2.84	4.26	54	0.73	2.07
2	138	1.95	3.93	24	8.51	12.77	162	2.20	4.27
3	463	6.55	10.48	40	14.18	26.95	503	6.84	11.11
4	1029	14.56	25.04	43	15.25	42.2	1072	14.58	25.70
5	1658	23.45	48.49	62	21.99	64.18	1720	23.4	49.10
6	1810	25.60	74.10	30	10.64	74.82	1840	25.03	74.13
7	1167	16.51	90.61	32	11.35	86.17	1199	16.31	90.44

8	664	9.39	100	39	13.83	100	703	9.56	100

Delayed	**Non-Imputed Cases**			**Imputed Cases**			**Total Cases**		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	257	3.64	3.64	5	1.77	1.77	262	3.56	3.56
1	88	1.24	4.88	10	3.55	5.32	98	1.33	4.90
2	273	3.86	8.74	33	11.70	17.02	306	4.16	9.06
3	609	8.62	17.36	42	14.89	31.91	651	8.86	17.92
4	1115	15.77	33.13	53	18.79	50.71	1168	15.89	33.8
5	1589	22.48	55.61	53	18.79	69.50	1642	22.34	56.14
6	1518	21.47	77.08	34	12.06	81.56	1552	21.11	77.25
7	1011	14.30	91.38	25	8.87	90.43	1036	14.09	91.35
8	609	8.62	100	27	9.57	100	636	8.65	100

Table 2. Distribution of Total Number of Words Recalled on List B (Wave 1 – MHAS 2001)

Attempt 1	Non-Imputed Cases (n=6,325)			Imputed Cases (n=286)			Total Cases (n=6,611)		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	56	0.89	0.89	10	3.50	3.50	66	1.00	1.00
1	188	2.97	3.86	31	10.84	14.34	219	3.31	4.31
2	657	10.39	14.25	40	13.99	28.32	697	10.54	14.85
3	1325	20.95	35.19	62	21.68	50.00	1387	20.98	35.83
4	1776	28.08	63.27	54	18.88	68.88	1830	27.68	63.52
5	1460	23.08	86.36	39	13.64	82.52	1499	22.67	86.19
6	668	10.56	96.92	24	8.39	90.91	692	10.47	96.66
7	168	2.66	99.57	20	6.99	97.9	188	2.84	99.50
8	27	0.43	100	6	2.1	100	33	0.5	100
Attempt 2									
0	36	0.57	0.57	2	0.70	0.70	38	0.57	0.57
1	46	0.73	1.30	14	4.90	5.59	60	0.91	1.48
2	206	3.26	4.55	31	10.84	16.43	237	3.58	5.07
3	609	9.63	14.18	40	13.99	30.42	649	9.82	14.88
4	1378	21.79	35.97	55	19.23	49.65	1433	21.68	36.56
5	1855	29.33	65.3	44	15.38	65.03	1899	28.72	65.29
6	1423	22.50	87.79	44	15.38	80.42	1467	22.19	87.48
7	599	9.47	97.26	27	9.44	89.86	626	9.47	96.94
8	173	2.74	100	29	10.14	100	202	3.06	100
Attempt 3									
0	77	1.22	1.22	1	0.35	0.35	78	1.18	1.18
1	24	0.38	1.60	11	3.85	4.20	35	0.53	1.71
2	116	1.83	3.43	20	6.99	11.19	136	2.06	3.77
3	340	5.38	8.81	34	11.89	23.08	374	5.66	9.42
4	863	13.64	22.45	43	15.03	38.11	906	13.70	23.13
5	1484	23.46	45.91	48	16.78	54.90	1532	23.17	46.30
6	1735	27.43	73.34	48	16.78	71.68	1783	26.97	73.27
7	1081	17.09	90.43	41	14.34	86.01	1122	16.97	90.24
8	605	9.57	100	40	13.99	100	645	9.76	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	190	3.00	3.00	2	0.70	0.70	192	2.90	2.90
1	75	1.19	4.19	14	4.90	5.59	89	1.35	4.25
2	219	3.46	7.65	28	9.79	15.38	247	3.74	7.99
3	490	7.75	15.40	35	12.24	27.62	525	7.94	15.93
4	871	13.77	29.17	49	17.13	44.76	920	13.92	29.84
5	1454	22.99	52.16	49	17.13	61.89	1503	22.73	52.58
6	1444	22.83	74.99	44	15.38	77.27	1488	22.51	75.09
7	1011	15.98	90.97	32	11.19	88.46	1043	15.78	90.86
8	571	9.03	100	33	11.54	100	604	9.14	100

Table 3. Summary Descriptive Statistics (Wave 1 – MHAS 2001)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	7069	3.884	1.437	282	3.518	1.820	7351	3.870	1.455	0-8
List A – Attempt 2	7069	4.880	1.472	282	4.440	1.967	7351	4.863	1.496	0-8
List A – Attempt 3	7069	5.440	1.609	282	4.872	2.024	7351	5.419	1.630	0-8
List B – Attempt 1	6325	3.997	1.412	286	3.636	1.905	6611	3.981	1.439	0-8
List B – Attempt 2	6325	4.931	1.414	286	4.619	2.000	6611	4.917	1.446	0-8
List B – Attempt 3	6325	5.528	1.556	286	5.105	1.990	6611	5.510	1.580	0-8
Overall – Attempt 1	13394	3.937	1.426	282	3.518	1.820	13962	3.923	1.448	0-8
Overall – Attempt 2	13394	4.904	1.445	282	4.440	1.967	13962	4.889	1.473	0-8
Overall – Attempt 3	13394	5.482	1.585	282	4.872	2.024	13962	5.462	1.607	0-8
Delayed Word Recall										
List A	7069	5.082	1.875	282	4.518	1.991	7351	5.060	1.882	0-8
List B	6325	5.225	1.825	286	4.783	2.027	6611	5.206	1.836	0-8
Overall	13394	5.149	1.853	282	4.518	1.991	13962	5.129	1.862	0-8
Copying of Figures	12597	1.649	0.646	573	1.204	0. .874	13962	1.552	0.734	0,1,2
Figure Recall	12486	0.781	0.818	735	0.522	0.754	13962	0.729	0.813	0,1,2
Visual Scanning	12647	26.359	15.411	1315	9.444	12.178	13962	24.766	15.922	0-60

Table 4. Distribution of Total Number of Words Recalled on List A (Wave 2 – MHAS 2003)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative %	Frequency	Percent	Cumulative %	Frequency	Percent	Cumulative %
Attempt 1									
0	226	3.48	3.48	11	5.91	5.91	237	3.54	3.54
1	377	5.80	9.27	28	15.05	20.97	405	6.05	9.60
2	1048	16.12	25.39	34	18.28	39.25	1082	16.18	25.77
3	1577	24.25	49.64	37	19.89	59.14	1614	24.13	49.9
4	1624	24.97	74.61	27	14.52	73.66	1651	24.68	74.59
5	1050	16.15	90.76	21	11.29	84.95	1071	16.01	90.60
6	469	7.21	97.97	15	8.06	93.01	484	7.24	97.83
7	116	1.78	99.75	8	4.30	97.31	124	1.85	99.69
8	16	0.25	100	5	2.69	100	21	0.31	100
Attempt 2									
0	94	1.45	1.45	5	2.69	2.69	99	1.48	1.48
1	110	1.69	3.14	12	6.45	9.14	122	1.82	3.30
2	374	5.75	8.89	22	11.83	20.97	396	5.92	9.22
3	897	13.79	22.68	24	12.90	33.87	921	13.77	22.99
4	1347	20.71	43.40	35	18.82	52.69	1382	20.66	43.65
5	1496	23.00	66.40	25	13.44	66.13	1521	22.74	66.39
6	1212	18.64	85.04	26	13.98	80.11	1238	18.51	84.90
7	656	10.09	95.13	17	9.14	89.25	673	10.06	94.96
8	317	4.87	100	20	10.75	100	337	5.04	100
Attempt 3									
0	139	2.14	2.14	3	1.60	1.60	142	2.12	2.12
1	68	1.05	3.18	9	4.81	6.42	77	1.15	3.27
2	236	3.63	6.81	17	9.09	15.51	253	3.78	7.06
3	508	7.81	14.63	17	9.09	24.6	525	7.85	14.91
4	854	13.13	27.76	28	14.97	39.57	882	13.19	28.09
5	1221	18.78	46.54	22	11.76	51.34	1243	18.58	46.67
6	1430	21.99	68.53	36	19.25	70.59	1466	21.92	68.59
7	1212	18.64	87.17	26	13.90	84.49	1238	18.51	87.1
8	834	12.83	100	29	15.51	100	863	12.9	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	263	4.04	4.04	7	3.74	3.74	270	4.04	4.04
1	130	2.00	6.04	16	8.56	12.30	146	2.18	6.22
2	356	5.48	11.52	19	10.16	22.46	375	5.61	11.83
3	828	12.73	24.25	27	14.44	36.90	855	12.78	24.61
4	1348	20.73	44.99	30	16.04	52.94	1378	20.60	45.21
5	1530	23.53	68.52	30	16.04	68.98	1560	23.32	68.53
6	1118	17.19	85.71	31	16.58	85.56	1149	17.18	85.71
7	622	9.57	95.28	10	5.35	90.91	632	9.45	95.16
8	307	4.72	100	17	9.09	100	324	4.84	100

Table 5. Distribution of Total Number of Words Recalled on List B (Wave 2 – MHAS 2003)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	274	4.87	4.87	10	5.56	5.56	284	4.89	4.89
1	468	8.32	13.19	34	18.89	24.44	502	8.65	13.54
2	1105	19.64	32.83	39	21.67	46.11	1144	19.70	33.24
3	1560	27.73	60.56	38	21.11	67.22	1598	27.52	60.76
4	1260	22.4	82.95	31	17.22	84.44	1291	22.24	83.00
5	653	11.61	94.56	16	8.89	93.33	669	11.52	94.52
6	259	4.60	99.16	5	2.78	96.11	264	4.55	99.07
7	41	0.73	99.89	3	1.67	97.78	44	0.76	99.83
8	6	0.11	100	4	2.22	100	10	0.17	100
Attempt 2									
0	113	2.01	2.01	5	2.78	2.78	118	2.03	2.03
1	135	2.40	4.41	7	3.89	6.67	142	2.45	4.48
2	400	7.11	11.52	32	17.78	24.44	432	7.44	11.92
3	1031	18.33	29.84	28	15.56	40.00	1059	18.24	30.16
4	1328	23.60	53.45	40	22.22	62.22	1368	23.56	53.72
5	1224	21.76	75.20	31	17.22	79.44	1255	21.62	75.34
6	837	14.88	90.08	16	8.89	88.33	853	14.69	90.03
7	434	7.71	97.80	13	7.22	95.56	447	7.70	97.73
8	124	2.20	100	8	4.44	100	132	2.27	100
Attempt 3									
0	131	2.33	2.33	3	1.67	1.67	134	2.31	2.31
1	101	1.80	4.12	7	3.89	5.56	108	1.86	4.17
2	246	4.37	8.50	22	12.22	17.78	268	4.62	8.78
3	609	10.82	19.32	25	13.89	31.67	634	10.92	19.7
4	951	16.90	36.22	33	18.33	50.00	984	16.95	36.65
5	1114	19.80	56.03	30	16.67	66.67	1144	19.70	56.36
6	1133	20.14	76.16	25	13.89	80.56	1158	19.94	76.30
7	841	14.95	91.11	15	8.33	88.89	856	14.74	91.04
8	500	8.89	100	20	11.11	100	520	8.96	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	269	4.78	4.78	7	3.89	3.89	276	4.75	4.75
1	274	4.87	9.65	17	9.44	13.33	291	5.01	9.77
2	592	10.52	20.17	33	18.33	31.67	625	10.76	20.53
3	1051	18.68	38.86	37	20.56	52.22	1088	18.74	39.27
4	1181	20.99	59.85	37	20.56	72.78	1218	20.98	60.25
5	1042	18.52	78.37	17	9.44	82.22	1059	18.24	78.49
6	704	12.51	90.88	15	8.33	90.56	719	12.38	90.87
7	348	6.19	97.07	11	6.11	96.67	359	6.18	97.05
8	165	2.93	100	6	3.33	100	171	2.95	100

Table 9. Distribution of Identified Day/Month/Year and Attempt at Numeracy (Wave 3 – MHAS 2012)

Day	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	9059	72.52	72.52	2	50.00	50.00	10810	74.82	74.82
2	3432	27.48	100	2	50.00	100	3638	25.18	100
Month									
1	11260	90.14	90.14	4	100.00	100.00	13189	91.29	91.29
2	1231	9.86	100	0	0.00	100	1259	8.71	100
Year									
1	10230	81.90	82.13	253	74.41	74.41	11840	81.95	81.95
2	2521	17.87	100	87	25.59	100	2608	18.05	100

Table 6. Summary Descriptive Statistics (Wave 2 – MHAS 2003)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	6503	3.491	1.535	186	3.258	1.989	6689	3.485	1.550	0-8
List A – Attempt 2	6503	4.739	1.694	186	4.452	2.161	6689	4.731	1.709	0-8
List A – Attempt 3	6502	5.432	1.846	187	5.059	2.161	6689	5.422	1.856	0-8
List B – Attempt 1	5626	3.120	1.483	180	2.850	1.751	5806	3.111	1.493	0-8
List B – Attempt 2	5626	4.357	1.655	180	4.006	1.889	5806	4.346	1.663	0-8
List B – Attempt 3	5626	5.062	1.860	180	4.572	2.047	5806	5.047	1.868	0-8
Overall – Attempt 1	12129	3.319	1.522	366	3.057	1.884	12495	3.311	1.535	0-8
Overall – Attempt 2	12129	4.562	1.687	366	4.232	2.042	12495	4.552	1.699	0-8
Overall – Attempt 3	12128	5.261	1.862	367	4.820	2.117	12495	5.248	1.871	0-8
Delayed Word Recall										
List A	6502	4.596	1.832	187	4.262	2.153	6689	4.587	1.843	0-8
List B	5626	4.004	1.877	180	3.567	1.938	5806	3.990	1.880	0-8
Overall	12128	4.321	1.877	367	3.921	2.077	12495	4.310	1.884	0-8
Copying of Figures	10922	1.663	0.618	1573	1.353	0.780	12495	1.624	0.649	0,1,2
Figure Recall	10789	0.789	0.814	1706	0.541	0.759	12495	0.755	0.811	0,1,2
Visual Scanning	11583	25.178	15.794	912	11.395	12.544	12495	24.172	15.986	0-60

Table 7. Distribution of Total Number of Words Recalled on List A (Wave 3 – MHAS 2012)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	95	1.25	1.25	5	2.49	2.49	100	1.28	1.28
1	278	3.64	4.89	36	17.91	20.40	314	4.01	5.29
2	833	10.92	15.81	41	20.4	40.80	874	11.16	16.45
3	1739	22.8	38.61	49	24.38	65.17	1788	22.84	39.29
4	2081	27.28	65.89	26	12.94	78.11	2107	26.91	66.2
5	1646	21.58	87.47	16	7.96	86.07	1662	21.23	87.43
6	762	9.99	97.46	16	7.96	94.03	778	9.94	97.37
7	168	2.20	99.66	8	3.98	98.01	176	2.25	99.62
8	26	0.34	100	4	1.99	100	30	0.38	100
Attempt 2									
0	76	1.00	1.00	4	1.97	1.97	80	1.02	1.02
1	65	0.85	1.85	14	6.90	8.87	79	1.01	2.03
2	227	2.98	4.83	23	11.33	20.20	250	3.19	5.22
3	806	10.57	15.39	37	18.23	38.42	843	10.77	15.99
4	1651	21.65	37.04	43	21.18	59.61	1694	21.64	37.63
5	2076	27.22	64.27	28	13.79	73.40	2104	26.87	64.5
6	1679	22.02	86.28	20	9.85	83.25	1699	21.70	86.21
7	814	10.67	96.96	16	7.88	91.13	830	10.60	96.81
8	232	3.04	100	18	8.87	100	250	3.19	100
Attempt 3									
0	98	1.29	1.29	1	0.49	0.49	99	1.26	1.26
1	59	0.77	2.06	12	5.83	6.31	71	0.91	2.17
2	172	2.26	4.32	19	9.22	15.53	191	2.44	4.61
3	492	6.45	10.77	28	13.59	29.13	520	6.64	11.25
4	1052	13.8	24.57	46	22.33	51.46	1098	14.02	25.28
5	1793	23.52	48.09	27	13.11	64.56	1820	23.25	48.52
6	1998	26.21	74.30	26	12.62	77.18	2024	25.85	74.38
7	1352	17.74	92.04	19	9.22	86.41	1371	17.51	91.89
8	607	7.96	100	28	13.59	100	635	8.11	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	547	7.21	7.21	4	1.63	1.63	551	7.04	7.04
1	264	3.48	10.69	30	12.20	13.82	294	3.76	10.79
2	482	6.36	17.05	32	13.01	26.83	514	6.57	17.36
3	872	11.50	28.55	46	18.70	45.53	918	11.73	29.08
4	1403	18.50	47.05	48	19.51	65.04	1451	18.53	47.62
5	1587	20.93	67.98	39	15.85	80.89	1626	20.77	68.39
6	1299	17.13	85.11	17	6.91	87.80	1316	16.81	85.20
7	794	10.47	95.58	16	6.50	94.31	810	10.35	95.54
8	335	4.42	100	14	5.69	100	349	4.46	100

Table 8. Distribution of Total Number of Words Recalled on List B (Wave 3 – MHAS 2012)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 2									
0	69	1.07	1.07	8	4.02	4.02	77	1.16	1.16
1	192	2.99	4.07	29	14.57	18.59	221	3.34	4.50
2	586	9.13	13.19	28	14.07	32.66	614	9.28	13.78
3	1319	20.55	33.74	43	21.61	54.27	1362	20.58	34.36
4	1799	28.02	61.76	39	19.60	73.87	1838	27.77	62.12
5	1548	24.11	85.87	27	13.57	87.44	1575	23.80	85.92
6	705	10.98	96.85	11	5.53	92.96	716	10.82	96.74
7	180	2.80	99.66	6	3.02	95.98	186	2.81	99.55
8	22	0.34	100	8	4.02	100	30	0.45	100
Attempt 2									
0	37	0.58	0.58	3	1.47	1.47	40	0.60	0.60
1	48	0.75	1.33	10	4.90	6.37	58	0.88	1.48
2	170	2.65	3.98	26	12.75	19.12	196	2.96	4.44
3	575	8.96	12.94	36	17.65	36.76	611	9.23	13.67
4	1426	22.23	35.17	38	18.63	55.39	1464	22.12	35.79
5	1875	29.23	64.40	39	19.12	74.51	1914	28.92	64.71
6	1467	22.87	87.26	16	7.84	82.35	1483	22.41	87.11
7	644	10.04	97.30	20	9.80	92.16	664	10.03	97.14
8	173	2.7	100	16	7.84	100	189	2.86	100
Attempt 3									
0	66	1.03	1.03	1	0.48	0.48	67	1.01	1.01
1	46	0.72	1.75	7	3.37	3.85	53	0.80	1.81
2	128	2.00	3.74	24	11.54	15.38	152	2.30	4.11
3	340	5.30	9.05	31	14.90	30.29	371	5.61	9.71
4	786	12.26	21.31	36	17.31	47.60	822	12.42	22.13
5	1536	23.96	45.27	44	21.15	68.75	1580	23.87	46.00
6	1815	28.31	73.58	16	7.69	76.44	1831	27.66	73.67
7	1126	17.56	91.14	21	10.10	86.54	1147	17.33	91.00
8	568	8.86	100	28	13.46	100	596	9.00	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	444	6.94	6.94	3	1.35	1.35	447	6.75	6.75
1	198	3.10	10.04	22	9.91	11.26	220	3.32	10.08
2	376	5.88	15.91	35	15.77	27.03	411	6.21	16.29
3	689	10.77	26.68	43	19.37	46.40	732	11.06	27.35
4	1106	17.29	43.97	44	19.82	66.22	1150	17.37	44.72
5	1369	21.40	65.37	30	13.51	79.73	1399	21.14	65.86
6	1230	19.23	84.60	17	7.66	87.39	1247	18.84	84.70
7	689	10.77	95.37	12	5.41	92.79	701	10.59	95.29
8	296	4.63	100	16	7.21	100	312	4.71	100

Table 9. Distribution of Identified Day/Month/Year and Attempt at Numeracy (Wave 3 – MHAS 2012)

Day	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	10575	74.91	74.91	235	71.00	71.00	10810	74.82	74.82
2	3542	25.09	100	96	29.00	100	3638	25.18	100
Month									
1	12901	91.39	91.39	288	86.75	86.75	13189	91.29	91.29
2	1215	8.61	100	44	13.25	100	1259	8.71	100
Year									
1	11587	82.13	82.13	253	74.41	74.41	11840	81.95	81.95
2	2521	17.87	100	87	25.59	100	2608	18.05	100
Attempt at Numeracy									
1	12250	91.13	91.13	801	79.7	79.7	13051	90.33	90.33
2	1193	8.87	100	204	20.3	100	1397	9.67	100

Table 10. Summary Descriptive Statistics (Wave 3 – MHAS 2012)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	7628	3.890	1.431	201	3.149	1.854	7829	3.871	1.448	0-8
List A – Attempt 2	7626	4.924	1.486	203	4.232	2.049	7829	4.906	1.507	0-8
List A – Attempt 3	7623	5.426	1.597	206	4.689	2.072	7829	5.406	1.616	0-8
List B – Attempt 1	6420	4.038	1.414	199	3.402	1.915	6619	4.019	1.435	0-8
List B – Attempt 2	6415	4.971	1.398	204	4.319	1.981	6619	4.950	1.424	0-8
List B – Attempt 3	6411	5.531	1.545	208	4.707	2.023	6619	5.506	1.569	0-8
Overall – Attempt 1	14048	3.957	1.425	400	3.275	1.8863	14448	3.939	1.444	0-8
Overall – Attempt 2	14041	4.945	1.447	407	4.275	2.013	14448	4.926	1.470	0-8
Overall – Attempt 3	14034	5.473	1.575	414	4.698	2.045	14448	5.451	1.595	0-8
Delayed Word Recall										
List A	7583	4.408	2.053	246	3.841	1.997	7829	4.390	2.054	0-8
List B	6397	4.511	2.041	222	3.878	2.004	6619	4.490	2.042	0-8
Overall	13980	4.454	2.048	468	3.859	1.998	14448	4.436	2.049	0-8
Copying of Figures	13116	1.083	0.276	1332	1.233	0.423	14448	5.440	1.170	0,1,2
Figure Recall	12938	4.815	1.632	1510	3.864	1.739	14448	4.716	1.669	0,1,2
Visual Scanning	13078	29.106	15.504	1370	19.798	10.803	14448	28.223	15.365	0-60
Number of Different Animals	14020	15.071	5.163	428	14.196	4.785	14448	15.045	5.154	0-66
Number of Repetitions (Animals)	13977	0.871	1.255	471	1.028	1.018	14448	0.876	1.248	0-13
Time for Numeracy (seconds)	13424	13.264	13.066	1024	19.787	10.869	14448	13.726	13.030	0-60

Table 11. Distribution of Total Number of Words Recalled on List A (Wave 4 – MHAS 2015)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	97	1.37	1.37	3	4.69	4.69	100	1.40	1.40
1	298	4.22	5.60	8	12.50	17.19	306	4.30	5.70
2	758	10.74	16.34	13	20.31	37.50	771	10.83	16.53
3	1551	21.98	38.31	9	14.06	51.56	1560	21.9	38.43
4	1969	27.90	66.21	13	20.31	71.88	1982	27.83	66.26
5	1520	21.54	87.74	8	12.50	84.38	1528	21.45	87.71
6	686	9.72	97.46	6	9.38	93.75	692	9.72	97.43
7	157	2.22	99.69	1	1.56	95.31	158	2.22	99.65
8	22	0.31	100	3	4.69	100	25	0.35	100
Attempt 2									
0	54	0.76	0.76	1	1.59	1.59	55	0.77	0.77
1	68	0.96	1.73	2	3.17	4.76	70	0.98	1.76
2	201	2.85	4.58	7	11.11	15.87	208	2.92	4.68
3	767	10.87	15.44	15	23.81	39.68	782	10.98	15.66
4	1605	22.74	38.18	11	17.46	57.14	1616	22.69	38.35
5	1858	26.32	64.50	15	23.81	80.95	1873	26.3	64.64
6	1591	22.54	87.04	4	6.35	87.30	1595	22.4	87.04
7	730	10.34	97.38	4	6.35	93.65	734	10.31	97.35
8	185	2.62	100	4	6.35	100	189	2.65	100
Attempt 3									
0	72	1.02	1.02	1	1.56	1.56	73	1.02	1.02
1	58	0.82	1.84	1	1.56	3.13	59	0.83	1.85
2	143	2.03	3.87	5	7.81	10.94	148	2.08	3.93
3	481	6.81	10.68	14	21.88	32.81	495	6.95	10.88
4	1136	16.10	26.78	6	9.38	42.19	1142	16.03	26.92
5	1608	22.78	49.56	13	20.31	62.50	1621	22.76	49.68
6	1833	25.97	75.53	7	10.94	73.44	1840	25.84	75.51
7	1231	17.44	92.97	6	9.38	82.81	1237	17.37	92.88
8	496	7.03	100	11	17.19	100	507	7.12	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	683	9.7	9.7	2	2.56	2.56	685	9.62	9.62
1	323	4.59	14.28	11	14.1	16.67	334	4.69	14.31
2	556	7.89	22.17	18	23.08	39.74	574	8.06	22.37
3	790	11.22	33.39	14	17.95	57.69	804	11.29	33.66
4	1243	17.65	51.04	11	14.1	71.79	1254	17.61	51.26
5	1433	20.34	71.38	8	10.26	82.05	1441	20.23	71.5
6	1104	15.67	87.05	8	10.26	92.31	1112	15.61	87.11
7	657	9.33	96.38	1	1.28	93.59	658	9.24	96.35
8	255	3.62	100	5	6.41	100	260	3.65	100

Table 12. Distribution of Total Number of Words Recalled on List B (Wave 4 – MHAS 2015)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	61	0.91	0.91	1	1.64	1.64	62	0.92	0.92
1	216	3.24	4.15	8	13.11	14.75	224	3.33	4.25
2	641	9.61	13.77	11	18.03	32.79	652	9.69	13.94
3	1331	19.96	33.73	14	22.95	55.74	1345	19.99	33.93
4	1811	27.16	60.9	7	11.48	67.21	1818	27.02	60.95
5	1659	24.88	85.78	10	16.39	83.61	1669	24.81	85.76
6	744	11.16	96.94	6	9.84	93.44	750	11.15	96.91
7	177	2.65	99.6	3	4.92	98.36	180	2.68	99.58
8	27	0.4	100	1	1.64	100	28	0.42	100
Attempt 2									
0	42	0.63	0.63	1	1.61	1.61	43	0.64	0.64
1	48	0.72	1.35	2	3.23	4.84	50	0.74	1.38
2	186	2.79	4.14	6	9.68	14.52	192	2.85	4.24
3	636	9.54	13.68	12	19.35	33.87	648	9.63	13.87
4	1405	21.08	34.76	15	24.19	58.06	1420	21.11	34.97
5	1987	29.81	64.57	7	11.29	69.35	1994	29.64	64.61
6	1562	23.43	88	6	9.68	79.03	1568	23.31	87.92
7	660	9.9	97.9	6	9.68	88.71	666	9.9	97.82
8	140	2.1	100	7	11.29	100	147	2.18	100
Attempt 3									
0	61	0.92	0.92	0	0.00	0.00	61	0.91	0.91
1	60	0.9	1.82	3	4.84	4.84	63	0.94	1.84
2	125	1.88	3.69	7	11.29	16.13	132	1.96	3.8
3	373	5.6	9.29	9	14.52	30.65	382	5.68	9.48
4	948	14.22	23.51	10	16.13	46.77	958	14.24	23.72
5	1521	22.82	46.32	10	16.13	62.9	1531	22.76	46.48
6	1884	28.26	74.59	4	6.45	69.35	1888	28.06	74.54
7	1242	18.63	93.22	4	6.45	75.81	1246	18.52	93.06
8	452	6.78	100	15	24.19	100	467	6.94	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	606	9.1	9.1	3	4.29	4.29	609	9.05	9.05
1	284	4.27	13.37	12	17.14	21.43	296	4.4	13.45
2	458	6.88	20.25	12	17.14	38.57	470	6.99	20.44
3	749	11.25	31.5	11	15.71	54.29	760	11.3	31.73
4	1131	16.99	48.48	8	11.43	65.71	1139	16.93	48.66
5	1351	20.29	68.77	7	10	75.71	1358	20.18	68.85
6	1202	18.05	86.83	8	11.43	87.14	1210	17.98	86.83
7	646	9.7	96.53	4	5.71	92.86	650	9.66	96.49
8	231	3.47	100	5	7.14	100	236	3.51	100

Table 13. Distribution of Identified Day/Month/Year and Attempt at Numeracy (Wave 4 – MHAS 2015)

Day	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	9948	72.26	72.26	57	68.67	68.67	10005	72.24	72.24
2	3819	27.74	100	26	31.33	100	3845	27.76	100
Month									
1	12482	90.67	90.67	77	92.77	92.77	12559	90.68	90.68
2	1285	9.33	100	6	7.23	100	1291	9.32	100
Year									
1	11132	80.86	80.86	66	79.52	79.52	11198	80.85	80.85
2	2635	19.14	100	17	20.48	100	2652	19.15	100
Attempt at Numeracy									
1	11782	89.54	89.54	421	60.84	60.84	12203	88.11	88.11
2	1376	10.46	100	271	39.16	100	1647	11.89	100

Table 14. Summary Descriptive Statistics (Wave 4 – MHAS 2015)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	7058	3.873	1.445	64	3.438	1.991	7122	3.869	1.451	0-8
List A – Attempt 2	7059	4.904	1.459	63	4.190	1.822	7122	4.898	1.464	0-8
List A – Attempt 3	7058	5.377	1.565	64	4.906	2.099	7122	5.373	1.571	0-8
List B – Attempt 1	6667	4.042	1.421	61	3.525	1.867	6728	4.037	1.426	0-8
List B – Attempt 2	6666	4.950	1.390	62	4.500	2.031	6728	4.946	1.398	0-8
List B – Attempt 3	6666	5.467	1.526	62	4.935	2.261	6728	5.462	1.535	0-8
Overall – Attempt 1	13725	3.955	1.436	125	3.480	1.924	13850	3.951	1.442	0-8
Overall – Attempt 2	13725	4.926	1.426	125	4.344	1.926	13850	4.920	1.432	0-8
Overall – Attempt 3	13724	5.421	1.547	126	4.921	2.171	13850	5.416	1.554	0-8
Delayed Word Recall										
List A	7044	4.146	2.149	78	3.436	2.042	7122	4.138	2.149	0-8
List B	6658	4.252	2.126	70	3.600	2.280	6728	4.245	2.128	0-8
Overall	13702	4.197	2.139	148	3.514	2.152	13850	4.190	2.140	0-8
Copying of Figures	12882	5.564	1.016	968	4.258	1.678	13850	5.473	1.126	0-6
Figure Recall	12758	4.808	1.693	1,092	3.567	1.782	13850	4.710	1.733	0-6
Visual Scanning	12858	29.343	15.913	992	16.130	9.929	13850	28.396	15.929	0-60
Number of Different Animals	13730	15.522	5.247	120	14.642	4.676	13850	15.514	5.243	0-40
Number of Repetitions (Animals)	13730	0.733	1.135	120	0.858	0.964	13850	0.735	1.134	0-22
Time for Numeracy (seconds)	13158	14.476	15.468	692	29.662	14.222	13850	15.235	15.759	0-60
Series 7 (Number of Correctness)	8921	3.368	1.491	4929	2.449	1.536	13850	3.041	1.570	0-5

Table 15. Distribution of Total Number of Words Recalled on List A (Wave 5 – MHAS 2018)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	99	1.23	1.23	3	2.59	2.59	102	1.25	1.25
1	258	3.21	4.44	13	11.21	13.79	271	3.32	4.57
2	781	9.71	14.15	22	18.97	32.76	803	9.84	14.41
3	1633	20.3	34.45	15	12.93	45.69	1648	20.2	34.61
4	2291	28.48	62.94	24	20.69	66.38	2315	28.37	62.99
5	1880	23.37	86.31	17	14.66	81.03	1897	23.25	86.24
6	864	10.74	97.05	9	7.76	88.79	873	10.7	96.94
7	210	2.61	99.66	6	5.17	93.97	216	2.65	99.58
8	27	0.34	100	7	6.03	100	34	0.42	100
Attempt 2									
0	87	1.08	1.08	1	0.86	0.86	88	1.08	1.08
1	80	0.99	2.08	7	6.03	6.9	87	1.07	2.14
2	215	2.67	4.75	11	9.48	16.38	226	2.77	4.91
3	783	9.74	14.48	21	18.1	34.48	804	9.85	14.77
4	1713	21.3	35.78	16	13.79	48.28	1729	21.19	35.96
5	2145	26.67	62.45	18	15.52	63.79	2163	26.51	62.47
6	1840	22.88	85.33	19	16.38	80.17	1859	22.78	85.26
7	951	11.82	97.15	9	7.76	87.93	960	11.77	97.02
8	229	2.85	100	14	12.07	100	243	2.98	100
Attempt 3									
0	85	1.06	1.06	1	0.86	0.86	86	1.05	1.05
1	77	0.96	2.01	6	5.17	6.03	83	1.02	2.07
2	174	2.16	4.18	10	8.62	14.66	184	2.26	4.33
3	499	6.2	10.38	13	11.21	25.86	512	6.28	10.6
4	1133	14.09	24.47	18	15.52	41.38	1151	14.11	24.71
5	1936	24.07	48.54	17	14.66	56.03	1953	23.94	48.65
6	2119	26.35	74.88	21	18.1	74.14	2140	26.23	74.87
7	1416	17.61	92.49	12	10.34	84.48	1428	17.5	92.38
8	604	7.51	100	18	15.52	100	622	7.62	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	524	6.51	6.51	6	5.17	5.17	530	6.5	6.5
1	343	4.26	10.78	11	9.48	14.66	354	4.34	10.83
2	549	6.83	17.61	14	12.07	26.72	563	6.9	17.74
3	997	12.4	30	19	16.38	43.1	1016	12.45	30.19
4	1485	18.46	48.46	20	17.24	60.34	1505	18.45	48.63
5	1724	21.43	69.9	16	13.79	74.14	1740	21.33	69.96
6	1334	16.59	86.49	11	9.48	83.62	1345	16.48	86.44
7	760	9.45	95.93	9	7.76	91.38	769	9.43	95.87
8	327	4.07	100	10	8.62	100	337	4.13	100

Table 16. Distribution of Total Number of Words Recalled on List B (Wave 5 – MHAS 2018)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	64	0.85	0.85	2	1.59	1.59	66	0.87	0.87
1	178	2.37	3.23	13	10.32	11.9	191	2.5	3.37
2	586	7.81	11.04	22	17.46	29.37	608	7.97	11.34
3	1406	18.74	29.78	24	19.05	48.41	1430	18.75	30.09
4	2055	27.4	57.18	27	21.43	69.84	2082	27.3	57.39
5	1937	25.82	83	15	11.9	81.75	1952	25.59	82.98
6	1005	13.4	96.4	13	10.32	92.06	1018	13.35	96.33
7	239	3.19	99.59	6	4.76	96.83	245	3.21	99.54
8	31	0.41	100	4	3.17	100	35	0.46	100
Attempt 2									
0	55	0.73	0.73	1	0.79	0.79	56	0.73	0.73
1	50	0.67	1.4	4	3.17	3.97	54	0.71	1.44
2	184	2.45	3.85	14	11.11	15.08	198	2.6	4.04
3	651	8.68	12.53	21	16.67	31.75	672	8.81	12.85
4	1502	20.02	32.56	24	19.05	50.79	1526	20.01	32.86
5	2183	29.1	61.66	27	21.43	72.22	2210	28.98	61.83
6	1783	23.77	85.43	14	11.11	83.33	1797	23.56	85.39
7	880	11.73	97.16	9	7.14	90.48	889	11.66	97.05
8	213	2.84	100	12	9.52	100	225	2.95	100
Attempt 3									
0	69	0.92	0.92	1	0.79	0.79	70	0.92	0.92
1	48	0.64	1.56	1	0.79	1.59	49	0.64	1.56
2	148	1.97	3.53	11	8.73	10.32	159	2.08	3.64
3	400	5.33	8.87	17	13.49	23.81	417	5.47	9.11
4	958	12.77	21.64	24	19.05	42.86	982	12.88	21.99
5	1718	22.9	44.54	26	20.63	63.49	1744	22.87	44.85
6	2092	27.89	72.43	16	12.7	76.19	2108	27.64	72.49
7	1473	19.64	92.07	14	11.11	87.3	1487	19.5	91.99
8	595	7.93	100	16	12.7	100	611	8.01	100

Delayed	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	458	6.11	6.11	3	2.38	2.38	461	6.04	6.04
1	277	3.69	9.8	10	7.94	10.32	287	3.76	9.81
2	465	6.2	16	15	11.9	22.22	480	6.29	16.1
3	771	10.28	26.28	30	23.81	46.03	801	10.5	26.6
4	1363	18.17	44.45	25	19.84	65.87	1388	18.2	44.8
5	1674	22.32	66.76	20	15.87	81.75	1694	22.21	67.01
6	1401	18.68	85.44	9	7.14	88.89	1410	18.49	85.5
7	806	10.75	96.19	9	7.14	96.03	815	10.69	96.18
8	286	3.81	100	5	3.97	100	291	3.82	100

Table 17. Distribution of Identified Day/Month/Year (Wave 5 – MHAS 2018)

Day	Non-Imputed Cases			Imputed Cases			Total Cases		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	14552	92.32	92.32	22	91.67	91.67	14574	92.32	92.32
2	1210	7.68	100	2	8.33	100	1212	7.68	100
Month									
1	14708	93.31	93.31	23	95.83	95.83	14731	93.32	93.32
2	1054	6.69	100	1	4.17	100	1055	6.68	100
Year									
1	13382	84.9	84.9	22	91.67	91.67	13404	84.91	84.91
2	2380	15.1	100	2	8.33	100	2382	15.09	100

Table 18. Summary Descriptive Statistics (Wave 5 – MHAS 2018)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	8043	3.998	1.425	116	3.75	2.042	8159	3.994	1.435	0-8
List A – Attempt 2	8043	4.969	1.493	116	4.612	2.084	8159	4.964	1.504	0-8
List A – Attempt 3	8043	5.420	1.571	116	4.966	2.110	8159	5.413	1.581	0-8
List B – Attempt 1	7501	4.189	1.401	126	3.683	1.862	7627	4.181	1.411	0-8
List B – Attempt 2	7501	5.047	1.421	126	4.516	1.900	7627	5.038	1.431	0-8
List B – Attempt 3	7501	5.544	1.527	126	4.937	1.892	7627	5.534	1.536	0-8
Overall – Attempt 1	15544	4.090	1.416	242	3.715	1.947	15786	4.085	1.427	0-8
Overall – Attempt 2	15544	5.006	1.459	242	4.562	1.9877	15786	5.000	1.470	0-8
Overall – Attempt 3	15544	5.480	1.551	242	4.950	1.995	15786	5.472	1.560	0-8
Delayed Word Recall										
List A	8043	4.343	2.021	116	4.009	2.228	8159	4.338	2.024	0-8
List B	7501	4.490	1.992	126	3.865	1.882	7627	4.479	1.992	0-8
Overall	15544	4.414	2.008	242	3.934	2.052	15786	4.407	2.010	0-8
Copying of Figures	14586	5.608	0.898	1200	4.447	1.585	15786	5.520	1.016	0-6
Figure Recall	14059	4.982	1.480	1727	3.893	1.701	15786	4.862	1.544	0-6
Visual Scanning	14449	31.700	16.075	1337	20.455	12.880	15786	30.747	16.136	0-60
Number of Different Animals	15297	15.753	5.249	489	14.280	5.019	15786	15.708	5.248	0-30
Number of Repetitions (Animals)	15297	0.714	1.181	489	0.796	0.923	15786	0.716	1.174	0-29
Series 7 (Number of Correctness)	11407	3.399	1.505	4379	2.326	1.570	15786	3.102	1.597	0-5

Table 19. Distribution of Total Number of Words Recalled on List A (Wave 6 – MHAS 2021)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	0	0.0	0.00	1	0.77	0.77	1	0.01	0.01
1	245	3.24	3.24	11	8.46	9.23	256	3.33	3.34
2	711	9.4	12.64	27	20.77	30	738	9.59	12.93
3	1,585	20.95	33.58	38	29.23	59.23	1,623	21.09	34.02
4	2,246	29.69	63.27	24	18.46	77.69	2,270	29.5	63.51
5	1,762	23.29	86.56	21	16.15	93.85	1,783	23.17	86.68
6	800	10.57	97.13	5	3.85	97.69	805	10.46	97.14
7	197	2.6	99.74	2	1.54	99.23	199	2.59	99.73
8	20	0.26	100	1	0.77	100	21	0.27	100
Attempt 2									
0	1	0.01	0.01	2	1.38	1.38	3	0.04	0.04
1	50	0.66	0.68	7	4.83	6.21	57	0.74	0.78
2	176	2.33	3.01	19	13.1	19.31	195	2.53	3.31
3	642	8.5	11.51	28	19.31	38.62	670	8.71	12.02
4	1,600	21.19	32.7	31	21.38	60	1,631	21.19	33.21
5	2,115	28.01	60.71	27	18.62	78.62	2,142	27.83	61.04
6	1,822	24.13	84.84	16	11.03	89.66	1,838	23.88	84.93
7	902	11.95	96.78	7	4.83	94.48	909	11.81	96.74
8	243	3.22	100	8	5.52	100	251	3.26	100
Attempt 3									
0	0	0.0	0.00	0	0.0	0.00	0	0.00	0.00
1	34	0.45	0	5	3	3.18	39	0.51	0.51
2	109	1.45	2	14	8.92	12.1	123	1.6	2.1
3	415	5.5	7.4	24	15.29	27.39	439	5.7	7.81
4	1,083	14.37	21.77	32	20.38	47.77	1,115	14.49	22.3
5	1,890	25.07	46.84	28	17.83	65.61	1,918	24.92	47.22
6	2,022	26.82	73.66	25	15.92	81.53	2,047	26.6	73.82

7	1,437	19.06	92.72	9	5.73	87.26	1,446	18.79	92.61
8	549	7.28	100	20	12.74	100	569	7.39	100

Delayed	**Non-Imputed Cases**			**Imputed Cases**			**Total Cases**		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
11	0.15	0.15	11	15	3.37	3.37	26	0.34	0.34
360	4.96	5.12	360	47	10.56	13.93	407	5.29	5.63
491	6.77	11.89	491	79	17.75	31.69	570	7.41	13.03
952	13.13	25.02	952	102	22.92	54.61	1,054	13.7	26.73
1,463	20.18	45.19	1,463	85	19.1	73.71	1,548	20.11	46.84
1,652	22.78	67.98	1,652	45	10.11	83.82	1,697	22.05	68.89
1,296	17.87	85.85	1,296	42	9.44	93.26	1,338	17.39	86.28
740	10.21	96.06	740	16	3.6	96.85	756	9.82	96.1
286	3.94	100	286	14	3.15	100	300	3.9	100

Table 20. Distribution of Total Number of Words Recalled on List B (Wave 6 – MHAS 2021)

	Non-Imputed Cases			Imputed Cases			Total Cases		
	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage	Frequency	Percent	Cumulative Percentage
Attempt 1									
0	0	0.0	0.00	1	0.92	0.92	1	0.01	0.01
1	142	2.13	2.13	10	9.17	10.09	152	2.24	2.25
2	473	7.08	9.21	15	13.76	23.85	488	7.19	9.44
3	1,184	17.73	26.94	24	22.02	45.87	1,208	17.8	27.24
4	1,959	29.33	56.27	18	16.51	62.39	1,977	29.12	56.36
5	1,729	25.89	82.15	22	20.18	82.57	1,751	25.8	82.16
6	922	13.8	95.96	8	7.34	89.91	930	13.7	95.86
7	240	3.59	99.55	5	4.59	94.5	245	3.61	99.47
8	30	0.45	100	6	5.5	100	36	0.53	100
Attempt 2									
0	0	0.0	0.00	2	1.87	1.87	2	0.03	0.03
1	41	0.61	0.61	4	3.74	5.61	45	0.66	0.69
2	160	2.39	3.01	11	10.28	15.89	171	2.52	3.21
3	540	8.08	11.09	16	14.95	30.84	556	8.19	11.4
4	1,255	18.78	29.88	21	19.63	50.47	1,276	18.8	30.2
5	1,982	29.67	59.54	12	11.21	61.68	1,994	29.38	59.58
6	1,728	25.86	85.41	18	16.82	78.5	1,746	25.72	85.3
7	805	12.05	97.46	10	9.35	87.85	815	12.01	97.3
8	170	2.54	100	13	12.15	100	183	2.7	100
Attempt 3									
1	0.01	0.01	1	1	0.83	0.83	0	2	0.03
24	0.36	0.37	24	5	4.17	5	1	29	0.43
92	1.38	1.75	92	6	5	10	2	98	1.44
301	4.51	6.27	301	20	16.67	26.67	3	321	4.73
775	11.62	17.89	775	21	17.5	44.17	4	796	11.73
1,587	23.8	41.69	1,587	17	14.17	58.33	5	1,604	23.63
1,890	28.34	70.04	1,890	20	16.67	75	6	1,910	28.14
1,457	21.85	91.89	1,457	17	14.17	89.17	7	1,474	21.71

541	8.11	100	541	13	10.83	100	8	554	8.16

Delayed	**Non-Imputed Cases**			**Imputed Cases**			**Total Cases**		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
0	7	0.11	0.11	15	3.69	3.69	22	0	0.32
1	227	3.56	3.67	31	7.62	11.3	258	4	4.12
2	373	5.85	9.51	61	14.99	26.29	434	6	10.52
3	655	10.26	19.78	91	22.36	48.65	746	10.99	21.51
4	1,191	18.66	38.44	83	20.39	69.04	1,274	18.77	40.28
5	1,502	24	61.98	53	13.02	82.06	1,555	22.91	63.19
6	1,366	21	83.39	34	8.35	90.42	1,400	20.62	83.81
7	781	12	95.63	18	4.42	94.84	799	11.77	95.58
8	279	4	100	21	5.16	100	300	4.42	100

Table 21. Distribution of Identified Day/Month/Year (Wave 6 – MHAS 2021)

Day	**Non-Imputed Cases**			**Imputed Cases**			**Total Cases**		
Total	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
1	11,380	78.57	78.57	0	0.0	0.00	11,380	78.57	78.57
2	3,104	21.43	100	0	0.0	0.00	3,104	21.43	100
Month									
1	13,440	92.79	92.79	0	0.0	0.00	13,440	92.79	92.79
2	1,044	7.21	100.00	0	0.0	0.00	1,044	7.21	100.00
Year									
1	11,959	82.57	82.57	0	0.0	0.00	11,959	82.57	82.57
2	2,525	17.43	100.00	0	0.0	0.00	2,525	17.43	100.00

Table 22. Summary Descriptive Statistics (Wave 6 – MHAS 2021)

	Non-Imputed Cases			Imputed Cases			Total Cases			
Variables	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	Range
Immediate Word Recall										
List A – Attempt 1	7,566	4.040	1.340	130	3.320	1.460	7,696	4.026	1.350	0-8
List A – Attempt 2	7,551	5.100	1.370	145	4.120	1.820	7,696	5.079	1.384	0-8
List A – Attempt 3	7,539	5.550	1.400	157	4.750	1.900	7,696	5.536	1.412	1-8
List B – Attempt 1	6,679	4.280	1.330	109	3.900	1.890	6,788	4.272	1.346	0-8
List B – Attempt 2	6,681	5.130	1.330	107	4.670	2.090	6,788	5.123	1.349	0-8
List B – Attempt 3	6,668	5.700	1.370	120	4.910	1.970	6,788	5.687	1.388	0-8
Overall – Attempt 1	14,245	4.150	1.350	239	3.590	1.690	14,484	4.141	1.353	0-8
Overall – Attempt 2	14,232	5.110	1.350	252	4.350	1.960	14,484	5.100	1.368	0-8
Overall – Attempt 3	14,207	5.620	1.390	277	4.820	1.930	14,484	5.607	1.402	0-8
Delayed Word Recall										
List A	7,251	4.630	1.720	445	3.490	1.870	7,696	4.562	1.753	0-8
List B	6,381	4.870	1.670	407	3.740	1.930	6,788	4.807	1.712	0-8
Overall	6,826	4.780	1.720	852	3.610	1.900	14,484	4.676	1.738	0-8
Copying of Figures	13,940	5.600	1.000	544	4.630	1.500	14,484	5.566	1.037	0-6
Figure Recall	13,938	5.030	1.520	546	4.170	1.710	14,484	4.997	1.533	0-6
Visual Scanning (Correct)	13,941	30.410	15.970	543	27.110	14.670	14,484	30.286	15.937	0-60
Visual Scanning (Incorrect)	13,941	0.540	2.020	543	0.570	1.140	14,484	0.537	1.998	0-51
Number of Different Animals	13,944	15.800	5.310	540	15.010	5.200	14,484	15.773	5.313	0-38
Number of Repetitions (Animals)	13,944	0.680	1.100	540	0.870	0.990	14,484	0.688	1.096	0-23
Series 3 (Number of Correctness)	11,545	4.190	1.070	2,939	3.350	1.460	14,484	4.018	1.210	0-5

Table 23. Summary Mean Trends (MHAS 2012 – MHAS 2021)

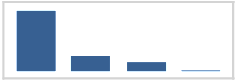
	Non-Imputed Cases Means				
Immediate Word Recall	**2012**	**2015**	**2018**	**2021**	**Trend**
List A – Attempt 1	3.890	3.873	3.998	4.038	
List A – Attempt 2	4.924	4.904	4.969	5.098	
List A – Attempt 3	5.426	5.377	5.420	5.553	
List B – Attempt 1	4.038	4.042	4.189	4.278	
List B – Attempt 2	4.971	4.950	5.047	5.130	
List B – Attempt 3	5.531	5.467	5.544	5.701	
Overall – Attempt 1	3.957	3.955	4.090	4.151	
Overall – Attempt 2	4.945	4.926	5.006	5.113	
Overall – Attempt 3	5.473	5.421	5.480	5.622	
Delayed Word Recall					
List A	4.408	4.146	4.343	4.628	
List B	4.511	4.252	4.490	4.875	
Overall	4.454	4.197	4.414	4.785	
Copying of Figures	5.542	5.564	5.608	5.602	
Figure Recall	4.815	4.808	4.982	5.029	
Visual Scanning (Correct)	29.106	29.343	31.700	30.410	
Number of Different Animals	15.071	15.522	15.753	15.803	
Number of Repetitions (Animals)	0.871	0.733	0.714	0.680	

	Imputed Cases Means				
Immediate Word Recall	**2012**	**2015**	**2018**	**2021**	**Trend**
List A – Attempt 1	3.149	3.438	3.750	3.323	
List A – Attempt 2	4.232	4.190	4.612	4.117	
List A – Attempt 3	4.689	4.906	4.966	4.752	

List B – Attempt 1	3.402	3.525	3.683	3.899	
List B – Attempt 2	4.319	4.500	4.516	4.673	
List B – Attempt 3	4.707	4.935	4.937	4.908	
Overall – Attempt 1	3.275	3.480	3.715	3.586	
Overall – Attempt 2	4.275	4.344	4.562	4.353	
Overall – Attempt 3	4.698	4.921	4.950	4.819	
Delayed Word Recall					
List A	3.841	3.436	4.009	3.488	
List B	3.878	3.600	3.865	3.737	
Overall	3.859	3.514	3.934	3.607	
Copying of Figures	4.435	4.258	4.447	4.631	
Figure Recall	3.864	3.567	3.893	4.172	
Visual Scanning (Correct)	19.798	16.130	20.455	27.109	
Number of Different Animals	14.196	14.642	14.280	15.011	
Number of Repetitions (Animals)	1.028	0.858	0.796	0.872	

Total Cases Means

Immediate Word Recall	**2012 (n=14,448)**	**2015 (n=13,850)**	**2018 (n=15,786)**	**2021 (n=14,484)**	
List A – Attempt 1	3.871	3.869	3.994	4.026	
List A – Attempt 2	4.906	4.898	4.964	5.079	
List A – Attempt 3	5.406	5.373	5.413	5.536	
List B – Attempt 1	4.019	4.037	4.181	4.272	
List B – Attempt 2	4.950	4.946	5.038	5.123	
List B – Attempt 3	5.506	5.462	5.534	5.687	
Overall – Attempt 1	3.939	3.951	4.085	4.141	
Overall – Attempt 2	4.926	4.920	5.000	5.100	
Overall – Attempt 3	5.451	5.416	5.472	5.607	
Delayed Word Recall					

List A	4.390	4.138	4.338	4.562	
List B	4.490	4.245	4.479	4.807	
Overall	4.436	4.190	4.407	4.676	
Copying of Figures	5.440	5.473	5.520	5.566	
Figure Recall	4.716	4.710	4.862	4.997	
Visual Scanning (Correct)	28.223	28.396	30.747	30.286	
Number of Different Animals	15.045	15.514	15.708	15.773	
Number of Repetitions (Animals)	0.876	0.735	0.716	0.688	

VII. Appendix D. Codebook

2001

Section E

```
-------------------------------------------------------------------------------
e8_e9_imp_01                                                  Constructional
Praxis (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/13,962

             tabulation:  Freq.  Value
                          2,036  0
                          2,187  1
                          9,739  2

-------------------------------------------------------------------------------
e8_e9_flag_01                                          Constructional Praxis:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp, but 2 nonmissing values are not labeled

                 range:  [0,3]                        units:  1
          unique values:  4                       missing .:  0/13,962

             tabulation:  Freq.   Numeric  Label
                         12,597         0  0.Not Imputed
                            573         1  1.IMPUTED
                            187         2
                            605         3

-------------------------------------------------------------------------------
e11_a1_imp_01                       Verbal Learning List A-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  6,611/13,962

             tabulation:  Freq.  Value
                             99  0
                            276  1
                            855  2
                          1,669  3
                          1,979  4
                          1,533  5
                            738  6
                            171  7
                             31  8
                          6,611  .

-------------------------------------------------------------------------------
```

e11_a2_imp_01 Verbal Learning List A-Trial 2: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 6,611/13,962

tabulation:

Freq.	Value
65	0
71	1
240	2
847	3
1,671	4
1,971	5
1,539	6
691	7
256	8
6,611	.

---

e11_a3_imp_01 Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 6,611/13,962

tabulation:

Freq.	Value
98	0
54	1
162	2
503	3
1,072	4
1,720	5
1,840	6
1,199	7
703	8
6,611	.

---

e11_b1_imp_01 Verbal Learning List B-Trial 1: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 7,351/13,962

tabulation:

Freq.	Value
66	0
219	1
697	2
1,387	3
1,830	4
1,499	5
692	6
188	7
33	8

```
                      7,351  .

-------------------------------------------------------------------------------
e11_b2_imp_01                            Verbal Learning List B-Trial 2: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  7,351/13,962

           tabulation:  Freq.  Value
                           38  0
                           60  1
                          237  2
                          649  3
                        1,433  4
                        1,899  5
                        1,467  6
                          626  7
                          202  8
                        7,351  .

-------------------------------------------------------------------------------
e11_b3_imp_01                            Verbal Learning List A-Trial 3: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  7,351/13,962

           tabulation:  Freq.  Value
                           78  0
                           35  1
                          136  2
                          374  3
                          906  4
                        1,532  5
                        1,783  6
                        1,122  7
                          645  8
                        7,351  .

-------------------------------------------------------------------------------
e11_flag_01                                                      Verbal Learning:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  implist

                range:  [0,2]                        units:  1
        unique values:  3                    missing .:  0/13,962

           tabulation:  Freq.   Numeric  Label
                       13,394         0  0.Not Imputed
                          282         1  1.IMPUTED-List A
                          286         2  2.IMPUTED-List B

-------------------------------------------------------------------------------
```

```
e12_imp_01
Visual Scan (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,60]                       units:  1
         unique values:  61                       missing .:  0/13,962

                  mean:    24.766
             std. dev:   15.9219

           percentiles:        10%       25%       50%       75%       90%
                                 3        12        23        36        49

-------------------------------------------------------------------------------
e12_flag_01                                                          Visual Scan:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp, but 2 nonmissing values are not labeled

                 range:  [0,3]                        units:  1
         unique values:  4                        missing .:  0/13,962

            tabulation:  Freq.   Numeric  Label
                        12,647         0  0.Not Imputed
                           551         1  1.IMPUTED
                           218         2
                           546         3

-------------------------------------------------------------------------------
e13_imp_01                                                  Constructional Praxis
Recall (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/13,962

            tabulation:  Freq.  Value
                         7,022  0
                         3,702  1
                         3,238  2

-------------------------------------------------------------------------------
e13_flag_01                                            Constructional Praxis Recall:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp, but 2 nonmissing values are not labeled

                 range:  [0,3]                        units:  1
         unique values:  4                        missing .:  0/13,962

            tabulation:  Freq.   Numeric  Label
                        12,486         0  0.Not Imputed
                           735         1  1.IMPUTED
                           195         2
                           546         3
```

---

e14_a_imp_01 Verbal Recall List A: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 6,611/13,962

tabulation:

Freq.	Value
262	0
98	1
306	2
651	3
1,168	4
1,642	5
1,552	6
1,036	7
636	8
6,611	.

---

e14_b_imp_01 Verbal Recall List B: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 7,351/13,962

tabulation:

Freq.	Value
192	0
89	1
247	2
525	3
920	4
1,503	5
1,488	6
1,043	7
604	8
7,351	.

---

e14_flag_01 Verbal Recall: Flag if Imputed

---

type: numeric (float)
label: implist

range: [0,2] units: 1
unique values: 3 missing .: 0/13,962

tabulation:

Freq.	Numeric	Label
13,394	0	0.Not Imputed
282	1	1.IMPUTED-List A
286	2	2.IMPUTED-List B

```
-------------------------------------------------------------------------------
pc5_imp_01                                  R's ability to remember things about family &
friends (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            12         1  1.Much improved
                            17         2  2.A bit improved
                           850         3  3.About the same
                            95         4  4.A bit worse
                            58         5  5.Much worse

-------------------------------------------------------------------------------
pc5_flag_01                          R's ability to remember things about family & friends:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                        1,020         0  0.Not Imputed
                           10         1  1.IMPUTED (ALL DK/RF/Missing)
                            2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc8_imp_01                                                    R's ability to remember
things (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            17         2  2.A bit improved
                           865         3  3.About the same
                            86         4  4.A bit worse
                            50         5  5.Much worse

-------------------------------------------------------------------------------
pc8_flag_01                                                R's ability to remember things:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp
```

```
                range:  [0,2]                       units:  1
         unique values:  3                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                         1,017         0  0.Not Imputed
                            12         1  1.IMPUTED (ALL DK/RF/Missing)
                             3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc11_imp_01                                 R's ability to recall conversations a few days
later (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
         unique values:  5                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            16         1  1.Much improved
                            14         2  2.A bit improved
                           862         3  3.About the same
                            93         4  4.A bit worse
                            47         5  5.Much worse

-------------------------------------------------------------------------------
pc11_flag_01                          R's ability to recall conversations a few days later:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                       units:  1
         unique values:  3                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                         1,017         0  0.Not Imputed
                            12         1  1.IMPUTED (ALL DK/RF/Missing)
                             3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc14_imp_01                                                R's ability to remember his/her
address (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
         unique values:  5                        missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            19         1  1.Much improved
                            14         2  2.A bit improved
                           857         3  3.About the same
                            84         4  4.A bit worse
                            58         5  5.Much worse

-------------------------------------------------------------------------------
pc14_flag_01                                    R's ability to remember his/her address:
Flag if Imputed
```

```
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                          missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,018         0  0.Not Imputed
                           12         1  1.IMPUTED (ALL DK/RF/Missing)
                            2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc17_imp_01                                  R's ability to remember what day and month
it is (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                          missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           14         1  1.Much improved
                           11         2  2.A bit improved
                          864         3  3.About the same
                           83         4  4.A bit worse
                           60         5  5.Much worse

-------------------------------------------------------------------------------
pc17_flag_01                       R's ability to remember what day and month it is:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                          missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,020         0  0.Not Imputed
                           11         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc20_imp_01                         R's ability to remember where things are usually
kept (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                          missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           13         1  1.Much improved
                            6         2  2.A bit improved
                          816         3  3.About the same
                          137         4  4.A bit worse
```

```
                          60         5  5.Much worse

-------------------------------------------------------------------------------
pc20_flag_01                         R's ability to remember where things are usually kept:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                    missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,019         0  0.Not Imputed
                            9         1  1.IMPUTED (ALL DK/RF/Missing)
                            4         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc23_imp_01               R's ability to remember where to find things put in a different
place (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                    missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           10         1  1.Much improved
                            5         2  2.A bit improved
                          799         3  3.About the same
                          149         4  4.A bit worse
                           69         5  5.Much worse

-------------------------------------------------------------------------------
pc23_flag_01              R's ability to remember where to find things put in a different
place: Flag if I
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                    missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,013         0  0.Not Imputed
                           13         1  1.IMPUTED (ALL DK/RF/Missing)
                            6         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc26_imp_01                                          R's ability to know how to use familiar
machines (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                    missing .:  0/1,032
```

```
            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            11         2  2.A bit improved
                           860         3  3.About the same
                            70         4  4.A bit worse
                            77         5  5.Much worse

--------------------------------------------------------------------------------
pc26_flag_01                              R's ability to know how to use familiar machines:
Flag if Imputed
--------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                           997         0  0.Not Imputed
                            33         1  1.IMPUTED (ALL DK/RF/Missing)
                             2         2  2.IMPUTED (ONE DK/RF/Missing)

--------------------------------------------------------------------------------
pc29_imp_01                                    R's ability to learn to use a new gadget or
machine (Imputed)
--------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            17         1  1.Much improved
                            12         2  2.A bit improved
                           819         3  3.About the same
                            92         4  4.A bit worse
                            92         5  5.Much worse

--------------------------------------------------------------------------------
pc29_flag_01                           R's ability to learn to use a new gadget or machine:
Flag if Imputed
--------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                           986         0  0.Not Imputed
                            41         1  1.IMPUTED (ALL DK/RF/Missing)
                             5         2  2.IMPUTED (ONE DK/RF/Missing)

--------------------------------------------------------------------------------
pc32_imp_01                                             R's ability to learn new things in
general (Imputed)
--------------------------------------------------------------------------------

                  type:  numeric (byte)
```

```
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           20         1  1.Much improved
                           28         2  2.A bit improved
                          825         3  3.About the same
                           80         4  4.A bit worse
                           79         5  5.Much worse

-------------------------------------------------------------------------------
pc32_flag_01                                  R's ability to learn new things in general:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,005         0  0.Not Imputed
                           26         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_01                                   R's ability to follow a story in a book or
on TV (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           15         1  1.Much improved
                           11         2  2.A bit improved
                          865         3  3.About the same
                           80         4  4.A bit worse
                           61         5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_01                             R's ability to follow a story in a book or on TV:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,004         0  0.Not Imputed
                           25         1  1.IMPUTED (ALL DK/RF/Missing)
                            3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
```

```
pc38_imp_01                                    R's ability to make decisions on everyday
matters (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           15         1  1.Much improved
                           16         2  2.A bit improved
                          868         3  3.About the same
                           65         4  4.A bit worse
                           68         5  5.Much worse

-------------------------------------------------------------------------------
pc38_flag_01                             R's ability to make decisions on everyday matters:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,002         0  0.Not Imputed
                           26         1  1.IMPUTED (ALL DK/RF/Missing)
                            4         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc41_imp_01                                                R's ability to handle money for
shopping (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           19         1  1.Much improved
                           11         2  2.A bit improved
                          846         3  3.About the same
                           72         4  4.A bit worse
                           84         5  5.Much worse

-------------------------------------------------------------------------------
pc41_flag_01                                    R's ability to handle money for shopping:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
```

```
                          999         0  0.Not Imputed
                           29         1  1.IMPUTED (ALL DK/RF/Missing)
                            4         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc44_imp_01                                                R's ability to handle financial
matters (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            16         1  1.Much improved
                            12         2  2.A bit improved
                           846         3  3.About the same
                            72         4  4.A bit worse
                            86         5  5.Much worse

-------------------------------------------------------------------------------
pc44_flag_01                                        R's ability to handle financial matters:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                           973         0  0.Not Imputed
                            56         1  1.IMPUTED (ALL DK/RF/Missing)
                             3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_01                                  R's ability to handle other everyday arithmetic
problems (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,032

            tabulation:  Freq.   Numeric  Label
                            16         1  1.Much improved
                            17         2  2.A bit improved
                           841         3  3.About the same
                            81         4  4.A bit worse
                            77         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_01                       R's ability to handle other everyday arithmetic problems:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp
```

```
                range:  [0,2]                       units:  1
        unique values:  3                        missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                          995         0  0.Not Imputed
                           36         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_01             R's ability to use his/her intelligence to understand what is going
on (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
        unique values:  5                        missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                           16         1  1.Much improved
                           13         2  2.A bit improved
                          877         3  3.About the same
                           69         4  4.A bit worse
                           57         5  5.Much worse

-------------------------------------------------------------------------------
pc50_flag_01            R's ability to use his/her intelligence to understand what is going
on: Flag if
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                       units:  1
        unique values:  3                        missing .:  0/1,032

           tabulation:  Freq.   Numeric  Label
                        1,017         0  0.Not Imputed
                           12         1  1.IMPUTED (ALL DK/RF/Missing)
                            3         2  2.IMPUTED (ONE DK/RF/Missing)
```

2003

Section E

```
-------------------------------------------------------------------------------
e6_e7_imp_03                                                          Constructional
Praxis (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,2]                       units:  1
        unique values:  3                        missing .:  0/12,495

           tabulation:  Freq.  Value
                        1,169  0
                        2,360  1
                        8,966  2
```

```
-------------------------------------------------------------------------------
e6_e7_flag_03                                                 Constructional Praxis:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  0/12,495

           tabulation:  Freq.   Numeric  Label
                       10,922         0  0.Not Imputed
                        1,573         1  1.IMPUTED

-------------------------------------------------------------------------------
e9_a1_imp_03                             Verbal Learning List A-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  5,806/12,495

           tabulation:  Freq.  Value
                          237  0
                          405  1
                        1,082  2
                        1,614  3
                        1,651  4
                        1,071  5
                          484  6
                          124  7
                           21  8
                        5,806  .

-------------------------------------------------------------------------------
e9_a1_flag_03                                          Verbal Learning List A-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  5,806/12,495

           tabulation:  Freq.   Numeric  Label
                        6,503         0  0.Not Imputed
                          186         1  1.IMPUTED
                        5,806         .

-------------------------------------------------------------------------------
e9_a2_imp_03                             Verbal Learning List A-Trial 2: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  5,806/12,495
```

```
            tabulation:  Freq.  Value
                            99  0
                           122  1
                           396  2
                           921  3
                         1,382  4
                         1,521  5
                         1,238  6
                           673  7
                           337  8
                         5,806  .

------------------------------------------------------------------------------
e9_a2_flag_03                                          Verbal Learning List A-Trial 2:
Flag if Imputed
------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  5,806/12,495

            tabulation:  Freq.   Numeric  Label
                         6,503         0  0.Not Imputed
                           186         1  1.IMPUTED
                         5,806         .

------------------------------------------------------------------------------
e9_a3_imp_03                              Verbal Learning List A-Trial 3: Number of Correct
Words (Imputed)
------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  5,806/12,495

            tabulation:  Freq.  Value
                           142  0
                            77  1
                           253  2
                           525  3
                           882  4
                         1,243  5
                         1,466  6
                         1,238  7
                           863  8
                         5,806  .

------------------------------------------------------------------------------
e9_a3_flag_03                                          Verbal Learning List A-Trial 3:
Flag if Imputed
------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  5,806/12,495

            tabulation:  Freq.   Numeric  Label
```

```
                        6,502          0  0.Not Imputed
                          187          1  1.IMPUTED
                        5,806          .
```

---

e9_b1_imp_03 Verbal Learning List B-Trial 1: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  6,689/12,495

           tabulation:  Freq.  Value
                          284  0
                          502  1
                        1,144  2
                        1,598  3
                        1,291  4
                          669  5
                          264  6
                           44  7
                           10  8
                        6,689  .
```

---

e9_b1_flag_03 Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                 type:  numeric (byte)

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  6,689/12,495

           tabulation:  Freq.  Value
                        5,626  0
                          180  1
                        6,689  .
```

---

e9_b2_imp_03 Verbal Learning List B-Trial 2: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  6,689/12,495

           tabulation:  Freq.  Value
                          118  0
                          142  1
                          432  2
                        1,059  3
                        1,368  4
                        1,255  5
                          853  6
                          447  7
                          132  8
                        6,689  .
```

---
e9_b2_flag_03 Verbal Learning List B-Trial 1: Flag if Imputed
---

type: numeric (byte)

range: [0,1] units: 1
unique values: 2 missing .: 6,689/12,495

tabulation:

Freq.	Value
5,626	0
180	1
6,689	.

---
e9_b3_imp_03 Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)
---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 6,689/12,495

tabulation:

Freq.	Value
134	0
108	1
268	2
634	3
984	4
1,144	5
1,158	6
856	7
520	8
6,689	.

---
e9_b3_flag_03 Verbal Learning List B-Trial 1: Flag if Imputed
---

type: numeric (byte)

range: [0,1] units: 1
unique values: 2 missing .: 6,689/12,495

tabulation:

Freq.	Value
5,626	0
180	1
6,689	.

---
e10_imp_03 Visual Scan (Imputed)
---

type: numeric (byte)

range: [0,60] units: 1
unique values: 61 missing .: 0/12,495

mean: 24.1721

```
              std. dev:   15.9864

           percentiles:        10%       25%       50%       75%       90%
                                 3        12        22        35        48

-------------------------------------------------------------------------------
e10_flag_03                                                          Visual Scan:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.   Numeric  Label
                         11,583         0  0.Not Imputed
                            912         1  1.IMPUTED

-------------------------------------------------------------------------------
e11_imp_03                                                 Constructional Praxis
Recall (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/12,495

             tabulation:  Freq.  Value
                          6,019  0
                          3,511  1
                          2,965  2

-------------------------------------------------------------------------------
e11_flag_03                                          Constructional Praxis Recall:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.   Numeric  Label
                         10,789         0  0.Not Imputed
                          1,706         1  1.IMPUTED

-------------------------------------------------------------------------------
e12_a_imp_03                                 Verbal Recall List A: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  5,806/12,495

             tabulation:  Freq.  Value
                            270  0
                            146  1
```

```
                          375  2
                          855  3
                        1,378  4
                        1,560  5
                        1,149  6
                          632  7
                          324  8
                        5,806  .

-------------------------------------------------------------------------------
e12_a_flag_03                                                  Verbal Recall List A:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  5,806/12,495

            tabulation:  Freq.   Numeric  Label
                         6,502         0  0.Not Imputed
                           187         1  1.IMPUTED
                         5,806         .

-------------------------------------------------------------------------------
e12_b_imp_03                                    Verbal Recall List B: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
         unique values:  9                       missing .:  6,689/12,495

            tabulation:  Freq.  Value
                           276  0
                           291  1
                           625  2
                         1,088  3
                         1,218  4
                         1,059  5
                           719  6
                           359  7
                           171  8
                         6,689  .

-------------------------------------------------------------------------------
e12_b_flag_03                                                  Verbal Recall List B:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  6,689/12,495

            tabulation:  Freq.   Numeric  Label
                         5,626         0  0.Not Imputed
                           180         1  1.IMPUTED
                         6,689         .
```

```
-------------------------------------------------------------------------------
e13a_imp_03                                                      Orientation
- Day (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.  Value
                          9,061  1
                          3,434  2

-------------------------------------------------------------------------------
e13a_flag_03                                          Orientation - Day:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.   Numeric  Label
                         12,491         0  0.Not Imputed
                              4         1  1.IMPUTED

-------------------------------------------------------------------------------
e13b_imp_03                                                    Orientation -
Month (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.  Value
                         11,264  1
                          1,231  2

-------------------------------------------------------------------------------
e13b_flag_03                                        Orientation - Month:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/12,495

             tabulation:  Freq.   Numeric  Label
                         12,491         0  0.Not Imputed
                              4         1  1.IMPUTED

-------------------------------------------------------------------------------
e13c_flag_03                                         Orientation - Year:
Flag if Imputed
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/12,495

            tabulation:  Freq.   Numeric  Label
                        12,491         0  0.Not Imputed
                             4         1  1.IMPUTED

-------------------------------------------------------------------------------
e13c_imp_03                                                          Orientation -
Year (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [1,2]                        units:  1
         unique values:  2                        missing .:  0/12,495

            tabulation:  Freq.  Value
                        10,234  1
                         2,261  2
```

Section PC

```
-------------------------------------------------------------------------------
pc5_imp_03                             R's ability to remember things about family & friends
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            16         1  1.Much improved
                            17         2  2.A bit improved
                           991         3  3.About the same
                           103         4  4.A bit worse
                            51         5  5.Much worse

-------------------------------------------------------------------------------
pc5_flag_03                    R's ability to remember things about family & friends: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                        1,167         0  0.Not Imputed
                           10         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
```

```
pc8_imp_03                                                    R's ability to remember things
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            19         2  2.A bit improved
                         1,005         3  3.About the same
                            96         4  4.A bit worse
                            44         5  5.Much worse

-------------------------------------------------------------------------------
pc8_flag_03                                          R's ability to remember things: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,167         0  0.Not Imputed
                            10         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc11_imp_03                          R's ability to recall conversations a few days later
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            10         1  1.Much improved
                            13         2  2.A bit improved
                           987         3  3.About the same
                           116         4  4.A bit worse
                            52         5  5.Much worse

-------------------------------------------------------------------------------
pc11_flag_03                    R's ability to recall conversations a few days later: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
```

```
                      1,168         0  0.Not Imputed
                         10         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc14_imp_03                                          R's ability to remember his/her address
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                           10         1  1.Much improved
                           10         2  2.A bit improved
                        1,017         3  3.About the same
                           87         4  4.A bit worse
                           54         5  5.Much worse

-------------------------------------------------------------------------------
pc14_flag_03                                  R's ability to remember his/her address: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                        1,161         0  0.Not Imputed
                           16         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc17_imp_03                                     R's ability to remember what day and month it
is (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                           14         1  1.Much improved
                           14         2  2.A bit improved
                          975         3  3.About the same
                          113         4  4.A bit worse
                           62         5  5.Much worse

-------------------------------------------------------------------------------
pc17_flag_03                          R's ability to remember what day and month it is: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp
```

```
                range:  [0,2]                       units:  1
        unique values:  3                        missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                        1,168         0  0.Not Imputed
                            9         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc20_imp_03                          R's ability to remember where things are usually
kept (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
        unique values:  5                        missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                           10         1  1.Much improved
                           15         2  2.A bit improved
                          927         3  3.About the same
                          160         4  4.A bit worse
                           66         5  5.Much worse

-------------------------------------------------------------------------------
pc20_flag_03                   R's ability to remember where things are usually kept: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                        1,170         0  0.Not Imputed
                            8         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc23_imp_03           R's ability to remember where to find things put in a different place
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
        unique values:  5                        missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                            7         1  1.Much improved
                            9         2  2.A bit improved
                          921         3  3.About the same
                          171         4  4.A bit worse
                           70         5  5.Much worse

-------------------------------------------------------------------------------
pc23_flag_03         R's ability to remember where to find things put in a different place:
Flag if I
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,168         0  0.Not Imputed
                             9         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc26_imp_03                                 R's ability to know how to use familiar machines
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                             8         1  1.Much improved
                            21         2  2.A bit improved
                           993         3  3.About the same
                            88         4  4.A bit worse
                            68         5  5.Much worse

-------------------------------------------------------------------------------
pc26_flag_03                       R's ability to know how to use familiar machines: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,144         0  0.Not Imputed
                            34         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc29_imp_03                                 R's ability to learn to use a new gadget or machine
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            30         2  2.A bit improved
                           952         3  3.About the same
                            99         4  4.A bit worse
                            83         5  5.Much worse
```

```
-------------------------------------------------------------------------------
pc29_flag_03                    R's ability to learn to use a new gadget or machine: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                        1,131         0  0.Not Imputed
                           47         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc32_imp_03                                    R's ability to learn new things in general
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                           17         1  1.Much improved
                           36         2  2.A bit improved
                          949         3  3.About the same
                          108         4  4.A bit worse
                           68         5  5.Much worse

-------------------------------------------------------------------------------
pc32_flag_03                          R's ability to learn new things in general: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                        1,161         0  0.Not Imputed
                           17         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_03                             R's ability to follow a story in a book or on
TV (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,178

           tabulation:  Freq.   Numeric  Label
                           19         1  1.Much improved
                           23         2  2.A bit improved
                          992         3  3.About the same
```

```
                          86         4  4.A bit worse
                          58         5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_03                        R's ability to follow a story in a book or on TV: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,155         0  0.Not Imputed
                            23         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc38_imp_03                                R's ability to make decisions on everyday matters
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            13         1  1.Much improved
                            16         2  2.A bit improved
                         1,015         3  3.About the same
                            70         4  4.A bit worse
                            64         5  5.Much worse

-------------------------------------------------------------------------------
pc38_flag_03                         R's ability to make decisions on everyday matters: Flag
if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,165         0  0.Not Imputed
                            13         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc41_imp_03                                          R's ability to handle money for shopping
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
```

```
                            25         1  1.Much improved
                            23         2  2.A bit improved
                           982         3  3.About the same
                            76         4  4.A bit worse
                            72         5  5.Much worse

-------------------------------------------------------------------------------
pc41_flag_03                                  R's ability to handle money for shopping: Flag
if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/1,178

             tabulation:  Freq.   Numeric  Label
                          1,161         0  0.Not Imputed
                             17         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc44_imp_03                                    R's ability to handle financial matters
(Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/1,178

             tabulation:  Freq.   Numeric  Label
                             14         1  1.Much improved
                             16         2  2.A bit improved
                            996         3  3.About the same
                             78         4  4.A bit worse
                             74         5  5.Much worse

-------------------------------------------------------------------------------
pc44_flag_03                                   R's ability to handle financial matters: Flag
if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/1,178

             tabulation:  Freq.   Numeric  Label
                          1,116         0  0.Not Imputed
                             62         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_03                          R's ability to handle other everyday arithmetic problems
(Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
```

```
         unique values:  5                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            15         1  1.Much improved
                             9         2  2.A bit improved
                           993         3  3.About the same
                            86         4  4.A bit worse
                            75         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_03               R's ability to handle other everyday arithmetic problems: Flag
if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                       units:  1
         unique values:  2                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,156         0  0.Not Imputed
                            22         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_03           R's ability to use his/her intelligence to understand what is going
on (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                       units:  1
         unique values:  5                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                            20         1  1.Much improved
                            10         2  2.A bit improved
                         1,006         3  3.About the same
                            86         4  4.A bit worse
                            56         5  5.Much worse

-------------------------------------------------------------------------------
pc50_flag_03          R's ability to use his/her intelligence to understand what is going
on: Flag if
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                       units:  1
         unique values:  2                       missing .:  0/1,178

            tabulation:  Freq.   Numeric  Label
                         1,171         0  0.Not Imputed
                             7         1  1.IMPUTED (ALL DK/RF/Missing)
```

Section E

```
-------------------------------------------------------------------------------
e7_a1_imp_12                              Verbal Learning List A-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  6,619/14,448

             tabulation:  Freq.  Value
                            100  0
                            314  1
                            874  2
                          1,788  3
                          2,107  4
                          1,662  5
                            778  6
                            176  7
                             30  8
                          6,619  .

-------------------------------------------------------------------------------
e7_a1_flag_12                                          Verbal Learning List A-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  6,619/14,448

             tabulation:  Freq.   Numeric  Label
                          7,628         0  0.Not Imputed
                            201         1  1.IMPUTED
                          6,619         .

-------------------------------------------------------------------------------
e7_a2_imp_12                              Verbal Learning List A-Trial 2: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  6,619/14,448

             tabulation:  Freq.  Value
                             80  0
                             79  1
                            250  2
                            843  3
                          1,694  4
                          2,104  5
                          1,699  6
                            830  7
                            250  8
```

```
                     6,619  .

-------------------------------------------------------------------------------
e7_a2_flag_12                                          Verbal Learning List A-Trial 2:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  6,619/14,448

           tabulation:  Freq.   Numeric  Label
                        7,626         0  0.Not Imputed
                          203         1  1.IMPUTED
                        6,619         .

-------------------------------------------------------------------------------
e7_a3_imp_12                           Verbal Learning List A-Trial 3: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  6,619/14,448

           tabulation:  Freq.  Value
                           99  0
                           71  1
                          191  2
                          520  3
                        1,098  4
                        1,820  5
                        2,024  6
                        1,371  7
                          635  8
                        6,619  .

-------------------------------------------------------------------------------
e7_a3_flag_12                                          Verbal Learning List A-Trial 3:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  6,619/14,448

           tabulation:  Freq.   Numeric  Label
                        7,623         0  0.Not Imputed
                          206         1  1.IMPUTED
                        6,619         .

-------------------------------------------------------------------------------
e7_b1_imp_12                           Verbal Learning List B-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
```

```
                range:  [0,8]                       units:  1
         unique values:  9                       missing .:  7,829/14,448

            tabulation:  Freq.  Value
                            77  0
                           221  1
                           614  2
                         1,362  3
                         1,838  4
                         1,575  5
                           716  6
                           186  7
                            30  8
                         7,829  .
```

---

e7_b1_flag_12 Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
         unique values:  2                       missing .:  7,829/14,448

            tabulation:  Freq.   Numeric  Label
                         6,420         0  0.Not Imputed
                           199         1  1.IMPUTED
                         7,829         .
```

---

e7_b2_imp_12 Verbal Learning List B-Trial 2: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                       units:  1
         unique values:  9                       missing .:  7,829/14,448

            tabulation:  Freq.  Value
                            40  0
                            58  1
                           196  2
                           611  3
                         1,464  4
                         1,914  5
                         1,483  6
                           664  7
                           189  8
                         7,829  .
```

---

e7_b2_flag_12 Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
         unique values:  2                       missing .:  7,829/14,448
```

```
            tabulation:  Freq.   Numeric  Label
                         6,415         0  0.Not Imputed
                           204         1  1.IMPUTED
                         7,829         .

-------------------------------------------------------------------------------
e7_b3_imp_12                              Verbal Learning List A-Trial 3: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  7,829/14,448

            tabulation:  Freq.  Value
                            67  0
                            53  1
                           152  2
                           371  3
                           822  4
                         1,580  5
                         1,831  6
                         1,147  7
                           596  8
                         7,829  .

-------------------------------------------------------------------------------
e7_b3_flag_12                                          Verbal Learning List B-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  7,829/14,448

            tabulation:  Freq.   Numeric  Label
                         6,411         0  0.Not Imputed
                           208         1  1.IMPUTED
                         7,829         .

-------------------------------------------------------------------------------
e8_imp_12                                                              Constructional
Praxis (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,6]                        units:  1
          unique values:  7                       missing .:  0/14,448

            tabulation:  Freq.  Value
                           311  0
                           180  1
                           337  2
                           448  3
                           849  4
                         1,821  5
                        10,502  6
```

```
-------------------------------------------------------------------------------
e8_flag_12                                                  Constructional Praxis:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  0/14,448

           tabulation:  Freq.   Numeric  Label
                       13,116         0  0.Not Imputed
                        1,332         1  1.IMPUTED

-------------------------------------------------------------------------------
e9a_imp_12                                   Verbal Fluency - Number of different
animals (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,66]                       units:  1
        unique values:  41                   missing .:  0/14,448

                 mean:   15.0448
            std. dev:   5.15426

          percentiles:        10%       25%       50%       75%       90%
                               9        11        15        18        22

-------------------------------------------------------------------------------
e9a_flag_12                            Verbal Fluency - Number of different animals:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  0/14,448

           tabulation:  Freq.   Numeric  Label
                       14,020         0  0.Not Imputed
                          428         1  1.IMPUTED

-------------------------------------------------------------------------------
e9b_imp_12                             Verbal Fluency - Number of times R repeated an
animal (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,13]                       units:  1
        unique values:  14                   missing .:  0/14,448

                 mean:   .876384
            std. dev:   1.24778

          percentiles:        10%       25%       50%       75%       90%
                               0         0         0         1         2

-------------------------------------------------------------------------------
```

e9b_flag_12 Verbal Fluency - Number of times R repeated an animal : Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/14,448

tabulation: Freq. Numeric Label
13,977 0 0.Not Imputed
471 1 1.IMPUTED

---

e10_imp_12
Visual Scan (Imputed)

---

type: numeric (byte)

range: [0,60] units: 1
unique values: 61 missing .: 0/14,448

mean: 28.2231
std. dev: 15.3646

percentiles: 10% 25% 50% 75% 90%
9 16 27 40 51

---

e10_flag_12 Visual Scan: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/14,448

tabulation: Freq. Numeric Label
13,078 0 0.Not Imputed
1,370 1 1.IMPUTED

---

e11a_imp_12 Orientation - Day (Imputed)

---

type: numeric (byte)

range: [1,2] units: 1
unique values: 2 missing .: 0/14,448

tabulation: Freq. Value
10,810 1
3,638 2

---

e11a_flag_12 Orientation - Day: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/14,448

            tabulation:  Freq.   Numeric  Label
                        14,117         0  0.Not Imputed
                           331         1  1.IMPUTED

-------------------------------------------------------------------------------
e11b_imp_12                                                      Orientation -
Month (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [1,2]                        units:  1
         unique values:  2                        missing .:  0/14,448

            tabulation:  Freq.  Value
                        13,189  1
                         1,259  2

-------------------------------------------------------------------------------
e11b_flag_12                                          Orientation - Month:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/14,448

            tabulation:  Freq.   Numeric  Label
                        14,116         0  0.Not Imputed
                           332         1  1.IMPUTED

-------------------------------------------------------------------------------
e11c_imp_12                                                       Orientation
- Year (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [1,2]                        units:  1
         unique values:  2                        missing .:  0/14,448

            tabulation:  Freq.  Value
                        11,840  1
                         2,608  2

-------------------------------------------------------------------------------
e11c_flag_12                                           Orientation - Year:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
```

```
         unique values:  2                       missing .:  0/14,448

            tabulation:  Freq.   Numeric  Label
                        14,108         0  0.Not Imputed
                           340         1  1.IMPUTED

-------------------------------------------------------------------------------
e12_imp_12                                          Numeracy - Score for First and Second
Attempt (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
         unique values:  2                       missing .:  0/14,448

            tabulation:  Freq.  Value
                        13,051  1
                         1,397  2

-------------------------------------------------------------------------------
e12_flag_12                                  Numeracy - Score for First and Second Attempt:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/14,448

            tabulation:  Freq.   Numeric  Label
                        13,443         0  0.Not Imputed
                         1,005         1  1.IMPUTED

-------------------------------------------------------------------------------
e12c_imp_12                                          Numeracy - Time for First and Second
Attempt (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,61]                       units:  1.000e-08
         unique values:  1,041                   missing .:  0/14,448

                  mean:   13.7264
             std. dev:     13.03

           percentiles:        10%       25%       50%       75%       90%
                                 5         6         9        15        27

-------------------------------------------------------------------------------
e12c_flag_12                                   Numeracy - Time for First and Second Attempt:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/14,448

            tabulation:  Freq.   Numeric  Label
```

13,424	0	0.Not Imputed
1,024	1	1.IMPUTED

---

e13_imp_12 — Constructional Praxis Recall (Imputed)

---

type: numeric (byte)

range: [0,6] — units: 1
unique values: 7 — missing .: 0/14,448

tabulation:

Freq.	Value
907	0
389	1
710	2
970	3
1,843	4
2,915	5
6,714	6

---

e13_flag_12 — Constructional Praxis Recall: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] — units: 1
unique values: 2 — missing .: 0/14,448

tabulation:

Freq.	Numeric	Label
12,938	0	0.Not Imputed
1,510	1	1.IMPUTED

---

e14_a_imp_12 — Verbal Recall List A: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] — units: 1
unique values: 9 — missing .: 6,619/14,448

tabulation:

Freq.	Value
551	0
294	1
514	2
918	3
1,451	4
1,626	5
1,316	6
810	7
349	8
6,619	.

---

e14_a_flag_12 — Verbal Recall List A: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  6,619/14,448

            tabulation:  Freq.   Numeric  Label
                         7,583         0  0.Not Imputed
                           246         1  1.IMPUTED
                         6,619         .
```

---

e14_b_imp_12 — Verbal Recall List B: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                        units:  1
         unique values:  9                        missing .:  7,829/14,448

            tabulation:  Freq.  Value
                           447  0
                           220  1
                           411  2
                           732  3
                         1,150  4
                         1,399  5
                         1,247  6
                           701  7
                           312  8
                         7,829  .
```

---

e14_b_flag_12 — Verbal Recall List B: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  7,829/14,448

            tabulation:  Freq.   Numeric  Label
                         6,397         0  0.Not Imputed
                           222         1  1.IMPUTED
                         7,829         .
```

Section PC

---

pc5_imp_12 — R's ability to remember things about family & friends (Imputed)

```
                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
```

```
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            35         1  1.Much improved
                            25         2  2.A bit improved
                           871         3  3.About the same
                           200         4  4.A bit worse
                           144         5  5.Much worse

-------------------------------------------------------------------------------
pc5_flag_12                          R's ability to remember things about family & friends:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                       units:  1
         unique values:  3                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,272         0  0.Not Imputed
                             2         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc8_imp_12                                                    R's ability to remember
things (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                       units:  1
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            32         1  1.Much improved
                            18         2  2.A bit improved
                           943         3  3.About the same
                           160         4  4.A bit worse
                           122         5  5.Much worse

-------------------------------------------------------------------------------
pc8_flag_12                                             R's ability to remember things:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                       units:  1
         unique values:  2                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,273         0  0.Not Imputed
                             2         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc11_imp_12                                R's ability to recall conversations a few days
later (Imputed)
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            36         1  1.Much improved
                            12         2  2.A bit improved
                           908         3  3.About the same
                           185         4  4.A bit worse
                           134         5  5.Much worse

-------------------------------------------------------------------------------
pc11_flag_12                          R's ability to recall conversations a few days later:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,273         0  0.Not Imputed
                             2         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc14_imp_12                                                R's ability to remember his/her
address (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            30         1  1.Much improved
                            17         2  2.A bit improved
                           902         3  3.About the same
                           175         4  4.A bit worse
                           151         5  5.Much worse

-------------------------------------------------------------------------------
pc14_flag_12                                       R's ability to remember his/her address:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,270         0  0.Not Imputed
                             5         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
```

pc17_imp_12 R's ability to remember what day and month it is (Imputed)

---

type: numeric (byte)
label: ability

range: [1,5] units: 1
unique values: 5 missing .: 0/1,275

tabulation:

Freq.	Numeric	Label
37	1	1.Much improved
14	2	2.A bit improved
890	3	3.About the same
166	4	4.A bit worse
168	5	5.Much worse

---

pc17_flag_12 R's ability to remember what day and month it is: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/1,275

tabulation:

Freq.	Numeric	Label
1,269	0	0.Not Imputed
6	1	1.IMPUTED (ALL DK/RF/Missing)

---

pc20_imp_12 R's ability to remember where things are usually kept (Imputed)

---

type: numeric (byte)
label: ability

range: [1,5] units: 1
unique values: 5 missing .: 0/1,275

tabulation:

Freq.	Numeric	Label
30	1	1.Much improved
7	2	2.A bit improved
884	3	3.About the same
201	4	4.A bit worse
153	5	5.Much worse

---

pc20_flag_12 R's ability to remember where things are usually kept: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/1,275

tabulation:

Freq.	Numeric	Label
1,272	0	0.Not Imputed

```
                            3        1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc23_imp_12              R's ability to remember where to find things put in a different
place (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            26         1  1.Much improved
                            12         2  2.A bit improved
                           882         3  3.About the same
                           193         4  4.A bit worse
                           162         5  5.Much worse

-------------------------------------------------------------------------------
pc23_flag_12             R's ability to remember where to find things put in a different
place: Flag if I
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,270         0  0.Not Imputed
                             4         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc26_imp_12                                R's ability to know how to use familiar machines
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            27         1  1.Much improved
                             6         2  2.A bit improved
                           900         3  3.About the same
                           159         4  4.A bit worse
                           183         5  5.Much worse

-------------------------------------------------------------------------------
pc26_flag_12                            R's ability to know how to use familiar machines:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
```

```
         unique values:  2                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,255         0  0.Not Imputed
                            20         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc29_imp_12                                    R's ability to learn to use a new gadget or
machine (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            30         1  1.Much improved
                             9         2  2.A bit improved
                           831         3  3.About the same
                           202         4  4.A bit worse
                           203         5  5.Much worse

-------------------------------------------------------------------------------
pc29_flag_12                          R's ability to learn to use a new gadget or machine:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,244         0  0.Not Imputed
                            29         1  1.IMPUTED (ALL DK/RF/Missing)
                             2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc32_imp_12                                             R's ability to learn new things in
general (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            35         1  1.Much improved
                            13         2  2.A bit improved
                           841         3  3.About the same
                           193         4  4.A bit worse
                           193         5  5.Much worse

-------------------------------------------------------------------------------
pc32_flag_12                                    R's ability to learn new things in general:
Flag if Imputed
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,275

           tabulation:  Freq.   Numeric  Label
                        1,256         0  0.Not Imputed
                           18         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_12                                 R's ability to follow a story in a book or on
TV (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,275

           tabulation:  Freq.   Numeric  Label
                           32         1  1.Much improved
                           18         2  2.A bit improved
                          928         3  3.About the same
                          145         4  4.A bit worse
                          152         5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_12                          R's ability to follow a story in a book or on TV:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,275

           tabulation:  Freq.   Numeric  Label
                        1,261         0  0.Not Imputed
                           13         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc38_imp_12                                    R's ability to make decisions on everyday
matters (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,275

           tabulation:  Freq.   Numeric  Label
                           30         1  1.Much improved
                           10         2  2.A bit improved
                          966         3  3.About the same
                          120         4  4.A bit worse
                          149         5  5.Much worse
```

```
-------------------------------------------------------------------------------
pc38_flag_12                          R's ability to make decisions on everyday matters:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,269         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc41_imp_12                                        R's ability to handle money for shopping
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            35         1  1.Much improved
                            11         2  2.A bit improved
                           904         3  3.About the same
                           130         4  4.A bit worse
                           195         5  5.Much worse

-------------------------------------------------------------------------------
pc41_flag_12                                    R's ability to handle money for shopping:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,261         0  0.Not Imputed
                            12         1  1.IMPUTED (ALL DK/RF/Missing)
                             2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc44_imp_12                                                 R's ability to handle financial
matters (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            25         1  1.Much improved
                            11         2  2.A bit improved
```

```
                          891         3  3.About the same
                          151         4  4.A bit worse
                          197         5  5.Much worse

-------------------------------------------------------------------------------
pc44_flag_12                                    R's ability to handle financial matters:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,227         0  0.Not Imputed
                            46         1  1.IMPUTED (ALL DK/RF/Missing)
                             2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_12                      R's ability to handle other everyday arithmetic problems
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                            33         1  1.Much improved
                             7         2  2.A bit improved
                           893         3  3.About the same
                           150         4  4.A bit worse
                           192         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_12                    R's ability to handle other everyday arithmetic problems:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,255         0  0.Not Imputed
                            20         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_12            R's ability to use his/her intelligence to understand what is going
on (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,275
```

```
            tabulation:  Freq.   Numeric  Label
                            31         1  1.Much improved
                            11         2  2.A bit improved
                           954         3  3.About the same
                           132         4  4.A bit worse
                           147         5  5.Much worse

------------------------------------------------------------------------------
pc50_flag_12           R's ability to use his/her intelligence to understand what is going
on: Flag if
------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/1,275

            tabulation:  Freq.   Numeric  Label
                         1,269         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)
```

2015

Section E

```
------------------------------------------------------------------------------
e7_a1_imp_15                              Verbal Learning List A-Trial 1: Number of Correct
Words (Imputed)
------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
          unique values:  9                       missing .:  6,728/13,850

            tabulation:  Freq.  Value
                           100  0
                           306  1
                           771  2
                         1,560  3
                         1,982  4
                         1,528  5
                           692  6
                           158  7
                            25  8
                         6,728  .

------------------------------------------------------------------------------
e7_a1_flag_15                                          Verbal Learning List A-Trial 1:
Flag if Imputed
------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  6,728/13,850

            tabulation:  Freq.   Numeric  Label
```

```
                        7,058         0  0.Not Imputed
                           64         1  1.IMPUTED
                        6,728         .
```

---

e7_a2_imp_15 Verbal Learning List A-Trial 2: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  6,728/13,850

           tabulation:  Freq.  Value
                           55  0
                           70  1
                          208  2
                          782  3
                        1,616  4
                        1,873  5
                        1,595  6
                          734  7
                          189  8
                        6,728  .
```

---

e7_a2_flag_15 Verbal Learning List A-Trial 2: Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  6,728/13,850

           tabulation:  Freq.   Numeric  Label
                        7,059         0  0.Not Imputed
                           63         1  1.IMPUTED
                        6,728         .
```

---

e7_a3_imp_15 Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  6,728/13,850

           tabulation:  Freq.  Value
                           73  0
                           59  1
                          148  2
                          495  3
                        1,142  4
                        1,621  5
                        1,840  6
                        1,237  7
                          507  8
                        6,728  .
```

```
-------------------------------------------------------------------------------
e7_a3_flag_15                                          Verbal Learning List A-Trial 3:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  6,728/13,850

            tabulation:  Freq.   Numeric  Label
                         7,058         0  0.Not Imputed
                            64         1  1.IMPUTED
                         6,728         .

-------------------------------------------------------------------------------
e7_b1_imp_15                             Verbal Learning List B-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
         unique values:  9                       missing .:  7,122/13,850

            tabulation:  Freq.  Value
                            62  0
                           224  1
                           652  2
                         1,345  3
                         1,818  4
                         1,669  5
                           750  6
                           180  7
                            28  8
                         7,122  .

-------------------------------------------------------------------------------
e7_b1_flag_15                                          Verbal Learning List B-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                       missing .:  7,122/13,850

            tabulation:  Freq.   Numeric  Label
                         6,667         0  0.Not Imputed
                            61         1  1.IMPUTED
                         7,122         .

-------------------------------------------------------------------------------
e7_b2_imp_15                             Verbal Learning List B-Trial 2: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
```

```
         unique values:  9                        missing .:  7,122/13,850

            tabulation:  Freq.  Value
                            43  0
                            50  1
                           192  2
                           648  3
                         1,420  4
                         1,994  5
                         1,568  6
                           666  7
                           147  8
                         7,122  .
```

---

e7_b2_flag_15 — Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  7,122/13,850

            tabulation:  Freq.   Numeric  Label
                         6,666         0  0.Not Imputed
                            62         1  1.IMPUTED
                         7,122         .
```

---

e7_b3_imp_15 — Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)

```
                  type:  numeric (byte)

                 range:  [0,8]                        units:  1
         unique values:  9                        missing .:  7,122/13,850

            tabulation:  Freq.  Value
                            61  0
                            63  1
                           132  2
                           382  3
                           958  4
                         1,531  5
                         1,888  6
                         1,246  7
                           467  8
                         7,122  .
```

---

e7_b3_flag_15 — Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  7,122/13,850
```

```
            tabulation:  Freq.   Numeric  Label
                         6,666         0  0.Not Imputed
                            62         1  1.IMPUTED
                         7,122         .

-------------------------------------------------------------------------------
e8_imp_15                                                        Constructional
Praxis (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,6]                        units:  1
          unique values:  7                       missing .:  0/13,850

            tabulation:  Freq.  Value
                           138  0
                            96  1
                           354  2
                           436  3
                           831  4
                         1,697  5
                        10,298  6

-------------------------------------------------------------------------------
e8_flag_15                                                 Constructional Praxis:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        12,868         0  0.Not Imputed
                           982         1  1.IMPUTED

-------------------------------------------------------------------------------
e9a_imp_15                                      Verbal Fluency - Number of different
animals (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [0,40]                       units:  1
          unique values:  40                      missing .:  0/13,850

                  mean:   15.5143
             std. dev:   5.24259

            percentiles:        10%       25%       50%       75%       90%
                                  9        12        15        19        23

-------------------------------------------------------------------------------
e9a_flag_15                                Verbal Fluency - Number of different animals:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp
```

```
                range:  [0,1]                       units:  1
         unique values:  2                        missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        13,730         0  0.Not Imputed
                           120         1  1.IMPUTED
```

---

e9b_imp_15 Verbal Fluency - Number of times R repeated an animal (Imputed)

```
                 type:  numeric (byte)

                range:  [0,22]                       units:  1
         unique values:  14                       missing .:  0/13,850

                 mean:   .734513
            std. dev:   1.13373

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         1         2
```

---

e9b_flag_15 Verbal Fluency - Number of times R repeated an animal : Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
         unique values:  2                        missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        13,730         0  0.Not Imputed
                           120         1  1.IMPUTED
```

---

e10_imp_15
Visual Scan (Imputed)

```
                 type:  numeric (byte)

                range:  [0,60]                       units:  1
         unique values:  61                       missing .:  0/13,850

                 mean:   28.3962
            std. dev:   15.9294

           percentiles:        10%       25%       50%       75%       90%
                                 8        16        27        41        52
```

---

e10_flag_15 Visual Scan: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
```

```
         unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        12,858         0  0.Not Imputed
                           992         1  1.IMPUTED

-------------------------------------------------------------------------------
e11a_imp_15                                                          Orientation
- Day (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
         unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.  Value
                        10,005  1
                         3,845  2

-------------------------------------------------------------------------------
e11a_flag_15                                           Orientation - Day:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        13,767         0  0.Not Imputed
                            83         1  1.IMPUTED

-------------------------------------------------------------------------------
e11b_imp_15                                                        Orientation -
Month (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
         unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.  Value
                        12,559  1
                         1,291  2

-------------------------------------------------------------------------------
e11b_flag_15                                         Orientation - Month:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                       missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        13,767         0  0.Not Imputed
                            83         1  1.IMPUTED
```

```
-------------------------------------------------------------------------------
e11c_imp_15                                                        Orientation
- Year (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
          unique values:  2                       missing .:  0/13,850

             tabulation:  Freq.  Value
                         11,198  1
                          2,652  2

-------------------------------------------------------------------------------
e11c_flag_15                                                Orientation - Year:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/13,850

             tabulation:  Freq.   Numeric  Label
                         13,767         0  0.Not Imputed
                             83         1  1.IMPUTED

-------------------------------------------------------------------------------
e12_imp_15                                      Numeracy - Score for First and Second
Attempt (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
          unique values:  2                       missing .:  0/13,850

             tabulation:  Freq.  Value
                         12,203  1
                          1,647  2

-------------------------------------------------------------------------------
e12_flag_15                           Numeracy - Score for First and Second Attempt:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/13,850

             tabulation:  Freq.   Numeric  Label
                         13,158         0  0.Not Imputed
                            692         1  1.IMPUTED

-------------------------------------------------------------------------------
e12c_imp_15                                      Numeracy - Time for First and Second
Attempt (Imputed)
-------------------------------------------------------------------------------
```

```
                  type:  numeric (float)

                 range:  [0,60]                       units:  1.000e-08
         unique values:  727                      missing .:  0/13,850

                  mean:   15.2346
             std. dev:   15.7585

           percentiles:        10%       25%       50%       75%       90%
                                 5         6         9        15   41.8789
```

---

e12c_flag_15 — Numeracy - Time for First and Second Attempt: Flag if Imputed

---

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        13,158         0  0.Not Imputed
                           692         1  1.IMPUTED
```

---

e13_imp_15 — Constructional Praxis Recall (Imputed)

```
                  type:  numeric (byte)

                 range:  [0,6]                        units:  1
         unique values:  7                        missing .:  0/13,850

            tabulation:  Freq.  Value
                           822  0
                           260  1
                           715  2
                           962  3
                         1,785  4
                         2,479  5
                         6,827  6
```

---

e13_flag_15 — Constructional Praxis Recall: Flag if Imputed

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                        12,757         0  0.Not Imputed
                         1,093         1  1.IMPUTED
```

---

e14_a_imp_15 Verbal Recall List A: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 6,728/13,850

tabulation:

Freq.	Value
685	0
334	1
574	2
804	3
1,254	4
1,441	5
1,112	6
658	7
260	8
6,728	.

---

e14_a_flag_15 Verbal Recall List A: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 6,728/13,850

tabulation:

Freq.	Numeric	Label
7,044	0	0.Not Imputed
78	1	1.IMPUTED
6,728	.	

---

e14_b_imp_15 Verbal Recall List B: Number of Correct Words (Imputed)

---

type: numeric (byte)

range: [0,8] units: 1
unique values: 9 missing .: 7,122/13,850

tabulation:

Freq.	Value
609	0
296	1
470	2
760	3
1,139	4
1,358	5
1,210	6
650	7
236	8
7,122	.

---

e14_b_flag_15 Verbal Recall List B: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  7,122/13,850

            tabulation:  Freq.   Numeric  Label
                         6,658         0  0.Not Imputed
                            70         1  1.IMPUTED
                         7,122         .

-------------------------------------------------------------------------------
e15_imp_15                                                    Succesive Subtractions -
Serial 7 (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,5]                        units:  1
         unique values:  6                        missing .:  0/13,850

            tabulation:  Freq.  Value
                           791  0
                         2,109  1
                         2,294  2
                         2,632  3
                         2,597  4
                         3,427  5

-------------------------------------------------------------------------------
e15_flag_15                                            Succesive Subtractions - Serial 7:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/13,850

            tabulation:  Freq.   Numeric  Label
                         8,921         0  0.Not Imputed
                         4,929         1  1.IMPUTED
```

Section PC

```
-------------------------------------------------------------------------------
pc5_imp_15                                  R's ability to remember things about family &
friends (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                            11         1  1.Much improved
                            17         2  2.A bit improved
```

```
                          623         3  3.About the same
                          166         4  4.A bit worse
                          112         5  5.Much worse

-------------------------------------------------------------------------------
pc5_flag_15                          R's ability to remember things about family & friends:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           927         0  0.Not Imputed
                             2         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc8_imp_15                                                    R's ability to remember
things (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                            12         1  1.Much improved
                            10         2  2.A bit improved
                           663         3  3.About the same
                           136         4  4.A bit worse
                           108         5  5.Much worse

-------------------------------------------------------------------------------
pc8_flag_15                                          R's ability to remember things:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           928         0  0.Not Imputed
                             1         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc11_imp_15                                R's ability to recall conversations a few days
later (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/929
```

```
            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            10         2  2.A bit improved
                           643         3  3.About the same
                           143         4  4.A bit worse
                           119         5  5.Much worse

-------------------------------------------------------------------------------
pc11_flag_15                          R's ability to recall conversations a few days later:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           927         0  0.Not Imputed
                             2         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc14_imp_15                                                R's ability to remember his/her
address (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                            17         1  1.Much improved
                             6         2  2.A bit improved
                           650         3  3.About the same
                           126         4  4.A bit worse
                           130         5  5.Much worse

-------------------------------------------------------------------------------
pc14_flag_15                                       R's ability to remember his/her address:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           921         0  0.Not Imputed
                             8         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc17_imp_15                                   R's ability to remember what day and month it
is (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability
```

```
                range:  [1,5]                       units:  1
        unique values:  5                        missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           16         1  1.Much improved
                            9         2  2.A bit improved
                          617         3  3.About the same
                          147         4  4.A bit worse
                          140         5  5.Much worse
```

---

pc17_flag_15 R's ability to remember what day and month it is: Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          926         0  0.Not Imputed
                            3         1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc20_imp_15 R's ability to remember where things are usually kept (Imputed)

```
                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                       units:  1
        unique values:  5                        missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           17         1  1.Much improved
                           10         2  2.A bit improved
                          582         3  3.About the same
                          192         4  4.A bit worse
                          128         5  5.Much worse
```

---

pc20_flag_15 R's ability to remember where things are usually kept: Flag if Imputed

---

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                       units:  1
        unique values:  3                        missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          923         0  0.Not Imputed
                            5         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)
```

---

pc23_imp_15 R's ability to remember where to find things put in a different place (Imputed)

```
                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           16         1  1.Much improved
                            6         2  2.A bit improved
                          566         3  3.About the same
                          200         4  4.A bit worse
                          141         5  5.Much worse

-------------------------------------------------------------------------------
pc23_flag_15            R's ability to remember where to find things put in a different
place: Flag if I
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          923         0  0.Not Imputed
                            6         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc26_imp_15                               R's ability to know how to use familiar machines
(Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           11         1  1.Much improved
                            7         2  2.A bit improved
                          648         3  3.About the same
                          119         4  4.A bit worse
                          144         5  5.Much worse

-------------------------------------------------------------------------------
pc26_flag_15                             R's ability to know how to use familiar machines:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          912         0  0.Not Imputed
                           17         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
```

pc29_imp_15 R's ability to learn to use a new gadget or machine (Imputed)

---

type: numeric (byte)
label: ability

range: [1,5] units: 1
unique values: 5 missing .: 0/929

tabulation:

Freq.	Numeric	Label
13	1	1.Much improved
24	2	2.A bit improved
576	3	3.About the same
163	4	4.A bit worse
153	5	5.Much worse

---

pc29_flag_15 R's ability to learn to use a new gadget or machine: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/929

tabulation:

Freq.	Numeric	Label
903	0	0.Not Imputed
26	1	1.IMPUTED (ALL DK/RF/Missing)

---

pc32_imp_15 R's ability to learn new things in general (Imputed)

---

type: numeric (byte)
label: ability

range: [1,5] units: 1
unique values: 5 missing .: 0/929

tabulation:

Freq.	Numeric	Label
18	1	1.Much improved
29	2	2.A bit improved
568	3	3.About the same
162	4	4.A bit worse
152	5	5.Much worse

---

pc32_flag_15 R's ability to learn new things in general: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/929

tabulation:

Freq.	Numeric	Label
913	0	0.Not Imputed

```
                           16        1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_15                                  R's ability to follow a story in a book or on
TV (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/929

             tabulation:  Freq.   Numeric  Label
                             23        1  1.Much improved
                             11        2  2.A bit improved
                            646        3  3.About the same
                            109        4  4.A bit worse
                            140        5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_15                           R's ability to follow a story in a book or on TV:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/929

             tabulation:  Freq.   Numeric  Label
                            910        0  0.Not Imputed
                             19        1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc38_imp_15                                  R's ability to make decisions on everyday
matters (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/929

             tabulation:  Freq.   Numeric  Label
                             21        1  1.Much improved
                             16        2  2.A bit improved
                            657        3  3.About the same
                             98        4  4.A bit worse
                            137        5  5.Much worse

-------------------------------------------------------------------------------
pc38_flag_15                           R's ability to make decisions on everyday matters:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
          unique values:  2                       missing .:  0/929
```

```
            tabulation:  Freq.   Numeric  Label
                           923         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc41_imp_15                                          R's ability to handle money for shopping
(Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                            21         1  1.Much improved
                            16         2  2.A bit improved
                           595         3  3.About the same
                           124         4  4.A bit worse
                           173         5  5.Much worse

-------------------------------------------------------------------------------
pc41_flag_15                                       R's ability to handle money for shopping:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           920         0  0.Not Imputed
                             8         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc44_imp_15                                                R's ability to handle financial
matters (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                            15         1  1.Much improved
                            16         2  2.A bit improved
                           629         3  3.About the same
                           110         4  4.A bit worse
                           159         5  5.Much worse

-------------------------------------------------------------------------------
pc44_flag_15                                       R's ability to handle financial matters:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
```

```
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          888         0  0.Not Imputed
                           40         1  1.IMPUTED (ALL DK/RF/Missing)
                            1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_15                        R's ability to handle other everyday arithmetic problems
(Imputed)
-------------------------------------------------------------------------------

                type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           12         1  1.Much improved
                            9         2  2.A bit improved
                          627         3  3.About the same
                          127         4  4.A bit worse
                          154         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_15                    R's ability to handle other everyday arithmetic problems:
Flag if Imputed
-------------------------------------------------------------------------------

                type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                          910         0  0.Not Imputed
                           17         1  1.IMPUTED (ALL DK/RF/Missing)
                            2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_15            R's ability to use his/her intelligence to understand what is going
on (Imputed)
-------------------------------------------------------------------------------

                type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/929

           tabulation:  Freq.   Numeric  Label
                           13         1  1.Much improved
                           20         2  2.A bit improved
                          651         3  3.About the same
                          110         4  4.A bit worse
                          135         5  5.Much worse

-------------------------------------------------------------------------------
```

```
pc50_flag_15          R's ability to use his/her intelligence to understand what is going
on: Flag if
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/929

            tabulation:  Freq.   Numeric  Label
                           923         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)
```

2018

Section E

```
-------------------------------------------------------------------------------
e7_a1_imp_18                              Verbal Learning List A-Trial 1: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
         unique values:  9                        missing .:  7,627/15,786

            tabulation:  Freq.  Value
                           102  0
                           271  1
                           803  2
                         1,648  3
                         2,315  4
                         1,897  5
                           873  6
                           216  7
                            34  8
                         7,627  .

-------------------------------------------------------------------------------
e7_a1_flag_18                                          Verbal Learning List A-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
         unique values:  2                        missing .:  7,627/15,786

            tabulation:  Freq.   Numeric  Label
                         8,043         0  0.Not Imputed
                           116         1  1.IMPUTED
                         7,627         .

-------------------------------------------------------------------------------
e7_a2_imp_18                              Verbal Learning List A-Trial 2: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------
```

```
                type:  numeric (byte)

               range:  [0,8]                        units:  1
        unique values:  9                       missing .:  7,627/15,786

           tabulation:  Freq.  Value
                          88  0
                          87  1
                         226  2
                         804  3
                       1,729  4
                       2,163  5
                       1,859  6
                         960  7
                         243  8
                       7,627  .
```

---

e7_a2_flag_18 Verbal Learning List A-Trial 2: Flag if Imputed

---

```
                type:  numeric (byte)
               label:  imp

               range:  [0,1]                        units:  1
        unique values:  2                       missing .:  7,627/15,786

           tabulation:  Freq.   Numeric  Label
                        8,043         0  0.Not Imputed
                          116         1  1.IMPUTED
                        7,627         .
```

---

e7_a3_imp_18 Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)

```
                type:  numeric (byte)

               range:  [0,8]                        units:  1
        unique values:  9                       missing .:  7,627/15,786

           tabulation:  Freq.  Value
                          86  0
                          83  1
                         184  2
                         512  3
                       1,151  4
                       1,953  5
                       2,140  6
                       1,428  7
                         622  8
                       7,627  .
```

---

e7_a3_flag_18 Verbal Learning List A-Trial 3: Flag if Imputed

---

```
                type:  numeric (byte)
               label:  imp
```

```
                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  7,627/15,786

           tabulation:  Freq.   Numeric  Label
                        8,043         0  0.Not Imputed
                          116         1  1.IMPUTED
                        7,627         .
```

---

e7_b1_imp_18 — Verbal Learning List B-Trial 1: Number of Correct Words (Imputed)

```
                type:  numeric (byte)

                range:  [0,8]                       units:  1
        unique values:  9                        missing .:  8,159/15,786

           tabulation:  Freq.  Value
                           66  0
                          191  1
                          608  2
                        1,430  3
                        2,082  4
                        1,952  5
                        1,018  6
                          245  7
                           35  8
                        8,159  .
```

---

e7_b1_flag_18 — Verbal Learning List B-Trial 1: Flag if Imputed

---

```
                type:  numeric (byte)
               label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  8,159/15,786

           tabulation:  Freq.   Numeric  Label
                        7,501         0  0.Not Imputed
                          126         1  1.IMPUTED
                        8,159         .
```

---

e7_b2_imp_18 — Verbal Learning List B-Trial 2: Number of Correct Words (Imputed)

```
                type:  numeric (byte)

                range:  [0,8]                       units:  1
        unique values:  9                        missing .:  8,159/15,786

           tabulation:  Freq.  Value
                           56  0
                           54  1
                          198  2
                          672  3
                        1,526  4
                        2,210  5
```

```
                        1,797  6
                          889  7
                          225  8
                        8,159  .

-------------------------------------------------------------------------------
e7_b2_flag_18                                          Verbal Learning List B-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  8,159/15,786

           tabulation:  Freq.   Numeric  Label
                        7,501         0  0.Not Imputed
                          126         1  1.IMPUTED
                        8,159         .

-------------------------------------------------------------------------------
e7_b3_imp_18                          Verbal Learning List A-Trial 3: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                        units:  1
        unique values:  9                    missing .:  8,159/15,786

           tabulation:  Freq.  Value
                           70  0
                           49  1
                          159  2
                          417  3
                          982  4
                        1,744  5
                        2,108  6
                        1,487  7
                          611  8
                        8,159  .

-------------------------------------------------------------------------------
e7_b3_flag_18                                          Verbal Learning List B-Trial 1:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  8,159/15,786

           tabulation:  Freq.   Numeric  Label
                        7,501         0  0.Not Imputed
                          126         1  1.IMPUTED
                        8,159         .

-------------------------------------------------------------------------------
e8_imp_18                                                          Constructional
Praxis (Imputed)
-------------------------------------------------------------------------------
```

```
                type:  numeric (byte)

               range:  [0,6]                        units:  1
        unique values:  7                       missing .:  0/15,786

           tabulation:  Freq.  Value
                           79  0
                           87  1
                          279  2
                          498  3
                          946  4
                        2,167  5
                       11,730  6
```

---

e8_flag_18 — Constructional Praxis: Flag if Imputed

```
                type:  numeric (byte)
               label:  imp

               range:  [0,1]                        units:  1
        unique values:  2                       missing .:  0/15,786

           tabulation:  Freq.   Numeric  Label
                       14,586         0  0.Not Imputed
                        1,200         1  1.IMPUTED
```

---

e9a_imp_18 — Verbal Fluency - Number of different animals (Imputed)

```
                type:  numeric (byte)

               range:  [0,30]                       units:  1
        unique values:  31                      missing .:  0/15,786

                mean:   15.7078
           std. dev:   5.24839

         percentiles:        10%       25%       50%       75%       90%
                              9        12        16        19        23
```

---

e9a_flag_18 — Verbal Fluency - Number of different animals: Flag if Imputed

---

```
                type:  numeric (byte)
               label:  imp

               range:  [0,1]                        units:  1
        unique values:  2                       missing .:  0/15,786

           tabulation:  Freq.   Numeric  Label
                       15,297         0  0.Not Imputed
                          489         1  1.IMPUTED
```

---

e9b_imp_18 Verbal Fluency - Number of times R repeated an animal (Imputed)

---

type: numeric (byte)

range: [0,29] units: 1
unique values: 16 missing .: 0/15,786

mean: .716331
std. dev: 1.17394

percentiles:	10%	25%	50%	75%	90%
	0	0	0	1	2

---

e9b_flag_18 Verbal Fluency - Number of times R repeated an animal : Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/15,786

tabulation:	Freq.	Numeric	Label
	15,297	0	0.Not Imputed
	489	1	1.IMPUTED

---

e10_imp_18 Visual Scan (Imputed)

---

type: numeric (byte)

range: [0,60] units: 1
unique values: 61 missing .: 0/15,786

mean: 30.7472
std. dev: 16.1361

percentiles:	10%	25%	50%	75%	90%
	9	18	30	44	54

---

e10_flag_18 Visual Scan: Flag if Imputed

---

type: numeric (byte)
label: imp

range: [0,1] units: 1
unique values: 2 missing .: 0/15,786

tabulation:	Freq.	Numeric	Label
	14,449	0	0.Not Imputed
	1,337	1	1.IMPUTED

---

e11a_imp_18 Orientation - Day (Imputed)

```
                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
         unique values:  2                        missing .:  0/15,786

            tabulation:  Freq.  Value
                        14,574  1
                         1,212  2
```

e11a_flag_18 Orientation - Day: Flag if Imputed

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/15,786

            tabulation:  Freq.   Numeric  Label
                        15,762         0  0.Not Imputed
                            24         1  1.IMPUTED
```

e11b_imp_18 Orientation - Month (Imputed)

```
                  type:  numeric (byte)

                 range:  [1,2]                        units:  1
         unique values:  2                        missing .:  0/15,786

            tabulation:  Freq.  Value
                        14,731  1
                         1,055  2
```

e11b_flag_18 Orientation - Month: Flag if Imputed

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/15,786

            tabulation:  Freq.   Numeric  Label
                        15,762         0  0.Not Imputed
                            24         1  1.IMPUTED
```

e11c_imp_18 Orientation - Year (Imputed)

```
                  type:  numeric (byte)
```

```
                range:  [1,2]                       units:  1
        unique values:  2                        missing .:  0/15,786

           tabulation:  Freq.  Value
                       13,404  1
                        2,382  2
```

---

e11c_flag_18 Orientation - Year: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  0/15,786

           tabulation:  Freq.   Numeric  Label
                       15,762         0  0.Not Imputed
                           24         1  1.IMPUTED
```

---

e13_imp_18 Constructional Praxis Recall (Imputed)

```
                 type:  numeric (byte)

                range:  [0,6]                       units:  1
        unique values:  7                        missing .:  0/15,786

           tabulation:  Freq.  Value
                          515  0
                          228  1
                          672  2
                        1,253  3
                        2,252  4
                        2,776  5
                        8,090  6
```

---

e13_flag_18 Constructional Praxis Recall: Flag if Imputed

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                        missing .:  0/15,786

           tabulation:  Freq.   Numeric  Label
                       14,059         0  0.Not Imputed
                        1,727         1  1.IMPUTED
```

---

e14_a_imp_18 Verbal Recall List A: Number of Correct Words (Imputed)

```
                 type:  numeric (byte)
```

```
                range:  [0,8]                       units:  1
        unique values:  9                       missing .:  7,627/15,786

           tabulation:  Freq.  Value
                          530  0
                          354  1
                          563  2
                        1,016  3
                        1,505  4
                        1,740  5
                        1,345  6
                          769  7
                          337  8
                        7,627  .

-------------------------------------------------------------------------------
e14_a_flag_18                                                 Verbal Recall List A:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
        unique values:  2                       missing .:  7,627/15,786

           tabulation:  Freq.   Numeric  Label
                        8,043         0  0.Not Imputed
                          116         1  1.IMPUTED
                        7,627         .

-------------------------------------------------------------------------------
e14_b_imp_18                                 Verbal Recall List B: Number of Correct
Words (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)

                range:  [0,8]                       units:  1
        unique values:  9                       missing .:  8,159/15,786

           tabulation:  Freq.  Value
                          461  0
                          287  1
                          480  2
                          801  3
                        1,388  4
                        1,694  5
                        1,410  6
                          815  7
                          291  8
                        8,159  .

-------------------------------------------------------------------------------
e14_b_flag_18                                                 Verbal Recall List B:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                       units:  1
```

```
         unique values:  2                        missing .:  8,159/15,786

            tabulation:  Freq.   Numeric  Label
                         7,501         0  0.Not Imputed
                           126         1  1.IMPUTED
                         8,159         .
```

---

e15_imp_18 — Succesive Subtractions - Serial 7 (Imputed)

```
                  type:  numeric (byte)

                 range:  [0,5]                        units:  1
         unique values:  6                        missing .:  0/15,786

            tabulation:  Freq.  Value
                           951  0
                         2,342  1
                         2,401  2
                         2,834  3
                         2,973  4
                         4,285  5
```

---

e15_flag_18 — Succesive Subtractions - Serial 7: Flag if Imputed

---

```
                  type:  numeric (byte)
                 label:  imp

                 range:  [0,1]                        units:  1
         unique values:  2                        missing .:  0/15,786

            tabulation:  Freq.   Numeric  Label
                        11,407         0  0.Not Imputed
                         4,379         1  1.IMPUTED
```

Section PC

---

pc5_imp_18 — R's ability to remember things about family & friends (Imputed)

```
                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            30         1  1.Much improved
                            34         2  2.A bit improved
                           940         3  3.About the same
                           211         4  4.A bit worse
                           113         5  5.Much worse
```

```
pc5_flag_18                     R's ability to remember things about family & friends:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,307         0  0.Not Imputed
                             4         1  1.IMPUTED (ALL DK/RF/Missing)
                            17         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc8_imp_18                                                    R's ability to remember
things (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            31         1  1.Much improved
                            34         2  2.A bit improved
                           976         3  3.About the same
                           182         4  4.A bit worse
                           105         5  5.Much worse

-------------------------------------------------------------------------------
pc8_flag_18                                      R's ability to remember things:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,319         0  0.Not Imputed
                             3         1  1.IMPUTED (ALL DK/RF/Missing)
                             6         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc11_imp_18                          R's ability to recall conversations a few days
later (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            22         1  1.Much improved
                            28         2  2.A bit improved
```

```
                          966          3  3.About the same
                          194          4  4.A bit worse
                          118          5  5.Much worse

-------------------------------------------------------------------------------
pc11_flag_18                      R's ability to recall conversations a few days later:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,319         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)
                             3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc14_imp_18                                          R's ability to remember his/her
address (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            22         1  1.Much improved
                            19         2  2.A bit improved
                           982         3  3.About the same
                           185         4  4.A bit worse
                           120         5  5.Much worse

-------------------------------------------------------------------------------
pc14_flag_18                                   R's ability to remember his/her address:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,312         0  0.Not Imputed
                            11         1  1.IMPUTED (ALL DK/RF/Missing)
                             5         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc17_imp_18                                     R's ability to remember what day and month
it is (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
```

```
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            19         1  1.Much improved
                            17         2  2.A bit improved
                           946         3  3.About the same
                           200         4  4.A bit worse
                           146         5  5.Much worse

-------------------------------------------------------------------------------
pc17_flag_18                           R's ability to remember what day and month it is:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,314         0  0.Not Imputed
                             8         1  1.IMPUTED (ALL DK/RF/Missing)
                             6         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc20_imp_18                             R's ability to remember where things are usually
kept (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            14         1  1.Much improved
                            14         2  2.A bit improved
                           913         3  3.About the same
                           250         4  4.A bit worse
                           137         5  5.Much worse

-------------------------------------------------------------------------------
pc20_flag_18                    R's ability to remember where things are usually kept:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,318         0  0.Not Imputed
                             6         1  1.IMPUTED (ALL DK/RF/Missing)
                             4         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc23_imp_18            R's ability to remember where to find things put in a different
place (Imputed)
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,328

           tabulation:  Freq.   Numeric  Label
                           17         1  1.Much improved
                           11         2  2.A bit improved
                          898         3  3.About the same
                          259         4  4.A bit worse
                          143         5  5.Much worse

-------------------------------------------------------------------------------
pc23_flag_18          R's ability to remember where to find things put in a different
place: Flag if I
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,328

           tabulation:  Freq.   Numeric  Label
                       1,316         0  0.Not Imputed
                           9         1  1.IMPUTED (ALL DK/RF/Missing)
                           3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc26_imp_18                                  R's ability to know how to use familiar
machines (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
        unique values:  5                         missing .:  0/1,328

           tabulation:  Freq.   Numeric  Label
                           18         1  1.Much improved
                           18         2  2.A bit improved
                          987         3  3.About the same
                          157         4  4.A bit worse
                          148         5  5.Much worse

-------------------------------------------------------------------------------
pc26_flag_18                           R's ability to know how to use familiar machines:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
        unique values:  3                         missing .:  0/1,328

           tabulation:  Freq.   Numeric  Label
                       1,298         0  0.Not Imputed
                          27         1  1.IMPUTED (ALL DK/RF/Missing)
                           3         2  2.IMPUTED (ONE DK/RF/Missing)
```

```
-------------------------------------------------------------------------------
pc29_imp_18                                R's ability to learn to use a new gadget or
machine (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            30         1  1.Much improved
                            40         2  2.A bit improved
                           858         3  3.About the same
                           218         4  4.A bit worse
                           182         5  5.Much worse

-------------------------------------------------------------------------------
pc29_flag_18                        R's ability to learn to use a new gadget or machine:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                        1,294         0  0.Not Imputed
                           31         1  1.IMPUTED (ALL DK/RF/Missing)
                            3         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc32_imp_18                                 R's ability to learn new things in
general (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            35         1  1.Much improved
                            37         2  2.A bit improved
                           868         3  3.About the same
                           222         4  4.A bit worse
                           166         5  5.Much worse

-------------------------------------------------------------------------------
pc32_flag_18                          R's ability to learn new things in general:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328
```

```
            tabulation:  Freq.   Numeric  Label
                         1,309         0  0.Not Imputed
                            18         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_18                                  R's ability to follow a story in a book or
on TV (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            29         1  1.Much improved
                            26         2  2.A bit improved
                           979         3  3.About the same
                           140         4  4.A bit worse
                           154         5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_18                           R's ability to follow a story in a book or on TV:
Flag if Imputed
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  imp

                 range:  [0,2]                        units:  1
          unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,307         0  0.Not Imputed
                            17         1  1.IMPUTED (ALL DK/RF/Missing)
                             4         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc38_imp_18                                    R's ability to make decisions on everyday
matters (Imputed)
-------------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  ability

                 range:  [1,5]                        units:  1
          unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            31         1  1.Much improved
                            21         2  2.A bit improved
                           974         3  3.About the same
                           146         4  4.A bit worse
                           156         5  5.Much worse

-------------------------------------------------------------------------------
pc38_flag_18                          R's ability to make decisions on everyday matters:
Flag if Imputed
-------------------------------------------------------------------------------
```

```
                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,317         0  0.Not Imputed
                            10         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc41_imp_18                                          R's ability to handle money for
shopping (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            30         1  1.Much improved
                            29         2  2.A bit improved
                           938         3  3.About the same
                           169         4  4.A bit worse
                           162         5  5.Much worse

-------------------------------------------------------------------------------
pc41_flag_18                                 R's ability to handle money for shopping:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,312         0  0.Not Imputed
                            14         1  1.IMPUTED (ALL DK/RF/Missing)
                             2         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc44_imp_18                                          R's ability to handle financial
matters (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                        missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            22         1  1.Much improved
                            24         2  2.A bit improved
                           957         3  3.About the same
                           160         4  4.A bit worse
                           165         5  5.Much worse
```

```
-------------------------------------------------------------------------------
pc44_flag_18                                    R's ability to handle financial matters:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,300         0  0.Not Imputed
                            27         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_18                           R's ability to handle other everyday arithmetic
problems (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            23         1  1.Much improved
                            23         2  2.A bit improved
                           940         3  3.About the same
                           165         4  4.A bit worse
                           177         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_18                  R's ability to handle other everyday arithmetic problems:
Flag if Imputed
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,2]                        units:  1
         unique values:  3                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                         1,309         0  0.Not Imputed
                            18         1  1.IMPUTED (ALL DK/RF/Missing)
                             1         2  2.IMPUTED (ONE DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_18            R's ability to use his/her intelligence to understand what is
going on (Imputed)
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  ability

                range:  [1,5]                        units:  1
         unique values:  5                       missing .:  0/1,328

            tabulation:  Freq.   Numeric  Label
                            21         1  1.Much improved
```

```
                          30         2  2.A bit improved
                         984         3  3.About the same
                         153         4  4.A bit worse
                         140         5  5.Much worse

-------------------------------------------------------------------------------
pc50_flag_18          R's ability to use his/her intelligence to understand what is
going on: Flag if
-------------------------------------------------------------------------------

                 type:  numeric (byte)
                label:  imp

                range:  [0,1]                        units:  1
        unique values:  2                    missing .:  0/1,328

           tabulation:  Freq.   Numeric  Label
                        1,317         0  0.Not Imputed
                           11         1  1.IMPUTED (ALL DK/RF/Missing)
```

2021

Section E

```
-------------------------------------------------------------------------------
e7_a1_imp_21                                                            Verbal
Learning List A-Trial 1: Number of Correct Words (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [0,8]                        Units: 1
        Unique values: 9                    Missing .: 6,788/14,484

           Tabulation: Freq.  Value
                         1  0
                       256  1
                       738  2
                     1,623  3
                     2,270  4
                     1,783  5
                       805  6
                       199  7
                        21  8
                     6,788  .

-------------------------------------------------------------------------------
e7_a1_flag_21
Verbal Learning List A-Trial 1: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                        Units: 1
        Unique values: 2                    Missing .: 6,788/14,484
```

Tabulation:	Freq.	Numeric	Label
	7,566	0	0.Not Imputed
	130	1	1.IMPUTED
	6,788	.	

---

e7_a2_imp_21 Verbal

Learning List A-Trial 2: Number of Correct Words (Imputed)

Type: Numeric (byte)

Range: [0,8] Units: 1

Unique values: 9 Missing .: 6,788/14,484

Tabulation:	Freq.	Value
	3	0
	57	1
	195	2
	670	3
	1,631	4
	2,142	5
	1,838	6
	909	7
	251	8
	6,788	.

---

e7_a2_flag_21

Verbal Learning List A-Trial 2: Flag if Imputed

Type: Numeric (byte)

Label: imp

Range: [0,1] Units: 1

Unique values: 2 Missing .: 6,788/14,484

Tabulation:	Freq.	Numeric	Label
	7,551	0	0.Not Imputed
	145	1	1.IMPUTED
	6,788	.	

---

e7_a3_imp_21 Verbal

Learning List A-Trial 3: Number of Correct Words (Imputed)

Type: Numeric (byte)

Range: [1,8] Units: 1

Unique values: 8 Missing .: 6,788/14,484

Tabulation:	Freq.	Value
	39	1
	123	2
	439	3
	1,115	4
	1,918	5
	2,047	6
	1,446	7
	569	8
	6,788	.

```
-------------------------------------------------------------------------------
e7_a3_flag_21
Verbal Learning List A-Trial 3: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 6,788/14,484

           Tabulation: Freq.   Numeric  Label
                       7,539         0  0.Not Imputed
                         157         1  1.IMPUTED
                       6,788         .

-------------------------------------------------------------------------------
e7_b1_imp_21                                                                 Verbal
Learning List B-Trial 1: Number of Correct Words (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [0,8]                         Units: 1
        Unique values: 9                          Missing .: 7,696/14,484

           Tabulation: Freq.  Value
                           1  0
                         152  1
                         488  2
                       1,208  3
                       1,977  4
                       1,751  5
                         930  6
                         245  7
                          36  8
                       7,696  .

-------------------------------------------------------------------------------
e7_b1_flag_21
Verbal Learning List B-Trial 1: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 7,696/14,484

           Tabulation: Freq.   Numeric  Label
                       6,679         0  0.Not Imputed
                         109         1  1.IMPUTED
                       7,696         .

-------------------------------------------------------------------------------
e7_b2_imp_21                                                                 Verbal
Learning List B-Trial 2: Number of Correct Words (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [0,8]                         Units: 1
```

```
         Unique values: 9                        Missing .: 7,696/14,484

            Tabulation: Freq.  Value
                          2  0
                         45  1
                        171  2
                        556  3
                      1,276  4
                      1,994  5
                      1,746  6
                        815  7
                        183  8
                      7,696  .
```

---

e7_b2_flag_21
Verbal Learning List B-Trial 1: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 7,696/14,484

            Tabulation: Freq.   Numeric  Label
                        6,681         0  0.Not Imputed
                          107         1  1.IMPUTED
                        7,696         .
```

---

e7_b3_imp_21 Verbal Learning List A-Trial 3: Number of Correct Words (Imputed)

```
                 Type: Numeric (byte)

                Range: [0,8]                         Units: 1
         Unique values: 9                        Missing .: 7,696/14,484

            Tabulation: Freq.  Value
                          2  0
                         29  1
                         98  2
                        321  3
                        796  4
                      1,604  5
                      1,910  6
                      1,474  7
                        554  8
                      7,696  .
```

---

e7_b3_flag_21
Verbal Learning List B-Trial 1: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 7,696/14,484
```

```
            Tabulation: Freq.   Numeric  Label
                        6,668         0  0.Not Imputed
                          120         1  1.IMPUTED
                        7,696         .
```

---

e8_imp_21
Constructional Praxis (Imputed)

```
                  Type: Numeric (byte)

                 Range: [0,6]                         Units: 1
          Unique values: 7                        Missing .: 0/14,484

             Tabulation: Freq.  Value
                           202  0
                            33  1
                           177  2
                           261  3
                           808  4
                         1,809  5
                        11,194  6
```

---

e8_flag_21
Constructional Praxis: Flag if Imputed

```
                  Type: Numeric (byte)
                 Label: imp

                 Range: [0,1]                         Units: 1
          Unique values: 2                        Missing .: 0/14,484

             Tabulation: Freq.   Numeric  Label
                        13,940         0  0.Not Imputed
                           544         1  1.IMPUTED
```

---

e9a_imp_21
Verbal Fluency - Number of different animals (Imputed)

```
                  Type: Numeric (byte)

                 Range: [0,38]                        Units: 1
          Unique values: 37                       Missing .: 0/14,484

                  Mean: 15.7735
             Std. dev.: 5.31261

            Percentiles:     10%       25%       50%       75%       90%
                              9        12        16        19        23
```

---

e9a_flag_21
Verbal Fluency - Number of different animals: Flag if Imputed

---

```
                  Type: Numeric (byte)
                 Label: imp
```

```
                Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
                       13,944         0  0.Not Imputed
                          540         1  1.IMPUTED
```

---

e9b_imp_21
Verbal Fluency - Number of times R repeated an animal (Imputed)

```
                 Type: Numeric (byte)

                Range: [0,23]                        Units: 1
         Unique values: 16                       Missing .: 0/14,484

                 Mean: .687586
            Std. dev.: 1.09563

           Percentiles:     10%       25%       50%       75%       90%
                              0         0         0         1         2
```

---

e9b_flag_21 Verbal Fluency - Number of times R repeated an animal : Flag if Imputed

---

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
                       13,944         0  0.Not Imputed
                          540         1  1.IMPUTED
```

---

e10_c_imp_21
Visual Scan correct (Imputed)

```
                 Type: Numeric (byte)

                Range: [0,60]                        Units: 1
         Unique values: 61                       Missing .: 0/14,484

                 Mean: 30.2858
            Std. dev.:  15.937

           Percentiles:     10%       25%       50%       75%       90%
                              9        18        30        43        53
```

---

e10_c_flag_21
Visual Scan: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
```

```
         Unique values: 2                        Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
                       13,941         0  0.Not Imputed
                          543         1  1.IMPUTED

-------------------------------------------------------------------------------
e10_i_imp_21
Visual Scan incorrect (Imputed)
-------------------------------------------------------------------------------

                  Type: Numeric (byte)

                 Range: [0,51]                        Units: 1
         Unique values: 33                       Missing .: 0/14,484

                  Mean: .537144
             Std. dev.:  1.9977

           Percentiles:     10%       25%       50%       75%       90%
                             0         0         0         0         1

-------------------------------------------------------------------------------
e10_i_flag_21
Visual Scan: Flag if Imputed
-------------------------------------------------------------------------------

                  Type: Numeric (byte)
                 Label: imp

                 Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
                       13,941         0  0.Not Imputed
                          543         1  1.IMPUTED

-------------------------------------------------------------------------------
e11a_imp_21
Orientation - Day (Imputed)
-------------------------------------------------------------------------------

                  Type: Numeric (byte)

                 Range: [1,2]                         Units: 1
         Unique values: 2                        Missing .: 0/14,484

            Tabulation: Freq.  Value
                       11,380  1
                        3,104  2

-------------------------------------------------------------------------------
e11a_flag_21
Orientation - Day: Flag if Imputed
-------------------------------------------------------------------------------

                  Type: Numeric (byte)
                 Label: imp

                 Range: [0,0]                         Units: 1
         Unique values: 1                        Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
```

```
                    14,484         0  0.Not Imputed

-------------------------------------------------------------------------------
e11b_imp_21
Orientation - Month (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [1,2]                         Units: 1
        Unique values: 2                          Missing .: 0/14,484

           Tabulation: Freq.  Value
                      13,440  1
                       1,044  2

-------------------------------------------------------------------------------
e11b_flag_21
Orientation - Month: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,0]                         Units: 1
        Unique values: 1                          Missing .: 0/14,484

           Tabulation: Freq.   Numeric  Label
                      14,484         0  0.Not Imputed

-------------------------------------------------------------------------------
e11c_imp_21
Orientation - Year (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [1,2]                         Units: 1
        Unique values: 2                          Missing .: 0/14,484

           Tabulation: Freq.  Value
                      11,959  1
                       2,525  2

-------------------------------------------------------------------------------
e11c_flag_21
Orientation - Year: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,0]                         Units: 1
        Unique values: 1                          Missing .: 0/14,484

           Tabulation: Freq.   Numeric  Label
                      14,484         0  0.Not Imputed

-------------------------------------------------------------------------------
e13_imp_21
Constructional Praxis Recall (Imputed)
-------------------------------------------------------------------------------
```

```
                 Type: Numeric (byte)

                Range: [0,6]                          Units: 1
        Unique values: 7                          Missing .: 0/14,484

           Tabulation: Freq.  Value
                         661  0
                          89  1
                         434  2
                         651  3
                       1,683  4
                       3,062  5
                       7,904  6
```

---

e13_flag_21
Constructional Praxis Recall: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                          Units: 1
        Unique values: 2                          Missing .: 0/14,484

           Tabulation: Freq.   Numeric  Label
                      13,938         0  0.Not Imputed
                         546         1  1.IMPUTED
```

---

e14_a_imp_21
Verbal Recall List A: Number of Correct Words (Imputed)

```
                 Type: Numeric (byte)

                Range: [0,8]                          Units: 1
        Unique values: 9                          Missing .: 6,788/14,484

           Tabulation: Freq.  Value
                          26  0
                         407  1
                         570  2
                       1,054  3
                       1,548  4
                       1,697  5
                       1,338  6
                         756  7
                         300  8
                       6,788  .
```

---

e14_a_flag_21
Verbal Recall List A: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                          Units: 1
        Unique values: 2                          Missing .: 6,788/14,484

           Tabulation: Freq.   Numeric  Label
```

```
                      7,251         0  0.Not Imputed
                        445         1  1.IMPUTED
                      6,788         .

-------------------------------------------------------------------------------
e14_b_imp_21
Verbal Recall List B: Number of Correct Words (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [0,8]                          Units: 1
        Unique values: 9                      Missing .: 7,696/14,484

           Tabulation: Freq.  Value
                         22  0
                        258  1
                        434  2
                        746  3
                      1,274  4
                      1,555  5
                      1,400  6
                        799  7
                        300  8
                      7,696  .

-------------------------------------------------------------------------------
e14_b_flag_21
Verbal Recall List B: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                          Units: 1
        Unique values: 2                      Missing .: 7,696/14,484

           Tabulation: Freq.   Numeric  Label
                      6,381         0  0.Not Imputed
                        407         1  1.IMPUTED
                      7,696         .

-------------------------------------------------------------------------------
e14_b_imp_21
Verbal Recall List B: Number of Correct Words (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)

                Range: [0,8]                          Units: 1
        Unique values: 9                      Missing .: 7,696/14,484

           Tabulation: Freq.  Value
                         22  0
                        258  1
                        434  2
                        746  3
                      1,274  4
                      1,555  5
                      1,400  6
                        799  7
                        300  8
                      7,696  .
```

```
-------------------------------------------------------------------------------
e14_b_flag_21
Verbal Recall List B: Flag if Imputed
-------------------------------------------------------------------------------

                  Type: Numeric (byte)
                 Label: imp

                 Range: [0,1]                         Units: 1
         Unique values: 2                         Missing .: 7,696/14,484

            Tabulation: Freq.   Numeric  Label
                        6,381         0  0.Not Imputed
                          407         1  1.IMPUTED
                        7,696         .

-------------------------------------------------------------------------------
e15_imp_21
Succesive Subtractions - Serial 3 (Imputed)
-------------------------------------------------------------------------------

                  Type: Numeric (byte)

                 Range: [0,5]                         Units: 1
         Unique values: 6                         Missing .: 0/14,484

            Tabulation: Freq.  Value
                          221  0
                          544  1
                        1,033  2
                        1,896  3
                        4,050  4
                        6,740  5

-------------------------------------------------------------------------------
e15_flag_21
Succesive Subtractions - Serial 3: Flag if Imputed
-------------------------------------------------------------------------------

                  Type: Numeric (byte)
                 Label: imp

                 Range: [0,1]                         Units: 1
         Unique values: 2                         Missing .: 0/14,484

            Tabulation: Freq.   Numeric  Label
                       11,545         0  0.Not Imputed
                        2,939         1  1.IMPUTED
```

Section PC

```
-------------------------------------------------------------------------------
pc5_imp_21                                                                R's
ability to remember things about family & friends (Imputed)
-------------------------------------------------------------------------------

                  Type: Numeric (byte)
                 Label: ability

                 Range: [1,5]                         Units: 1
         Unique values: 5                         Missing .: 0/1,255
```

```
            Tabulation: Freq.   Numeric  Label
                          24         1  1.Much improved
                          19         2  2.A bit improved
                         870         3  3.About the same
                         224         4  4.A bit worse
                         118         5  5.Much worse
```

---

pc5_flag_21 R's ability to remember things about family & friends: Flag if Imputed

---

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
          Unique values: 2                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                        1,254        0  0.Not Imputed
                            1        1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc8_imp_21
R's ability to remember things (Imputed)

```
                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
          Unique values: 5                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                          34         1  1.Much improved
                          21         2  2.A bit improved
                         893         3  3.About the same
                         192         4  4.A bit worse
                         115         5  5.Much worse
```

---

pc8_flag_21
R's ability to remember things: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
          Unique values: 2                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                        1,254        0  0.Not Imputed
                            1        1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc11_imp_21 R's ability to recall conversations a few days later (Imputed)

```
                 Type: Numeric (byte)
                Label: ability
```

```
                Range: [1,5]                         Units: 1
        Unique values: 5                             Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         30         1  1.Much improved
                         16         2  2.A bit improved
                        852         3  3.About the same
                        216         4  4.A bit worse
                        141         5  5.Much worse
```

---

pc11_flag_21 R's ability to recall conversations a few days later: Flag if Imputed

---

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                             Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,252         0  0.Not Imputed
                           3         1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc14_imp_21
R's ability to remember his/her address (Imputed)

```
                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                             Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         25         1  1.Much improved
                         14         2  2.A bit improved
                        887         3  3.About the same
                        173         4  4.A bit worse
                        156         5  5.Much worse
```

---

pc14_flag_21
R's ability to remember his/her address: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                             Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,250         0  0.Not Imputed
                           5         1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc17_imp_21
R's ability to remember what day and month it is (Imputed)

```
                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         25         1  1.Much improved
                         18         2  2.A bit improved
                        833         3  3.About the same
                        206         4  4.A bit worse
                        173         5  5.Much worse

-------------------------------------------------------------------------------
pc17_flag_21                                                                R's
ability to remember what day and month it is: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,252         0  0.Not Imputed
                           3         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc20_imp_21                                                                  R's
ability to remember where things are usually kept (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         28         1  1.Much improved
                         11         2  2.A bit improved
                        821         3  3.About the same
                        232         4  4.A bit worse
                        163         5  5.Much worse

-------------------------------------------------------------------------------
pc20_flag_21                                                          R's ability
to remember where things are usually kept: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,250         0  0.Not Imputed
                           5         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
```

pc23_imp_21 R's ability to remember where to find things put in a different place (Imputed)

Type: Numeric (byte)
Label: ability

Range: [1,5] Units: 1
Unique values: 5 Missing .: 0/1,255

Tabulation:	Freq.	Numeric	Label
	24	1	1.Much improved
	7	2	2.A bit improved
	819	3	3.About the same
	245	4	4.A bit worse
	160	5	5.Much worse

---

pc23_flag_21 R's ability to remember where to find things put in a different place: Flag if I

Type: Numeric (byte)
Label: imp

Range: [0,2] Units: 1
Unique values: 3 Missing .: 0/1,255

Tabulation:	Freq.	Numeric	Label
	1,249	0	0.Not Imputed
	5	1	1.IMPUTED (ALL DK/RF/Missing)
	1	2	2.IMPUTED (ONE DK/RF/Missing)

---

pc26_imp_21
R's ability to know how to use familiar machines (Imputed)

Type: Numeric (byte)
Label: ability

Range: [1,5] Units: 1
Unique values: 5 Missing .: 0/1,255

Tabulation:	Freq.	Numeric	Label
	26	1	1.Much improved
	16	2	2.A bit improved
	861	3	3.About the same
	183	4	4.A bit worse
	169	5	5.Much worse

---

pc26_flag_21 R's ability to know how to use familiar machines: Flag if Imputed

---

Type: Numeric (byte)
Label: imp

Range: [0,1] Units: 1
Unique values: 2 Missing .: 0/1,255

Tabulation:	Freq.	Numeric	Label

```
                      1,242         0  0.Not Imputed
                         13         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc29_imp_21
R's ability to learn to use a new gadget or machine (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         40         1  1.Much improved
                         24         2  2.A bit improved
                        792         3  3.About the same
                        213         4  4.A bit worse
                        186         5  5.Much worse

-------------------------------------------------------------------------------
pc29_flag_21                                                                R's
ability to learn to use a new gadget or machine: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                      1,236         0  0.Not Imputed
                         19         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc32_imp_21
R's ability to learn new things in general (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                         42         1  1.Much improved
                         36         2  2.A bit improved
                        801         3  3.About the same
                        200         4  4.A bit worse
                        176         5  5.Much worse

-------------------------------------------------------------------------------
pc32_flag_21
R's ability to learn new things in general: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
```

```
         Unique values: 2                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                        1,246         0  0.Not Imputed
                            9         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc35_imp_21
R's ability to follow a story in a book or on TV (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
         Unique values: 5                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                           21         1  1.Much improved
                           35         2  2.A bit improved
                          889         3  3.About the same
                          162         4  4.A bit worse
                          148         5  5.Much worse

-------------------------------------------------------------------------------
pc35_flag_21                                                              R's
ability to follow a story in a book or on TV: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
         Unique values: 2                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                        1,244         0  0.Not Imputed
                           11         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc38_imp_21
R's ability to make decisions on everyday matters (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
         Unique values: 5                        Missing .: 0/1,255

            Tabulation: Freq.   Numeric  Label
                           34         1  1.Much improved
                           16         2  2.A bit improved
                          886         3  3.About the same
                          153         4  4.A bit worse
                          166         5  5.Much worse

-------------------------------------------------------------------------------
pc38_flag_21                                                              R's
ability to make decisions on everyday matters: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
```

```
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,247         0  0.Not Imputed
                           8         1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc41_imp_21
R's ability to handle money for shopping (Imputed)

```
                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                          36         1  1.Much improved
                          14         2  2.A bit improved
                         859         3  3.About the same
                         167         4  4.A bit worse
                         179         5  5.Much worse
```

---

pc41_flag_21
R's ability to handle money for shopping: Flag if Imputed

```
                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,243         0  0.Not Imputed
                          12         1  1.IMPUTED (ALL DK/RF/Missing)
```

---

pc44_imp_21
R's ability to handle financial matters (Imputed)

```
                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                          24         1  1.Much improved
                          14         2  2.A bit improved
                         877         3  3.About the same
                         161         4  4.A bit worse
                         179         5  5.Much worse
```

---

pc44_flag_21
R's ability to handle financial matters: Flag if Imputed

```
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,238         0  0.Not Imputed
                          17         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc47_imp_21                                                                  R's
ability to handle other everyday arithmetic problems (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                          25         1  1.Much improved
                          13         2  2.A bit improved
                         858         3  3.About the same
                         189         4  4.A bit worse
                         170         5  5.Much worse

-------------------------------------------------------------------------------
pc47_flag_21                                                  R's ability to
handle other everyday arithmetic problems: Flag if Imputed
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: imp

                Range: [0,1]                         Units: 1
        Unique values: 2                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                       1,241         0  0.Not Imputed
                          14         1  1.IMPUTED (ALL DK/RF/Missing)

-------------------------------------------------------------------------------
pc50_imp_21                                          R's ability to use
his/her intelligence to understand what is going on (Imputed)
-------------------------------------------------------------------------------

                 Type: Numeric (byte)
                Label: ability

                Range: [1,5]                         Units: 1
        Unique values: 5                          Missing .: 0/1,255

           Tabulation: Freq.   Numeric  Label
                          31         1  1.Much improved
                          13         2  2.A bit improved
                         909         3  3.About the same
                         163         4  4.A bit worse
                         139         5  5.Much worse
```

---

pc50_flag_21 R's ability to use his/her intelligence to understand what is going on: Flag if

---

Type: Numeric (byte)
Label: imp

Range: [0,1] Units: 1
Unique values: 2 Missing .: 0/1,255

Tabulation:

Freq.	Numeric	Label
1,250	0	0.Not Imputed
5	1	1.IMPUTED (ALL DK/RF/Missing)

VIII. Appendix E. SAS Program for Imputation of Cognitive Functioning Variables – Direct Interviews (Section E)

2001

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

LIBNAME WW "C:\OOOXXXOOO";
RUN;

*************************************************************************;

DATA M01_1;
 RETAIN cunicah codent01
        AGE_01 SEX_01 yrschool_01
        tamloc_01 h1hhresp
       c1_01 c2_01 c45_01 c47_01
        e1_01 e2_01 e3_01 e4_01 e5_01 e6_01 e7_01 e8_e9_01 e10_01
        e11_1a_01 e11_1b_01 e11_1c_01 e11_1d_01 e11_1e_01 e11_1f_01
        e11_1g_01 e11_1h_01 e11_1i_01
        e11_2a_01 e11_2b_01 e11_2c_01 e11_2d_01 e11_2e_01 e11_2f_01
        e11_2g_01 e11_2h_01 e11_2i_01
        e11_3a_01 e11_3b_01 e11_3c_01 e11_3d_01 e11_3e_01 e11_3f_01
        e11_3g_01 e11_3h_01 e11_3i_01
       best_a_01
        e11_4a_01 e11_4b_01 e11_4c_01 e11_4d_01 e11_4e_01 e11_4f_01
        e11_4g_01 e11_4h_01 e11_4i_01
        e11_5a_01 e11_5b_01 e11_5c_01 e11_5d_01 e11_5e_01 e11_5f_01
        e11_5g_01 e11_5h_01 e11_5i_01
        e11_6a_01 e11_6b_01 e11_6c_01 e11_6d_01 e11_6e_01 e11_6f_01
        e11_6g_01 e11_6h_01 e11_6i_01
       best_b_01
       e12_01 e13_01
        e14_1a_01 e14_1b_01 e14_1c_01 e14_1d_01 e14_1e_01 e14_1f_01
        e14_1g_01 e14_1h_01 e14_1i_01
        e14_2a_01 e14_2b_01 e14_2c_01 e14_2d_01 e14_2e_01 e14_2f_01
        e14_2g_01 e14_2h_01 e14_2i_01
 ;
 SET WW.MHAS_2001_Cognition_FINAL;
 KEEP cunicah codent01
      AGE_01 SEX_01 yrschool_01
      tamloc_01 h1hhresp
      c1_01 c2_01 c45_01 c47_01
      e1_01 e2_01 e3_01 e4_01 e5_01 e6_01 e7_01 e8_e9_01 e10_01
      e11_1a_01 e11_1b_01 e11_1c_01 e11_1d_01 e11_1e_01 e11_1f_01 e11_1g_01
      e11_1h_01 e11_1i_01
      e11_2a_01 e11_2b_01 e11_2c_01 e11_2d_01 e11_2e_01 e11_2f_01 e11_2g_01
      e11_2h_01 e11_2i_01
      e11_3a_01 e11_3b_01 e11_3c_01 e11_3d_01 e11_3e_01 e11_3f_01 e11_3g_01
      e11_3h_01 e11_3i_01
     best_a_01
      e11_4a_01 e11_4b_01 e11_4c_01 e11_4d_01 e11_4e_01 e11_4f_01 e11_4g_01
      e11_4h_01 e11_4i_01
      e11_5a_01 e11_5b_01 e11_5c_01 e11_5d_01 e11_5e_01 e11_5f_01 e11_5g_01
```

```
      e11_5h_01 e11_5i_01
      e11_6a_01 e11_6b_01 e11_6c_01 e11_6d_01 e11_6e_01 e11_6f_01 e11_6g_01
      e11_6h_01 e11_6i_01
     best_b_01
     e12_01 e13_01
      e14_1a_01 e14_1b_01 e14_1c_01 e14_1d_01 e14_1e_01 e14_1f_01 e14_1g_01
      e14_1h_01 e14_1i_01
      e14_2a_01 e14_2b_01 e14_2c_01 e14_2d_01 e14_2e_01 e14_2f_01 e14_2g_01
     e14_2h_01 e14_2i_01
 ;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH CODENT01;
RUN;

DATA M01_2;
 SET M01_1_SORT;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA PROXY;
 SET WW.PROXY2001;
RUN;

DATA PROXY1;
 SET WW.PROXY2001;
 IF CODENT01 = "Selected person" THEN CODENT01_A = 1;
 ELSE CODENT01_A = 2;
 KEEP CUNICAH CODENT01_A;
RUN;

PROC SORT DATA=PROXY1 OUT=PROXY_SORT NODUPKEY;
 BY CUNICAH CODENT01_A;
RUN;

DATA M01_3;
 MERGE M01_2(IN=A)
       PROXY_SORT(RENAME=(CODENT01_A=CODENT01) IN=B)
 ;
 BY CUNICAH CODENT01;
 IF A;
 IF NOT B;
RUN;

DATA M01_5;
 SET M01_3;
 IF CUNICAH = 1614 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 1663 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 1707 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 1714 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 1722 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 2200 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 2612 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 3989 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 4841 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 5055 AND CODENT01 = 1 THEN DELETE;
```

```
 IF CUNICAH = 5081 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 5371 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 6324 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 6944 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 6944 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 7136 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 7256 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 7312 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 8013 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 8918 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 9079 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 9312 AND CODENT01 = 2 THEN DELETE;
 IF CUNICAH = 9704 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 10191 AND CODENT01 = 1 THEN DELETE;
 IF CUNICAH = 10312 AND CODENT01 = 2 THEN DELETE;
RUN;

DATA M01_6;
 SET M01_5;
 KEEP cunicah codent01
      AGE_01 SEX_01 yrschool_01
      tamloc_01 h1hhresp
     c1_01 c2_01 c45_01 c47_01
      e1_01 e5_01 e6_01 e7_01
      e8_e9_01
     e10_01
      e11_1i_01 e11_2i_01 e11_3i_01 best_a_01
      e11_4i_01 e11_5i_01 e11_6i_01 best_b_01
      e12_01
     e13_01
     e14_1i_01 e14_2i_01
 ;
RUN;

DATA M01_7;
 SET M01_6;
 IF e1_01 = 2 THEN DELETE;
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah codent01 AGE_01 SEX_01 yrschool_01 tamloc_01 h1hhresp c1_01
      c2_01 c45_01 c47_01;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool_01 = 99 THEN yrschool_01 = .;
 ARRAY CV(*) c1_01 c2_01 c45_01 c47_01;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9) THEN CV(I) = .;
 END;
 IF c45_01 = 6 THEN INDEX_45 = 0; ELSE INDEX_45 = 1;
 IF c47_01 = 6 THEN INDEX_47 = 0; ELSE INDEX_47 = 1;
 DROP I;
RUN;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_mult1r.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01
               ;
  RESTRICT     c45_01(INDEX_45=1) c47_01(INDEX_47=1)
               ;
  BOUNDS       yrschool_01(>=0,<=22)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=C:/Users/nachen/Desktop/imputecov);

DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c45_01 = 7 THEN c45_01 = 6;
 IF c47_01 = 7 THEN c47_01 = 6;
RUN;

*************************************************************************;

DATA M01_7_LIST0;
 SET M01_7;
 IF cunicah = 4212 AND codent01 = 2 THEN E10_01 = 2;
 IF cunicah = 7338 AND codent01 = 2 THEN E10_01 = 2;
 KEEP cunicah codent01 E10_01;
RUN;

DATA M01_7_LIST1;
 SET M01_7_LIST0;
 IF E10_01 IN (.,8);
 CALL STREAMINIT(1345671);
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;
```

```
DATA M01_7_LIST2;
 SET M01_7_LIST1;
 E10_01 = INDEX_1+1;
RUN;

DATA M01_7_A;
 SET M01_7;
 IF cunicah = 4212 AND codent01 = 2 THEN E10_01 = 2;
 IF cunicah = 7338 AND codent01 = 2 THEN E10_01 = 2;
 KEEP cunicah codent01 E10_01 e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01;
 PROC SORT;
  BY cunicah codent01;
RUN;

PROC SORT DATA=MULT1R_RETURN6 OUT=ZCOV;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_LIST1 OUT=M01_7_LIST1_SORT;
 BY cunicah codent01;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_A
       M01_7_LIST1_SORT(DROP=E10_01 IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF B THEN E10_01 = INDEX_1+1;
 DROP INDEX_1;
RUN;

*************************;
*** List A: 3 Attempts ***;
*************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,DROPVAR=e11_2i_01 e11_3i_01,OUD=A1); QUIT;
%LISTA(DIN=M01_7_A1,DROPVAR=e11_1i_01 e11_3i_01,OUD=A2); QUIT;
%LISTA(DIN=M01_7_A1,DROPVAR=e11_1i_01 e11_2i_01,OUD=A3); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multA1.set";
%LET DATAGO = OKIN_A1;
%LET DATAOT = MULT_A1;
%LET DATANM = impute_multA1;
```

```
%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_1i_01;
  RESTRICT     e11_1i_01(E10_01=1);
  BOUNDS       yrschool_01(>=0,<=22) e11_1i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multA2.set";
%LET DATAGO = OKIN_A2;
%LET DATAOT = MULT_A2;
%LET DATANM = impute_multA2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_2i_01;
  RESTRICT     e11_2i_01(E10_01=1);
  BOUNDS       yrschool_01(>=0,<=22) e11_2i_01(>=0,<=8);
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multA3.set";
%LET DATAGO = OKIN_A3;
%LET DATAOT = MULT_A3;
%LET DATANM = impute_multA3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_3i_01;
  RESTRICT     e11_3i_01(E10_01=1);
  BOUNDS       yrschool_01(>=0,<=22) e11_3i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

DATA MULT_A11;
 SET MULT_A1;
 IF e11_1i_01 = 0 and e10_01 = 2 THEN e11_1i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

DATA MULT_A12;
 SET MULT_A2;
 IF e11_2i_01 = 0 and e10_01 = 2 THEN e11_2i_01 = .;
 PROC SORT;
  BY cunicah codent01;
```

```
RUN;

DATA MULT_A13;
 SET MULT_A3;
 IF e11_3i_01 = 0 and e10_01 = 2 THEN e11_3i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

DATA MULT_A123;
 MERGE MULT_A11
       MULT_A12(KEEP=cunicah codent01 e11_2i_01)
       MULT_A13(KEEP=cunicah codent01 e11_3i_01)
 ;
 BY cunicah codent01;
RUN;

DATA M01_7_B;
 SET M01_7;
 IF cunicah = 4212 AND codent01 = 2 THEN E10_01 = 2;
 IF cunicah = 7338 AND codent01 = 2 THEN E10_01 = 2;
 KEEP cunicah codent01 E10_01 e11_4i_01 e11_5i_01 e11_6i_01 e14_2i_01;
 PROC SORT;
  BY cunicah codent01;
RUN;

PROC SORT DATA=MULT1R_RETURN6 OUT=ZCOV;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_LIST1 OUT=M01_7_LIST1_SORT;
 BY cunicah codent01;
RUN;

DATA M01_7_B1;
 MERGE ZCOV(IN=A)
       M01_7_B
       M01_7_LIST1_SORT(DROP=E10_01 IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF B THEN E10_01 = INDEX_1+1;
 DROP INDEX_1;
RUN;

*************************;
*** List B: 3 Attempts ***;
*************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_B1,DROPVAR=e11_5i_01 e11_6i_01,OUD=B1); QUIT;
```

```
%LISTA(DIN=M01_7_B1,DROPVAR=e11_4i_01 e11_6i_01,OUD=B2); QUIT;
%LISTA(DIN=M01_7_B1,DROPVAR=e11_4i_01 e11_5i_01,OUD=B3); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multB1.set";
%LET DATAGO = OKIN_B1;
%LET DATAOT = MULT_B1;
%LET DATANM = impute_multB1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_4i_01;
  RESTRICT     e11_4i_01(E10_01=2);
  BOUNDS       yrschool_01(>=0,<=22) e11_4i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multB2.set";
%LET DATAGO = OKIN_B2;
%LET DATAOT = MULT_B2;
%LET DATANM = impute_multB2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
```

```
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_5i_01;
  RESTRICT     e11_5i_01(E10_01=2);
  BOUNDS       yrschool_01(>=0,<=22) e11_5i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multB3.set";
%LET DATAGO = OKIN_B3;
%LET DATAOT = MULT_B3;
%LET DATANM = impute_multB3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e11_6i_01;
  RESTRICT     e11_6i_01(E10_01=2);
  BOUNDS       yrschool_01(>=0,<=22) e11_6i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
DATA MULT_B11;
 SET MULT_B1;
 IF e11_4i_01 = 0 and e10_01 = 1 THEN e11_4i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

DATA MULT_B12;
 SET MULT_B2;
 IF e11_5i_01 = 0 and e10_01 = 1 THEN e11_5i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

DATA MULT_B13;
 SET MULT_B3;
 IF e11_6i_01 = 0 and e10_01 = 1 THEN e11_6i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

DATA MULT_B123;
 MERGE MULT_B11
       MULT_B12(KEEP=cunicah codent01 e11_5i_01)
       MULT_B13(KEEP=cunicah codent01 e11_6i_01)
 ;
 BY cunicah codent01;
RUN;

*************************************************************************;

*********************;
*** List A: Delay ***;
*********************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,DROPVAR=e11_1i_01 e11_2i_01 e11_3i_01,OUD=DA1); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multdA1.set";
%LET DATAGO = OKIN_DA1;
%LET DATAOT = MULT_DA1;
%LET DATANM = impute_multdA1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
```

```
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e14_1i_01;
  RESTRICT     e14_1i_01(E10_01=1);
  BOUNDS       yrschool_01(>=0,<=22) e14_1i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

DATA MULT_DA11;
 SET MULT_DA1;
 IF e14_1i_01 = 0 and e10_01 = 2 THEN e14_1i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

**********************;
*** List B: Delay ***;
**********************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_B1,DROPVAR=e11_4i_01 e11_5i_01 e11_6i_01,OUD=DB1); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov/impute_multdB1.set";
%LET DATAGO = OKIN_DB1;
%LET DATAOT = MULT_DB1;
%LET DATANM = impute_multdB1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov;

DATA _NULL_;
```

```
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01;
  COUNT        e14_2i_01;
  RESTRICT     e14_2i_01(E10_01=2);
  BOUNDS       yrschool_01(>=0,<=22) e14_2i_01(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

DATA MULT_DB11;
 SET MULT_DB1;
 IF e14_2i_01 = 0 and e10_01 = 1 THEN e14_2i_01 = .;
 PROC SORT;
  BY cunicah codent01;
RUN;

*************************************************************************;

PROC SORT DATA=MULT1R_RETURN6 OUT=ZCOV;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
 BY cunicah codent01;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_SORT(KEEP=cunicah codent01 e5_01 e6_01 e7_01 IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF cunicah = 470 AND codent01 = 1 THEN e6_01 = 1;
RUN;

DATA M01_7_A2;
 SET M01_7_A1;
 IF e5_01 = 8 THEN e5_01 = .;
 IF e6_01 = 8 THEN e6_01 = .;
 IF cunicah = 470 AND codent01 = 1 THEN e6_01 = 1;
RUN;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_multe567.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_A2;
  DATAOUT multe567;
  DEFAULT TRANSFER;
  /*TRANSFER     cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01 e5_01 e6_01 e7_01
               ;
  RESTRICT     e7_01(e6_01=1)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe567, DIR=C:/Users/nachen/Desktop/imputecov);



**************;
*** Figure ***;
**************;

DATA multe57;
 SET multe567;
 IF e7_01 = 5 THEN e7_01 = 0;
 DROP e6_01;
 PROC SORT;
  BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
 BY cunicah codent01;
RUN;

DATA multe57_1;
 MERGE multe57(IN=A)
       M01_7_SORT(KEEP=cunicah codent01 e8_e9_01 IN=B)
```

```
 ;
 BY cunicah codent01;
 IF A;
 IF e8_e9_01 NOT IN (0,1,2) THEN e8_e9_01 = .;
RUN;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_multe5789.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN multe57_1;
  DATAOUT multe5789;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01 e5_01 e7_01
               e8_e9_01
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe5789, DIR=C:/Users/nachen/Desktop/imputecov);

PROC SORT DATA=multe5789;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_A1 OUT=M01_7A1_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe567;
 BY cunicah codent01;
RUN;

DATA multe5789_1;
 MERGE multe5789(IN=A)
```

```
       multe567(KEEP=cunicah codent01 e6_01 IN=A1)
       M01_7A1_SORT(KEEP=cunicah codent01 e5_01 e6_01 e7_01
                    RENAME=(e5_01=e5_01_old e6_01=e6_01_old e7_01=e7_01_old)
                    IN=B)
       M01_7_SORT(KEEP=cunicah codent01 e8_e9_01
                  RENAME=(e8_e9_01=e8_e9_01_old) IN=B1)
 ;
 BY cunicah codent01;
 IF A;
RUN;



**************************;
*** Visual Figure Recall ***;
**************************;

DATA multe57_13;
 MERGE multe57(IN=A)
       M01_7_SORT(KEEP=cunicah codent01 e13_01 IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF e13_01 NOT IN (0,1,2) THEN e13_01 = .;
RUN;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_multe5713.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN multe57_13;
  DATAOUT multe5713;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01 e5_01 e7_01 e13_01
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe5713, DIR=C:/Users/nachen/Desktop/imputecov);
```

```
PROC SORT DATA=multe5713;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_A1 OUT=M01_7A1_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe567;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe5789;
 BY cunicah codent01;
RUN;

DATA multe5713_1;
 MERGE multe5713(IN=A)
       multe5789(KEEP=cunicah codent01 e8_e9_01 IN=A0)
       multe567(KEEP=cunicah codent01 e6_01 IN=A1)
       M01_7A1_SORT(KEEP=cunicah codent01 e5_01 e6_01 e7_01
                    RENAME=(e5_01=e5_01_old e6_01=e6_01_old e7_01=e7_01_old)
                    IN=B)
       M01_7_SORT(KEEP=cunicah codent01 e8_e9_01 e13_01
                  RENAME=(e8_e9_01=e8_e9_01_old e13_01=e13_01_old) IN=B1)
 ;
 BY cunicah codent01;
 IF A;
RUN;




**********************;
*** Visual Scanning ***;
**********************;

DATA multe57_12;
 MERGE multe57(IN=A)
       M01_7_SORT(KEEP=cunicah codent01 e12_01 IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF e12_01 IN (.,80,88) THEN e12_01 = .;
RUN;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
```

```
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_multe5712.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN multe57_12;
  DATAOUT multe5712;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool_01 h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c1_01 c2_01 c45_01 c47_01 e5_01 e7_01
               ;
  COUNT        e12_01;
  BOUNDS       e12_01(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe5712, DIR=C:/Users/nachen/Desktop/imputecov);

PROC SORT DATA=multe5712;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_A1 OUT=M01_7A1_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe567;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe5789;
 BY cunicah codent01;
RUN;

PROC SORT DATA=multe5713;
 BY cunicah codent01;
RUN;

DATA multe5712_1;
 MERGE multe5712(IN=A)
       multe5789(KEEP=cunicah codent01 e8_e9_01 IN=A0)
       multe5713(KEEP=cunicah codent01 e13_01)
       multe567(KEEP=cunicah codent01 e6_01 IN=A1)
```

```
       M01_7A1_SORT(KEEP=cunicah codent01 e5_01 e6_01 e7_01
                    RENAME=(e5_01=e5_01_old e6_01=e6_01_old e7_01=e7_01_old)
                    IN=B)
       M01_7_SORT(KEEP=cunicah codent01 e8_e9_01 e13_01 e12_01
                  RENAME=(e8_e9_01=e8_e9_01_old e13_01=e13_01_old
                  e12_01=e12_01_old) IN=B1)
 ;
 BY cunicah codent01;
 IF A;
RUN;
```

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```
OPTIONS PS=100 LS=100  NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

LIBNAME WW "C:\OOOOOOO\XXXXXXX";
RUN;

*******************************************************************************;

DATA M03_1;
 RETAIN cunicah codent01 codent03 np sect_e_res_03 new_sample_03
        age_01 sex_01 yrschool_01 h1hhresp tamloc_01
        age_03 sexo_03 yrschool_03 h2hhresp
       c1_03 c2_03 c42_03 c44_03
        e1_03 e2_03 e3_03 e4_03 e5_03 e6_e7_03
        e8_03
       e9_a1_1_03 e9_a1_2_03 e9_a1_3_03 e9_a1_4_03 e9_a1_5_03 e9_a1_6_03
        e9_a1_7_03 e9_a1_8_03 e9_a1_9_03
        e9_a2_1_03 e9_a2_2_03 e9_a2_3_03 e9_a2_4_03 e9_a2_5_03 e9_a2_6_03
        e9_a2_7_03 e9_a2_8_03 e9_a2_9_03
        e9_a3_1_03 e9_a3_2_03 e9_a3_3_03 e9_a3_4_03 e9_a3_5_03 e9_a3_6_03
        e9_a3_7_03 e9_a3_8_03 e9_a3_9_03
        e12a_1_03 e12a_2_03 e12a_3_03 e12a_4_03 e12a_5_03 e12a_6_03
        e12a_7_03 e12a_8_03 e12a_9_03
        e9_b1_1_03 e9_b1_2_03 e9_b1_3_03 e9_b1_4_03 e9_b1_5_03 e9_b1_6_03
        e9_b1_7_03 e9_b1_8_03 e9_b1_9_03
        e9_b2_1_03 e9_b2_2_03 e9_b2_3_03 e9_b2_4_03 e9_b2_5_03 e9_b2_6_03
        e9_b2_7_03 e9_b2_8_03 e9_b2_9_03
        e9_b3_1_03 e9_b3_2_03 e9_b3_3_03 e9_b3_4_03 e9_b3_5_03 e9_b3_6_03
        e9_b3_7_03 e9_b3_8_03 e9_b3_9_03
        e12b_1_03 e12b_2_03 e12b_3_03 e12b_4_03 e12b_5_03 e12b_6_03
        e12b_7_03 e12b_8_03 e12b_9_03
        e10_03 e11_03
        e13a_03 e13b_03 e13c_03
 ;
 SET WW.MHAS_2003_Cognition_FINAL;
 KEEP cunicah codent01 codent03 np sect_e_res_03 new_sample_03
      age_01 sex_01 yrschool_01 h1hhresp tamloc_01
      age_03 sexo_03 yrschool_03 h2hhresp
     c1_03 c2_03 c42_03 c44_03
      e1_03 e2_03 e3_03 e4_03 e5_03 e6_e7_03
      e8_03
     e9_a1_1_03 e9_a1_2_03 e9_a1_3_03 e9_a1_4_03 e9_a1_5_03 e9_a1_6_03
      e9_a1_7_03 e9_a1_8_03 e9_a1_9_03
      e9_a2_1_03 e9_a2_2_03 e9_a2_3_03 e9_a2_4_03 e9_a2_5_03 e9_a2_6_03
      e9_a2_7_03 e9_a2_8_03 e9_a2_9_03
      e9_a3_1_03 e9_a3_2_03 e9_a3_3_03 e9_a3_4_03 e9_a3_5_03 e9_a3_6_03
      e9_a3_7_03 e9_a3_8_03 e9_a3_9_03
      e12a_1_03 e12a_2_03 e12a_3_03 e12a_4_03 e12a_5_03 e12a_6_03 e12a_7_03
      e12a_8_03 e12a_9_03
      e9_b1_1_03 e9_b1_2_03 e9_b1_3_03 e9_b1_4_03 e9_b1_5_03 e9_b1_6_03
      e9_b1_7_03 e9_b1_8_03 e9_b1_9_03
      e9_b2_1_03 e9_b2_2_03 e9_b2_3_03 e9_b2_4_03 e9_b2_5_03 e9_b2_6_03
      e9_b2_7_03 e9_b2_8_03 e9_b2_9_03
      e9_b3_1_03 e9_b3_2_03 e9_b3_3_03 e9_b3_4_03 e9_b3_5_03 e9_b3_6_03
      e9_b3_7_03 e9_b3_8_03 e9_b3_9_03
      e12b_1_03 e12b_2_03 e12b_3_03 e12b_4_03 e12b_5_03 e12b_6_03 e12b_7_03
      e12b_8_03 e12b_9_03
```

```
      e10_03 e11_03
      e13a_03 e13b_03 e13c_03
 ;
RUN;

PROC SORT DATA=M03_1 OUT=M03_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M03_2;
 SET M03_1_SORT;
 IF sect_e_res_03 = 3;
 ATTRIB _ALL_ LABEL = " ";
RUN;

*****************************************************************;
*** 2001-Proxy + 2001-Non-Spanish Speaking Interviewee + 2003-New ***;
*****************************************************************;

PROC SORT DATA=WW.Mhas_2001_cognition_final OUT=WV1(KEEP=CUNICAH CODENT01
E1_01);
 BY CUNICAH CODENT01;
RUN;

PROC SORT DATA=WW.V1_cognition_impute_data_2001 OUT=WV2(KEEP=CUNICAH
CODENT01);
 BY CUNICAH CODENT01;
RUN;

DATA WVPNS;
 MERGE WV1(IN=A) WV2(IN=B);
 BY CUNICAH CODENT01;
 IF A AND NOT B;
 NP = 10*CODENT01;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M03_2_OLD M03_2_NEW;
 SET M03_2;
 IF NEW_SAMPLE_03 = 2 THEN OUTPUT M03_2_NEW;
 ELSE OUTPUT M03_2_OLD;
RUN;

PROC SORT DATA=M03_2_OLD OUT=M03_2_OLD_SORT;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS OUT=WVPNS_SORT(KEEP=CUNICAH NP E1_01
                                    RENAME=(E1_01=E1_SAMP));
 BY CUNICAH NP;
RUN;


DATA WVPNS_1 WVPNS_1_OTHER;
 MERGE M03_2_OLD_SORT(IN=A) WVPNS_SORT(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN DO;
```

```
    IF E1_SAMP = . THEN E1_SAMP = 1;
    OUTPUT WVPNS_1;
 END;
 IF A AND NOT B THEN DO;
    OUTPUT WVPNS_1_OTHER;
 END;
RUN;

*******************************************************;
*** --- (I.) No Cognition Interview in Year 2001 --- ***;
*******************************************************;

DATA WVPNS_2;
 SET M03_2_NEW(IN=A) WVPNS_1;
 IF A THEN E1_SAMP = 0;
RUN;

*********************************************************************;
*** (II.) Cognition Interview INCLUDED Imputed Scores in Year 2001 ***;
*********************************************************************;

PROC SORT DATA=WW.V1_cognition_impute_data_2001 OUT=W1IMP;
 BY CUNICAH CODENT01;
RUN;

PROC SORT DATA=WVPNS_1_OTHER OUT=WVPNS_1_OT_SORT;
 BY CUNICAH CODENT01;
RUN;

DATA WVPNS_1_OTHER2 WVPNS_1_OTHER2_CK;
 MERGE WVPNS_1_OT_SORT(IN=A) W1IMP(IN=B);
 BY CUNICAH CODENT01;
 IF A AND B THEN OUTPUT WVPNS_1_OTHER2;
 IF A AND NOT B THEN OUTPUT WVPNS_1_OTHER2_CK;
RUN;

DATA WW.COG_AT_01;
 SET WVPNS_1_OTHER2;
RUN;

*************************************************************************;

*********************************************************;
*** --- (I. Conti) No Cognition Interview in Year 2001 --- ***;
*********************************************************;

DATA WVPNS_1_OTHER2_CK1;
 SET WVPNS_1_OTHER2_CK;
 E1_SAMP = 4;
 KEEP CUNICAH--E1_SAMP;
RUN;


DATA WVPNS_2_FN;
 SET WVPNS_2 WVPNS_1_OTHER2_CK1;
RUN;
```

```
DATA WW.NOCOG_AT_01;
 SET WVPNS_2_FN;
RUN;

*******************************************************************************;
*******************************************************************************;

*** --- Further Inspect 55 Unknown Situations --- ***;

PROC SORT DATA=WW.Mhas_2001_cognition_final OUT=WV1_CK;
 BY CUNICAH CODENT01;
RUN;

PROC SORT DATA=WVPNS_1_OTHER2_CK OUT=ZZV;
 BY CUNICAH CODENT01;
RUN;

DATA ZZV1;
 MERGE ZZV(KEEP=CUNICAH CODENT01 codent03 np sect_e_res_03 new_sample_03
           IN=A)
       WV1_CK(IN=B)
 ;
 BY CUNICAH CODENT01;
 IF A AND B;
RUN;

PROC SORT DATA=WW.Mhas_2003_cognition_final OUT=WV3_CK;
 BY CUNICAH NP;
RUN;

DATA ZZV3;
 MERGE ZZV(KEEP=CUNICAH NP IN=A)
       WV3_CK(IN=B)
 ;
 BY CUNICAH NP;
 IF A AND B;
RUN;

*******************************************************************************;
*******************************************************************************;

PROC FREQ DATA=WW.COG_AT_01;
 TABLES SEX_01*SEXO_03 YRSCHOOL_01*YRSCHOOL_03 / MISSING;
RUN;

DATA YSEX_CK YEDU_CK;
 SET WW.COG_AT_01;
 IF SEX_01 ^= SEXO_03 THEN OUTPUT YSEX_CK;
 IF YRSCHOOL_01 ^= YRSCHOOL_03 THEN OUTPUT YEDU_CK;
RUN;




PROC SORT DATA=WW.NOCOG_AT_01 OUT=XX;
 BY E1_SAMP;
RUN;
```

```
DATA YCOG_AT_01;
 SET WW.COG_AT_01;
 IF E1_03 = 1;
 COG_01 = 1;
RUN;

DATA YNOCOG_AT_01;
 SET WW.NOCOG_AT_01;
 IF E1_03 = 1;
 COG_01 = 0;
 IF E1_SAMP = 4 THEN YRSCHOOL_03 = 99;
RUN;

*************************************************************************;
*************************************************************************;

DATA M03_7;
 SET YCOG_AT_01
     YNOCOG_AT_01
 ;
RUN;

DATA M03_7_COV0;
 RETAIN cunicah NP AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03
        c42_03 c44_03;
 SET M03_7;
 KEEP cunicah NP AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03
      c42_03 c44_03;
RUN;

DATA M03_7_COV1;
 SET M03_7_COV0;
 IF yrschool_03 = 99 THEN yrschool_03 = .;
 IF age_03 = 999 THEN age_03 = .;
 ARRAY CV(*) c1_03 c2_03 c42_03 c44_03;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9) THEN CV(I) = .;
 END;
 IF c42_03 = 6 THEN INDEX_42 = 0; ELSE INDEX_42 = 1;
 IF c44_03 = 6 THEN INDEX_44 = 0; ELSE INDEX_44 = 1;
 DROP I;
RUN;




*************************************************************************;
*** Ranges on Age & Education Combine 2001 & 2003 ***;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov3/impute_mult1r.set";
```

```
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M03_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_03 yrschool_03 h2hhresp
               ;
  CATEGORICAL  SEXO_03 tamloc_01 c1_03 c2_03 c42_03 c44_03
               ;
  RESTRICT     c42_03(INDEX_42=1) c44_03(INDEX_44=1)
               ;
  BOUNDS       AGE_03(>=18,<=107) yrschool_03(>=0,<=22)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=C:/Users/nachen/Desktop/imputecov3);

DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c42_03 = 7 THEN c42_03 = 6;
 IF c44_03 = 7 THEN c42_03 = 6;
RUN;

DATA MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
 DROP INDEX_42 INDEX_44;
RUN;

*******************************************************************************;
*******************************************************************************;

DATA M03_7;
 SET YCOG_AT_01(KEEP=cunicah NP AGE_03 SEXO_03 yrschool_03 tamloc_01
                     h2hhresp c1_03 c2_03 c42_03 c44_03)
     YNOCOG_AT_01(KEEP=cunicah NP AGE_03 SEXO_03 yrschool_03 tamloc_01
                       h2hhresp c1_03 c2_03 c42_03 c44_03)
 ;
RUN;


DATA M03_7_LIST0;
 SET M03_7;
 KEEP cunicah np e8_03;
RUN;

DATA M03_7_LIST1;
 SET M03_7_LIST0;
 IF E8_03 IN (.,8);
 CALL STREAMINIT(1945671);
```

```
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;

DATA M03_7_LIST2;
 SET M03_7_LIST1;
 E8_03 = INDEX_1+1;
RUN;

DATA M03_7_A00;
 RETAIN cunicah np cog_01 e8_03
        e9_a1_9_03 e9_a2_9_03 e9_a3_9_03 e9_b1_9_03 e9_b2_9_03 e9_b3_9_03
        e12a_9_03 e12b_9_03
        e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
        e14_1i_01 e14_2i_01
       e8_e9_01 e12_01 e13_01
        ;
 SET M03_7;
 KEEP cunicah np cog_01 e8_03
      e9_a1_9_03 e9_a2_9_03 e9_a3_9_03 e9_b1_9_03 e9_b2_9_03 e9_b3_9_03
      e12a_9_03 e12b_9_03
      e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
      e14_1i_01 e14_2i_01
     e8_e9_01 e12_01 e13_01
      ;
 PROC SORT;
  BY cog_01 cunicah np;
RUN;

DATA M03_7_A01;
 SET M03_7_A00;
 ARRAY K1(*) e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01;
 ARRAY K2(*) e11_4i_01 e11_5i_01 e11_6i_01 e14_2i_01;
 ARRAY K3(*) ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01;
 IF COG_01 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;



PROC SORT DATA=M03_7_A01 OUT=M03_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M03_7_LIST1 OUT=M03_7_LIST1_SORT;
 BY cunicah np;
RUN;

DATA M03_7_A02;
```

```
 MERGE ZCOV(IN=A)
       M03_7_A01_SORT
       M03_7_LIST1_SORT(DROP=E8_03 IN=B)
 ;
 BY cunicah np;
 IF A;
 IF B THEN E8_03 = INDEX_1+1;
 IF cunicah = 10445 AND np = 10 THEN DO;
    e9_b3_9_03 = .;
    e12b_9_03  = .;
 END;
 DROP INDEX_1 e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01 e11_4i_01 e11_5i_01
      e11_6i_01 e14_2i_01;
RUN;

DATA M03_7_A05;
 RETAIN cunicah NP cog_01 e8_03
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e9_a1_9_03 e9_a2_9_03 e9_a3_9_03 e12a_9_03
 ;
 SET M03_7_A02;
 KEEP   cunicah NP cog_01 e8_03
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e9_a1_9_03 e9_a2_9_03 e9_a3_9_03 e12a_9_03
 ;
RUN;

PROC SORT DATA=M03_7_A05 OUT=M03_7_A1;
 BY DESCENDING cog_01 e8_03 cunicah NP;
RUN;

*********************************;
*** List A: 3 Attempts + Delay ***;
*********************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;



*************************;
*** --- New Sample --- ***;
*************************;

%LISTA(DIN=M03_7_A1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_a2_9_03 e9_a3_9_03 e12a_9_03, OUD=ALLA1); QUIT;
%LISTA(DIN=M03_7_A1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_a1_9_03 e9_a3_9_03 e12a_9_03, OUD=ALLA2); QUIT;
```

```
%LISTA(DIN=M03_7_A1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_a1_9_03 e9_a2_9_03 e12a_9_03, OUD=ALLA3); QUIT;
%LISTA(DIN=M03_7_A1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_a1_9_03 e9_a2_9_03 e9_a3_9_03,OUD=ALLA4); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLA1.set";
%LET DATAGO = OKIN_ALLA1;
%LET DATAOT = MULT_ALLA1;
%LET DATANM = impute_multALLA1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a1_9_03;
  RESTRICT     e9_a1_9_03(E8_03=1);
  BOUNDS       e9_a1_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLA2.set";
%LET DATAGO = OKIN_ALLA2;
%LET DATAOT = MULT_ALLA2;
%LET DATANM = impute_multALLA2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
```

```
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a2_9_03;
  RESTRICT     e9_a2_9_03(e8_03=1);
  BOUNDS       e9_a2_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLA3.set";
%LET DATAGO = OKIN_ALLA3;
%LET DATAOT = MULT_ALLA3;
%LET DATANM = impute_multALLA3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a3_9_03;
  RESTRICT     e9_a3_9_03(e8_03=1);
  BOUNDS       e9_a3_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLA4.set";
%LET DATAGO = OKIN_ALLA4;
%LET DATAOT = MULT_ALLA4;
%LET DATANM = impute_multALLA4;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e12a_9_03;
  RESTRICT     e12a_9_03(e8_03=1);
  BOUNDS       e12a_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah np;
RUN;




PROC SORT DATA=M03_7_A1 OUT=M03_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA1 OUT=MULT_ALLA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA2 OUT=MULT_ALLA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA3 OUT=MULT_ALLA3_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLA4 OUT=MULT_ALLA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP e8_03 RENAME=(e8_03=e8_03_old)
       IN=A)
       M03_7_A1_SORT(KEEP=CUNICAH NP COG_01 e8_03 e9_a1_9_03 e9_a2_9_03
                          e9_a3_9_03 e12a_9_03)
       MULT_ALLA1_SORT(KEEP=CUNICAH NP e9_a1_9_03
                       RENAME=(e9_a1_9_03=e9_a1_9_03_comp))
       MULT_ALLA2_SORT(KEEP=CUNICAH NP e9_a2_9_03
                       RENAME=(e9_a2_9_03=e9_a2_9_03_comp))
       MULT_ALLA3_SORT(KEEP=CUNICAH NP e9_a3_9_03
                       RENAME=(e9_a3_9_03=e9_a3_9_03_comp))
       MULT_ALLA4_SORT(KEEP=CUNICAH NP e12a_9_03
                       RENAME=(e12a_9_03=e12a_9_03_comp))
 ;
 BY cunicah np;
 IF COG_01 = 0;
RUN;

DATA MULT_ALL_NEW2;
 SET MULT_ALL_NEW1;
 ARRAY NEW(*) e9_a1_9_03_comp e9_a2_9_03_comp e9_a3_9_03_comp
              e12a_9_03_comp;
 DO I = 1 TO DIM(NEW);
    IF e8_03 = 2 THEN NEW(I) = .;
 END;
 DROP I;
RUN;




*************************;
*** --- Follow-up --- ***;
*************************;

%MACRO LISTA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_01 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA1(DIN=M03_7_A1,DROPVAR=e9_a2_9_03 e9_a3_9_03 e12a_9_03, OUD=COGA1);
QUIT;
%LISTA1(DIN=M03_7_A1,DROPVAR=e9_a1_9_03 e9_a3_9_03 e12a_9_03, OUD=COGA2);
QUIT;
%LISTA1(DIN=M03_7_A1,DROPVAR=e9_a1_9_03 e9_a2_9_03 e12a_9_03, OUD=COGA3);
QUIT;
%LISTA1(DIN=M03_7_A1,DROPVAR=e9_a1_9_03 e9_a2_9_03 e9_a3_9_03,OUD=COGA4);
QUIT;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGA1.set";
%LET DATAGO = OKIN_COGA1;
%LET DATAOT = MULT_COGA1;
%LET DATANM = impute_multCOGA1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a1_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_a1_9_03(E8_03=1);
  BOUNDS       e9_a1_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGA2.set";
%LET DATAGO = OKIN_COGA2;
%LET DATAOT = MULT_COGA2;
%LET DATANM = impute_multCOGA2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
```

```
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a2_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_a2_9_03(e8_03=1);
  BOUNDS       e9_a2_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGA3.set";
%LET DATAGO = OKIN_COGA3;
%LET DATAOT = MULT_COGA3;
%LET DATANM = impute_multCOGA3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;


DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_a3_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_a3_9_03(e8_03=1);
  BOUNDS       e9_a3_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;
```

```
%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGA4.set";
%LET DATAGO = OKIN_COGA4;
%LET DATAOT = MULT_COGA4;
%LET DATANM = impute_multCOGA4;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e12a_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e12a_9_03(e8_03=1);
  BOUNDS       e12a_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_COGA1 OUT=MULT_COGA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA2 OUT=MULT_COGA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA3 OUT=MULT_COGA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA4 OUT=MULT_COGA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP e8_03 RENAME=(e8_03=e8_03_old))
       M03_7_A1_SORT(KEEP=CUNICAH NP COG_01 e8_03 e9_a1_9_03 e9_a2_9_03
                          e9_a3_9_03 e12a_9_03)
       MULT_COGA1_SORT(KEEP=CUNICAH NP e9_a1_9_03
                       RENAME=(e9_a1_9_03=e9_a1_9_03_comp) IN=A)
       MULT_COGA2_SORT(KEEP=CUNICAH NP e9_a2_9_03
```

```
                        RENAME=(e9_a2_9_03=e9_a2_9_03_comp))
       MULT_COGA3_SORT(KEEP=CUNICAH NP e9_a3_9_03
                        RENAME=(e9_a3_9_03=e9_a3_9_03_comp))
       MULT_COGA4_SORT(KEEP=CUNICAH NP e12a_9_03
                        RENAME=(e12a_9_03=e12a_9_03_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW2;
 SET MULT_COG_NEW1;
 ARRAY COG(*) e9_a1_9_03_comp e9_a2_9_03_comp e9_a3_9_03_comp
              e12a_9_03_comp;
 DO I = 1 TO DIM(COG);
    IF e8_03 = 2 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEW_LA;
 SET MULT_COG_NEW2 MULT_ALL_NEW2;
RUN;


*************************************************************************;
*************************************************************************;

DATA M03_7_B05;
 RETAIN cunicah NP cog_01 e8_03
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e9_b1_9_03 e9_b2_9_03 e9_b3_9_03 e12b_9_03
 ;
 SET M03_7_A02;
 KEEP   cunicah NP cog_01 e8_03
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e9_b1_9_03 e9_b2_9_03 e9_b3_9_03 e12b_9_03
 ;
RUN;

PROC SORT DATA=M03_7_B05 OUT=M03_7_B1;
 BY DESCENDING cog_01 e8_03 cunicah NP;
RUN;

*********************************;
*** List B: 3 Attempts + Delay ***;
*********************************;

************************;
*** --- New Sample --- ***;
************************;
```

```
%LISTA(DIN=M03_7_B1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_b2_9_03 e9_b3_9_03 e12b_9_03, OUD=ALLB1); QUIT;
%LISTA(DIN=M03_7_B1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_b1_9_03 e9_b3_9_03 e12b_9_03, OUD=ALLB2); QUIT;
%LISTA(DIN=M03_7_B1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_b1_9_03 e9_b2_9_03 e12b_9_03, OUD=ALLB3); QUIT;
%LISTA(DIN=M03_7_B1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e9_b1_9_03 e9_b2_9_03 e9_b3_9_03,OUD=ALLB4); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLB1.set";
%LET DATAGO = OKIN_ALLB1;
%LET DATAOT = MULT_ALLB1;
%LET DATANM = impute_multALLB1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;




DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b1_9_03;
  RESTRICT     e9_b1_9_03(E8_03=2);
  BOUNDS       e9_b1_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLB2.set";
%LET DATAGO = OKIN_ALLB2;
```

```
%LET DATAOT = MULT_ALLB2;
%LET DATANM = impute_multALLB2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b2_9_03;
  RESTRICT     e9_b2_9_03(e8_03=2);
  BOUNDS       e9_b2_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLB3.set";
%LET DATAGO = OKIN_ALLB3;
%LET DATAOT = MULT_ALLB3;
%LET DATANM = impute_multALLB3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b3_9_03;
  RESTRICT     e9_b3_9_03(e8_03=2);
  BOUNDS       e9_b3_9_03(>=0,<=8);
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLB4.set";
%LET DATAGO = OKIN_ALLB4;
%LET DATAOT = MULT_ALLB4;
%LET DATANM = impute_multALLB4;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;


DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e12b_9_03;
  RESTRICT     e12b_9_03(e8_03=2);
  BOUNDS       e12b_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M03_7_B1 OUT=M03_7_B1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB1 OUT=MULT_ALLB1_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLB2 OUT=MULT_ALLB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB3 OUT=MULT_ALLB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB4 OUT=MULT_ALLB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEWB1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP e8_03 RENAME=(e8_03=e8_03_old)
IN=A)
       M03_7_B1_SORT(KEEP=CUNICAH NP COG_01 e8_03 e9_b1_9_03 e9_b2_9_03
                          e9_b3_9_03 e12b_9_03)
       MULT_ALLB1_SORT(KEEP=CUNICAH NP e9_b1_9_03
                       RENAME=(e9_b1_9_03=e9_b1_9_03_comp))
       MULT_ALLB2_SORT(KEEP=CUNICAH NP e9_b2_9_03
       RENAME=(e9_b2_9_03=e9_b2_9_03_comp))
       MULT_ALLB3_SORT(KEEP=CUNICAH NP e9_b3_9_03
       RENAME=(e9_b3_9_03=e9_b3_9_03_comp))
       MULT_ALLB4_SORT(KEEP=CUNICAH NP e12b_9_03
       RENAME=(e12b_9_03=e12b_9_03_comp))
 ;
 BY cunicah np;
 IF COG_01 = 0;
RUN;

DATA MULT_ALL_NEWB2;
 SET MULT_ALL_NEWB1;
 ARRAY NEW(*) e9_b1_9_03_comp e9_b2_9_03_comp e9_b3_9_03_comp
              e12b_9_03_comp;
 DO I = 1 TO DIM(NEW);
    IF e8_03 = 1 THEN NEW(I) = .;
 END;
 DROP I;
RUN;


************************;
*** --- Follow-up --- ***;
************************;

%LISTA1(DIN=M03_7_B1,DROPVAR=e9_b2_9_03 e9_b3_9_03 e12b_9_03, OUD=COGB1);
QUIT;
%LISTA1(DIN=M03_7_B1,DROPVAR=e9_b1_9_03 e9_b3_9_03 e12b_9_03, OUD=COGB2);
QUIT;
%LISTA1(DIN=M03_7_B1,DROPVAR=e9_b1_9_03 e9_b2_9_03 e12b_9_03, OUD=COGB3);
QUIT;
%LISTA1(DIN=M03_7_B1,DROPVAR=e9_b1_9_03 e9_b2_9_03 e9_b3_9_03,OUD=COGB4);
QUIT;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGB1.set";
%LET DATAGO = OKIN_COGB1;
%LET DATAOT = MULT_COGB1;
%LET DATANM = impute_multCOGB1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b1_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_b1_9_03(E8_03=2);
  BOUNDS       e9_b1_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGB2.set";
%LET DATAGO = OKIN_COGB2;
%LET DATAOT = MULT_COGB2;
%LET DATANM = impute_multCOGB2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b2_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_b2_9_03(e8_03=2);
  BOUNDS       e9_b2_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGB3.set";
%LET DATAGO = OKIN_COGB3;
%LET DATAOT = MULT_COGB3;
%LET DATANM = impute_multCOGB3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e9_b3_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e9_b3_9_03(e8_03=2);
  BOUNDS       e9_b3_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;
```

```
%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGB4.set";
%LET DATAGO = OKIN_COGB4;
%LET DATAOT = MULT_COGB4;
%LET DATANM = impute_multCOGB4;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;









DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03;
  COUNT        e12b_9_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
               e8_e9_01 e12_01 e13_01;
  RESTRICT     e12b_9_03(e8_03=2);
  BOUNDS       e12b_9_03(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;
%IMPUTE(NAME=&DATANM,DIR=&DATADR);

PROC SORT DATA=MULT_COGB1 OUT=MULT_COGB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB2 OUT=MULT_COGB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB3 OUT=MULT_COGB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB4 OUT=MULT_COGB4_SORT;
 BY cunicah np;
RUN;
```

```
DATA MULT_COG_NEWB1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP e8_03 RENAME=(e8_03=e8_03_old))
       M03_7_B1_SORT(KEEP=CUNICAH NP COG_01 e8_03 e9_b1_9_03 e9_b2_9_03
                          e9_b3_9_03 e12b_9_03)
       MULT_COGB1_SORT(KEEP=CUNICAH NP e9_b1_9_03
                       RENAME=(e9_b1_9_03=e9_b1_9_03_comp) IN=A)
       MULT_COGB2_SORT(KEEP=CUNICAH NP e9_b2_9_03
                       RENAME=(e9_b2_9_03=e9_b2_9_03_comp))
       MULT_COGB3_SORT(KEEP=CUNICAH NP e9_b3_9_03
                       RENAME=(e9_b3_9_03=e9_b3_9_03_comp))
       MULT_COGB4_SORT(KEEP=CUNICAH NP e12b_9_03
                       RENAME=(e12b_9_03=e12b_9_03_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEWB2;
 SET MULT_COG_NEWB1;
 ARRAY COG(*) e9_b1_9_03_comp e9_b2_9_03_comp e9_b3_9_03_comp
              e12b_9_03_comp;
 DO I = 1 TO DIM(COG);
    IF e8_03 = 1 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB2 MULT_ALL_NEWB2;
RUN;

*************************************************************************;

PROC SORT DATA=MULT_COG_NEW_LA OUT=XVA;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COG_NEWB_LA OUT=XVB;
 BY cunicah np;
RUN;

DATA XVAB;
 MERGE XVA(IN=A)
       XVB(KEEP=cunicah np e9_b1_9_03 e9_b2_9_03 e9_b3_9_03 e12b_9_03
                e9_b1_9_03_comp e9_b2_9_03_comp e9_b3_9_03_comp
                e12b_9_03_comp IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA XVAB1;
 SET XVAB;
 ARRAY VV1(*) e9_a1_9_03 e9_a2_9_03 e9_a3_9_03 e12a_9_03 e9_b1_9_03
              e9_b2_9_03 e9_b3_9_03 e12b_9_03;
 ARRAY VV2(*) elig_e9_a1_03 elig_e9_a2_03 elig_e9_a3_03 elig_e12a_03
```

```
              elig_e9_b1_03 elig_e9_b2_03 elig_e9_b3_03 elig_e12b_03;
 IF E8_03 = 1 THEN DO;
    DO I = 1 TO 4;
       IF VV1(I) = . THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
 END;
 IF E8_03 = 2 THEN DO;
    DO J = 5 TO 8;
       IF VV1(J) = . THEN VV2(J) = 1;
      ELSE VV2(J) = 0;
    END;
 END;
 DROP I J;
RUN;



*************************************************************************;
*** OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO ***;
*************************************************************************;

PROC SORT DATA=MULT1R_RETURN6_COV OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah NP;
RUN;

DATA M03_7_A1;
 MERGE ZCOV(IN=A)
       M03_7_SORT(KEEP=cunicah NP e2_03 e3_03 e4_03 e5_03 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M03_7_A2;
 SET M03_7_A1;
 IF e4_03 = 8 THEN e4_03 = .;
 IF cunicah = 3589 AND NP = 10 THEN e5_03 = .;
 DROP e2_03 e3_03;
RUN;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov/impute_multe45.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
```

```
  DATAIN M03_7_A2;
  DATAOUT multe45;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_03 yrschool_03 h2hhresp
               ;
  CATEGORICAL  SEXO_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e4_03 e5_03
               ;
  RESTRICT     e5_03(e4_03=1)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe45, DIR=C:/Users/nachen/Desktop/imputecov);

DATA multe45_0;
 SET multe45;
 IF e5_03 = 5 THEN e5_03 = 0;
 DROP e4_03;
 PROC SORT;
  BY cunicah NP;
RUN;

DATA M03_7_A00;
 RETAIN cunicah np cog_01
        e6_e7_03 e10_03 e11_03
        e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
        e14_1i_01 e14_2i_01
       e8_e9_01 e12_01 e13_01
        ;
 SET M03_7;
 KEEP cunicah np cog_01
      e6_e7_03 e10_03 e11_03
      e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
      e14_1i_01 e14_2i_01
     e8_e9_01 e12_01 e13_01
      ;
 PROC SORT;
  BY cog_01 cunicah np;
RUN;

DATA M03_7_A01;
 SET M03_7_A00;
 ARRAY K1(*) e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01;
 ARRAY K2(*) e11_4i_01 e11_5i_01 e11_6i_01 e14_2i_01;
 ARRAY K3(*) ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01;
 IF COG_01 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
     END;
 END;
 DROP I;
RUN;
```

```
PROC SORT DATA=M03_7_A01 OUT=M03_7_A01_SORT;
 BY cunicah np;
RUN;

DATA M03_7_A02;
 MERGE multe45_0(IN=A)
       M03_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01 e11_4i_01 e11_5i_01 e11_6i_01
      e14_2i_01;
RUN;


DATA M03_7_A05;
 RETAIN cunicah NP cog_01
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e5_03 e6_e7_03 e10_03 e11_03
 ;
 SET M03_7_A02;
 KEEP   cunicah NP cog_01
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e5_03 e6_e7_03 e10_03 e11_03
 ;
RUN;

PROC SORT DATA=M03_7_A05 OUT=M03_7_V1;
 BY DESCENDING cog_01 cunicah NP;
RUN;


**********************;
*** Visual Scanning ***;
**********************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e6_e7_03 NOT IN (0,1,2) THEN e6_e7_03 = .;
 IF e10_03 IN (.,80,88,77) THEN e10_03 = .;
 IF e11_03 NOT IN (0,1,2) THEN e11_03 = .;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;
```

```
%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e10_03 e11_03,   OUD=ALLV1); QUIT;
%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e6_e7_03 e11_03, OUD=ALLV2); QUIT;
%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e6_e7_03 e10_03, OUD=ALLV3); QUIT;



OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03 e6_e7_03;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03 e11_03;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03;
  COUNT        e10_03;
  BOUNDS       e10_03(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
*************************************************************************;

PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M03_7_A1 OUT=M03_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;


DATA MULT_ALL_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP COG_01 e5_03 e6_e7_03 e10_03
                  e11_03 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e6_e7_03
                       RENAME=(e6_e7_03=e6_e7_03_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e10_03   RENAME=(e10_03=e10_03_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e11_03   RENAME=(e11_03=e11_03_comp))
 ;
 BY cunicah np;
 IF COG_01 = 0;
RUN;


************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_01 = 1;
 IF e6_e7_03 NOT IN (0,1,2) THEN e6_e7_03 = .;
 IF e10_03 IN (.,80,88,77) THEN e10_03 = .;
 IF e11_03 NOT IN (0,1,2) THEN e11_03 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M03_7_V1,DROPVAR=e10_03 e11_03,   OUD=COGV1); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPVAR=e6_e7_03 e11_03, OUD=COGV2); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPVAR=e6_e7_03 e10_03, OUD=COGV3); QUIT;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGV1.set";
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;
%LET DATANM = impute_multCOGV1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03 e6_e7_03;
  COUNT        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01
               e13_01;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGV3.set";
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;
%LET DATANM = impute_multCOGV3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;




DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
```

```
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03 e11_03;
  COUNT        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01
               e13_01;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov3/impute_multCOGV2.set";
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
%LET DATANM = impute_multCOGV2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e5_03;
  COUNT        e10_03 ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01
               e12_01 e13_01;
  BOUNDS       e10_03(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
```

```
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP COG_01 e5_03 e6_e7_03 e10_03
                       e11_03)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e6_e7_03
                       RENAME=(e6_e7_03=e6_e7_03_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e10_03   RENAME=(e10_03=e10_03_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e11_03   RENAME=(e11_03=e11_03_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_FS;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

*************************************************************************;

DATA XVFS1;
 SET MULT_COG_NEW_FS;
 ARRAY VV1(*) e6_e7_03 e10_03 e11_03;
 ARRAY VV2(*) elig_e6_e7_03 elig_e10_03 elig_e11_03;
 DO I = 1 TO 3;
    IF I = 1 THEN DO;
       IF   VV1(I) NOT IN (0,1,2) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 2 THEN DO;
       IF   VV1(I) IN (.,80,88,77) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 3 THEN DO;
       IF   VV1(I) NOT IN (0,1,2) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
 END;
 DROP I;
RUN;

*************************************************************************;

DATA XVFS2;
 SET XVFS1;
 IF elig_e6_e7_03 = 1 THEN e6_e7_03 = .;
 IF elig_e10_03 = 1   THEN e10_03 = .;
 IF elig_e11_03 = 1   THEN e11_03 = .;
RUN;


*************************************************************************;
```

```
*** OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO ***;
*************************************************************************;


PROC SORT DATA=MULT1R_RETURN6_COV OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_01;
 SET WW.COG_AT_01;
 IF E1_03 = 1;
 COG_01 = 1;
RUN;

DATA YNOCOG_AT_01;
 SET WW.NOCOG_AT_01;
 IF E1_03 = 1;
 COG_01 = 0;
 IF E1_SAMP = 4 THEN YRSCHOOL_03 = 99;
RUN;

DATA M03_7;
 SET YCOG_AT_01
     YNOCOG_AT_01
 ;
RUN;

DATA M03_7_A1;
 MERGE ZCOV(IN=A)
       M03_7_SORT(KEEP=cunicah NP e13a_03 e13b_03 e13c_03 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah NP;
RUN;









DATA M03_7_A00;
 RETAIN cunicah np cog_01 e8_03
        e13a_03 e13b_03 e13c_03
        e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
        e14_1i_01 e14_2i_01
       e8_e9_01 e12_01 e13_01
        ;
 SET M03_7;
 KEEP cunicah np cog_01 e8_03
```

```
      e13a_03 e13b_03 e13c_03
      e11_1i_01 e11_2i_01 e11_3i_01 e11_4i_01 e11_5i_01 e11_6i_01
      e14_1i_01 e14_2i_01
     e8_e9_01 e12_01 e13_01
      ;
 PROC SORT;
  BY cog_01 cunicah np;
RUN;

DATA M03_7_A01;
 SET M03_7_A00;
 ARRAY K1(*) e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01;
 ARRAY K2(*) e11_4i_01 e11_5i_01 e11_6i_01 e14_2i_01;
 ARRAY K3(*) ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01;
 IF COG_01 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
         IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
     END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M03_7_A01 OUT=M03_7_A01_SORT;
 BY cunicah np;
RUN;

DATA M03_7_A02;
 MERGE ZCOV(IN=A)
       M03_7_A01_SORT
 ;
 BY cunicah np;
 IF A;
 DROP e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01 e11_4i_01 e11_5i_01 e11_6i_01
      e14_2i_01;
RUN;


DATA M03_7_A05;
 RETAIN cunicah NP cog_01
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e13a_03 e13b_03 e13c_03
 ;
 SET M03_7_A02;
 KEEP   cunicah NP cog_01
        AGE_03 SEXO_03 yrschool_03 tamloc_01 h2hhresp c1_03 c2_03 c42_03
        c44_03
        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01 e13_01
        e13a_03 e13b_03 e13c_03
 ;
RUN;

PROC SORT DATA=M03_7_A05 OUT=M03_7_V1;
 BY DESCENDING cog_01 cunicah NP;
RUN;
```

```
%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;


%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e13b_03 e13c_03,  OUD=ALLV1); QUIT;
%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e13a_03 e13c_03,  OUD=ALLV2); QUIT;
%LISTV(DIN=M03_7_V1,DROPVAR=ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01
e8_e9_01 e12_01 e13_01 e13a_03 e13b_03,  OUD=ALLV3); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13a_03;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
```

```
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13b_03;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13c_03;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*************************************************************************;

PROC SORT DATA=M03_7 OUT=M03_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M03_7_A1 OUT=M03_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;


DATA MULT_ALL_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP COG_01 e13a_03 e13b_03 e13c_03
                  IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e13a_03
                       RENAME=(e13a_03=e13a_03_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e13b_03
                       RENAME=(e13b_03=e13b_03_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e13c_03
                       RENAME=(e13c_03=e13c_03_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_01 = 0;
RUN;


************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_01 = 1;
 DROP &DROPVAR;
RUN;
```

```
%MEND;

%LISTVA1(DIN=M03_7_V1,DROPVAR=e13b_03 e13c_03, OUD=COGV1); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPVAR=e13a_03 e13c_03, OUD=COGV2); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPVAR=e13a_03 e13b_03, OUD=COGV3); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multCOGV1.set";
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;
%LET DATANM = impute_multCOGV1;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13a_03;
  COUNT        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01
               e13_01;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multCOGV2.set";
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
%LET DATANM = impute_multCOGV2;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
```

```
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13b_03;
  COUNT        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01
               e13_01;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/OOOXXX/Desktop/imputecov3/impute_multCOGV3.set";
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;
%LET DATANM = impute_multCOGV3;

%LET DATADR = C:/Users/OOOXXX/Desktop/imputecov3;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_03 yrschool_03 h2hhresp;
  CATEGORICAL  sexo_03 tamloc_01 c1_03 c2_03 c42_03 c44_03 e13c_03;
  COUNT        ecom_1i_01 ecom_2i_01 ecom_3i_01 ecom_4i_01 e8_e9_01 e12_01
               e13_01;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;


DATA MULT_COG_NEW1;
 MERGE M03_7_SORT(KEEP=CUNICAH NP E1_SAMP COG_01 e13a_03 e13b_03 e13c_03)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e13a_03
                       RENAME=(e13a_03=e13a_03_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e13b_03
                       RENAME=(e13b_03=e13b_03_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e13c_03
                       RENAME=(e13c_03=e13c_03_comp))
 ;
 BY cunicah np;
 IF A;
RUN;


DATA MULT_COG_NEW_DMY;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;


DATA XVFS1;
 SET MULT_COG_NEW_DMY;
 ARRAY VV1(*) e13a_03 e13b_03 e13c_03;
 ARRAY VV2(*) elig_e13a_03 elig_e13b_03 elig_e13c_03;
 DO I = 1 TO 3;
       IF   VV1(I) NOT IN (1,2) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
 END;
 DROP I;
RUN;
```

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```
OPTIONS PS=100 LS=100  NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

LIBNAME WW "C:\OOOOOOO\XXXXXXX";
RUN;

*******************************************************************************;

DATA M12_7;
 SET WW.MHAS_2012_Cognition_FINAL;
 IF tipent_12 IN (1,2);
 KEEP cunicah np tipent_12--e14b_12;
RUN;
PROC SORT DATA=M03_1 OUT=M03_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M12_7_COV0;
 RETAIN cunicah NP AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12
        c42_12 c44_12;
 SET M12_7;
 KEEP cunicah NP AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12
      c42_12 c44_12;
RUN;

DATA M12_7_COV1;
 SET M12_7_COV0;
 IF yrschool IN (88,99) THEN yrschool = .;
 IF age_12 = 999 THEN age_12 = .;
 ARRAY CV(*) c1_12 c2a_12 c42_12;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9) THEN CV(I) = .;
 END;
 IF c42_12 = 6 THEN INDEX_42 = 0; ELSE INDEX_42 = 1;
 DROP I c44_12;
RUN;

*******************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov12/impute_mult1r.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M12_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_12 yrschool h3hhresp
               ;
  CATEGORICAL  SEX_12 tam_loc_12 c1_12 c2a_12 c42_12
```

```
                ;
  RESTRICT      c42_12(INDEX_42=1)
                ;
  BOUNDS        AGE_12(>=21,<=112) yrschool(>=0,<=22)
                ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=C:/Users/nachen/Desktop/imputecov12);

DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c42_12 = 7 THEN c42_12 = 6;
RUN;

DATA MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
 DROP INDEX_42;
RUN;

DATA M12_7_LIST0;
 SET M12_7;
 KEEP cunicah np e6_12;
RUN;

DATA M12_7_LIST1;
 SET M12_7_LIST0;
 IF E6_12 IN (.,8);
 CALL STREAMINIT(1151271);
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;

DATA M12_7_LIST2;
 SET M12_7_LIST1;
 E6_12 = INDEX_1+1;
RUN;

DATA M12_7_A00;
 RETAIN cunicah np e6_12
        e7a_1_12 e7a_2_12 e7a_3_12 e7b_1_12 e7b_2_12 e7b_3_12
       e14a_12 e14b_12
       e8_12 e13_12
        e9a_12 e9b_12
        ;
 SET M12_7;
 ARRAY RF(*) e7a_1_12 e7a_2_12 e7a_3_12 e7b_1_12 e7b_2_12 e7b_3_12 e14a_12
             e14b_12;
 DO I = 1 TO DIM(RF);
    IF RF(I) = 9 THEN RF(I) = .;
 END;
 KEEP cunicah np e6_12
      e7a_1_12 e7a_2_12 e7a_3_12 e7b_1_12 e7b_2_12 e7b_3_12
      e14a_12 e14b_12
```

```
      e8_12 e13_12
       e9a_12 e9b_12
       ;
 PROC SORT;
  BY cunicah np;
RUN;


PROC SORT DATA=Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7_LIST1 OUT=M12_7_LIST1_SORT;
 BY cunicah np;
RUN;

DATA M12_7_A02;
 MERGE ZCOV(IN=A)
       M12_7_A00
       M12_7_LIST1_SORT(DROP=E6_12 IN=B)
 ;
 BY cunicah np;
 IF A;
 IF B THEN E6_12 = INDEX_1+1;
 DROP INDEX_1;
RUN;

DATA M12_7_A05;
 RETAIN cunicah NP e6_12
        AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12 c42_12
        e7a_1_12 e7a_2_12 e7a_3_12 e14a_12
 ;
 SET M12_7_A02;
 KEEP   cunicah NP e6_12
        AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12 c42_12
        e7a_1_12 e7a_2_12 e7a_3_12 e14a_12
 ;
RUN;

PROC SORT DATA=M12_7_A05 OUT=M12_7_A1;
 BY DESCENDING e6_12 cunicah NP;
RUN;

*********************************;
*** List A: 3 Attempts + Delay ***;
*********************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA(DIN=M12_7_A1,DROPVAR=e7a_2_12 e7a_3_12 e14a_12, OUD=ALLA1); QUIT;
%LISTA(DIN=M12_7_A1,DROPVAR=e7a_1_12 e7a_3_12 e14a_12, OUD=ALLA2); QUIT;
%LISTA(DIN=M12_7_A1,DROPVAR=e7a_1_12 e7a_2_12 e14a_12, OUD=ALLA3); QUIT;
```

```
%LISTA(DIN=M12_7_A1,DROPVAR=e7a_1_12 e7a_2_12 e7a_3_12,OUD=ALLA4); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLA1.set";
%LET DATAGO = OKIN_ALLA1;
%LET DATAOT = MULT_ALLA1;
%LET DATANM = impute_multALLA1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7a_1_12;
  RESTRICT     e7a_1_12(E6_12=1);
  BOUNDS       e7a_1_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLA2.set";
%LET DATAGO = OKIN_ALLA2;
%LET DATAOT = MULT_ALLA2;
%LET DATANM = impute_multALLA2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
```

```
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7a_2_12;
  RESTRICT     e7a_2_12(E6_12=1);
  BOUNDS       e7a_2_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLA3.set";
%LET DATAGO = OKIN_ALLA3;
%LET DATAOT = MULT_ALLA3;
%LET DATANM = impute_multALLA3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7a_3_12;
  RESTRICT     e7a_3_12(E6_12=1);
  BOUNDS       e7a_3_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLA4.set";
%LET DATAGO = OKIN_ALLA4;
%LET DATAOT = MULT_ALLA4;
%LET DATANM = impute_multALLA4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e14a_12;
  RESTRICT     e14a_12(E6_12=1);
  BOUNDS       e14a_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);



PROC SORT DATA=M12_7 OUT=M12_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7_A1 OUT=M12_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA1 OUT=MULT_ALLA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA2 OUT=MULT_ALLA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA3 OUT=MULT_ALLA3_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLA4 OUT=MULT_ALLA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M12_7_SORT(KEEP=CUNICAH NP e6_12 RENAME=(e6_12=e6_12_old) IN=A)
       M12_7_A1_SORT(KEEP=CUNICAH NP e6_12 e7a_1_12 e7a_2_12 e7a_3_12
                          e14a_12)
       MULT_ALLA1_SORT(KEEP=CUNICAH NP e7a_1_12
                       RENAME=(e7a_1_12=e7a_1_12_comp))
       MULT_ALLA2_SORT(KEEP=CUNICAH NP e7a_2_12
                       RENAME=(e7a_2_12=e7a_2_12_comp))
       MULT_ALLA3_SORT(KEEP=CUNICAH NP e7a_3_12
                       RENAME=(e7a_3_12=e7a_3_12_comp))
       MULT_ALLA4_SORT(KEEP=CUNICAH NP e14a_12
                       RENAME=(e14a_12=e14a_12_comp))
 ;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW2;
 SET MULT_ALL_NEW1;
 ARRAY NEW(*) e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_12 = 2 THEN NEW(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEW_LA;
 SET MULT_ALL_NEW2;
RUN;

*************************************************************************;

DATA M12_7_B05;
 RETAIN cunicah NP e6_12
        AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12 c42_12
        e7b_1_12 e7b_2_12 e7b_3_12 e14b_12
 ;
 SET M12_7_A02;
 KEEP   cunicah NP e6_12
        AGE_12 SEX_12 yrschool tam_loc_12 h3hhresp c1_12 c2a_12 c42_12
        e7b_1_12 e7b_2_12 e7b_3_12 e14b_12
 ;
RUN;

PROC SORT DATA=M12_7_B05 OUT=M12_7_B1;
 BY DESCENDING e6_12 cunicah NP;
RUN;
```

```
*********************************;
*** List B: 3 Attempts + Delay ***;
*********************************;

%LISTA(DIN=M12_7_B1,DROPVAR=e7b_2_12 e7b_3_12 e14b_12, OUD=ALLB1); QUIT;
%LISTA(DIN=M12_7_B1,DROPVAR=e7b_1_12 e7b_3_12 e14b_12, OUD=ALLB2); QUIT;
%LISTA(DIN=M12_7_B1,DROPVAR=e7b_1_12 e7b_2_12 e14b_12, OUD=ALLB3); QUIT;
%LISTA(DIN=M12_7_B1,DROPVAR=e7b_1_12 e7b_2_12 e7b_3_12,OUD=ALLB4); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLB1.set";
%LET DATAGO = OKIN_ALLB1;
%LET DATAOT = MULT_ALLB1;
%LET DATANM = impute_multALLB1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7b_1_12;
  RESTRICT     e7b_1_12(E6_12=2);
  BOUNDS       e7b_1_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLB2.set";
%LET DATAGO = OKIN_ALLB2;
%LET DATAOT = MULT_ALLB2;
%LET DATANM = impute_multALLB2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7b_2_12;
  RESTRICT     e7b_2_12(E6_12=2);
  BOUNDS       e7b_2_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLB3.set";
%LET DATAGO = OKIN_ALLB3;
%LET DATAOT = MULT_ALLB3;
%LET DATANM = impute_multALLB3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e7b_3_12;
  RESTRICT     e7b_3_12(E6_12=2);
  BOUNDS       e7b_3_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
```

```
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLB4.set";
%LET DATAGO = OKIN_ALLB4;
%LET DATAOT = MULT_ALLB4;
%LET DATANM = impute_multALLB4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e14b_12;
  RESTRICT     e14b_12(E6_12=2);
  BOUNDS       e14b_12(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=M12_7 OUT=M12_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7_B1 OUT=M12_7_B1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB1 OUT=MULT_ALLB1_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLB2 OUT=MULT_ALLB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB3 OUT=MULT_ALLB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB4 OUT=MULT_ALLB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEWB1;
 MERGE M12_7_SORT(KEEP=CUNICAH NP e6_12 RENAME=(e6_12=e6_12_old) IN=A)
       M12_7_B1_SORT(KEEP=CUNICAH NP e6_12 e7b_1_12 e7b_2_12 e7b_3_12
                          e14b_12)
       MULT_ALLB1_SORT(KEEP=CUNICAH NP e7b_1_12
                       RENAME=(e7b_1_12=e7b_1_12_comp))
       MULT_ALLB2_SORT(KEEP=CUNICAH NP e7b_2_12
                       RENAME=(e7b_2_12=e7b_2_12_comp))
       MULT_ALLB3_SORT(KEEP=CUNICAH NP e7b_3_12
                       RENAME=(e7b_3_12=e7b_3_12_comp))
       MULT_ALLB4_SORT(KEEP=CUNICAH NP e14b_12
                       RENAME=(e14b_12=e14b_12_comp))
 ;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEWB2;
 SET MULT_ALL_NEWB1;
 ARRAY NEW(*) e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_12 = 1 THEN NEW(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEWB_LA;
 SET MULT_ALL_NEWB2;
RUN;


PROC SORT DATA=MULT_COG_NEW_LA OUT=XVA;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COG_NEWB_LA OUT=XVB;
 BY cunicah np;
RUN;
```

```
DATA XVAB;
 MERGE XVA(IN=A)
       XVB(KEEP=cunicah np e7b_1_12 e7b_2_12 e7b_3_12 e14b_12 e7b_1_12_comp
                e7b_2_12_comp e7b_3_12_comp e14b_12_comp IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA XVAB1;
 SET XVAB;
 ARRAY VV1(*) e7a_1_12 e7a_2_12 e7a_3_12 e14a_12 e7b_1_12 e7b_2_12 e7b_3_12
              e14b_12;
 ARRAY VV2(*) elig_e7a_1_12 elig_e7a_2_12 elig_e7a_3_12 elig_e14a_12
              elig_e7b_1_12 elig_e7b_2_12 elig_e7b_3_12 elig_e14b_12;
 IF E6_12 = 1 THEN DO;
    DO I = 1 TO 4;
       IF VV1(I) = . THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
 END;
 IF E6_12 = 2 THEN DO;
    DO J = 5 TO 8;
       IF VV1(J) = . THEN VV2(J) = 1;
         ELSE VV2(J) = 0;
     END;
 END;
 DROP I J;
RUN;

*************************************************************************;
*** OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO ***;
*************************************************************************;

PROC SORT DATA=Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7 OUT=M12_7_SORT;
 BY cunicah np;
RUN;

DATA M12_7_A1;
 MERGE ZCOV(IN=A)
       M12_7_SORT(KEEP=cunicah np e3b_12 e4_12 e5_12 e9a_12 e9b_12 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M12_7_A2;
 SET M12_7_A1;
 IF e3b_12 IN (6,9) THEN e3b_12 = .;
 IF e4_12 = 8 THEN e4_12 = .;
 IF e5_12 = 9 THEN e5_12 = .;
RUN;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov12/impute_multe345.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M12_7_A2;
  DATAOUT multe345;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_12 yrschool h3hhresp
               ;
  CATEGORICAL  SEX_12 tam_loc_12 c1_12 c2a_12 c42_12 e3b_12 e4_12 e5_12
               ;
  RESTRICT     e5_12(e4_12=1)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe345, DIR=C:/Users/nachen/Desktop/imputecov12);

DATA multe35;
 SET multe345;
 IF e5_12 = 5 THEN e5_12 = 0;
 DROP e4_12;
 PROC SORT;
  BY cunicah np;
RUN;

DATA M12_7_V1;
 MERGE multe35(IN=A)
       M12_7_SORT(KEEP=cunicah np e8_12 e10_12 e13_12 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e8_12  NOT IN (0,1,2,3,4,5,6) THEN e8_12 = .;
 IF e13_12 NOT IN (0,1,2,3,4,5,6) THEN e13_12 = .;
 IF e10_12 IN (.,80,88,99) THEN e10_12 = .;
 IF e9a_12 = 88 THEN e9a_12 = .;
 IF e9b_12 = 99 THEN e9b_12 = .;
 DROP &DROPVAR;
RUN;
%MEND;
```

```
%LISTV(DIN=M12_7_V1,DROPVAR= e10_12 e13_12 e9a_12 e9b_12, OUD=ALLV1); QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e8_12  e13_12 e9a_12 e9b_12, OUD=ALLV2); QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e8_12  e10_12 e9a_12 e9b_12, OUD=ALLV3); QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e8_12  e10_12 e13_12 e9b_12 e3b_12 e5_12,
       OUD=ALLV4); QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e8_12  e10_12 e13_12 e9a_12 e3b_12 e5_12,
       OUD=ALLV5); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e3b_12 e5_12;
  COUNT        e8_12;
  BOUNDS       e8_12(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e3b_12 e5_12;
  COUNT        e13_12;
  BOUNDS       e13_12(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e3b_12 e5_12;
  COUNT        e10_12;
  BOUNDS       e10_12(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV4.set";
%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;
%LET DATANM = impute_multALLV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e9a_12;
  BOUNDS       e9a_12(>=0,<=66);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV5.set";
%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;
%LET DATANM = impute_multALLV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
```

```
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  COUNT        e9b_12;
  BOUNDS       e9b_12(>=0,<=13);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;


DATA MULT_ALL_NEW1;
 MERGE M12_7_SORT(KEEP=CUNICAH NP e8_12 e10_12 e13_12 e9a_12 e9b_12)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e8_12  RENAME=(e8_12=e8_12_comp)
                       IN=A)
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e10_12 RENAME=(e10_12=e10_12_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e13_12 RENAME=(e13_12=e13_12_comp))
      MULT_ALLV4_SORT(KEEP=CUNICAH NP e9a_12 RENAME=(e9a_12=e9a_12_comp))
      MULT_ALLV5_SORT(KEEP=CUNICAH NP e9b_12 RENAME=(e9b_12=e9b_12_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_FS;
 SET MULT_ALL_NEW1;
RUN;
```

```
DATA XVFS1;
 SET MULT_COG_NEW_FS;
 ARRAY VV1(*) e8_12 e10_12 e13_12 e9a_12 e9b_12;
 ARRAY VV2(*) elig_e8_12 elig_e10_12 elig_e13_12 elig_e9a_12 elig_e9b_12;
 DO I = 1 TO 5;
    IF I = 1 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (0,1,2,3,4,5,6) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 2 THEN DO;
       IF   VV1(I) IN (.,80,88,99) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 4 | I = 5 THEN DO;
       IF   VV1(I) IN (.,88,99) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
 END;
 DROP I;
RUN;

*************************************************************************;
*** OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO ***;
*************************************************************************;

PROC SORT DATA=Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7 OUT=M12_7_SORT;
 BY cunicah np;
RUN;

DATA M12_7_A1;
 MERGE ZCOV(IN=A)
       M12_7_SORT(KEEP=cunicah np e11a_12 e11b_12 e11c_12 e12a_12 e12b_12
                       e12c_12 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M12_7_V1;
 SET M12_7_A1;
 IF e12a_12 IN (3,8) THEN DO;
    e12a_12 = e12b_12;
 END;
 RENAME e12a_12 = e12ab_12;
 DROP e12b_12;
RUN;
```

```
%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e11a_12 = 9 THEN e11a_12 = .;
 IF e11b_12 = 9 THEN e11b_12 = .;
 IF e11c_12 = 9 THEN e11c_12 = .;
 IF e12ab_12 IN (8,9) THEN e12ab_12 = .;
 IF e12c_12 = 99 THEN e12c_12 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTV(DIN=M12_7_V1,DROPVAR= e11b_12 e11c_12 e12ab_12 e12c_12,OUD=ALLV1);
QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e11a_12 e11c_12 e12ab_12 e12c_12,OUD=ALLV2);
QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e11a_12 e11b_12 e12ab_12 e12c_12,OUD=ALLV3);
QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e11a_12 e11b_12 e11c_12  e12c_12,OUD=ALLV4);
QUIT;
%LISTV(DIN=M12_7_V1,DROPVAR= e11a_12 e11b_12 e11c_12  e12ab_12,OUD=ALLV5);
QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;
%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e11a_12;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;
%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e11b_12;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;
%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e11c_12;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV4.set";
%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;
%LET DATANM = impute_multALLV4;
%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12 e12ab_12;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);



OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov12/impute_multALLV5.set";
%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;
%LET DATANM = impute_multALLV5;
%LET DATADR = C:/Users/nachen/Desktop/imputecov12;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
```

```
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_12 yrschool h3hhresp e12c_12;
  CATEGORICAL  sex_12 tam_loc_12 c1_12 c2a_12 c42_12;
  BOUNDS       e12c_12(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);



PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M12_7_V1 OUT=M12_7_V1_SORT;
 BY cunicah np;
RUN;
```

```
DATA MULT_ALL_NEW1;
 MERGE M12_7_SORT(KEEP=CUNICAH NP e11a_12 e11b_12 e11c_12 e12a_12 e12b_12
                       e12c_12)
       M12_7_V1_SORT(KEEP=CUNICAH NP e12ab_12)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e11a_12
                       RENAME=(e11a_12=e11a_12_comp) IN=A)
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e11b_12
                       RENAME=(e11b_12=e11b_12_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e11c_12
                       RENAME=(e11c_12=e11c_12_comp))
         MULT_ALLV4_SORT(KEEP=CUNICAH NP e12ab_12
                         RENAME=(e12ab_12=e12ab_12_comp))
         MULT_ALLV5_SORT(KEEP=CUNICAH NP e12c_12
                         RENAME=(e12c_12=e12c_12_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_DMY;
 SET MULT_ALL_NEW1;
RUN;

DATA XVFS1;
 SET MULT_COG_NEW_DMY;
 ARRAY VV1(*) e11a_12 e11b_12 e11c_12 e12ab_12 e12c_12;
 ARRAY VV2(*) elig_e11a_12 elig_e11b_12 elig_e11c_12 elig_e12ab_12
elig_e12c_12;
 DO I = 1 TO 5;
    IF I = 1 | I = 2 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (1,2) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 4 THEN DO;
       IF   VV1(I) IN (.,8,9) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
    IF I = 5 THEN DO;
       IF   VV1(I) IN (.,99) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
     END;
 END;
 DROP I;
RUN;
```

2015

```
OPTIONS PS=100 LS=100  NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

LIBNAME WW "C:\OOOOOOO\XXXXXXX";
RUN;

*******************************************************************************;

DATA M15_1;
 RETAIN cunicah np tipent_15 resul_ec_15
        AGE_12 SEX_12 yrschool yrschool_12 yrschool_15 h3hhresp tam_loc_12
        c1_12 c2a_12 c42_12 c44_12
        AGE_15 SEX_15 tam_loc_15 h4hhresp c1_15 c2a_15 c42_15 c44_15
        e6_15
        e7a_1_15 e7a_2_15 e7a_3_15 e14a_15
        e7b_1_15 e7b_2_15 e7b_3_15 e14b_15
        e3b_15 e4_15 e5_15
        e8_15 e10_15 e13_15 e9a_15 e9b_15
        e11a_15 e11b_15 e11c_15 e12a_15 e12b_15 e12c_15

 ;
 SET WW.MHAS_2015_Cognition_FINAL;
 KEEP cunicah np tipent_15 resul_ec_15
      AGE_12 SEX_12 yrschool yrschool_12 yrschool_15 h3hhresp tam_loc_12
      c1_12 c2a_12 c42_12 c44_12
      AGE_15 SEX_15 tam_loc_15 h4hhresp c1_15 c2a_15 c42_15 c44_15
      e6_15
     e7a_1_15 e7a_2_15 e7a_3_15 e14a_15
      e7b_1_15 e7b_2_15 e7b_3_15 e14b_15
      e3b_15 e4_15 e5_15
      e8_15 e10_15 e13_15 e9a_15 e9b_15
      e11a_15 e11b_15 e11c_15 e12a_15 e12b_15 e12c_15
 ;
RUN;

PROC SORT DATA=M15_1 OUT=M15_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M15_2;
 SET M15_1_SORT;
 IF TIPENT_15 IN (1,2);
 ATTRIB _ALL_ LABEL = " ";
RUN;


PROC SORT DATA=WW.Mhas_2012_cognition_final OUT=WV1(KEEP=CUNICAH NP
TIPENT_12 resul_ec_12);
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WW.v1_cognition_impute_data_2012 OUT=WV2(KEEP=CUNICAH NP);
 BY CUNICAH NP;
RUN;
```

```
DATA WVPNS;
 MERGE WV1(IN=A) WV2(IN=B);
 BY CUNICAH NP;
 IF A AND NOT B;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M15_2_OLD M15_2_NEW;
 SET M15_2;
 IF TIPENT_15 = 2 THEN OUTPUT M15_2_NEW;
 ELSE OUTPUT M15_2_OLD;
RUN;

PROC SORT DATA=M15_2_OLD OUT=M15_2_OLD_SORT;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS OUT=WVPNS_SORT(KEEP=CUNICAH NP TIPENT_12
                                    RENAME=(TIPENT_12=E12_SAMP));
 BY CUNICAH NP;
RUN;

DATA WVPNS_1 WVPNS_1_OTHER;
 MERGE M15_2_OLD_SORT(IN=A) WVPNS_SORT(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN DO;
    IF E12_SAMP = . THEN E12_SAMP = 1;
      OUTPUT WVPNS_1;
 END;
 IF A AND NOT B THEN DO;
    OUTPUT WVPNS_1_OTHER;
 END;
RUN;

DATA WVPNS_2;
 SET M15_2_NEW(IN=A) WVPNS_1;
 IF A THEN E12_SAMP = 0;
RUN;

PROC SORT DATA=WW.V1_cognition_impute_data_2012 OUT=W1IMP;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS_1_OTHER OUT=WVPNS_1_OT_SORT;
 BY CUNICAH NP;
RUN;

DATA WVPNS_1_OTHER2 WVPNS_1_OTHER2_CK;
 MERGE WVPNS_1_OT_SORT(IN=A) W1IMP(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN OUTPUT WVPNS_1_OTHER2;
 IF A AND NOT B THEN OUTPUT WVPNS_1_OTHER2_CK;
RUN;

DATA WW.COG_AT_12;
 SET WVPNS_1_OTHER2;
```

```
RUN;

DATA WVPNS_1_OTHER2_CK1;
 SET WVPNS_1_OTHER2_CK;
 E12_SAMP = 4;
 KEEP CUNICAH--E12_SAMP;
RUN;

DATA WVPNS_2_FN;
 SET WVPNS_2(IN=A) WVPNS_1_OTHER2_CK1;
 IF A THEN DO;
    IF E12_SAMP IN (3,4) THEN DO;
       E12_SAMP = E12_SAMP-2;
    END;
 END;
RUN;

DATA WW.NOCOG_AT_12;
 SET WVPNS_2_FN;
RUN;

DATA YCOG_AT_12;
 SET WW.COG_AT_12;
 COG_12 = 1;
RUN;

DATA YNOCOG_AT_12;
 SET WW.NOCOG_AT_12;
 COG_12 = 0;
RUN;

DATA M15_7;
 SET YCOG_AT_12
     YNOCOG_AT_12
 ;
RUN;

DATA M15_7_COV0;
 RETAIN cunicah NP AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15
        c42_15 c44_15;
 SET M15_7;
 KEEP cunicah NP AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15
      c42_15 c44_15;
RUN;

DATA M15_7_COV1;
 SET M15_7_COV0;
 IF yrschool IN (88,99,.M) THEN yrschool = .;
 IF age_15 = 999 THEN age_15 = .;
 ARRAY CV(*) c1_15 c2a_15 c42_15 c44_15;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9,.I) THEN CV(I) = .;
 END;
 IF c42_15 = 6 THEN INDEX_42 = 0; ELSE INDEX_42 = 1;
 IF c44_15 = 6 THEN INDEX_44 = 0; ELSE INDEX_44 = 1;
 DROP I;
RUN;
```

```
*************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov15/impute_mult1r.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M15_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_15 yrschool h4hhresp
               ;
  CATEGORICAL  SEX_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15
               ;
  RESTRICT     c42_15(INDEX_42=1) c44_15(INDEX_44=1)
               ;
  BOUNDS       AGE_15(>=21,<=112) yrschool(>=0,<=22)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=C:/Users/nachen/Desktop/imputecov15);

DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c42_15 = 7 THEN c42_15 = 6;
 IF c44_15 = 7 THEN c44_15 = 6;
RUN;

DATA WW.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
 DROP INDEX_42 INDEX_44;
RUN;

DATA M15_7_LIST0;
 SET M15_7;
 KEEP cunicah np e6_15;
RUN;

DATA M15_7_LIST1;
 SET M15_7_LIST0;
 IF E6_15 IN (.,.I,8);
 CALL STREAMINIT(5293171);
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;
```

```
DATA M15_7_LIST2;
 SET M15_7_LIST1;
 E6_15 = INDEX_1+1;
RUN;

DATA M15_7_A00;
 RETAIN cunicah np cog_12 e6_15
        e7a_1_15 e7a_2_15 e7a_3_15 e7b_1_15 e7b_2_15 e7b_3_15 e14a_15
         e14b_15
         e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
         e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
         e8_12_comp e10_12_comp e13_12_comp
        e9a_12_comp e9b_12_comp
         e11a_12_comp e11b_12_comp e11c_12_comp
        e12ab_12_comp e12c_12_comp
         ;
 SET M15_7;
 KEEP cunicah np cog_12 e6_15
      e7a_1_15 e7a_2_15 e7a_3_15 e7b_1_15 e7b_2_15 e7b_3_15 e14a_15 e14b_15
       e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
       e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
       e8_12_comp e10_12_comp e13_12_comp
      e9a_12_comp e9b_12_comp
       e11a_12_comp e11b_12_comp e11c_12_comp
      e12ab_12_comp e12c_12_comp
       ;
 PROC SORT;
  BY cog_12 cunicah np;
RUN;

DATA M15_7_A01;
 SET M15_7_A00;
 ARRAY K1(*) e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp;
 ARRAY K2(*) e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp;
 ARRAY K3(*) ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12;
 IF COG_12 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_A01 OUT=M15_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_LIST1 OUT=M15_7_LIST1_SORT;
 BY cunicah np;
RUN;
```

```
DATA M15_7_A02;
 MERGE ZCOV(IN=A)
       M15_7_A01_SORT
       M15_7_LIST1_SORT(DROP=E6_15 IN=B)
 ;
 BY cunicah np;
 IF A;
 IF B THEN E6_15 = INDEX_1+1;
 DROP INDEX_1
      e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
      e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
 ;
RUN;

DATA M15_7_A05;
 RETAIN cunicah NP cog_12 e6_15
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
       e7a_1_15 e7a_2_15 e7a_3_15 e14a_15
 ;
 SET M15_7_A02;
 ARRAY EAB(*) e7a_1_15 e7a_2_15 e7a_3_15 e14a_15;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_12 e6_15
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e7a_1_15 e7a_2_15 e7a_3_15 e14a_15
 ;
RUN;

PROC SORT DATA=M15_7_A05 OUT=M15_7_A1;
 BY DESCENDING cog_12 e6_15 cunicah NP;
RUN;

*********************************;
*** List A: 3 Attempts + Delay ***;
*********************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;
```

```
*************************;
*** --- New Sample --- ***;
*************************;

%LISTA(DIN=M15_7_A1,DROPVAR=ecom_1i_12--e12c_12_comp e7a_2_15 e7a_3_15
e14a_15, OUD=ALLA1); QUIT;
%LISTA(DIN=M15_7_A1,DROPVAR=ecom_1i_12--e12c_12_comp e7a_1_15 e7a_3_15
e14a_15, OUD=ALLA2); QUIT;
%LISTA(DIN=M15_7_A1,DROPVAR=ecom_1i_12--e12c_12_comp e7a_1_15 e7a_2_15
e14a_15, OUD=ALLA3); QUIT;
%LISTA(DIN=M15_7_A1,DROPVAR=ecom_1i_12--e12c_12_comp e7a_1_15 e7a_2_15
e7a_3_15,OUD=ALLA4); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLA1.set";
%LET DATAGO = OKIN_ALLA1;
%LET DATAOT = MULT_ALLA1;
%LET DATANM = impute_multALLA1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7a_1_15;
  RESTRICT     e7a_1_15(E6_15=1);
  BOUNDS       e7a_1_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLA2.set";
%LET DATAGO = OKIN_ALLA2;
```

```
%LET DATAOT = MULT_ALLA2;
%LET DATANM = impute_multALLA2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7a_2_15;
  RESTRICT     e7a_2_15(E6_15=1);
  BOUNDS       e7a_2_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLA3.set";
%LET DATAGO = OKIN_ALLA3;
%LET DATAOT = MULT_ALLA3;
%LET DATANM = impute_multALLA3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7a_3_15;
  RESTRICT     e7a_3_15(E6_15=1);
```

```
  BOUNDS       e7a_3_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLA4.set";
%LET DATAGO = OKIN_ALLA4;
%LET DATAOT = MULT_ALLA4;
%LET DATANM = impute_multALLA4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e14a_15;
  RESTRICT     e14a_15(E6_15=1);
  BOUNDS       e14a_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_A1 OUT=M15_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA1 OUT=MULT_ALLA1_SORT;
 BY cunicah np;
```

```
RUN;

PROC SORT DATA=MULT_ALLA2 OUT=MULT_ALLA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA3 OUT=MULT_ALLA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA4 OUT=MULT_ALLA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP e6_15 RENAME=(e6_15=e6_15_old)
                  IN=A)
       M15_7_A1_SORT(KEEP=CUNICAH NP COG_12 e6_15 e7a_1_15 e7a_2_15 e7a_3_15
                     e14a_15)
       MULT_ALLA1_SORT(KEEP=CUNICAH NP e7a_1_15
                       RENAME=(e7a_1_15=e7a_1_15_comp))
       MULT_ALLA2_SORT(KEEP=CUNICAH NP e7a_2_15
                       RENAME=(e7a_2_15=e7a_2_15_comp))
       MULT_ALLA3_SORT(KEEP=CUNICAH NP e7a_3_15
                       RENAME=(e7a_3_15=e7a_3_15_comp))
       MULT_ALLA4_SORT(KEEP=CUNICAH NP e14a_15
                       RENAME=(e14a_15=e14a_15_comp))
 ;
 BY cunicah np;
 IF COG_12 = 0;
RUN;

DATA MULT_ALL_NEW2;
 SET MULT_ALL_NEW1;
 ARRAY NEW(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_15 = 2 THEN NEW(I) = .;
 END;
 DROP I;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_12 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA1(DIN=M15_7_A1,DROPVAR=e7a_2_15 e7a_3_15 e14a_15, OUD=COGA1); QUIT;
%LISTA1(DIN=M15_7_A1,DROPVAR=e7a_1_15 e7a_3_15 e14a_15, OUD=COGA2); QUIT;
%LISTA1(DIN=M15_7_A1,DROPVAR=e7a_1_15 e7a_2_15 e14a_15, OUD=COGA3); QUIT;
%LISTA1(DIN=M15_7_A1,DROPVAR=e7a_1_15 e7a_2_15 e7a_3_15,OUD=COGA4); QUIT;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGA1.set";
%LET DATAGO = OKIN_COGA1;
%LET DATAOT = MULT_COGA1;
%LET DATANM = impute_multCOGA1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7a_1_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7a_1_15(E6_15=1);
  BOUNDS       e7a_1_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGA2.set";
%LET DATAGO = OKIN_COGA2;
%LET DATAOT = MULT_COGA2;
%LET DATANM = impute_multCOGA2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
```

```
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7a_2_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7a_2_15(E6_15=1);
  BOUNDS       e7a_2_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGA3.set";
%LET DATAGO = OKIN_COGA3;
%LET DATAOT = MULT_COGA3;
%LET DATANM = impute_multCOGA3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7a_3_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7a_3_15(E6_15=1);
  BOUNDS       e7a_3_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGA4.set";
%LET DATAGO = OKIN_COGA4;
%LET DATAOT = MULT_COGA4;
%LET DATANM = impute_multCOGA4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e14a_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e14a_15(E6_15=1);
  BOUNDS       e14a_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;
%IMPUTE(NAME=&DATANM,DIR=&DATADR);

PROC SORT DATA=MULT_COGA1 OUT=MULT_COGA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA2 OUT=MULT_COGA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA3 OUT=MULT_COGA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA4 OUT=MULT_COGA4_SORT;
 BY cunicah np;
RUN;
```

```
DATA MULT_COG_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP e6_15 RENAME=(e6_15=e6_15_old))
       M15_7_A1_SORT(KEEP=CUNICAH NP COG_12 e6_15 e7a_1_15 e7a_2_15 e7a_3_15
                     e14a_15)
       MULT_COGA1_SORT(KEEP=CUNICAH NP e7a_1_15
                       RENAME=(e7a_1_15=e7a_1_15_comp) IN=A)
       MULT_COGA2_SORT(KEEP=CUNICAH NP e7a_2_15
                       RENAME=(e7a_2_15=e7a_2_15_comp))
       MULT_COGA3_SORT(KEEP=CUNICAH NP e7a_3_15
                       RENAME=(e7a_3_15=e7a_3_15_comp))
       MULT_COGA4_SORT(KEEP=CUNICAH NP e14a_15
                       RENAME=(e14a_15=e14a_15_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW2;
 SET MULT_COG_NEW1;
 ARRAY COG(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;
 DO I = 1 TO DIM(COG);
    IF e6_15 = 2 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEW_LA;
 SET MULT_COG_NEW2 MULT_ALL_NEW2;
RUN;

DATA WW.MULT_COG_NEW_LA;
 SET MULT_COG_NEW_LA;
RUN;

*************************************************************************;
*************************************************************************;

DATA M15_7_B05;
 RETAIN cunicah NP cog_12 e6_15
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
       e7b_1_15 e7b_2_15 e7b_3_15 e14b_15
 ;
 SET M15_7_A02;
 ARRAY EAB(*) e7b_1_15 e7b_2_15 e7b_3_15 e14b_15;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_12 e6_15
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
```

```
         ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
        e8_12_comp e10_12_comp e13_12_comp
        e9a_12_comp e9b_12_comp
         e11a_12_comp e11b_12_comp e11c_12_comp
        e12ab_12_comp e12c_12_comp
        e7b_1_15 e7b_2_15 e7b_3_15 e14b_15
 ;
RUN;

PROC SORT DATA=M15_7_B05 OUT=M15_7_B1;
 BY DESCENDING cog_12 e6_15 cunicah NP;
RUN;

*********************************;
*** List B: 3 Attempts + Delay ***;
*********************************;

************************;
*** --- New Sample --- ***;
************************;

%LISTA(DIN=M15_7_B1,DROPVAR=ecom_1i_12--e12c_12_comp e7b_2_15 e7b_3_15
e14b_15, OUD=ALLB1); QUIT;
%LISTA(DIN=M15_7_B1,DROPVAR=ecom_1i_12--e12c_12_comp e7b_1_15 e7b_3_15
e14b_15, OUD=ALLB2); QUIT;
%LISTA(DIN=M15_7_B1,DROPVAR=ecom_1i_12--e12c_12_comp e7b_1_15 e7b_2_15
e14b_15, OUD=ALLB3); QUIT;
%LISTA(DIN=M15_7_B1,DROPVAR=ecom_1i_12--e12c_12_comp e7b_1_15 e7b_2_15
e7b_3_15,OUD=ALLB4); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLB1.set";
%LET DATAGO = OKIN_ALLB1;
%LET DATAOT = MULT_ALLB1;
%LET DATANM = impute_multALLB1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7b_1_15;
  RESTRICT     e7b_1_15(E6_15=2);
```

```
  BOUNDS       e7b_1_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLB2.set";
%LET DATAGO = OKIN_ALLB2;
%LET DATAOT = MULT_ALLB2;
%LET DATANM = impute_multALLB2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7b_2_15;
  RESTRICT     e7b_2_15(E6_15=2);
  BOUNDS       e7b_2_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLB3.set";
%LET DATAGO = OKIN_ALLB3;
%LET DATAOT = MULT_ALLB3;
%LET DATANM = impute_multALLB3;
```

```
%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e7b_3_15;
  RESTRICT     e7b_3_15(E6_15=2);
  BOUNDS       e7b_3_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLB4.set";
%LET DATAGO = OKIN_ALLB4;
%LET DATAOT = MULT_ALLB4;
%LET DATANM = impute_multALLB4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e14b_15;
  RESTRICT     e14b_15(E6_15=2);
  BOUNDS       e14b_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
```

```
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_B1 OUT=M15_7_B1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB1 OUT=MULT_ALLB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB2 OUT=MULT_ALLB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB3 OUT=MULT_ALLB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB4 OUT=MULT_ALLB4_SORT;
 BY cunicah np;
RUN;


DATA MULT_ALL_NEWB1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP e6_15 RENAME=(e6_15=e6_15_old)
                  IN=A)
       M15_7_B1_SORT(KEEP=CUNICAH NP COG_12 e6_15 e7b_1_15 e7b_2_15 e7b_3_15
                     e14b_15)
       MULT_ALLB1_SORT(KEEP=CUNICAH NP e7b_1_15
                       RENAME=(e7b_1_15=e7b_1_15_comp))
       MULT_ALLB2_SORT(KEEP=CUNICAH NP e7b_2_15
                       RENAME=(e7b_2_15=e7b_2_15_comp))
       MULT_ALLB3_SORT(KEEP=CUNICAH NP e7b_3_15
                       RENAME=(e7b_3_15=e7b_3_15_comp))
       MULT_ALLB4_SORT(KEEP=CUNICAH NP e14b_15
                       RENAME=(e14b_15=e14b_15_comp))
 ;
 BY cunicah np;
 IF COG_12 = 0;
RUN;

DATA MULT_ALL_NEWB2;
 SET MULT_ALL_NEWB1;
 ARRAY NEW(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_15 = 1 THEN NEW(I) = .;
 END;
```

```
 DROP I;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%LISTA1(DIN=M15_7_B1,DROPVAR=e7b_2_15 e7b_3_15 e14b_15, OUD=COGB1); QUIT;
%LISTA1(DIN=M15_7_B1,DROPVAR=e7b_1_15 e7b_3_15 e14b_15, OUD=COGB2); QUIT;
%LISTA1(DIN=M15_7_B1,DROPVAR=e7b_1_15 e7b_2_15 e14b_15, OUD=COGB3); QUIT;
%LISTA1(DIN=M15_7_B1,DROPVAR=e7b_1_15 e7b_2_15 e7b_3_15,OUD=COGB4); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGB1.set";
%LET DATAGO = OKIN_COGB1;
%LET DATAOT = MULT_COGB1;
%LET DATANM = impute_multCOGB1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7b_1_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7b_1_15(E6_15=2);
  BOUNDS       e7b_1_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGB2.set";
```

```
%LET DATAGO = OKIN_COGB2;
%LET DATAOT = MULT_COGB2;
%LET DATANM = impute_multCOGB2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7b_2_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7b_2_15(E6_15=2);
  BOUNDS       e7b_2_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGB3.set";
%LET DATAGO = OKIN_COGB3;
%LET DATAOT = MULT_COGB3;
%LET DATANM = impute_multCOGB3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
```

```
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e7b_3_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e7b_3_15(E6_15=2);
  BOUNDS       e7b_3_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGB4.set";
%LET DATAGO = OKIN_COGB4;
%LET DATAOT = MULT_COGB4;
%LET DATANM = impute_multCOGB4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e14b_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
               e8_12_comp e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  RESTRICT     e14b_15(E6_15=2);
  BOUNDS       e14b_15(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_COGB1 OUT=MULT_COGB1_SORT;
 BY cunicah np;
```

```
RUN;

PROC SORT DATA=MULT_COGB2 OUT=MULT_COGB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB3 OUT=MULT_COGB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB4 OUT=MULT_COGB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEWB1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP e6_15 RENAME=(e6_15=e6_15_old))
       M15_7_B1_SORT(KEEP=CUNICAH NP COG_12 e6_15 e7b_1_15 e7b_2_15 e7b_3_15
                     e14b_15)
       MULT_COGB1_SORT(KEEP=CUNICAH NP e7b_1_15
                       RENAME=(e7b_1_15=e7b_1_15_comp) IN=A)
       MULT_COGB2_SORT(KEEP=CUNICAH NP e7b_2_15
                       RENAME=(e7b_2_15=e7b_2_15_comp))
       MULT_COGB3_SORT(KEEP=CUNICAH NP e7b_3_15
                       RENAME=(e7b_3_15=e7b_3_15_comp))
       MULT_COGB4_SORT(KEEP=CUNICAH NP e14b_15
                       RENAME=(e14b_15=e14b_15_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEWB2;
 SET MULT_COG_NEWB1;
 ARRAY COG(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 DO I = 1 TO DIM(COG);
    IF e6_15 = 1 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB2 MULT_ALL_NEWB2;
RUN;

DATA WW.MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB_LA;
RUN;

*************************************************************************;
*************************************************************************;

PROC SORT DATA=WW.MULT_COG_NEW_LA OUT=XVA;
 BY cunicah np;
RUN;

PROC SORT DATA=WW.MULT_COG_NEWB_LA OUT=XVB;
 BY cunicah np;
```

```
RUN;

DATA XVAB;
 MERGE XVA(IN=A)
       XVB(KEEP=cunicah np e7b_1_15 e7b_2_15 e7b_3_15 e14b_15 e7b_1_15_comp
                e7b_2_15_comp e7b_3_15_comp e14b_15_comp IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA XVAB1;
 SET XVAB;
 ARRAY VV1(*) e7a_1_15 e7a_2_15 e7a_3_15 e14a_15 e7b_1_15 e7b_2_15 e7b_3_15
              e14b_15;
 ARRAY VV2(*) elig_e7a_1_15 elig_e7a_2_15 elig_e7a_3_15 elig_e14a_15
              elig_e7b_1_15 elig_e7b_2_15 elig_e7b_3_15 elig_e14b_15;
 IF E6_15 = 1 THEN DO;
    DO I = 1 TO 4;
       IF VV1(I) = . THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
 END;
 IF E6_15 = 2 THEN DO;
    DO J = 5 TO 8;
       IF VV1(J) = . THEN VV2(J) = 1;
      ELSE VV2(J) = 0;
    END;
 END;
 DROP I J;
RUN;

*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_12;
 SET WW.COG_AT_12;
 COG_12 = 1;
RUN;

DATA YNOCOG_AT_12;
 SET WW.NOCOG_AT_12;
 COG_12 = 0;
RUN;

*************************************************************************;

DATA M15_7;
 SET YCOG_AT_12
     YNOCOG_AT_12
 ;
RUN;
```

```
PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah NP;
RUN;

DATA M15_7_A1;
 MERGE ZCOV(IN=A)
       M15_7_SORT(KEEP=cunicah np e11a_15 e11b_15 e11c_15 e12a_15 e12b_15
                  e12c_15 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M15_7_A2;
 SET M15_7_A1;
 IF e12a_15 IN (.I,.S) THEN e12a_15 = .;
 IF e12b_15 IN (.I,.S) THEN e12b_15 = .;
 IF e12a_15 IN (3,8) THEN DO;
    e12a_15 = e12b_15;
 END;
 RENAME e12a_15 = e12ab_15;
 DROP e12b_15;
RUN;


DATA M15_7_A00;
 RETAIN cunicah np cog_12
        e11a_15 e11b_15 e11c_15
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        ;
 SET M15_7;
 KEEP   cunicah np cog_12
        e11a_15 e11b_15 e11c_15
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        ;
 PROC SORT;
  BY cog_12 cunicah np;
RUN;

DATA M15_7_A01;
 SET M15_7_A00;
 ARRAY K1(*) e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp;
 ARRAY K2(*) e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp;
 ARRAY K3(*) ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12;
 IF COG_12 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
```

```
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M15_7_A01 OUT=M15_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_A2 OUT=M15_7_A2_SORT;
 BY cunicah np;
RUN;

DATA M15_7_A02;
 MERGE M15_7_A2_SORT(DROP=e11a_15 e11b_15 e11c_15 IN=A)
       M15_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A ;
 DROP e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
      e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
      ;
RUN;

DATA M15_7_A05;
 RETAIN cunicah NP cog_12
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e11a_15 e11b_15 e11c_15 e12ab_15 e12c_15
 ;
 SET M15_7_A02;
 KEEP   cunicah NP cog_12
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e11a_15 e11b_15 e11c_15 e12ab_15 e12c_15
 ;
RUN;

PROC SORT DATA=M15_7_A05 OUT=M15_7_V1;
 BY DESCENDING cog_12 cunicah NP;
RUN;

*******************************;
*** Day/Month/Year + Numercy ***;
*******************************;
```

```
%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e11a_15 IN (.,.I) THEN e11a_15 = .;
 IF e11b_15 IN (.,.I) THEN e11b_15 = .;
 IF e11c_15 IN (.,.I) THEN e11c_15 = .;
 IF e12ab_15 IN (.,8,9) THEN e12ab_15 = .;
 IF e12c_15 IN (.,.I,.S) THEN e12c_15 = .;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e11b_15 e11c_15
e12ab_15 e12c_15,  OUD=ALLV1); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e11a_15 e11c_15
e12ab_15 e12c_15,  OUD=ALLV2); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e11a_15 e11b_15
e12ab_15 e12c_15,  OUD=ALLV3); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e11a_15 e11b_15 e11c_15
e12c_15,  OUD=ALLV4); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e11a_15 e11b_15 e11c_15
e12ab_15, OUD=ALLV5); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_15;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
```

```
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11b_15;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
```

```
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11c_15;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV4.set";
%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;
%LET DATANM = impute_multALLV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e12ab_15;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV5.set";
%LET DATAGO = OKIN_ALLV5;
```

```
%LET DATAOT = MULT_ALLV5;
%LET DATANM = impute_multALLV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_15;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  BOUNDS       e12c_15(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*************************************************************************;

PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_V1 OUT=M15_7_V1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;
```

```
DATA MULT_ALL_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e11a_15 e11b_15 e11c_15
                  e12a_15 e12b_15 e12c_15 IN=A)
       M15_7_V1_SORT(KEEP=CUNICAH NP e12ab_15)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e11a_15
                       RENAME=(e11a_15=e11a_15_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e11b_15
                       RENAME=(e11b_15=e11b_15_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e11c_15
                       RENAME=(e11c_15=e11c_15_comp))
      MULT_ALLV4_SORT(KEEP=CUNICAH NP e12ab_15
                        RENAME=(e12ab_15=e12ab_15_comp))
      MULT_ALLV5_SORT(KEEP=CUNICAH NP e12c_15
                        RENAME=(e12c_15=e12c_15_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_12 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_12 = 1;
 IF e11a_15 IN (.,.I) THEN e11a_15 = .;
 IF e11b_15 IN (.,.I) THEN e11b_15 = .;
 IF e11c_15 IN (.,.I) THEN e11c_15 = .;
 IF e12ab_15 IN (.,8,9) THEN e12ab_15 = .;
 IF e12c_15 IN (.,.I,.S) THEN e12c_15 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M15_7_V1,DROPVAR=e11b_15 e11c_15 e12ab_15 e12c_15,  OUD=COGV1);
QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e11a_15 e11c_15 e12ab_15 e12c_15,  OUD=COGV2);
QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e11a_15 e11b_15 e12ab_15 e12c_15,  OUD=COGV3);
QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e11a_15 e11b_15 e11c_15  e12c_15,  OUD=COGV4);
QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e11a_15 e11b_15 e11c_15  e12ab_15, OUD=COGV5);
QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV1.set";
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;
```

```
%LET DATANM = impute_multCOGV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e11a_15;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV2.set";
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
%LET DATANM = impute_multCOGV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e11b_15;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV3.set";
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;
%LET DATANM = impute_multCOGV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e11c_15;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV4.set";
%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;
%LET DATANM = impute_multCOGV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e12ab_15;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV5.set";
%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;
%LET DATANM = impute_multCOGV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp e12c_15;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS       e12c_15(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
```

```
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;


DATA MULT_COG_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e11a_15 e11b_15 e11c_15
                  e12a_15 e12b_15 e12c_15)
       M15_7_V1_SORT(KEEP=CUNICAH NP e12ab_15)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e11a_15
                       RENAME=(e11a_15=e11a_15_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e11b_15
                       RENAME=(e11b_15=e11b_15_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e11c_15
                       RENAME=(e11c_15=e11c_15_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e12ab_15
                       RENAME=(e12ab_15=e12ab_15_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e12c_15
                       RENAME=(e12c_15=e12c_15_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_DMY;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_DMY;
 SET MULT_COG_NEW_DMY;
RUN;

*************************************************************************;
```

```
DATA XVFS1;
 SET WW.MULT_COG_NEW_DMY;
 ARRAY VV1(*) e11a_15 e11b_15 e11c_15 e12ab_15 e12c_15;
 ARRAY VV2(*) elig_e11a_15 elig_e11b_15 elig_e11c_15 elig_e12ab_15
              elig_e12c_15;
 DO I = 1 TO 5;
    IF I = 1 | I = 2 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (1,2) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 4 THEN DO;
       IF   VV1(I) IN (.,8,9) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 5 THEN DO;
       IF   VV1(I) IN (.,.I,.S) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
 END;
 DROP I;
RUN;

*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_12;
 SET WW.COG_AT_12;
 COG_12 = 1;
RUN;

DATA YNOCOG_AT_12;
 SET WW.NOCOG_AT_12;
 COG_12 = 0;
RUN;

*************************************************************************;

DATA M15_7;
 SET YCOG_AT_12
     YNOCOG_AT_12
 ;
RUN;

PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah NP;
RUN;

DATA M15_7_A1;
 MERGE ZCOV(IN=A)
       M15_7_SORT(KEEP=cunicah np e3b_15 e4_15 e5_15 IN=B)
 ;
 BY cunicah np;
 IF A;
```

```
RUN;

DATA M15_7_A2;
 SET M15_7_A1;
 IF e3b_15 IN (6,.I,.S) THEN e3b_15 = .;
 IF e4_15 IN (8,.I,.S)  THEN e4_15 = .;
 IF e5_15 IN (.I,.S)    THEN e5_15 = .;
RUN;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputecov15/impute_multe45.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M15_7_A2;
  DATAOUT multe45;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_15 yrschool h4hhresp
               ;
  CATEGORICAL  SEX_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e4_15
               e5_15
               ;
  RESTRICT     e5_15(e4_15=1)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=impute_multe45, DIR=C:/Users/nachen/Desktop/imputecov15);

DATA multe45_0;
 SET multe45;
 IF e5_15 = 5 THEN e5_15 = 0;
 DROP e4_15;
 PROC SORT;
  BY cunicah NP;
RUN;

DATA M15_7_A00;
 RETAIN cunicah np cog_12
        e9a_15 e9b_15 e8_15 e10_15 e13_15
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
```

```
        ;
 SET M15_7;
 KEEP   cunicah np cog_12
        e9a_15 e9b_15 e8_15 e10_15 e13_15
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        ;
 PROC SORT;
  BY cog_12 cunicah np;
RUN;

DATA M15_7_A01;
 SET M15_7_A00;
 ARRAY K1(*) e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp;
 ARRAY K2(*) e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp;
 ARRAY K3(*) ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12;
 IF COG_12 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M15_7_A01 OUT=M15_7_A01_SORT;
 BY cunicah np;
RUN;

DATA M15_7_A02;
 MERGE multe45_0(IN=A)
       M15_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
      e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
      ;
RUN;

DATA M15_7_A05;
 RETAIN cunicah NP cog_12
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15 e3b_15 e5_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e8_15 e10_15 e13_15 e9a_15 e9b_15
 ;
 SET M15_7_A02;
 KEEP   cunicah NP cog_12
```

```
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15 e3b_15 e5_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e8_15 e10_15 e13_15 e9a_15 e9b_15
 ;
RUN;

PROC SORT DATA=M15_7_A05 OUT=M15_7_V1;
 BY DESCENDING cog_12 cunicah NP;
RUN;

****************************************;
*** Visual Scanning + Semantic Verbal ***;
****************************************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e8_15  NOT IN (0,1,2,3,4,5,6) THEN e8_15 = .;
 IF e13_15 NOT IN (0,1,2,3,4,5,6) THEN e13_15 = .;
 IF e10_15 IN (.,80,88,.I,.S,.P)  THEN e10_15 = .;
 IF e9a_15 IN (.,88,.I,.S,.P)     THEN e9a_15 = .;
 IF e9b_15 IN (.,88,.I,.S,.P)     THEN e9b_15 = .;
 DROP &DROPVAR;
RUN;
%MEND;


*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e10_15 e13_15 e9a_15
e9b_15, OUD=ALLV1); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e8_15  e13_15 e9a_15
e9b_15, OUD=ALLV2); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e8_15  e10_15 e9a_15
e9b_15, OUD=ALLV3); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e8_15  e10_15 e13_15
e9b_15 e3b_15 e5_15, OUD=ALLV4); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e8_15  e10_15 e13_15
e9a_15 e3b_15 e5_15, OUD=ALLV5); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;
```

```
%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15;
  COUNT        e8_15;
  BOUNDS       e8_15(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15;
  COUNT        e13_15;
  BOUNDS       e13_15(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
```

```
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15;
  COUNT        e10_15;
  BOUNDS       e10_15(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV4.set";
%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;
%LET DATANM = impute_multALLV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
```

```
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e9a_15;
  BOUNDS       e9a_15(>=0,<=40);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV5.set";
%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;
%LET DATANM = impute_multALLV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e9b_15;
  BOUNDS       e9b_15(>=0,<=22);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*****************************************************************************;
```

```
PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_A1 OUT=M15_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;


DATA MULT_ALL_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e3b_15 e5_15 e8_15 e10_15
                  e13_15 e9a_15 e9b_15 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e8_15  RENAME=(e8_15=e8_15_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e10_15 RENAME=(e10_15=e10_15_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e13_15 RENAME=(e13_15=e13_15_comp))
      MULT_ALLV4_SORT(KEEP=CUNICAH NP e9a_15 RENAME=(e9a_15=e9a_15_comp))
      MULT_ALLV5_SORT(KEEP=CUNICAH NP e9b_15 RENAME=(e9b_15=e9b_15_comp))
 ;
 BY cunicah np;
 IF COG_12 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_12 = 1;
 IF e8_15  NOT IN (0,1,2,3,4,5,6) THEN e8_15 = .;
 IF e13_15 NOT IN (0,1,2,3,4,5,6) THEN e13_15 = .;
 IF e10_15 IN (.,80,88,.I,.S,.P)  THEN e10_15 = .;
 IF e9a_15 IN (.,88,.I,.S,.P)     THEN e9a_15 = .;
 IF e9b_15 IN (.,88,.I,.S,.P)     THEN e9b_15 = .;
 DROP &DROPVAR;
```

```
RUN;
%MEND;

%LISTVA1(DIN=M15_7_V1,DROPVAR=e10_15 e13_15 e9a_15 e9b_15, OUD=COGV1); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR= e8_15 e13_15 e9a_15 e9b_15, OUD=COGV2); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR= e8_15 e10_15 e9a_15 e9b_15, OUD=COGV3); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR= e8_15 e10_15 e13_15 e9b_15 e3b_15 e5_15,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR= e8_15 e10_15 e13_15 e9a_15 e3b_15 e5_15,
OUD=COGV5); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV1.set";
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;
%LET DATANM = impute_multCOGV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15
               e11a_12_comp e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e8_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS       e8_15(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV3.set";
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;
```

```
%LET DATANM = impute_multCOGV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15
               e11a_12_comp e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e13_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS       e13_15(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV2.set";
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
%LET DATANM = impute_multCOGV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e3b_15 e5_15
               e11a_12_comp e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e10_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
```

```
                e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS        e10_15(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV4.set";
%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;
%LET DATANM = impute_multCOGV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL   sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
                e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT         e9a_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
                e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS        e9a_15(>=0,<=40);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV5.set";
%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;
```

```
%LET DATANM = impute_multCOGV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        e9b_15 ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  BOUNDS       e9b_15(>=0,<=22);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e3b_15 e5_15 e8_15 e10_15
                  e13_15 e9a_15 e9b_15)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e8_15  RENAME=(e8_15=e8_15_comp)
                       IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e10_15 RENAME=(e10_15=e10_15_comp))
```

```
       MULT_COGV3_SORT(KEEP=CUNICAH NP e13_15 RENAME=(e13_15=e13_15_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e9a_15 RENAME=(e9a_15=e9a_15_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e9b_15 RENAME=(e9b_15=e9b_15_comp))
 ;
 BY cunicah np;
 IF A;
RUN;


DATA MULT_COG_NEW_FS;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_FS;
 SET MULT_COG_NEW_FS;
RUN;

*************************************************************************;

DATA XVFS1;
 SET WW.MULT_COG_NEW_FS;
 ARRAY VV1(*) e8_15 e10_15 e13_15 e9a_15 e9b_15;
 ARRAY VV2(*) elig_e8_15 elig_e10_15 elig_e13_15 elig_e9a_15 elig_e9b_15;
 DO I = 1 TO 5;
    IF I = 1 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (0,1,2,3,4,5,6) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 2 THEN DO;
       IF   VV1(I) IN (.,80,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 4 | I = 5 THEN DO;
       IF   VV1(I) IN (.,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
 END;
 DROP I;
RUN;

*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_12;
 SET WW.COG_AT_12;
 COG_12 = 1;
RUN;

DATA YNOCOG_AT_12;
 SET WW.NOCOG_AT_12;
 COG_12 = 0;
RUN;

*************************************************************************;
```

```
DATA M15_7;
 SET YCOG_AT_12
     YNOCOG_AT_12
 ;
RUN;

PROC SORT DATA=M15_7 OUT=M15_7_SORT;
 BY cunicah NP;
RUN;

PROC SORT DATA=WW.Mhas_2015_cognition_final OUT=ZMH15;
 BY cunicah np;
RUN;

DATA M15_7_A1;
 MERGE ZCOV(IN=A)
       ZMH15(KEEP=cunicah np e15a_15 e15b_15 e15c_15 e15d_15 e15e_15 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M15_7_A1M;

 SET M15_7_A1;

 IF e15a_15 = 99 THEN DO;
    IF e15b_15 = 999 THEN DO;
       case = "1a";
       e15a_15 = 999;
       e15b_15 = .S; e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
    END;
    IF e15b_15 = 99 THEN DO;
        case = "1c";
        e15a_15 = 999;
        e15b_15 = .S; e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
    END;
    IF cunicah = 9419 AND np = 20 THEN DO;
       case = "1d";
       e15a_15 = 888;
       e15b_15 = .S; e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
    END;
 END;

 IF e15a_15 = 88 THEN DO;
    IF e15b_15 = 888 THEN DO;
       case = "2a";
       e15a_15 = 888;
      e15b_15 = .S; e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
    END;
 END;

 IF e15b_15 = 99 and (e15a_15 NOT IN (88,99)) THEN DO;
    IF e15c_15 = 999 THEN DO;
       case = "3b";
       e15b_15 = 999;
```

```
      e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
   END;
   IF cunicah = 14600 AND np = 14 THEN DO;
      case = "3c";
      e15b_15 = 999;
     e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
   END;
   IF e15c_15 = 99 THEN DO;
      case = "3d";
      e15b_15 = 999;
     e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
   END;
END;

IF e15b_15 = 88 and (e15a_15 NOT IN (88,99)) THEN DO;
   IF e15c_15 = 888 THEN DO;
      case = "4a";
      e15b_15 = 888;
     e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
   END;
   IF e15c_15 = 88 THEN DO;
      case = "4c";
      e15b_15 = 888;
       e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
   END;
   IF e15c_15 = 99 THEN DO;
      case = "4d";
      e15c_15 = 999;
     e15d_15 = .S; e15e_15 = .S;
   END;
END;

IF e15c_15 = 99 and (e15b_15 NOT IN (88,99) and e15a_15 NOT IN (88,99))
THEN DO;
   IF e15d_15 = 999 THEN DO;
      case = "6e";
      e15c_15 = 999;
     e15d_15 = .S; e15e_15 = .S;
   END;
   IF e15d_15 = 99 THEN DO;
      case = "6f";
      e15c_15 = 999;
     e15d_15 = .S; e15e_15 = .S;
   END;
END;

IF e15d_15 = 88 and (e15c_15 NOT IN (88,99) and e15b_15 NOT IN (88,99) and
                     e15a_15 NOT IN (88,99)) THEN DO;
   IF e15e_15 = 888 THEN DO;
      case = "7a";
      e15d_15 = 888;
     e15e_15 = .S;
   END;
   IF e15e_15 = 88 THEN DO;
      case = "7c";
      e15d_15 = 888;
     e15e_15 = .S;
```

```
   END;
END;

IF e15d_15 = 99 and (e15c_15 NOT IN (88,99) and e15b_15 NOT IN (88,99) and
                     e15a_15 NOT IN (88,99)) THEN DO;
   IF e15e_15 = 888 THEN DO;
      case = "8a";
      e15d_15 = 999;
     e15e_15 = .S;
   END;
   IF e15e_15 = 999 THEN DO;
      case = "8b";
      e15d_15 = 999;
     e15e_15 = .S;
   END;
   IF e15e_15 = 88 THEN DO;
      case = "8c";
      e15d_15 = 999;
     e15e_15 = .S;
   END;
   IF e15e_15 = 99 THEN DO;
      case = "8d";
      e15d_15 = 999;
     e15e_15 = .S;
    END;
END;

IF (e15e_15 IN (88,99)) and (e15c_15 NOT IN (88,99) and e15b_15 NOT IN
   (88,99) and e15a_15 NOT IN (88,99)) THEN DO;
   IF (cunicah ^= 4 AND np ^= 20 )    | (cunicah ^= 89 AND np ^= 10)    |
      (cunicah ^= 370 AND np ^= 20)   | (cunicah ^= 1058 AND np ^= 10) |
     (cunicah ^= 1093 AND np ^= 10) | (cunicah ^= 4107 AND np ^= 20) |
      (cunicah ^= 4149 AND np ^= 20) | (cunicah ^= 4240 AND np ^= 20) |
     (cunicah ^= 5093 AND np ^= 20) | (cunicah ^= 5731 AND np ^= 10) |
      (cunicah ^= 6601 AND np ^= 10) | (cunicah ^= 9051 AND np ^= 10) |
     (cunicah ^= 9236 AND np ^= 20) | (cunicah ^= 10138 AND np ^= 10)|
      (cunicah ^= 11238 AND np ^= 10)| (cunicah ^= 11406 AND np ^= 20)|
     (cunicah ^= 13564 AND np ^= 10) THEN DO;
      IF e15e_15 = 88 THEN DO;
         case = "9 ";
        e15e_15 = 888;
     END;
      IF e15e_15 = 99 THEN DO;
         case = "9 ";
        e15e_15 = 999;
     END;
   END;
END;

IF (cunicah = 11677 AND np = 10) THEN DO;
   case = "10";
   e15b_15 = 999;
   e15c_15 = .S; e15d_15 = .S; e15e_15 = .S;
END;
IF (cunicah = 10645 AND np = 10) THEN DO;
    case = "10";
    e15a_15 = 93;
```

```
 END;

RUN;

DATA M15_7_A2;

 SET M15_7_A1M;

 ARRAY FT(*) e15a_15 e15b_15 e15c_15 e15d_15 e15e_15;

 DO I = 1 TO DIM(FT);
      IF FT(I) IN (.I,.S,888,999) THEN FT(I) = .;
 END;

 IF e15a_15 = 93 THEN e15a_15_ok = 1;
 ELSE IF e15a_15 not in (.,93) THEN e15a_15_ok = 0;
 ELSE e15a_15_ok = .;

 e15ab_15 = e15a_15-e15b_15;

 IF e15ab_15 = 7 THEN e15b_15_ok = 1;
 ELSE IF e15ab_15 not in (.,7) THEN e15b_15_ok = 0;
 ELSE e15b_15_ok = .;

 e15bc_15 = e15b_15-e15c_15;

 IF e15bc_15 = 7 THEN e15c_15_ok = 1;
 ELSE IF e15bc_15 not in (.,7) THEN e15c_15_ok = 0;
 ELSE e15c_15_ok = .;

 e15cd_15 = e15c_15-e15d_15;

 IF e15cd_15 = 7 THEN e15d_15_ok = 1;
 ELSE IF e15cd_15 not in (.,7) THEN e15d_15_ok = 0;
 ELSE e15d_15_ok = .;

 e15de_15 = e15d_15-e15e_15;

 IF e15de_15 = 7 THEN e15e_15_ok = 1;
 ELSE IF e15de_15 not in (.,7) THEN e15e_15_ok = 0;
 ELSE e15e_15_ok = .;

 e15ser7_15 = e15a_15_ok+e15b_15_ok+e15c_15_ok+e15d_15_ok+e15e_15_ok;

 DROP case I e15a_15 e15b_15 e15c_15 e15d_15 e15e_15 e15ab_15 e15bc_15
      e15cd_15 e15de_15;

RUN;

DATA M15_7_A00;
 RETAIN cunicah np cog_12 e12_samp
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
```

```
        ;
 SET M15_7;
 KEEP   cunicah np cog_12 e12_samp
        e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
        e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
        e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        ;
 PROC SORT;
  BY cog_12 cunicah np;
RUN;

DATA M15_7_A01;
 SET M15_7_A00;
 ARRAY K1(*) e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp;
 ARRAY K2(*) e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp;
 ARRAY K3(*) ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12;
 IF COG_12 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
      IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M15_7_A01 OUT=M15_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M15_7_A2 OUT=M15_7_A2_SORT;
 BY cunicah np;
RUN;

DATA M15_7_A02;
 MERGE M15_7_A2_SORT(IN=A)
       M15_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a_1_12_comp e7a_2_12_comp e7a_3_12_comp e14a_12_comp
      e7b_1_12_comp e7b_2_12_comp e7b_3_12_comp e14b_12_comp
      ;
RUN;

DATA M15_7_A05;
 RETAIN cunicah NP cog_12 e12_samp
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok e15e_15_ok e15ser7_15
```

```
 ;
 SET M15_7_A02;
 KEEP   cunicah NP cog_12 e12_samp
        AGE_15 SEX_15 yrschool tam_loc_15 h4hhresp c1_15 c2a_15 c42_15
        c44_15
        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12
       e8_12_comp e10_12_comp e13_12_comp
       e9a_12_comp e9b_12_comp
        e11a_12_comp e11b_12_comp e11c_12_comp
       e12ab_12_comp e12c_12_comp
        e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok e15e_15_ok e15ser7_15
 ;
RUN;

PROC SORT DATA=M15_7_A05 OUT=M15_7_V1;
 BY DESCENDING cog_12 cunicah NP;
RUN;

***************;
*** Series-7 ***;
***************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15b_15_ok e15c_15_ok
e15d_15_ok e15e_15_ok e15ser7_15, OUD=ALLV1); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15a_15_ok e15c_15_ok
e15d_15_ok e15e_15_ok e15ser7_15, OUD=ALLV2); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15a_15_ok e15b_15_ok
e15d_15_ok e15e_15_ok e15ser7_15, OUD=ALLV3); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15a_15_ok e15b_15_ok
e15c_15_ok e15e_15_ok e15ser7_15, OUD=ALLV4); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15a_15_ok e15b_15_ok
e15c_15_ok e15d_15_ok e15ser7_15, OUD=ALLV5); QUIT;
%LISTV(DIN=M15_7_V1,DROPVAR=ecom_1i_12--e12c_12_comp e15a_15_ok e15b_15_ok
e15c_15_ok e15d_15_ok e15e_15_ok, OUD=ALLV6); QUIT;


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV1.set";
%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;
%LET DATANM = impute_multALLV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e15a_15_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV2.set";
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
%LET DATANM = impute_multALLV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e15b_15_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV3.set";
%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;
%LET DATANM = impute_multALLV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e15c_15_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV4.set";
%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;
%LET DATANM = impute_multALLV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
```

```
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e15d_15_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV5.set";
%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;
%LET DATANM = impute_multALLV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e15e_15_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multALLV6.set";
%LET DATAGO = OKIN_ALLV6;
%LET DATAOT = MULT_ALLV6;
%LET DATANM = impute_multALLV6;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
```

```
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15;
  COUNT        e15ser7_15;
  BOUNDS       e15ser7_15(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


**************************************************************************;

PROC SORT DATA=M15_7_A05 OUT=M15_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV6 OUT=MULT_ALLV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e15a_15_ok e15b_15_ok
                  e15c_15_ok e15d_15_ok e15e_15_ok e15ser7_15 IN=A)
```

```
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e15a_15_ok
                       RENAME=(e15a_15_ok=e15a_15_ok_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e15b_15_ok
                       RENAME=(e15b_15_ok=e15b_15_ok_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e15c_15_ok
                       RENAME=(e15c_15_ok=e15c_15_ok_comp))
      MULT_ALLV4_SORT(KEEP=CUNICAH NP e15d_15_ok
                       RENAME=(e15d_15_ok=e15d_15_ok_comp))
      MULT_ALLV5_SORT(KEEP=CUNICAH NP e15e_15_ok
                       RENAME=(e15e_15_ok=e15e_15_ok_comp))
      MULT_ALLV6_SORT(KEEP=CUNICAH NP e15ser7_15
                       RENAME=(e15ser7_15=e15ser7_15_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_12 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_12 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M15_7_V1,DROPVAR=e15b_15_ok e15c_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV1); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15c_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV2); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV3); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15c_15_ok e15e_15_ok
e15ser7_15, OUD=COGV4); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok
e15ser7_15, OUD=COGV5); QUIT;
%LISTVA1(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok
e15e_15_ok, OUD=COGV6); QUIT;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV1.set";
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;
%LET DATANM = impute_multCOGV1;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
```

```
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e15a_15_ok;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV2.set";
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
%LET DATANM = impute_multCOGV2;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e15b_15_ok;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV3.set";
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;
%LET DATANM = impute_multCOGV3;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e15c_15_ok;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV4.set";
%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;
%LET DATANM = impute_multCOGV4;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
```

```
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e15d_15_ok;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV5.set";
%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;
%LET DATANM = impute_multCOGV5;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp e15e_15_ok;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "C:/Users/nachen/Desktop/imputecov15/impute_multCOGV6.set";
%LET DATAGO = OKIN_COGV6;
%LET DATAOT = MULT_COGV6;
%LET DATANM = impute_multCOGV6;

%LET DATADR = C:/Users/nachen/Desktop/imputecov15;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_15 yrschool h4hhresp e12c_12_comp;
  CATEGORICAL  sex_15 tam_loc_15 c1_15 c2a_15 c42_15 c44_15 e11a_12_comp
               e11b_12_comp e11c_12_comp e12ab_12_comp;
  COUNT        ecom_1i_12 ecom_2i_12 ecom_3i_12 ecom_4i_12 e8_12_comp
               e10_12_comp e13_12_comp e9a_12_comp e9b_12_comp e15ser7_15;
  BOUNDS       e15ser7_15(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_COGV6 OUT=MULT_COGV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M15_7_SORT(KEEP=CUNICAH NP E12_SAMP COG_12 e15a_15_ok e15b_15_ok
                  e15c_15_ok e15d_15_ok e15e_15_ok e15ser7_15)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e15a_15_ok
                       RENAME=(e15a_15_ok=e15a_15_ok_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e15b_15_ok
                       RENAME=(e15b_15_ok=e15b_15_ok_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e15c_15_ok
                       RENAME=(e15c_15_ok=e15c_15_ok_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e15d_15_ok
                       RENAME=(e15d_15_ok=e15d_15_ok_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e15e_15_ok
                       RENAME=(e15e_15_ok=e15e_15_ok_comp))
      MULT_COGV6_SORT(KEEP=CUNICAH NP e15ser7_15
                       RENAME=(e15ser7_15=e15ser7_15_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_S7;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_S7;
 SET MULT_COG_NEW_S7;
RUN;

DATA XVFS1;
 SET WW.MULT_COG_NEW_S7;
 ARRAY VV1(*) e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok e15e_15_ok
              e15ser7_15;
 ARRAY VV2(*) elig_e15a_15 elig_e15b_15 elig_e15c_15 elig_e15d_15
              elig_e15e_15 elig_e15s7_15;
 DO I = 1 TO 6;
    IF VV1(I) = . THEN VV2(I) = 1;
    ELSE VV2(I) = 0;
 END;
 DROP I;
RUN;
```

2018

```
libname raw "D:\LuChen\MHAS\Data\Raw";
libname ww "D:\LuChen\MHAS\Data\Cognition\2018_sect_e";

/*
proc contents data=raw.Sect_g_j_k_sa_2015;
run;
*/

DATA M18_1;
 RETAIN cunicah np tipent_18 resul_ec_18 yrschool
        AGE_18 SEX_18 tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
        e6_18
        e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18
        e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18
        e3b_18 e4_18 e5_18
        e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18
        e11a_18 e11b_18 e11c_18
 ;
 SET ww.Mhas_2018_cognition_final;
 KEEP cunicah np tipent_18 resul_ec_18 yrschool
      AGE_18 SEX_18 tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
      e6_18
      e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18
      e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18
      e3b_18 e4_18 e5_18
      e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18
      e11a_18 e11b_18 e11c_18
 ;
RUN;
*N=17114;

PROC SORT DATA=M18_1 OUT=M18_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M18_2;
 SET M18_1_SORT;
 IF TIPENT_18 IN (1,2); *direct interview;
 ATTRIB _ALL_ LABEL = " ";
RUN;
*N=15786;

PROC SORT DATA=raw.Sect_a_c_d_e_pc_f_h_i_2015 OUT=WV1(KEEP=CUNICAH NP TIPENT_15
resul_ec_15);
 BY CUNICAH NP;
RUN;
*non-imputed 2015 data: N=14779;

PROC SORT DATA=WW.v1_cognition_impute_data_s7_2015 OUT=WV2(KEEP=CUNICAH NP);
 BY CUNICAH NP;
RUN;
*imputed 2015 data: N=13850;

DATA WVPNS;
 MERGE WV1(IN=A) WV2(IN=B);
 BY CUNICAH NP;
 IF A AND NOT B;
 ATTRIB _ALL_ LABEL = " ";
RUN;
*2015 proxy: N=929;

DATA M18_2_OLD M18_2_NEW;
```

```
 SET M18_2;
 IF TIPENT_18 = 2 THEN OUTPUT M18_2_NEW; *direct, new sample in 2018: N=4603;
 ELSE OUTPUT M18_2_OLD;*direct, follow-up in 2018: N=11183;
RUN;

PROC SORT DATA=M18_2_OLD OUT=M18_2_OLD_SORT;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS OUT=WVPNS_SORT(KEEP=CUNICAH NP TIPENT_15
                                    RENAME=(TIPENT_15=E15_SAMP));
 BY CUNICAH NP;
RUN;

DATA WVPNS_1 WVPNS_1_OTHER;
 MERGE M18_2_OLD_SORT(IN=A) WVPNS_SORT(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN DO;
    IF E15_SAMP = . THEN E15_SAMP = 1; *?;
       OUTPUT WVPNS_1; *direct fu in 2018 & proxy in 2015: N=254;
 END;
 IF A AND NOT B THEN DO;
    OUTPUT WVPNS_1_OTHER; *direct fu in 2018 & other in 2015: N=10929;
 END;
RUN;
/*
proc freq data=WVPNS_1;
tables e15_samp; *3=proxy, fu, 4=proxy, new;
run;
*/
DATA WVPNS_2; *direct fu in 2018 and proxy in 2015 & direct new in 2018;
 SET M18_2_NEW(IN=A) WVPNS_1;
 IF A THEN E15_SAMP = 0; *direct new in 2018;
RUN;

PROC SORT DATA=WW.V1_cognition_impute_data_s7_2015 OUT=W1IMP;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS_1_OTHER OUT=WVPNS_1_OT_SORT;
 BY CUNICAH NP;
RUN;

DATA WVPNS_1_OTHER2 WVPNS_1_OTHER2_CK;
 MERGE WVPNS_1_OT_SORT(IN=A) W1IMP(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN OUTPUT WVPNS_1_OTHER2; *direct fu in 2018 & observed and imputed in
2015: N=10636;
 IF A AND NOT B THEN OUTPUT WVPNS_1_OTHER2_CK; *direct fu in 2018 & unknown in 2015:
N=293;
RUN;

DATA WW.COG_AT_15; *direct fu in 2018 & observed and imputed in 2015;
 SET WVPNS_1_OTHER2;
RUN;

DATA WVPNS_1_OTHER2_CK1;
 SET WVPNS_1_OTHER2_CK;
 E15_SAMP = 4;
 KEEP CUNICAH--E15_SAMP;
RUN;
```

```
DATA WVPNS_2_FN;*direct fu in 2018 and proxy/unknown in 2015 & direct new in 2018 =
direct in 2018 and not imputed in 2015;
 SET WVPNS_2(IN=A) WVPNS_1_OTHER2_CK1;
 IF A THEN DO;*direct fu in 2018 and proxy in 2015 & direct new in 2018;
    IF E15_SAMP IN (3,4) THEN DO;
       E15_SAMP = E15_SAMP-2;
    END;
 END;
RUN;

DATA WW.NOCOG_AT_15; *direct (fu & new) in 2018 and not imputed in 2015;
 SET WVPNS_2_FN;
RUN;

DATA YCOG_AT_15;
 SET WW.COG_AT_15;
 COG_15 = 1;
RUN;

DATA YNOCOG_AT_15;
 SET WW.NOCOG_AT_15;
 COG_15 = 0;
RUN;

DATA M18_7;
 SET YCOG_AT_15
     YNOCOG_AT_15
 ;
RUN;

DATA M18_7_COV0;
 RETAIN cunicah NP AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18
        c42_18 c44_18;
 SET M18_7;
 KEEP cunicah NP AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18
      c42_18 c44_18;
RUN;

DATA M18_7_COV1;
 SET M18_7_COV0;
 IF yrschool IN (88,99,.M) THEN yrschool = .;
 IF age_18 in (888, 999) THEN age_18 = .;
 ARRAY CV(*) c1_18 c2a_18 c42_18 c44_18; *c1: health condition, c2a: health compared to
2 yrs ago, c42: vision, c44: hearing;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9,.I) THEN CV(I) = .;
 END;
 IF c42_18 = 6 THEN INDEX_42 = 0; ELSE INDEX_42 = 1; *6=blind;
 IF c44_18 = 6 THEN INDEX_44 = 0; ELSE INDEX_44 = 1; *6=deaf;
 DROP I;
RUN;
/*
proc means data=M18_7_COV1;
var yrschool;
run;
*/
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%impute(name=impute,dir=.,setup=new)
title Multiple imputation;
datain M18_7_COV1;
dataout mult1r;
```

```
default transfer;
continuous  AGE_18 yrschool h5hhresp;
categorical SEX_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
restrict  c42_18(INDEX_42=1) c44_18(INDEX_44=1);
bounds  AGE_18(>=16,<=102) yrschool(>=0,<=22); * Ranges on Age & Education Combine 2015
& 2018: age_18: 16-102,age_15:22-101, yrschool_18: 0-22;
iterations 5;
multiples 1;
maxlogi 150;
seed 512171109;
run;
/*
proc freq data=MULT1R;
tables c42_18 c44_18;
run;
*/
DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c42_18 = 7 THEN c42_18 = 6;
 IF c44_18 = 7 THEN c44_18 = 6;
RUN;
*When the restriction is not met, the value of the restricted variable will be set to
zero for
a continuous and count variables. For a categorical variable, a separate category will
be
created with the response code, one higher than the highest observed code for the
restricted
categorical variable. So 7 needs to be changed back to 6.;

DATA WW.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
 DROP INDEX_42 INDEX_44;
RUN;

DATA M18_7_LIST0;
 SET M18_7;
 KEEP cunicah np e6_18; *e6: indicate the applied list;
RUN;

DATA M18_7_LIST1;
 SET M18_7_LIST0;
 IF E6_18 IN (.,.I,8);*missing;
 CALL STREAMINIT(5293171);
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;

DATA M18_7_LIST2;
 SET M18_7_LIST1;
 E6_18 = INDEX_1+1; *randomly assign a value to missing;
RUN;

DATA M18_7_A00;
 RETAIN cunicah np cog_15 e6_18
        e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18
        e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
        e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp;
 SET M18_7;
```

```
 KEEP cunicah np cog_15 e6_18
      e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18
      e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18
      e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
      e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
      e8_15_comp e10_15_comp e13_15_comp
      e9a_15_comp e9b_15_comp
      e11a_15_comp e11b_15_comp e11c_15_comp
        e12ab_15_comp e12c_15_comp
      e15ser7_15_comp;
 PROC SORT;
  BY cog_15 cunicah np;
RUN;

DATA M18_7_A01;
 SET M18_7_A00;
 ARRAY K1(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;*e7a_1/2/3: Verbal
Learning List A-Trial 1/2/3, e14a: Verbal Recall List A;
 ARRAY K2(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 ARRAY K3(*) ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15;
 IF COG_15 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_A01 OUT=M18_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_LIST1 OUT=M18_7_LIST1_SORT;
 BY cunicah np;
RUN;


DATA M18_7_A02;
 MERGE ZCOV(IN=A)
       M18_7_A01_SORT
       M18_7_LIST1_SORT(DROP=E6_18 IN=B)
 ;
 BY cunicah np;
 IF A;
 IF B THEN E6_18 = INDEX_1+1;
 DROP INDEX_1
      e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
      e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
 ;
RUN;

DATA M18_7_A05;
 RETAIN cunicah NP cog_15 e6_18
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
```

```
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp
          e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18;
 SET M18_7_A02;
 ARRAY EAB(*) e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.r,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_15 e6_18
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp
          e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18;
RUN;

PROC SORT DATA=M18_7_A05 OUT=M18_7_A1;
 BY DESCENDING cog_15 e6_18 cunicah NP;
RUN;

*********************************;
*** List A: 3 Attempts + Delay ***;
*********************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTA(DIN=M18_7_A1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7a2_tot_18 e7a3_tot_18
e14a_tot_18, OUD=ALLA1); QUIT;
%LISTA(DIN=M18_7_A1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7a1_tot_18 e7a3_tot_18
e14a_tot_18, OUD=ALLA2); QUIT;
%LISTA(DIN=M18_7_A1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7a1_tot_18 e7a2_tot_18
e14a_tot_18, OUD=ALLA3); QUIT;
%LISTA(DIN=M18_7_A1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7a1_tot_18 e7a2_tot_18
e7a3_tot_18, OUD=ALLA4); QUIT;

*impute e7a_1;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA1;
%LET DATAOT = MULT_ALLA1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
```

```
  COUNT        e7a1_tot_18;
  RESTRICT     e7a1_tot_18(E6_18=1); *e6=1: assign to list a;
  BOUNDS       e7a1_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7a_2;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA2;
%LET DATAOT = MULT_ALLA2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e7a2_tot_18;
  RESTRICT     e7a2_tot_18(E6_18=1); *e6=1: assign to list a;
  BOUNDS       e7a2_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;


*impute e7a_3;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA3;
%LET DATAOT = MULT_ALLA3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e7a3_tot_18;
  RESTRICT     e7a3_tot_18(E6_18=1); *e6=1: assign to list a;
  BOUNDS       e7a3_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;


  *impute e14a;
```

```
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA4;
%LET DATAOT = MULT_ALLA4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT         e14a_tot_18;
  RESTRICT      e14a_tot_18(E6_18=1); *e6=1: assign to list a;
  BOUNDS        e14a_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;


PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_A1 OUT=M18_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA1 OUT=MULT_ALLA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA2 OUT=MULT_ALLA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA3 OUT=MULT_ALLA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA4 OUT=MULT_ALLA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP e6_18 RENAME=(e6_18=e6_18_old)
                  IN=A)
       M18_7_A1_SORT(KEEP=CUNICAH NP COG_15 e6_18 e7a1_tot_18 e7a2_tot_18 e7a3_tot_18
                     e14a_tot_18)
       MULT_ALLA1_SORT(KEEP=CUNICAH NP e7a1_tot_18
                       RENAME=(e7a1_tot_18=e7a1_tot_18_comp))
       MULT_ALLA2_SORT(KEEP=CUNICAH NP e7a2_tot_18
                       RENAME=(e7a2_tot_18=e7a2_tot_18_comp))
       MULT_ALLA3_SORT(KEEP=CUNICAH NP e7a3_tot_18
                       RENAME=(e7a3_tot_18=e7a3_tot_18_comp))
       MULT_ALLA4_SORT(KEEP=CUNICAH NP e14a_tot_18
                       RENAME=(e14a_tot_18=e14a_tot_18_comp))
 ;
```

```
 BY cunicah np;
 IF COG_15 = 0;*direct (fu & new) in 2018 and not in 2015;
RUN;

DATA MULT_ALL_NEW2;
 SET MULT_ALL_NEW1;
 ARRAY NEW(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_18 = 2 THEN NEW(I) = .;*assign to list b;
 END;
 DROP I;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_15 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA1(DIN=M18_7_A1,DROPVAR=e7a2_tot_18 e7a3_tot_18 e14a_tot_18, OUD=COGA1); QUIT;
%LISTA1(DIN=M18_7_A1,DROPVAR=e7a1_tot_18 e7a3_tot_18 e14a_tot_18, OUD=COGA2); QUIT;
%LISTA1(DIN=M18_7_A1,DROPVAR=e7a1_tot_18 e7a2_tot_18 e14a_tot_18, OUD=COGA3); QUIT;
%LISTA1(DIN=M18_7_A1,DROPVAR=e7a1_tot_18 e7a2_tot_18 e7a3_tot_18, OUD=COGA4); QUIT;

*impiute e7a_1;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA1;
%LET DATAOT = MULT_COGA1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp; *e12c: numeracy
time;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
               e11b_15_comp e11c_15_comp e12ab_15_comp; *e11a/b/c: day/month/year,
e12ab: numeracy attemp;
  COUNT        e7a1_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
               e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;*e8: copy
figures, e10: visual scanning, e13: figure recall, e9a: #of annimals, e9b: #of repeated
animals;
  RESTRICT     e7a1_tot_18(E6_18=1);
  BOUNDS       e7a1_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7a_2;
```

```
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA2;
%LET DATAOT = MULT_COGA2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp; *e12c: numeracy
time;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp; *e11a/b/c: day/month/year,
e12ab: numeracy attemp;
  COUNT         e7a2_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
                e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;*e8: copy
figures, e10: visual scanning, e13: figure recall, e9a: #of annimals, e9b: #of repeated
animals;
  RESTRICT      e7a2_tot_18(E6_18=1);
  BOUNDS        e7a2_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7a_3;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA3;
%LET DATAOT = MULT_COGA3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp; *e12c: numeracy
time;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp; *e11a/b/c: day/month/year,
e12ab: numeracy attemp;
  COUNT         e7a3_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
                e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;*e8: copy
figures, e10: visual scanning, e13: figure recall, e9a: #of annimals, e9b: #of repeated
animals;
  RESTRICT      e7a3_tot_18(E6_18=1);
  BOUNDS        e7a3_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e14a;
```

```
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA4;
%LET DATAOT = MULT_COGA4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp; *e12c: numeracy
time;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
               e11b_15_comp e11c_15_comp e12ab_15_comp; *e11a/b/c: day/month/year,
e12ab: numeracy attemp;
  COUNT        e14a_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
               e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;*e8: copy
figures, e10: visual scanning, e13: figure recall, e9a: #of annimals, e9b: #of repeated
animals;
  RESTRICT     e14a_tot_18(E6_18=1);
  BOUNDS       e14a_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGA1 OUT=MULT_COGA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA2 OUT=MULT_COGA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA3 OUT=MULT_COGA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA4 OUT=MULT_COGA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP e6_18 RENAME=(e6_18=e6_18_old))
       M18_7_A1_SORT(KEEP=CUNICAH NP COG_15 e6_18 e7a1_tot_18 e7a2_tot_18 e7a3_tot_18
                     e14a_tot_18)
       MULT_COGA1_SORT(KEEP=CUNICAH NP e7a1_tot_18
                       RENAME=(e7a1_tot_18=e7a1_tot_18_comp) IN=A)
       MULT_COGA2_SORT(KEEP=CUNICAH NP e7a2_tot_18
                       RENAME=(e7a2_tot_18=e7a2_tot_18_comp))
       MULT_COGA3_SORT(KEEP=CUNICAH NP e7a3_tot_18
                       RENAME=(e7a3_tot_18=e7a3_tot_18_comp))
       MULT_COGA4_SORT(KEEP=CUNICAH NP e14a_tot_18
                       RENAME=(e14a_tot_18=e14a_tot_18_comp))
 ;
 BY cunicah np;
 IF A;
RUN;
```

```
DATA MULT_COG_NEW2;
 SET MULT_COG_NEW1;
 ARRAY COG(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp;
 DO I = 1 TO DIM(COG);
    IF e6_18 = 2 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEW_LA; *all direct in 2018;
 SET MULT_COG_NEW2 MULT_ALL_NEW2;
RUN;

DATA WW.MULT_COG_NEW_LA;
 SET MULT_COG_NEW_LA;
RUN;

*************************************************************************;
*************************************************************************;


DATA M18_7_B05;
 RETAIN cunicah NP cog_15 e6_18
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp
          e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18;
 SET M18_7_A02;
 ARRAY EAB(*) e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.r,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_15 e6_18
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18 c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp
          e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18;
RUN;

PROC SORT DATA=M18_7_B05 OUT=M18_7_B1;
 BY DESCENDING cog_15 e6_18 cunicah NP;
RUN;


*********************************;
*** List B: 3 Attempts + Delay ***;
*********************************;

************************;
*** --- New Sample --- ***;
************************;

%LISTA(DIN=M18_7_B1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7b2_tot_18 e7b3_tot_18
e14b_tot_18, OUD=ALLB1); QUIT;
```

```
%LISTA(DIN=M18_7_B1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7b1_tot_18 e7b3_tot_18
e14b_tot_18, OUD=ALLB2); QUIT;
%LISTA(DIN=M18_7_B1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7b1_tot_18 e7b2_tot_18
e14b_tot_18, OUD=ALLB3); QUIT;
%LISTA(DIN=M18_7_B1,DROPVAR=ecom_1i_15--e15ser7_15_comp e7b1_tot_18 e7b2_tot_18
e7b3_tot_18, OUD=ALLB4); QUIT;

*impiute e7b_1;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB1;
%LET DATAOT = MULT_ALLB1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e7b1_tot_18;
  RESTRICT     e7b1_tot_18(E6_18=2); *assigned to list b;
  BOUNDS       e7b1_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7b_2;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB2;
%LET DATAOT = MULT_ALLB2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e7b2_tot_18;
  RESTRICT     e7b2_tot_18(E6_18=2); *assigned to list b;
  BOUNDS       e7b2_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7b_3;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
```

```
%LET DATAGO = OKIN_ALLB3;
%LET DATAOT = MULT_ALLB3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e7b3_tot_18;
  RESTRICT     e7b3_tot_18(E6_18=2); *assigned to list b;
  BOUNDS       e7b3_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e14b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB4;
%LET DATAOT = MULT_ALLB4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e14b_tot_18;
  RESTRICT     e14b_tot_18(E6_18=2); *assigned to list b;
  BOUNDS       e14b_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_B1 OUT=M18_7_B1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB1 OUT=MULT_ALLB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB2 OUT=MULT_ALLB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB3 OUT=MULT_ALLB3_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLB4 OUT=MULT_ALLB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEWB1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP e6_18 RENAME=(e6_18=e6_18_old)
                  IN=A)
       M18_7_B1_SORT(KEEP=CUNICAH NP COG_15 e6_18 e7b1_tot_18 e7b2_tot_18 e7b3_tot_18
                     e14b_tot_18)
       MULT_ALLB1_SORT(KEEP=CUNICAH NP e7b1_tot_18
                       RENAME=(e7b1_tot_18=e7b1_tot_18_comp))
       MULT_ALLB2_SORT(KEEP=CUNICAH NP e7b2_tot_18
                       RENAME=(e7b2_tot_18=e7b2_tot_18_comp))
       MULT_ALLB3_SORT(KEEP=CUNICAH NP e7b3_tot_18
                       RENAME=(e7b3_tot_18=e7b3_tot_18_comp))
       MULT_ALLB4_SORT(KEEP=CUNICAH NP e14b_tot_18
                       RENAME=(e14b_tot_18=e14b_tot_18_comp))
 ;
 BY cunicah np;
 IF COG_15 = 0; *direct in 2018 & not in 2015;
RUN;

DATA MULT_ALL_NEWB2;
 SET MULT_ALL_NEWB1;
 ARRAY NEW(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_18 = 1 THEN NEW(I) = .;
 END;
 DROP I;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%LISTA1(DIN=M18_7_B1,DROPVAR=e7b2_tot_18 e7b3_tot_18 e14b_tot_18, OUD=COGB1); QUIT;
%LISTA1(DIN=M18_7_B1,DROPVAR=e7b1_tot_18 e7b3_tot_18 e14b_tot_18, OUD=COGB2); QUIT;
%LISTA1(DIN=M18_7_B1,DROPVAR=e7b1_tot_18 e7b2_tot_18 e14b_tot_18, OUD=COGB3); QUIT;
%LISTA1(DIN=M18_7_B1,DROPVAR=e7b1_tot_18 e7b2_tot_18 e7b3_tot_18, OUD=COGB4); QUIT;

*impute e7b_1;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB1;
%LET DATAOT = MULT_COGB1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
               e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT        e7b1_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
               e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  RESTRICT     e7b1_tot_18(E6_18=2);
  BOUNDS       e7b1_tot_18(>=0,<=8);
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e7b_2;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB2;
%LET DATAOT = MULT_COGB2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e7b2_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
                e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  RESTRICT      e7b2_tot_18(E6_18=2);
  BOUNDS        e7b2_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impue e7b_3;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB3;
%LET DATAOT = MULT_COGB3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e7b3_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
                e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  RESTRICT      e7b3_tot_18(E6_18=2);
  BOUNDS        e7b3_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e14b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;
```

```
/* run iveware */

%LET DATAGO = OKIN_COGB4;
%LET DATAOT = MULT_COGB4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e14b_tot_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
                e8_15_comp e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  RESTRICT      e14b_tot_18(E6_18=2);
  BOUNDS        e14b_tot_18(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGB1 OUT=MULT_COGB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB2 OUT=MULT_COGB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB3 OUT=MULT_COGB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB4 OUT=MULT_COGB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEWB1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP e6_18 RENAME=(e6_18=e6_18_old))
       M18_7_B1_SORT(KEEP=CUNICAH NP COG_15 e6_18 e7b1_tot_18 e7b2_tot_18 e7b3_tot_18
                     e14b_tot_18)
       MULT_COGB1_SORT(KEEP=CUNICAH NP e7b1_tot_18
                       RENAME=(e7b1_tot_18=e7b1_tot_18_comp) IN=A)
       MULT_COGB2_SORT(KEEP=CUNICAH NP e7b2_tot_18
                       RENAME=(e7b2_tot_18=e7b2_tot_18_comp))
       MULT_COGB3_SORT(KEEP=CUNICAH NP e7b3_tot_18
                       RENAME=(e7b3_tot_18=e7b3_tot_18_comp))
       MULT_COGB4_SORT(KEEP=CUNICAH NP e14b_tot_18
                       RENAME=(e14b_tot_18=e14b_tot_18_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEWB2;
 SET MULT_COG_NEWB1;
 ARRAY COG(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 DO I = 1 TO DIM(COG);
    IF e6_18 = 1 THEN COG(I) = .;
 END;
 DROP I;
```

```
RUN;

DATA MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB2 MULT_ALL_NEWB2;
RUN;

DATA WW.MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB_LA;
RUN;

*************************************************************************;
*************************************************************************;

PROC SORT DATA=WW.MULT_COG_NEW_LA OUT=XVA;
 BY cunicah np;
RUN;

PROC SORT DATA=WW.MULT_COG_NEWB_LA OUT=XVB;
 BY cunicah np;
RUN;

DATA XVAB;
 MERGE XVA(IN=A)
       XVB(KEEP=cunicah np e7b1_tot_18 e7b2_tot_18 e7b3_tot_18 e14b_tot_18
e7b1_tot_18_comp
                e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA XVAB1;
 SET XVAB;
 ARRAY VV1(*) e7a1_tot_18 e7a2_tot_18 e7a3_tot_18 e14a_tot_18 e7b1_tot_18 e7b2_tot_18
e7b3_tot_18 e14b_tot_18;
 ARRAY VV2(*) elig_e7a1_tot_18 elig_e7a2_tot_18 elig_e7a3_tot_18 elig_e14a_tot_18
              elig_e7b1_tot_18 elig_e7b2_tot_18 elig_e7b3_tot_18 elig_e14b_tot_18;
 IF E6_18 = 1 THEN DO;
    DO I = 1 TO 4;
       IF VV1(I) = . THEN VV2(I) = 1; *imputation indicator;
       ELSE VV2(I) = 0;
    END;
 END;
 IF E6_18 = 2 THEN DO;
    DO J = 5 TO 8;
       IF VV1(J) = . THEN VV2(J) = 1; *imputation indicator;
       ELSE VV2(J) = 0;
    END;
 END;
 DROP I J;
IF e14a_tot_18_comp in (0,1,2,3) then BEST_DA4=0;
IF e14a_tot_18_comp in (4,5,6,7,8) then BEST_DA4=1;
IF e14b_tot_18_comp in (0,1,2,3) then BEST_DB4=0;
IF e14b_tot_18_comp in (4,5,6,7,8) then BEST_DB4=1;
RUN;

*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV; *demographic and health imputed;
 BY cunicah np;
RUN;

DATA YCOG_AT_15;
```

```
 SET WW.COG_AT_15;
 COG_15 = 1;
RUN;

DATA YNOCOG_AT_15;
 SET WW.NOCOG_AT_15;
 COG_15 = 0;
RUN;

*************************************************************************;

DATA M18_7;
 SET YCOG_AT_15
     YNOCOG_AT_15
 ;
RUN;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah NP;
RUN;

DATA M18_7_A1;
 MERGE ZCOV(IN=A)
       M18_7_SORT(KEEP=cunicah np e11a_18 e11b_18 e11c_18
                  IN=B);*e11a/b/c: correctly identified the day/month/year, e12a/b:
1st/2nd attemp at numeracy, e12c: time at numeracy;
 BY cunicah np;
 IF A;
RUN;

DATA M18_7_A00;
 RETAIN cunicah np cog_15
        e11a_18 e11b_18 e11c_18
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        ;
 SET M18_7;
 KEEP   cunicah np cog_15
        e11a_18 e11b_18 e11c_18
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        ;
 PROC SORT;
  BY cog_15 cunicah np;
RUN;

DATA M18_7_A01;
 SET M18_7_A00;
 ARRAY K1(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;*e7a_1/2/3: Verbal
Learning List A-Trial 1/2/3, e14a: Verbal Recall List A;
 ARRAY K2(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 ARRAY K3(*) ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15;
 IF COG_15 = 1 THEN DO;
```

```
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
 IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M18_7_A01 OUT=M18_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_A1 OUT=M18_7_A1_SORT;
 BY cunicah np;
RUN;

DATA M18_7_A02;
 MERGE M18_7_A1_SORT(DROP=e11a_18 e11b_18 e11c_18 IN=A)
       M18_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A ;
 DROP e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
      e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
      ;
RUN;

DATA M18_7_A05;
 RETAIN cunicah NP cog_15
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        e11a_18 e11b_18 e11c_18
 ;
 SET M18_7_A02;
 KEEP   cunicah NP cog_15
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        e11a_18 e11b_18 e11c_18
 ;
RUN;

PROC SORT DATA=M18_7_A05 OUT=M18_7_V1;
 BY DESCENDING cog_15 cunicah NP;
RUN;

*******************************;
*** Day/Month/Year + Numercy ***;
*******************************;
%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
```

```
 IF e11a_18 IN (.,.I) THEN e11a_18 = .;
 IF e11b_18 IN (.,.I) THEN e11b_18 = .;
 IF e11c_18 IN (.,.I) THEN e11c_18 = .;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e11b_18 e11c_18,  OUD=ALLV1);
QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e11a_18 e11c_18,  OUD=ALLV2);
QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e11a_18 e11b_18,  OUD=ALLV3);
QUIT;

*impute e11a;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_18;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e11b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11b_18;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e11c;
```

```
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11c_18;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*****************************************************************************;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e11a_18 e11b_18 e11c_18
                  IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e11a_18
                       RENAME=(e11a_18=e11a_18_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e11b_18
                       RENAME=(e11b_18=e11b_18_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e11c_18
                       RENAME=(e11c_18=e11c_18_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_15 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_15 = 1;
 IF e11a_18 IN (.,.I) THEN e11a_18 = .;
```

```
 IF e11b_18 IN (.,.I) THEN e11b_18 = .;
 IF e11c_18 IN (.,.I) THEN e11c_18 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M18_7_V1,DROPVAR=e11b_18 e11c_18,  OUD=COGV1); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e11a_18 e11c_18,  OUD=COGV2); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e11a_18 e11b_18,  OUD=COGV3); QUIT;

*impute e11a;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e11a_18;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

  *impute e11b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e11b_18;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e11c;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
```

```
%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
               e11b_15_comp e11c_15_comp e12ab_15_comp e11c_18;
  COUNT        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
               e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e11a_18 e11b_18 e11c_18)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e11a_18
                       RENAME=(e11a_18=e11a_18_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e11b_18
                       RENAME=(e11b_18=e11b_18_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e11c_18
                       RENAME=(e11c_18=e11c_18_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_DMY;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_DMY;
 SET MULT_COG_NEW_DMY;
RUN;

*************************************************************************;
DATA XVDMY1;
 SET WW.MULT_COG_NEW_DMY;
 ARRAY VV1(*) e11a_18 e11b_18 e11c_18;
 ARRAY VV2(*) elig_e11a_18 elig_e11b_18 elig_e11c_18;
 DO I = 1 TO 5;
    IF I = 1 | I = 2 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (1,2) THEN VV2(I) = 1; *imputation indicator;
       ELSE VV2(I) = 0;
    END;
 END;
```

```
 DROP I;
RUN;
/*
proc freq data=XVFS1;
where elig_e11c_18=1;
tables e11c_18_comp;
run;

proc freq data=XVFS1;
where e15_samp=.;
tables elig_e11c_18;
run;

proc freq data=XVFS1;
tables e15_samp*elig_e11c_18;
run;
*/
*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_15;
 SET WW.COG_AT_15;
 COG_15 = 1;
RUN;

DATA YNOCOG_AT_15;
 SET WW.NOCOG_AT_15;
 COG_15 = 0;
RUN;

*************************************************************************;
DATA M18_7;
 SET YCOG_AT_15
     YNOCOG_AT_15
 ;
RUN;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah NP;
RUN;

DATA M18_7_A1;
 MERGE ZCOV(IN=A)
       M18_7_SORT(KEEP=cunicah np e3b_18 e4_18 e5_18 IN=B); *e3b: reading ability, e4:
holding pencil problem, e5: kind of problems;
 BY cunicah np;
 IF A;
RUN;

DATA M18_7_A2;
 SET M18_7_A1;
 IF e3b_18 IN (6,.I,.S) THEN e3b_18 = .;
 IF e4_18 IN (8,.I,.S)  THEN e4_18 = .;
 IF e5_18 IN (.I,.S)    THEN e5_18 = .;
RUN;

*impute e3b, e4, e5;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;
```

```
/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN M18_7_A2;
  DATAOUT multe45;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e4_18
               e5_18;
  RESTRICT     e5_18(e4_18=1); *1=yes, 2=no;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

DATA multe45_0;
 SET multe45;
 IF e5_18 = 5 THEN e5_18 = 0;*5 is assined to respondent with e4=2 (no pencil holding
problem), so need to change to 0;
 DROP e4_18;
 PROC SORT;
  BY cunicah NP;
RUN;

DATA M18_7_A00;
 RETAIN cunicah np cog_15
        e9a_c_18 e9b_c_18 e8a_c_18 e10_c_18 e13a_c_18
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        ;
SET M18_7;
 KEEP   cunicah np cog_15
        e9a_c_18 e9b_c_18 e8a_c_18 e10_c_18 e13a_c_18
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        ;
 PROC SORT;
  BY cog_15 cunicah np;
RUN;

DATA M18_7_A01;
 SET M18_7_A00;
 ARRAY K1(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;
 ARRAY K2(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 ARRAY K3(*) ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15;
 IF COG_15 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
```

```
RUN;

PROC SORT DATA=M18_7_A01 OUT=M18_7_A01_SORT;
 BY cunicah np;
RUN;

DATA M18_7_A02;
 MERGE multe45_0(IN=A)
       M18_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
      e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
      ;
RUN;

DATA M18_7_A05;
 RETAIN cunicah NP cog_15
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18 e3b_18 e5_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
          e15ser7_15_comp
        e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18;
 SET M18_7_A02;
 KEEP   cunicah NP cog_15
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18 e3b_18 e5_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
          e15ser7_15_comp
        e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18;
RUN;

PROC SORT DATA=M18_7_A05 OUT=M18_7_V1;
 BY DESCENDING cog_15 cunicah NP;
RUN;

****************************************;
*** Visual Scanning + Semantic Verbal ***;
****************************************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e8a_c_18  NOT IN (0,1,2,3,4,5,6) THEN e8a_c_18 = .;
 IF e13a_c_18 NOT IN (0,1,2,3,4,5,6) THEN e13a_c_18 = .;
 IF e10_c_18 IN (.,80,88,.I,.S,.P)  THEN e10_c_18 = .;
 IF e9a_c_18 IN (.,88,.I,.S,.P)     THEN e9a_c_18 = .;
 IF e9b_c_18 IN (.,88,.I,.S,.P)     THEN e9b_c_18 = .;
 DROP &DROPVAR;
RUN;
%MEND;


************************;
```

```
*** --- New Sample --- ***;
************************;

%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e10_c_18  e13a_c_18 e9a_c_18
e9b_c_18, OUD=ALLV1); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e8a_c_18  e13a_c_18 e9a_c_18
e9b_c_18, OUD=ALLV2); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e8a_c_18  e10_c_18 e9a_c_18
e9b_c_18, OUD=ALLV3); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e8a_c_18  e10_c_18 e13a_c_18
e9b_c_18 e3b_18 e5_18, OUD=ALLV4); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e8a_c_18  e10_c_18 e13a_c_18
e9a_c_18 e3b_18 e5_18, OUD=ALLV5); QUIT;

*impute e8: copy figures;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18;
  COUNT        e8a_c_18;
  BOUNDS       e8a_c_18(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

  *impute e13: recall figures;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18;
  COUNT        e13a_c_18;
  BOUNDS       e13a_c_18(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

  *impute e10: visual scanning;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;
```

```
%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18;
  COUNT        e10_c_18;
  BOUNDS       e10_c_18(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

  *impute e9a: #of animals;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e9a_c_18;
  BOUNDS       e9a_c_18(>=0,<=30);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

  *impute e9b: #of repeated animals;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e9b_c_18;
  BOUNDS       e9b_c_18(>=0,<=29);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
```

```
  SEED 512171109;
  RUN;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_A1 OUT=M18_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e3b_18 e5_18 e8a_c_18 e10_c_18
                  e13a_c_18 e9a_c_18 e9b_c_18 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e8a_c_18  RENAME=(e8a_c_18=e8a_c_18_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e10_c_18 RENAME=(e10_c_18=e10_c_18_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e13a_c_18 RENAME=(e13a_c_18=e13a_c_18_comp))
       MULT_ALLV4_SORT(KEEP=CUNICAH NP e9a_c_18 RENAME=(e9a_c_18=e9a_c_18_comp))
       MULT_ALLV5_SORT(KEEP=CUNICAH NP e9b_c_18 RENAME=(e9b_c_18=e9b_c_18_comp))
 ;
 BY cunicah np;
 IF COG_15 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_15 = 1;
 IF e8a_c_18  NOT IN (0,1,2,3,4,5,6) THEN e8a_c_18 = .;
 IF e13a_c_18 NOT IN (0,1,2,3,4,5,6) THEN e13a_c_18 = .;
 IF e10_c_18 IN (.,80,88,.I,.S,.P)  THEN e10_c_18 = .;
 IF e9a_c_18 IN (.,88,.I,.S,.P)     THEN e9a_c_18 = .;
 IF e9b_c_18 IN (.,88,.I,.S,.P)     THEN e9b_c_18 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M18_7_V1,DROPVAR= e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18, OUD=COGV1); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR= e8a_c_18 e13a_c_18 e9a_c_18 e9b_c_18, OUD=COGV2); QUIT;
```

```
%LISTVA1(DIN=M18_7_V1,DROPVAR= e8a_c_18 e10_c_18 e9a_c_18 e9b_c_18, OUD=COGV3); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR= e8a_c_18 e10_c_18 e13a_c_18 e9b_c_18 e3b_18 e5_18,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR= e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e3b_18 e5_18,
OUD=COGV5); QUIT;

*impute e8;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18
                e11a_15_comp e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e8a_c_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  BOUNDS        e8a_c_18(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e13;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18
                e11a_15_comp e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e13a_c_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  BOUNDS        e13a_c_18(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e10;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;
```

```
/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e3b_18 e5_18
                e11a_15_comp e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e10_c_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  BOUNDS        e10_c_18(>=0,<=60);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e9a;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18
                e11a_15_comp e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e9a_c_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  BOUNDS        e9a_c_18(>=0,<=30);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e9b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18
                e11a_15_comp e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         e9b_c_18 ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  BOUNDS        e9b_c_18(>=0,<=29);*range at each wave;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e3b_18 e5_18 e8a_c_18 e10_c_18
                  e13a_c_18 e9a_c_18 e9b_c_18)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e8a_c_18  RENAME=(e8a_c_18=e8a_c_18_comp)
                       IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e10_c_18 RENAME=(e10_c_18=e10_c_18_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e13a_c_18 RENAME=(e13a_c_18=e13a_c_18_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e9a_c_18 RENAME=(e9a_c_18=e9a_c_18_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e9b_c_18 RENAME=(e9b_c_18=e9b_c_18_comp))
 ;
 BY cunicah np;
 IF A;
RUN;


DATA MULT_COG_NEW_FS;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_FS;
 SET MULT_COG_NEW_FS;
RUN;

*************************************************************************;

DATA XVFS1;
 SET WW.MULT_COG_NEW_FS;
 ARRAY VV1(*) e8a_c_18 e10_c_18 e13a_c_18 e9a_c_18 e9b_c_18;
 ARRAY VV2(*) elig_e8a_c_18 elig_e10_c_18 elig_e13a_c_18 elig_e9a_c_18 elig_e9b_c_18;
 DO I = 1 TO 5;
    IF I = 1 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (0,1,2,3,4,5,6) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 2 THEN DO;
       IF   VV1(I) IN (.,80,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
```

```
    IF I = 4 | I = 5 THEN DO;
       IF   VV1(I) IN (.,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
 END;
 DROP I;
RUN;
/*
proc freq data=xvfs1;
tables elig_e9b_c_18*e15_samp;
run;

proc freq data=xvfs1;
*where e15_samp=.;
tables elig_e9b_c_18;
run;

proc freq data=xvfs1;
*where elig_e9b_c_18=1;
tables e9b_c_18_comp;
run;
*/

*******************************************************************************;
PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_15;
 SET WW.COG_AT_15;
 COG_15 = 1;
RUN;

DATA YNOCOG_AT_15;
 SET WW.NOCOG_AT_15;
 COG_15 = 0;
RUN;

*******************************************************************************;
DATA M18_7;
 SET YCOG_AT_15
     YNOCOG_AT_15
 ;
RUN;

PROC SORT DATA=M18_7 OUT=M18_7_SORT;
 BY cunicah NP;
RUN;

PROC SORT DATA=WW.Mhas_2018_cognition_final OUT=ZMH18;
 BY cunicah np;
RUN;

DATA M18_7_A1;
 MERGE ZCOV(IN=A)
       ZMH18(KEEP=cunicah np e15a_18 e15b_18 e15c_18 e15d_18 e15e_18 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M18_7_A1M;
 SET M18_7_A1;
```

```
IF e15a_18 = 9 THEN DO;
   IF e15b_18 = 9 THEN DO;
      e15a_18 = 999;
      e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15a_18 = 8 THEN DO;
   IF e15b_18 in (8, 9) and e15c_18 in (8, 9) THEN DO;
      e15a_18 = 888;
      e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15a_18 = 99 THEN DO;
   IF e15b_18 = 9 THEN DO;
      e15a_18 = 999;
      e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15b_18 = 999 THEN DO;
      e15a_18 = 999;
      e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15b_18 = 99 THEN DO;
        e15a_18 = 999;
        e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15b_18 = 888 THEN DO;
        e15a_18 = 999;
        e15b_18 = .S; e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15a_18 = 88 THEN DO;
   IF e15b_18 = 88 AND e15c_18 = 88 THEN DO;
      e15b_18 = 888;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15b_18 = 99 THEN DO;
      e15b_18 = 888;
       e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
 END;
IF e15b_18 = 88 and (e15a_18 NOT IN (88,99)) THEN DO;
   IF e15c_18 = 81 AND e15d_18=88 THEN DO;
      e15d_18 = 888;
      e15e_18 = .S;
   END;
   IF e15c_18 = 99 THEN DO;
      e15c_18 = 888;
      e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15c_18 = 888 THEN DO;
      e15b_18 = 888;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15c_18 = 88 THEN DO;
      e15b_18 = 888;
        e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15b_18 = 99 and (e15a_18 NOT IN (88,99)) THEN DO;
   IF e15c_18 = 999 THEN DO;
      e15b_18 = 999;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
```

```
   IF e15c_18 = 0 THEN DO;
      e15b_18 = 999;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15c_18 = 99 THEN DO;
      e15b_18 = 999;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15c_18 = 9 and (e15b_18 NOT IN (8,9,88,99) and e15a_18 NOT IN (8,9,88,99)) THEN DO;
   IF e15d_18 = 9 THEN DO;
      e15c_18 = 999;
      e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15c_18 = 88 and (e15b_18 NOT IN (88,99) and e15a_18 NOT IN (88,99)) THEN DO;
   IF e15d_18 = 99 THEN DO;
      e15d_18 = 888;
      e15e_18 = .S;
   END;
   IF e15d_18 = 88 THEN DO;
      e15c_18 = 888;
      e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15c_18 = 99 and (e15b_18 NOT IN (88,99) and e15a_18 NOT IN (88,99)) THEN DO;
   IF e15d_18 = 999 THEN DO;
      e15c_18 = 999;
      e15d_18 = .S; e15e_18 = .S;
   END;
   IF e15d_18 = 99 AND cunicah^=8077 THEN DO;
      e15c_18 = 999;
      e15d_18 = .S; e15e_18 = .S;
   END;
   IF cunicah=8077 THEN DO;
      e15b_18 = 999;
      e15c_18 = .S; e15d_18 = .S; e15e_18 = .S;
   END;
END;
IF e15d_18 = 88 and (e15c_18 NOT IN (88,99) and e15b_18 NOT IN (88,99) and
                     e15a_18 NOT IN (88,99)) THEN DO;
   IF e15e_18 = 88 THEN DO;
      e15d_18 = 888;
      e15e_18 = .S;
   END;
END;
IF e15d_18 = 99 and (e15c_18 NOT IN (88,99) and e15b_18 NOT IN (88,99) and
                     e15a_18 NOT IN (88,99)) THEN DO;
   IF e15e_18 = 999 THEN DO;
      e15d_18 = 999;
      e15e_18 = .S;
   END;
   IF e15e_18 = 99 THEN DO;
      e15d_18 = 999;
      e15e_18 = .S;
    END;
END;
IF (e15e_18 IN (88,99)) and (e15c_18 NOT IN (88,99) and e15b_18 NOT IN
   (88,99) and e15a_18 NOT IN (88,99)) THEN DO;
   IF (cunicah = 473 AND np = 10 )    | (cunicah = 3352 AND np = 10)    |
      (cunicah = 8047 AND np = 20)   | (cunicah = 10315 AND np = 10) |
      (cunicah = 11144 AND np = 20) | (cunicah = 11534 AND np = 20) |
      (cunicah = 11885 AND np = 10) | (cunicah = 12849 AND np = 20) |
```

```
        (cunicah = 13266 AND np = 10) | (cunicah = 14209 AND np = 10) |
        (cunicah = 15188 AND np = 10) | (cunicah = 15878 AND np = 10) |
        (cunicah = 16921 AND np = 10) | (cunicah = 17981 AND np = 20)|
        (cunicah = 18517 AND np = 10)| (cunicah = 20195 AND np = 10)
     THEN DO;
        e15e_18 = 999;
       END;
     IF (cunicah = 6215 AND np = 10) THEN DO;
      e15e_18 = 888;
     END;
   END;
RUN;

/*
DATA M18_7_A1M;
SET M18_7_A1;
run;
*/
DATA M18_7_A2;
 SET M18_7_A1M;
 ARRAY FT(*) e15a_18 e15b_18 e15c_18 e15d_18 e15e_18;
 DO I = 1 TO DIM(FT);
      IF FT(I) IN (.I,.S,888,999) THEN FT(I) = .;
 END;
 IF e15a_18 = 93 THEN e15a_18_ok = 1;
 ELSE IF e15a_18 not in (.,93) THEN e15a_18_ok = 0;
 ELSE e15a_18_ok = .;
 e15ab_18 = e15a_18-e15b_18;
 IF e15ab_18 = 7 THEN e15b_18_ok = 1;
 ELSE IF e15ab_18 not in (.,7) THEN e15b_18_ok = 0;
 ELSE e15b_18_ok = .;
 e15bc_18 = e15b_18-e15c_18;
 IF e15bc_18 = 7 THEN e15c_18_ok = 1;
 ELSE IF e15bc_18 not in (.,7) THEN e15c_18_ok = 0;
 ELSE e15c_18_ok = .;
 e15cd_18 = e15c_18-e15d_18;
 IF e15cd_18 = 7 THEN e15d_18_ok = 1;
 ELSE IF e15cd_18 not in (.,7) THEN e15d_18_ok = 0;
 ELSE e15d_18_ok = .;
 e15de_18 = e15d_18-e15e_18;
 IF e15de_18 = 7 THEN e15e_18_ok = 1;
 ELSE IF e15de_18 not in (.,7) THEN e15e_18_ok = 0;
 ELSE e15e_18_ok = .;
 e15ser7_18 = e15a_18_ok+e15b_18_ok+e15c_18_ok+e15d_18_ok+e15e_18_ok;
 DROP case I e15a_18 e15b_18 e15c_18 e15d_18 e15e_18 e15ab_18 e15bc_18
      e15cd_18 e15de_18;

RUN;

DATA M18_7_A00;
 RETAIN cunicah np cog_15 e15_samp
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp;
 SET M18_7;
 KEEP   cunicah np cog_15 e15_samp
        e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
        e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
        e8_15_comp e10_15_comp e13_15_comp
```

```
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
        e15ser7_15_comp;
 PROC SORT;
  BY cog_15 cunicah np;
RUN;

DATA M18_7_A01;
 SET M18_7_A00;
 ARRAY K1(*) e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp;
 ARRAY K2(*) e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp;
 ARRAY K3(*) ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15;
 IF COG_15 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M18_7_A01 OUT=M18_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M18_7_A2 OUT=M18_7_A2_SORT;
 BY cunicah np;
RUN;

DATA M18_7_A02;
 MERGE M18_7_A2_SORT(IN=A)
       M18_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a_1_15_comp e7a_2_15_comp e7a_3_15_comp e14a_15_comp
      e7b_1_15_comp e7b_2_15_comp e7b_3_15_comp e14b_15_comp
      ;
RUN;

DATA M18_7_A05;
 RETAIN cunicah NP cog_15 e15_samp
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
        e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18
 ;
 SET M18_7_A02;
 KEEP   cunicah NP cog_15 e15_samp
        AGE_18 SEX_18 yrschool tam_loc_18 h5hhresp c1_18 c2a_18 c42_18
        c44_18
        ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15
          e8_15_comp e10_15_comp e13_15_comp
          e9a_15_comp e9b_15_comp
        e11a_15_comp e11b_15_comp e11c_15_comp
          e12ab_15_comp e12c_15_comp
            e15ser7_15_comp
```

```
        e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18
 ;
RUN;

PROC SORT DATA=M18_7_A05 OUT=M18_7_V1;
 BY DESCENDING cog_15 cunicah NP;
RUN;

***************;
*** Series-7 ***;
***************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15b_18_ok e15c_18_ok e15d_18_ok
e15e_18_ok e15ser7_18, OUD=ALLV1); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15a_18_ok e15c_18_ok e15d_18_ok
e15e_18_ok e15ser7_18, OUD=ALLV2); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15a_18_ok e15b_18_ok e15d_18_ok
e15e_18_ok e15ser7_18, OUD=ALLV3); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15a_18_ok e15b_18_ok e15c_18_ok
e15e_18_ok e15ser7_18, OUD=ALLV4); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15a_18_ok e15b_18_ok e15c_18_ok
e15d_18_ok e15ser7_18, OUD=ALLV5); QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_1i_15--e15ser7_15_comp e15a_18_ok e15b_18_ok e15c_18_ok
e15d_18_ok e15e_18_ok, OUD=ALLV6); QUIT;

*impute e15a;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e15a_18_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;
```

```
/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e15b_18_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15c;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e15c_18_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15d;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e15d_18_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15e;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;
```

```
/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e15e_18_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15ser7;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV6;
%LET DATAOT = MULT_ALLV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_18 yrschool h5hhresp;
  CATEGORICAL  sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18;
  COUNT        e15ser7_18;
  BOUNDS       e15ser7_18(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*************************************************************************;

PROC SORT DATA=M18_7_A05 OUT=M18_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLV6 OUT=MULT_ALLV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e15a_18_ok e15b_18_ok
                  e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e15a_18_ok
                       RENAME=(e15a_18_ok=e15a_18_ok_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e15b_18_ok
                       RENAME=(e15b_18_ok=e15b_18_ok_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e15c_18_ok
                       RENAME=(e15c_18_ok=e15c_18_ok_comp))
       MULT_ALLV4_SORT(KEEP=CUNICAH NP e15d_18_ok
                       RENAME=(e15d_18_ok=e15d_18_ok_comp))
       MULT_ALLV5_SORT(KEEP=CUNICAH NP e15e_18_ok
                       RENAME=(e15e_18_ok=e15e_18_ok_comp))
       MULT_ALLV6_SORT(KEEP=CUNICAH NP e15ser7_18
                       RENAME=(e15ser7_18=e15ser7_18_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_15 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_15 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M18_7_V1,DROPVAR=e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV1); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e15a_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV2); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e15a_18_ok e15b_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV3); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e15a_18_ok e15b_18_ok e15c_18_ok e15e_18_ok e15ser7_18,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15ser7_18,
OUD=COGV5); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPVAR=e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok,
OUD=COGV6); QUIT;

*impute e15a;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e15a_18_ok;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15b;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e15b_18_ok;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15c;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e15c_18_ok;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15d;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;
```

```
%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e15d_18_ok;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15e;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp e15e_18_ok;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute e15ser7;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV6;
%LET DATAOT = MULT_COGV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_18 yrschool h5hhresp e12c_15_comp e15ser7_15_comp;
  CATEGORICAL   sex_18 tam_loc_18 c1_18 c2a_18 c42_18 c44_18 e11a_15_comp
                e11b_15_comp e11c_15_comp e12ab_15_comp;
  COUNT         ecom_1i_15 ecom_2i_15 ecom_3i_15 ecom_4i_15 e8_15_comp
                e10_15_comp e13_15_comp e9a_15_comp e9b_15_comp e15ser7_18;
```

```
  BOUNDS       e15ser7_18(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV6 OUT=MULT_COGV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M18_7_SORT(KEEP=CUNICAH NP E15_SAMP COG_15 e15a_18_ok e15b_18_ok
                  e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e15a_18_ok
                       RENAME=(e15a_18_ok=e15a_18_ok_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e15b_18_ok
                       RENAME=(e15b_18_ok=e15b_18_ok_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e15c_18_ok
                       RENAME=(e15c_18_ok=e15c_18_ok_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e15d_18_ok
                       RENAME=(e15d_18_ok=e15d_18_ok_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e15e_18_ok
                       RENAME=(e15e_18_ok=e15e_18_ok_comp))
       MULT_COGV6_SORT(KEEP=CUNICAH NP e15ser7_18
                       RENAME=(e15ser7_18=e15ser7_18_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_S7;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_S7_MOD;
 SET MULT_COG_NEW_S7;
RUN;

DATA XVS71;
 SET WW.MULT_COG_NEW_S7_MOD;
 ARRAY VV1(*) e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok
              e15ser7_18;
```

```
 ARRAY VV2(*) elig_e15a_18 elig_e15b_18 elig_e15c_18 elig_e15d_18
              elig_e15e_18 elig_e15s7_18;
 DO I = 1 TO 6;
    IF VV1(I) = . THEN VV2(I) = 1;
    ELSE VV2(I) = 0;
 END;
 DROP I;
series7_sep_18=e15a_18_ok_comp+e15b_18_ok_comp+e15c_18_ok_comp+e15d_18_ok_comp+e15e_18_o
k_comp;
RUN;

proc sort data=xvab1;
by cunicah np;
run;

proc sort data=xvfs1;
by cunicah np;
run;

proc sort data=xvdmy1;
by cunicah np;
run;

proc sort data=xvs71;
by cunicah np;
run;

data ww.e_cognition_imputed_data_2018;
retain cunicah np
elig_e7a1_tot_18 e7a1_tot_18_comp elig_e7a2_tot_18 e7a2_tot_18_comp elig_e7a3_tot_18
e7a3_tot_18_comp elig_e14a_tot_18 e14a_tot_18_comp
elig_e7b1_tot_18 e7b1_tot_18_comp elig_e7b2_tot_18 e7b2_tot_18_comp elig_e7b3_tot_18
e7b3_tot_18_comp elig_e14b_tot_18 e14b_tot_18_comp
elig_e8a_c_18 e8a_c_18_comp elig_e10_c_18 e10_c_18_comp elig_e13a_c_18 e13a_c_18_comp
elig_e9a_c_18 e9a_c_18_comp elig_e9b_c_18 e9b_c_18_comp
elig_e11a_18 e11a_18_comp elig_e11b_18 e11b_18_comp elig_e11c_18 e11c_18_comp
elig_e15s7_18 e15ser7_18_comp
;
merge xvab1 xvfs1 xvdmy1 xvs71;
by cunicah np;
keep cunicah np
elig_e7a1_tot_18 e7a1_tot_18_comp elig_e7a2_tot_18 e7a2_tot_18_comp elig_e7a3_tot_18
e7a3_tot_18_comp elig_e14a_tot_18 e14a_tot_18_comp
elig_e7b1_tot_18 e7b1_tot_18_comp elig_e7b2_tot_18 e7b2_tot_18_comp elig_e7b3_tot_18
e7b3_tot_18_comp elig_e14b_tot_18 e14b_tot_18_comp
elig_e8a_c_18 e8a_c_18_comp elig_e10_c_18 e10_c_18_comp elig_e13a_c_18 e13a_c_18_comp
elig_e9a_c_18 e9a_c_18_comp elig_e9b_c_18 e9b_c_18_comp
elig_e11a_18 e11a_18_comp elig_e11b_18 e11b_18_comp elig_e11c_18 e11c_18_comp
elig_e15s7_18 e15ser7_18_comp;
run;
```

2021

```
libname raw 'C:\Users\bbogrady\OneDrive - University of Texas Medical
Branch\Desktop\MHAS 2021\Data\Raw';
libname ww 'C:\Users\bbogrady\OneDrive - University of Texas Medical Branch\Desktop\MHAS
2021\Cognition\2021_sect_e';

proc contents data=raw.Sect_g_j_k_sa_2015;
run;


DATA M21_1;
 RETAIN cunicah np tipent_21 resul_ec_21 yrschool
        AGE_21 SEX_21 tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
        e6_21
        e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21
        e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21
        e3b_21 e4_21 e5_21
        e8a_c_21 e10_c_21 e10_i_21 e13_c_21 e9a_c_21 e9b_c_21
        e11a_21 e11b_21 e11c_21
 ;
 SET ww.Mhas_2021_cognition_final;
 KEEP cunicah np tipent_21 resul_ec_21 yrschool
      AGE_21 SEX_21 tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
      e6_21
      e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21
      e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21
      e3b_21 e4_21 e5_21
      e8a_c_21 e10_c_21 e10_i_21 e13_c_21 e9a_c_21 e9b_c_21
      e11a_21 e11b_21 e11c_21
 ;
RUN;
*N=15,379;

PROC SORT DATA=M21_1 OUT=M21_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M21_2;
 SET M21_1_SORT;
 IF TIPENT_21 IN (1,2); *direct interview;
 ATTRIB _ALL_ LABEL = " ";
RUN;
*N=14484;

PROC SORT DATA=raw.sect_a_c_d_f_e_pc_h_i_2018 OUT=WV1(KEEP=CUNICAH NP TIPENT_18
resul_ec_18);
 BY CUNICAH NP;
RUN;
*non-imputed 2018 data: N=17114;

PROC SORT DATA=WW.v1_cognition_impute_data_2018 OUT=WV2(KEEP=CUNICAH NP);
 BY CUNICAH NP;
RUN;
*imputed 2018 data: N= 15786;

DATA WVPNS;
 MERGE WV1(IN=A) WV2(IN=B);
 BY CUNICAH NP;
 IF A AND NOT B;
 ATTRIB _ALL_ LABEL = " ";
RUN;
*2018 proxy: N=1328;
```

```
DATA M21_2_OLD M21_2_NEW;
 SET M21_2;
 IF TIPENT_21 = 2 THEN OUTPUT M21_2_NEW; *direct, new sample in 2021: N=4603;
 ELSE OUTPUT M21_2_OLD;*direct, follow-up in 2021: N=11213;
RUN;

PROC SORT DATA=M21_2_OLD OUT=M21_2_OLD_SORT;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS OUT=WVPNS_SORT(KEEP=CUNICAH NP TIPENT_18
                                    RENAME=(TIPENT_18=e18_samp));
 BY CUNICAH NP;
RUN;

DATA WVPNS_1 WVPNS_1_OTHER;
 MERGE M21_2_OLD_SORT(IN=A) WVPNS_SORT(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN DO;
    IF e18_samp = . THEN e18_samp = 1; *?;
       OUTPUT WVPNS_1; *direct fu in 2021 & proxy in 2018: N=254;
 END;
 IF A AND NOT B THEN DO;
    OUTPUT WVPNS_1_OTHER; *direct fu in 2021 & other in 2018: N=10929;
 END;
RUN;
/*
proc freq data=WVPNS_1;
tables e18_samp; *3=proxy, fu, 4=proxy, new;
run;
*/
DATA WVPNS_2; *direct fu in 2021 and proxy in 2018 & direct new in 2021;
 SET M21_2_NEW(IN=A) WVPNS_1;
 IF A THEN e18_samp = 0; *direct new in 2021;
RUN;

PROC SORT DATA=WW.V1_cognition_impute_data_2018 OUT=W1IMP;
 BY CUNICAH NP;
RUN;

PROC SORT DATA=WVPNS_1_OTHER OUT=WVPNS_1_OT_SORT;
 BY CUNICAH NP;
RUN;

DATA WVPNS_1_OTHER2 WVPNS_1_OTHER2_CK;
 MERGE WVPNS_1_OT_SORT(IN=A) W1IMP(IN=B);
 BY CUNICAH NP;
 IF A AND B THEN OUTPUT WVPNS_1_OTHER2; *direct fu in 2021 & observed and imputed in
2018: N=12885;
 IF A AND NOT B THEN OUTPUT WVPNS_1_OTHER2_CK; *direct fu in 2021 & unknown in 2018:
N=962;
RUN;

DATA WW.COG_AT_18; *direct fu in 2021 & observed and imputed in 2018;
 SET WVPNS_1_OTHER2;
RUN;

DATA WVPNS_1_OTHER2_CK1;
 SET WVPNS_1_OTHER2_CK;
 e18_samp = 4;
 KEEP CUNICAH--e18_samp;
RUN;
```

```
DATA WVPNS_2_FN;*direct fu in 2021 and proxy/unknown in 2018 & direct new in 2021 =
direct in 2021 and not imputed in 2018;
 SET WVPNS_2(IN=A) WVPNS_1_OTHER2_CK1;
 IF A THEN DO;*direct fu in 2021 and proxy in 2018 & direct new in 2021;
    IF e18_samp IN (3,4) THEN DO;
       e18_samp = e18_samp-2;
    END;
 END;
RUN;

DATA WW.NOCOG_AT_18; *direct (fu & new) in 2021 and not imputed in 2018;
 SET WVPNS_2_FN;
RUN;

DATA YCOG_AT_18;
 SET WW.COG_AT_18;
 COG_18 = 1;
RUN;

DATA YNOCOG_AT_18;
 SET WW.NOCOG_AT_18;
 COG_18 = 0;
RUN;

DATA M21_7;
 SET YCOG_AT_18
     YNOCOG_AT_18
 ;
RUN;

DATA M21_7_COV0;
 RETAIN cunicah NP AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21
        c42_21 c44_21;
 SET M21_7;
 KEEP cunicah NP AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21
      c42_21 c44_21;
RUN;

DATA M21_7_COV1;
 SET M21_7_COV0;
 IF yrschool IN (88,99,.M) THEN yrschool = .;
 IF age_21 in (888, 999) THEN age_21 = .;
 ARRAY CV(*) c1_21 c2a_21 c42_21 c44_21; *c1: health condition, c2a: health compared to
2 yrs ago, c42: vision, c44: hearing;
 DO I = 1 TO DIM(CV);
    IF CV(I) IN (8,9,.I) THEN CV(I) = .;
 END;
 IF c42_21 = 6 THEN INDEX_42 = 0; ELSE INDEX_42 = 1; *6=blind;
 IF c44_21 = 6 THEN INDEX_44 = 0; ELSE INDEX_44 = 1; *6=deaf;
 DROP I;
RUN;
/*
proc means data=M21_7_COV1;
var yrschool;
run;
*/
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%impute(name=impute,dir=.,setup=new)
title Multiple imputation;
datain M21_7_COV1;
```

```
dataout mult1r;
default transfer;
continuous  AGE_21 yrschool h5hhresp;
categorical SEX_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
restrict  c42_21(INDEX_42=1) c44_21(INDEX_44=1);
bounds  AGE_21(>=16,<=102) yrschool(>=0,<=22); * Ranges on Age & Education Combine 2018
& 2021: age_21: 16-102,age_18:22-101, yrschool_21: 0-22;
iterations 5;
multiples 1;
maxlogi 180;
seed 512171109;
run;
/*
proc freq data=MULT1R;
tables c42_21 c44_21;7
run;
*/
DATA MULT1R_RETURN6;
 SET MULT1R;
 IF c42_21 = 7 THEN c42_21 = 6;
 IF c44_21 = 7 THEN c44_21 = 6;
RUN;
*When the restriction is not met, the value of the restricted variable will be set to
zero for
a continuous and count variables. For a categorical variable, a separate category will
be
created with the response code, one higher than the highest observed code for the
restricted
categorical variable. So 7 needs to be changed back to 6.;

DATA WW.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
 DROP INDEX_42 INDEX_44;
RUN;

DATA M21_7_LIST0;
 SET M21_7;
 KEEP cunicah np e6_21; *e6: indicate the applied list;
RUN;

/*proc contents data = M21_7_LIST0; run;*/

DATA M21_7_LIST1;
 SET M21_7_LIST0;
 IF e6_21 IN (.,.I,8);*missing;
 CALL STREAMINIT(5293171);
 INDEX_1 = RAND("Bernoulli",0.5);
RUN;

DATA M21_7_LIST2;
 SET M21_7_LIST1;
 E6_21 = INDEX_1+1; *randomly assign a value to missing;
RUN;

proc contents data = raw.sect_a_c_d_e_pc_f_h_i_2015; run;
proc contents data = M21_7; run;

DATA M21_7_A00;
 RETAIN cunicah np cog_18 e6_21
        e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21
        e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
```

```
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
        e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp;
 SET M21_7;
 KEEP cunicah np cog_18 e6_21
      e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21
      e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21
      e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
      e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
      e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
      e9a_c_18_comp e9b_c_18_comp
      e11a_18_comp e11b_18_comp e11c_18_comp

      e15ser7_18_comp;
 PROC SORT;
  BY cog_18 cunicah np;
RUN;

DATA M21_7_A01;
 SET M21_7_A00;
 ARRAY K1(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp
e14a_tot_18_comp;*e7a_1/2/3: Verbal Learning List A-Trial 1/2/3, e14a: Verbal Recall
List A;
 ARRAY K2(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 ARRAY K3(*) ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18;
 IF COG_18 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_A01 OUT=M21_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_LIST1 OUT=M21_7_LIST1_SORT; /* 0 observations*/
 BY cunicah np;
RUN;


DATA M21_7_A02;
 MERGE ZCOV(IN=A)
       M21_7_A01_SORT
       M21_7_LIST1_SORT(DROP=E6_21 IN=B)
 ;
 BY cunicah np;
 IF A;
 IF B THEN E6_21 = INDEX_1+1;
 DROP INDEX_1
      e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
      e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
 ;
RUN;
```

```
DATA M21_7_A05;
 RETAIN cunicah NP cog_18 e6_21
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp
          e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21;
 SET M21_7_A02;
 ARRAY EAB(*) e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.r,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_18 e6_21
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp
          e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21;
RUN;

PROC SORT DATA=M21_7_A05 OUT=M21_7_A1;
 BY DESCENDING cog_18 e6_21 cunicah NP;
RUN;

*********************************;
*** List A: 3 Attempts + Delay ***;
*********************************;

%MACRO LISTA(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTA(DIN=M21_7_A1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7a2_tot_21 e7a3_tot_21
e14a_tot_21, OUD=ALLA1); QUIT;
%LISTA(DIN=M21_7_A1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7a1_tot_21 e7a3_tot_21
e14a_tot_21, OUD=ALLA2); QUIT;
%LISTA(DIN=M21_7_A1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7a1_tot_21 e7a2_tot_21
e14a_tot_21, OUD=ALLA3); QUIT;
%LISTA(DIN=M21_7_A1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7a1_tot_21 e7a2_tot_21
e7a3_tot_21, OUD=ALLA4); QUIT;

*impute e7a_1;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA1;
%LET DATAOT = MULT_ALLA1;
```

```
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e7a1_tot_21;
  RESTRICT     e7a1_tot_21(E6_21=1); *e6=1: assign to list a;
  BOUNDS       e7a1_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7a_2;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA2;
%LET DATAOT = MULT_ALLA2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e7a2_tot_21;
  RESTRICT     e7a2_tot_21(E6_21=1); *e6=1: assign to list a;
  BOUNDS       e7a2_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;


*impute e7a_3;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA3;
%LET DATAOT = MULT_ALLA3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e7a3_tot_21;
  RESTRICT     e7a3_tot_21(E6_21=1); *e6=1: assign to list a;
  BOUNDS       e7a3_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
```

```
  MAXLOGI 180;
  SEED 512171109;
  RUN;


  *impute e14a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLA4;
%LET DATAOT = MULT_ALLA4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e14a_tot_21;
  RESTRICT     e14a_tot_21(E6_21=1); *e6=1: assign to list a;
  BOUNDS       e14a_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;


PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_A1 OUT=M21_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA1 OUT=MULT_ALLA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA2 OUT=MULT_ALLA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA3 OUT=MULT_ALLA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLA4 OUT=MULT_ALLA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp e6_21 RENAME=(e6_21=e6_21_old)
                  IN=A)
       M21_7_A1_SORT(KEEP=CUNICAH NP COG_18 e6_21 e7a1_tot_21 e7a2_tot_21 e7a3_tot_21
                     e14a_tot_21)
       MULT_ALLA1_SORT(KEEP=CUNICAH NP e7a1_tot_21
                       RENAME=(e7a1_tot_21=e7a1_tot_21_comp))
       MULT_ALLA2_SORT(KEEP=CUNICAH NP e7a2_tot_21
```

```
                        RENAME=(e7a2_tot_21=e7a2_tot_21_comp))
       MULT_ALLA3_SORT(KEEP=CUNICAH NP e7a3_tot_21
                        RENAME=(e7a3_tot_21=e7a3_tot_21_comp))
       MULT_ALLA4_SORT(KEEP=CUNICAH NP e14a_tot_21
                        RENAME=(e14a_tot_21=e14a_tot_21_comp))
 ;
 BY cunicah np;
 IF COG_18 = 0;*direct (fu & new) in 2021 and not in 2018;
RUN;

DATA MULT_ALL_NEW2;
 SET MULT_ALL_NEW1;
 ARRAY NEW(*) e7a1_tot_21_comp e7a2_tot_21_comp e7a3_tot_21_comp e14a_tot_21_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_21 = 2 THEN NEW(I) = .;*assign to list b;
 END;
 DROP I;
RUN;

proc means data = MULT_ALL_NEW2; var e7a1_tot_21_comp e7a2_tot_21_comp e7a3_tot_21_comp
e14a_tot_21_comp; run;
************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_18 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTA1(DIN=M21_7_A1,DROPVAR=e7a2_tot_21 e7a3_tot_21 e14a_tot_21, OUD=COGA1); QUIT;
%LISTA1(DIN=M21_7_A1,DROPVAR=e7a1_tot_21 e7a3_tot_21 e14a_tot_21, OUD=COGA2); QUIT;
%LISTA1(DIN=M21_7_A1,DROPVAR=e7a1_tot_21 e7a2_tot_21 e14a_tot_21, OUD=COGA3); QUIT;
%LISTA1(DIN=M21_7_A1,DROPVAR=e7a1_tot_21 e7a2_tot_21 e7a3_tot_21, OUD=COGA4); QUIT;

*impiute e7a_1;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA1;
%LET DATAOT = MULT_COGA1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp e15ser7_18_comp; *e12c: numeracy time;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp; *e11a/b/c: day/month/year, e12ab: numeracy
attemp;
  COUNT        e7a1_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
               e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp
e9b_c_18_comp;*e8: copy figures, e10: visual scanning, e13: figure recall, e9a: #of
annimals, e9b: #of repeated animals;
  RESTRICT     e7a1_tot_21(E6_21=1);
  BOUNDS       e7a1_tot_21(>=0,<=8);
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7a_2;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA2;
%LET DATAOT = MULT_COGA2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp e15ser7_18_comp; *e12c: numeracy time;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp; *e11a/b/c: day/month/year, e12ab: numeracy
attemp;
  COUNT        e7a2_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
               e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp
e9b_c_18_comp;*e8: copy figures, e10: visual scanning, e13: figure recall, e9a: #of
annimals, e9b: #of repeated animals;
  RESTRICT     e7a2_tot_21(E6_21=1);
  BOUNDS       e7a2_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7a_3;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA3;
%LET DATAOT = MULT_COGA3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp e15ser7_18_comp; *e12c: numeracy time;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp; *e11a/b/c: day/month/year, e12ab: numeracy
attemp;
  COUNT        e7a3_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
               e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp
e9b_c_18_comp;*e8: copy figures, e10: visual scanning, e13: figure recall, e9a: #of
annimals, e9b: #of repeated animals;
  RESTRICT     e7a3_tot_21(E6_21=1);
  BOUNDS       e7a3_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
```

```
  RUN;

*impute e14a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGA4;
%LET DATAOT = MULT_COGA4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp e15ser7_18_comp; *e12c: numeracy time;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp; *e11a/b/c: day/month/year, e12ab: numeracy
attemp;
  COUNT        e14a_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
               e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp
e9b_c_18_comp;*e8: copy figures, e10: visual scanning, e13: figure recall, e9a: #of
annimals, e9b: #of repeated animals;
  RESTRICT     e14a_tot_21(E6_21=1);
  BOUNDS       e14a_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGA1 OUT=MULT_COGA1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA2 OUT=MULT_COGA2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA3 OUT=MULT_COGA3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGA4 OUT=MULT_COGA4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp e6_21 RENAME=(e6_21=e6_21_old))
       M21_7_A1_SORT(KEEP=CUNICAH NP COG_18 e6_21 e7a1_tot_21 e7a2_tot_21 e7a3_tot_21
                     e14a_tot_21)
       MULT_COGA1_SORT(KEEP=CUNICAH NP e7a1_tot_21
                       RENAME=(e7a1_tot_21=e7a1_tot_21_comp) IN=A)
       MULT_COGA2_SORT(KEEP=CUNICAH NP e7a2_tot_21
                       RENAME=(e7a2_tot_21=e7a2_tot_21_comp))
       MULT_COGA3_SORT(KEEP=CUNICAH NP e7a3_tot_21
                       RENAME=(e7a3_tot_21=e7a3_tot_21_comp))
       MULT_COGA4_SORT(KEEP=CUNICAH NP e14a_tot_21
                       RENAME=(e14a_tot_21=e14a_tot_21_comp))
 ;
 BY cunicah np;
 IF A;
```

```
RUN;

DATA MULT_COG_NEW2;
 SET MULT_COG_NEW1;
 ARRAY COG(*) e7a1_tot_21_comp e7a2_tot_21_comp e7a3_tot_21_comp e14a_tot_21_comp;
 DO I = 1 TO DIM(COG);
    IF e6_21 = 2 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEW_LA; *all direct in 2021;
 SET MULT_COG_NEW2 MULT_ALL_NEW2;
RUN;

DATA WW.MULT_COG_NEW_LA;
 SET MULT_COG_NEW_LA;
RUN;

proc means data = WW.MULT_COG_NEW_LA; var e7a1_tot_21_comp e7a2_tot_21_comp
e7a3_tot_21_comp e14a_tot_21_comp; run;
*************************************************************************;
*************************************************************************;


DATA M21_7_B05;
 RETAIN cunicah NP cog_18 e6_21
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp
          e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21;
 SET M21_7_A02;
 ARRAY EAB(*) e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21;
 DO I = 1 TO DIM(EAB);
    IF EAB(I) IN (.I,.P,.r,.S,9) THEN EAB(I) = .;
 END;
 KEEP   cunicah NP cog_18 e6_21
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21 c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp
          e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21;
RUN;

PROC SORT DATA=M21_7_B05 OUT=M21_7_B1;
 BY DESCENDING cog_18 e6_21 cunicah NP;
RUN;


*********************************;
*** List B: 3 Attempts + Delay ***;
*********************************;

************************;
*** --- New Sample --- ***;
************************;
```

```
%LISTA(DIN=M21_7_B1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7b2_tot_21 e7b3_tot_21
e14b_tot_21, OUD=ALLB1); QUIT;
%LISTA(DIN=M21_7_B1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7b1_tot_21 e7b3_tot_21
e14b_tot_21, OUD=ALLB2); QUIT;
%LISTA(DIN=M21_7_B1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7b1_tot_21 e7b2_tot_21
e14b_tot_21, OUD=ALLB3); QUIT;
%LISTA(DIN=M21_7_B1,DROPVAR=ecom_1i_18--e15ser7_18_comp e7b1_tot_21 e7b2_tot_21
e7b3_tot_21, OUD=ALLB4); QUIT;

*impiute e7b_1;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB1;
%LET DATAOT = MULT_ALLB1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT         e7b1_tot_21;
  RESTRICT      e7b1_tot_21(E6_21=2); *assigned to list b;
  BOUNDS        e7b1_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7b_2;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB2;
%LET DATAOT = MULT_ALLB2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT         e7b2_tot_21;
  RESTRICT      e7b2_tot_21(E6_21=2); *assigned to list b;
  BOUNDS        e7b2_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7b_3;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;
```

```
/* run iveware */

%LET DATAGO = OKIN_ALLB3;
%LET DATAOT = MULT_ALLB3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT         e7b3_tot_21;
  RESTRICT      e7b3_tot_21(E6_21=2); *assigned to list b;
  BOUNDS        e7b3_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e14b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_ALLB4;
%LET DATAOT = MULT_ALLB4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT         e14b_tot_21;
  RESTRICT      e14b_tot_21(E6_21=2); *assigned to list b;
  BOUNDS        e14b_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_B1 OUT=M21_7_B1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB1 OUT=MULT_ALLB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB2 OUT=MULT_ALLB2_SORT;
 BY cunicah np;
RUN;
```

```
PROC SORT DATA=MULT_ALLB3 OUT=MULT_ALLB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLB4 OUT=MULT_ALLB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEWB1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp e6_21 RENAME=(e6_21=e6_21_old)
                  IN=A)
       M21_7_B1_SORT(KEEP=CUNICAH NP COG_18 e6_21 e7b1_tot_21 e7b2_tot_21 e7b3_tot_21
                     e14b_tot_21)
       MULT_ALLB1_SORT(KEEP=CUNICAH NP e7b1_tot_21
                       RENAME=(e7b1_tot_21=e7b1_tot_21_comp))
       MULT_ALLB2_SORT(KEEP=CUNICAH NP e7b2_tot_21
                       RENAME=(e7b2_tot_21=e7b2_tot_21_comp))
       MULT_ALLB3_SORT(KEEP=CUNICAH NP e7b3_tot_21
                       RENAME=(e7b3_tot_21=e7b3_tot_21_comp))
       MULT_ALLB4_SORT(KEEP=CUNICAH NP e14b_tot_21
                       RENAME=(e14b_tot_21=e14b_tot_21_comp))
 ;
 BY cunicah np;
 IF COG_18 = 0; *direct in 2021 & not in 2018;
RUN;

DATA MULT_ALL_NEWB2;
 SET MULT_ALL_NEWB1;
 ARRAY NEW(*) e7b1_tot_21_comp e7b2_tot_21_comp e7b3_tot_21_comp e14b_tot_21_comp;
 DO I = 1 TO DIM(NEW);
    IF e6_21 = 1 THEN NEW(I) = .;
 END;
 DROP I;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%LISTA1(DIN=M21_7_B1,DROPVAR=e7b2_tot_21 e7b3_tot_21 e14b_tot_21, OUD=COGB1); QUIT;
%LISTA1(DIN=M21_7_B1,DROPVAR=e7b1_tot_21 e7b3_tot_21 e14b_tot_21, OUD=COGB2); QUIT;
%LISTA1(DIN=M21_7_B1,DROPVAR=e7b1_tot_21 e7b2_tot_21 e14b_tot_21, OUD=COGB3); QUIT;
%LISTA1(DIN=M21_7_B1,DROPVAR=e7b1_tot_21 e7b2_tot_21 e7b3_tot_21, OUD=COGB4); QUIT;

*impute e7b_1;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB1;
%LET DATAOT = MULT_COGB1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp e15ser7_18_comp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp;
  COUNT        e7b1_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
               e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
```

```
  RESTRICT      e7b1_tot_21(E6_21=2);
  BOUNDS        e7b1_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e7b_2;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB2;
%LET DATAOT = MULT_COGB2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp;
  COUNT         e7b2_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
                e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  RESTRICT      e7b2_tot_21(E6_21=2);
  BOUNDS        e7b2_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impue e7b_3;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB3;
%LET DATAOT = MULT_COGB3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp;
  COUNT         e7b3_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
                e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  RESTRICT      e7b3_tot_21(E6_21=2);
  BOUNDS        e7b3_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e14b;
```

```
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

%LET DATAGO = OKIN_COGB4;
%LET DATAOT = MULT_COGB4;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp;
  COUNT         e14b_tot_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
                e8a_c_18_comp e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  RESTRICT      e14b_tot_21(E6_21=2);
  BOUNDS        e14b_tot_21(>=0,<=8);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGB1 OUT=MULT_COGB1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB2 OUT=MULT_COGB2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB3 OUT=MULT_COGB3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGB4 OUT=MULT_COGB4_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEWB1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp e6_21 RENAME=(e6_21=e6_21_old))
       M21_7_B1_SORT(KEEP=CUNICAH NP COG_18 e6_21 e7b1_tot_21 e7b2_tot_21 e7b3_tot_21
                     e14b_tot_21)
       MULT_COGB1_SORT(KEEP=CUNICAH NP e7b1_tot_21
                       RENAME=(e7b1_tot_21=e7b1_tot_21_comp) IN=A)
       MULT_COGB2_SORT(KEEP=CUNICAH NP e7b2_tot_21
                       RENAME=(e7b2_tot_21=e7b2_tot_21_comp))
       MULT_COGB3_SORT(KEEP=CUNICAH NP e7b3_tot_21
                       RENAME=(e7b3_tot_21=e7b3_tot_21_comp))
       MULT_COGB4_SORT(KEEP=CUNICAH NP e14b_tot_21
                       RENAME=(e14b_tot_21=e14b_tot_21_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEWB2;
 SET MULT_COG_NEWB1;
 ARRAY COG(*) e7b1_tot_21_comp e7b2_tot_21_comp e7b3_tot_21_comp e14b_tot_21_comp;
 DO I = 1 TO DIM(COG);
```

```
    IF e6_21 = 1 THEN COG(I) = .;
 END;
 DROP I;
RUN;

DATA MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB2 MULT_ALL_NEWB2;
RUN;

DATA WW.MULT_COG_NEWB_LA;
 SET MULT_COG_NEWB_LA;
RUN;

*******************************************************************************;
*******************************************************************************;

PROC SORT DATA=WW.MULT_COG_NEW_LA OUT=XVA;
 BY cunicah np;
RUN;

PROC SORT DATA=WW.MULT_COG_NEWB_LA OUT=XVB;
 BY cunicah np;
RUN;

DATA XVAB;
 MERGE XVA(IN=A)
       XVB(KEEP=cunicah np e7b1_tot_21 e7b2_tot_21 e7b3_tot_21 e14b_tot_21
e7b1_tot_21_comp
                e7b2_tot_21_comp e7b3_tot_21_comp e14b_tot_21_comp IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA XVAB1;
 SET XVAB;
 ARRAY VV1(*) e7a1_tot_21 e7a2_tot_21 e7a3_tot_21 e14a_tot_21 e7b1_tot_21 e7b2_tot_21
e7b3_tot_21 e14b_tot_21;
 ARRAY VV2(*) elig_e7a1_tot_21 elig_e7a2_tot_21 elig_e7a3_tot_21 elig_e14a_tot_21
              elig_e7b1_tot_21 elig_e7b2_tot_21 elig_e7b3_tot_21 elig_e14b_tot_21;
 IF E6_21 = 1 THEN DO;
    DO I = 1 TO 4;
       IF VV1(I) = . THEN VV2(I) = 1; *imputation indicator;
       ELSE VV2(I) = 0;
    END;
 END;
 IF E6_21 = 2 THEN DO;
    DO J = 5 TO 8;
       IF VV1(J) = . THEN VV2(J) = 1; *imputation indicator;
       ELSE VV2(J) = 0;
    END;
 END;
 DROP I J;
IF e14a_tot_21_comp in (0,1,2,3) then BEST_DA4=0;
IF e14a_tot_21_comp in (4,5,6,7,8) then BEST_DA4=1;
IF e14b_tot_21_comp in (0,1,2,3) then BEST_DB4=0;
IF e14b_tot_21_comp in (4,5,6,7,8) then BEST_DB4=1;
RUN;

*******************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV; *demographic and health imputed;
 BY cunicah np;
```

```
RUN;

DATA YCOG_AT_18;
 SET WW.COG_AT_18;
 COG_18 = 1;
RUN;

DATA YNOCOG_AT_18;
 SET WW.NOCOG_AT_18;
 COG_18 = 0;
RUN;

*************************************************************************;

DATA M21_7;
 SET YCOG_AT_18
     YNOCOG_AT_18
 ;
RUN;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah NP;
RUN;

DATA M21_7_A1;
 MERGE ZCOV(IN=A)
       M21_7_SORT(KEEP=cunicah np e11a_21 e11b_21 e11c_21
                  IN=B);*e11a/b/c: correctly identified the day/month/year, e12a/b:
1st/2nd attemp at numeracy, e12c: time at numeracy;
 BY cunicah np;
 IF A;
RUN;

DATA M21_7_A00;
 RETAIN cunicah np cog_18
        e11a_21 e11b_21 e11c_21
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        ;
 SET M21_7;
 KEEP   cunicah np cog_18
        e11a_21 e11b_21 e11c_21
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        ;
 PROC SORT;
  BY cog_18 cunicah np;
RUN;

DATA M21_7_A01;
 SET M21_7_A00;
```

```
 ARRAY K1(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp
e14a_tot_18_comp;*e7a_1/2/3: Verbal Learning List A-Trial 1/2/3, e14a: Verbal Recall
List A;
 ARRAY K2(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 ARRAY K3(*) ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18;
 IF COG_18 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
 IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M21_7_A01 OUT=M21_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_A1 OUT=M21_7_A1_SORT;
 BY cunicah np;
RUN;

DATA M21_7_A02;
 MERGE M21_7_A1_SORT(DROP=e11a_21 e11b_21 e11c_21 IN=A)
       M21_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A ;
 DROP e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
      e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
      ;
RUN;

DATA M21_7_A05;
 RETAIN cunicah NP cog_18
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        e11a_21 e11b_21 e11c_21
 ;
 SET M21_7_A02;
 KEEP   cunicah NP cog_18
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        e11a_21 e11b_21 e11c_21
 ;
RUN;

PROC SORT DATA=M21_7_A05 OUT=M21_7_V1;
 BY DESCENDING cog_18 cunicah NP;
RUN;
```

```
/*******************************;
*** Day/Month/Year + Numercy ***;
*******************************;
%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e11a_21 IN (.,.I) THEN e11a_21 = .;
 IF e11b_21 IN (.,.I) THEN e11b_21 = .;
 IF e11c_21 IN (.,.I) THEN e11c_21 = .;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e11b_21 e11c_21,  OUD=ALLV1);
QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e11a_21 e11c_21,  OUD=ALLV2);
QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e11a_21 e11b_21,  OUD=ALLV3);
QUIT;

/*impute e11a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

/*%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_21;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e11b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

/*%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11b_21;
```

```
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e11c;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */

/*%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11c_21;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*************************************************************************;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

/*NO MISSING DATA TO IMPUTE*/
/*PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e11a_21 e11b_21 e11c_21
                  IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e11a_21
                       RENAME=(e11a_21=e11a_21_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e11b_21
                       RENAME=(e11b_21=e11b_21_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e11c_21
                       RENAME=(e11c_21=e11c_21_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_18 = 0;
RUN;*/

************************;
```

```
*** --- Follow-up --- ***;
************************;

/*%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_18 = 1;
 IF e11a_21 IN (.,.I) THEN e11a_21 = .;
 IF e11b_21 IN (.,.I) THEN e11b_21 = .;
 IF e11c_21 IN (.,.I) THEN e11c_21 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M21_7_V1,DROPVAR=e11b_21 e11c_21,  OUD=COGV1); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e11a_21 e11c_21,  OUD=COGV2); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e11a_21 e11b_21,  OUD=COGV3); QUIT;

*impute e11a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
/*%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp  e15ser7_18_comp;
  /*CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp  e11a_21;
  /*COUNT        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
               e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

  *impute e11b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
/*%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp  e15ser7_18_comp;
  /*CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp  e11b_21;
  /*COUNT        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
               e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
```

```
  SEED 512171109;
  RUN;

*impute e11c;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
/*%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp  e15ser7_18_comp;
  /*CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
               e11b_18_comp e11c_18_comp  e11c_21;
  /*COUNT        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
               e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

/*NO MISSING DATA TO IMPUTE*/
/*PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e11a_21 e11b_21 e11c_21)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e11a_21
                       RENAME=(e11a_21=e11a_21_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e11b_21
                       RENAME=(e11b_21=e11b_21_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e11c_21
                       RENAME=(e11c_21=e11c_21_comp))
 ;
 BY cunicah np;
 IF A;
RUN;*/

PROC CONTENTS data = M21_7_SORT; run;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW_DMY;
 SET M21_7_SORT (KEEP=CUNICAH NP e18_samp COG_18 e11a_21 e11b_21 e11c_21
                  RENAME=(e11a_21=e11a_21_comp e11b_21=e11b_21_comp
e11c_21=e11c_21_comp));
```

```
RUN;

DATA WW.MULT_COG_NEW_DMY;
 SET MULT_COG_NEW_DMY;
RUN;



*************************************************************************;
DATA XVDMY1;
 SET WW.MULT_COG_NEW_DMY;
 ARRAY VV1(*) e11a_21 e11b_21 e11c_21;
 ARRAY VV2(*) elig_e11a_21 elig_e11b_21 elig_e11c_21;
 DO I = 1 TO 5;
    IF I = 1 | I = 2 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (1,2) THEN VV2(I) = 1; *imputation indicator;
       ELSE VV2(I) = 0;
    END;
 END;
 DROP I;
RUN;

proc contents data = XVDMY1; run;

/*proc freq data=XVFS1;
where elig_e11c_21=1;
tables e11c_21_comp;
run;

proc freq data=XVFS1;
where e18_samp=.;
tables elig_e11c_21;
run;

proc freq data=XVFS1;
tables e18_samp*elig_e11c_21;
run;
*/
*************************************************************************;

PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_18;
 SET WW.COG_AT_18;
 COG_18 = 1;
RUN;

DATA YNOCOG_AT_18;
 SET WW.NOCOG_AT_18;
 COG_18 = 0;
RUN;

*************************************************************************;
DATA M21_7;
 SET YCOG_AT_18
     YNOCOG_AT_18
 ;
RUN;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah NP;
```

```
RUN;

DATA M21_7_A1;
 MERGE ZCOV(IN=A)
       M21_7_SORT(KEEP=cunicah np e3b_21 e4_21 e5_21 IN=B); *e3b: reading ability, e4:
holding pencil problem, e5: kind of problems;
 BY cunicah np;
 IF A;
RUN;

DATA M21_7_A2;
 SET M21_7_A1;
 IF e3b_21 IN (6,.I,.S) THEN e3b_21 = .;
 IF e4_21 IN (8,.I,.S)  THEN e4_21 = .;
 IF e5_21 IN (.I,.S)    THEN e5_21 = .;
RUN;

*impute e3b, e4, e5;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN M21_7_A2;
  DATAOUT multe45;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e4_21
               e5_21;
  RESTRICT     e5_21(e4_21=1); *1=yes, 2=no;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

DATA multe45_0;
 SET multe45;
 IF e5_21 = 5 THEN e5_21 = 0;*5 is assined to respondent with e4=2 (no pencil holding
problem), so need to change to 0;
 DROP e4_21;

proc contents data = multe45_0; run;

 PROC SORT;
  BY cunicah NP;
RUN;

DATA M21_7_A00;
 RETAIN cunicah np cog_18
        e9a_c_21 e9b_c_21 e8a_c_21 e10_c_21 e10_i_21 e13_c_21
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        ;
SET M21_7;
 KEEP   cunicah np cog_18
        e9a_c_21 e9b_c_21 e8a_c_21 e10_c_21 e10_i_21 e13_c_21
```

```
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        ;
 PROC SORT;
  BY cog_18 cunicah np;
RUN;

DATA M21_7_A01;
 SET M21_7_A00;
 ARRAY K1(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp;
 ARRAY K2(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 ARRAY K3(*) ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18;
 IF COG_18 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M21_7_A01 OUT=M21_7_A01_SORT;
 BY cunicah np;
RUN;

DATA M21_7_A02;
 MERGE multe45_0(IN=A)
       M21_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
      e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
      ;
RUN;

DATA M21_7_A05;
 RETAIN cunicah NP cog_18
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21 e3b_21 e5_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

          e15ser7_18_comp
        e8a_c_21 e10_c_21 e10_i_21 e13_c_21 e9a_c_21 e9b_c_21;
 SET M21_7_A02;
 KEEP   cunicah NP cog_18
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21 e3b_21 e5_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

          e15ser7_18_comp
        e8a_c_21 e10_c_21 e10_i_21 e13_c_21 e9a_c_21 e9b_c_21;
```

```
RUN;

PROC SORT DATA=M21_7_A05 OUT=M21_7_V1;
 BY DESCENDING cog_18 cunicah NP;
RUN;

****************************************;
*** Visual Scanning + Semantic Verbal ***;
****************************************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF e8a_c_21  NOT IN (0,1,2,3,4,5,6) THEN e8a_c_21 = .;
 IF e13_c_21 NOT IN (0,1,2,3,4,5,6) THEN e13_c_21 = .;
 IF e10_c_21 IN (.,80,88,.I,.S,.P)  THEN e10_c_21 = .;
 IF e10_i_21 IN (.,80,88,.I,.S,.P)  THEN e10_i_21 = .;
 IF e9a_c_21 IN (.,88,.I,.S,.P)     THEN e9a_c_21 = .;
 IF e9b_c_21 IN (.,88,.I,.S,.P)     THEN e9b_c_21 = .;
 DROP &DROPVAR;
RUN;
%MEND;


*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e10_c_21  e13_c_21 e9a_c_21
e9b_c_21, OUD=ALLV1); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e8a_c_21  e13_c_21 e9a_c_21
e9b_c_21, OUD=ALLV2); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e8a_c_21  e10_c_21 e9a_c_21
e9b_c_21, OUD=ALLV3); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e8a_c_21  e10_c_21 e13_c_21
e9b_c_21 e3b_21 e5_21, OUD=ALLV4); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e8a_c_21  e10_c_21 e13_c_21
e9a_c_21 e3b_21 e5_21, OUD=ALLV5); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e8a_c_21  e13_c_21 e9a_c_21
e9b_c_21, OUD=ALLV6); QUIT;

*impute e8: copy figures;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21;
  COUNT        e8a_c_21;
  BOUNDS       e8a_c_21(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;
```

```
  *impute e13: recall figures;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21;
  COUNT        e13_c_21;
  BOUNDS       e13_c_21(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

  *impute e10c: visual scanning;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21;
  COUNT        e10_c_21;
  BOUNDS       e10_c_21(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

    *impute e10i: visual scanning;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV6;
%LET DATAOT = MULT_ALLV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21;
  COUNT        e10_i_21;
```

```
  BOUNDS       e10_i_21(>=0,<=60);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

  *impute e9a: #of animals;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e9a_c_21;
  BOUNDS       e9a_c_21(>=0,<=30);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

  *impute e9b: #of repeated animals;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e9b_c_21;
  BOUNDS       e9b_c_21(>=0,<=29);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_A1 OUT=M21_7_A1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
```

```
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV6 OUT=MULT_ALLV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e3b_21 e5_21 e8a_c_21 e10_c_21
e10_i_21
                  e13_c_21 e9a_c_21 e9b_c_21 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e8a_c_21  RENAME=(e8a_c_21=e8a_c_21_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e10_c_21 RENAME=(e10_c_21=e10_c_21_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e13_c_21 RENAME=(e13_c_21=e13_c_21_comp))
       MULT_ALLV4_SORT(KEEP=CUNICAH NP e9a_c_21 RENAME=(e9a_c_21=e9a_c_21_comp))
       MULT_ALLV5_SORT(KEEP=CUNICAH NP e9b_c_21 RENAME=(e9b_c_21=e9b_c_21_comp))
     MULT_ALLV6_SORT(KEEP=CUNICAH NP e10_i_21 RENAME=(e10_i_21=e10_i_21_comp))
 ;
 BY cunicah np;
 IF COG_18 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_18 = 1;
 IF e8a_c_21  NOT IN (0,1,2,3,4,5,6) THEN e8a_c_21 = .;
 IF e13_c_21 NOT IN (0,1,2,3,4,5,6) THEN e13_c_21 = .;
 IF e10_c_21 IN (.,80,88,.I,.S,.P)  THEN e10_c_21 = .;
 IF e10_i_21 IN (.,80,88,.I,.S,.P)  THEN e10_i_21 = .;
 IF e9a_c_21 IN (.,88,.I,.S,.P)     THEN e9a_c_21 = .;
 IF e9b_c_21 IN (.,88,.I,.S,.P)     THEN e9b_c_21 = .;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M21_7_V1,DROPVAR= e10_c_21 e13_c_21 e9a_c_21 e9b_c_21, OUD=COGV1); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR= e8a_c_21 e13_c_21 e9a_c_21 e9b_c_21, OUD=COGV6); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR= e8a_c_21 e13_c_21 e9a_c_21 e9b_c_21, OUD=COGV2); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR= e8a_c_21 e10_c_21 e9a_c_21 e9b_c_21, OUD=COGV3); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR= e8a_c_21 e10_c_21 e13_c_21 e9b_c_21 e3b_21 e5_21,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR= e8a_c_21 e10_c_21 e13_c_21 e9a_c_21 e3b_21 e5_21,
OUD=COGV5); QUIT;
```

```
*impute e8;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e8a_c_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e8a_c_21(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e13;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e13_c_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e13_c_21(>=0,<=6);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e10c;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e10_c_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e10_c_21(>=0,<=60);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

  *impute e10i;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV6;
%LET DATAOT = MULT_COGV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e3b_21 e5_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e10_i_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e10_i_21(>=0,<=51);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e9a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e9a_c_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e9a_c_21(>=0,<=30);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;
```

```
*impute e9b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21
                e11a_18_comp e11b_18_comp e11c_18_comp ;
  COUNT         e9b_c_21 ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  BOUNDS        e9b_c_21(>=0,<=29);*range at each wave;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV6 OUT=MULT_COGV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_COG_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e3b_21 e5_21 e8a_c_21 e10_c_21
e10_i_21
                  e13_c_21 e9a_c_21 e9b_c_21)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e8a_c_21  RENAME=(e8a_c_21=e8a_c_21_comp)
                       IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e10_c_21 RENAME=(e10_c_21=e10_c_21_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e13_c_21 RENAME=(e13_c_21=e13_c_21_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e9a_c_21 RENAME=(e9a_c_21=e9a_c_21_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e9b_c_21 RENAME=(e9b_c_21=e9b_c_21_comp))
         MULT_COGV6_SORT(KEEP=CUNICAH NP e10_i_21 RENAME=(e10_i_21=e10_i_21_comp))
 ;
 BY cunicah np;
 IF A;
```

```
RUN;


DATA MULT_COG_NEW_FS;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_FS;
 SET MULT_COG_NEW_FS;
RUN;

*************************************************************************;

DATA XVFS1;
 SET WW.MULT_COG_NEW_FS;
 ARRAY VV1(*) e8a_c_21 e10_c_21  e13_c_21 e9a_c_21 e9b_c_21 e10_i_21;
 ARRAY VV2(*) elig_e8a_c_21 elig_e10_c_21  elig_e13_c_21 elig_e9a_c_21 elig_e9b_c_21
elig_e10_i_21;
 DO I = 1 TO 6;
    IF I = 1 | I = 3 THEN DO;
       IF   VV1(I) NOT IN (0,1,2,3,4,5,6) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 2 THEN DO;
       IF   VV1(I) IN (.,80,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
    IF I = 4 | I = 5 THEN DO;
       IF   VV1(I) IN (.,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
          IF I = 6 THEN DO;
       IF   VV1(I) IN (.,88,.I,.S,.P) THEN VV2(I) = 1;
       ELSE VV2(I) = 0;
    END;
 END;
 DROP I;
RUN;
/*
proc freq data=xvfs1;
tables elig_e9b_c_21*e18_samp;
run;

proc freq data=xvfs1;
*where e18_samp=.;
tables elig_e9b_c_21;
run;

proc freq data=xvfs1;
*where elig_e9b_c_21=1;
tables e9b_c_21_comp;
run;
*/

*************************************************************************;
PROC SORT DATA=WW.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

DATA YCOG_AT_18;
 SET WW.COG_AT_18;
 COG_18 = 1;
RUN;
```

```
DATA YNOCOG_AT_18;
 SET WW.NOCOG_AT_18;
 COG_18 = 0;
RUN;

*************************************************************************;
DATA M21_7;
 SET YCOG_AT_18
     YNOCOG_AT_18
 ;
RUN;

PROC SORT DATA=M21_7 OUT=M21_7_SORT;
 BY cunicah NP;
RUN;

PROC SORT DATA=WW.Mhas_2021_cognition_final OUT=ZMH21;
 BY cunicah np;
RUN;

DATA M21_7_A1;
 MERGE ZCOV(IN=A)
       ZMH21(KEEP=cunicah np e15a_21 e15b_21 e15c_21 e15d_21 e15e_21 IN=B)
 ;
 BY cunicah np;
 IF A;
RUN;

DATA M21_7_A1M;
 SET M21_7_A1;
 IF e15a_21 = 9 THEN DO;
    IF e15b_21 = 9 THEN DO;
       e15a_21 = 999;
       e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
 END;
 IF e15a_21 = 8 THEN DO;
    IF e15b_21 in (8, 9) and e15c_21 in (8, 9) THEN DO;
       e15a_21 = 888;
       e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
 END;
 IF e15a_21 = 99 THEN DO;
    IF e15b_21 = 9 THEN DO;
       e15a_21 = 999;
       e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
    IF e15b_21 = 999 THEN DO;
       e15a_21 = 999;
       e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
    IF e15b_21 = 99 THEN DO;
         e15a_21 = 999;
         e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
    IF e15b_21 = 888 THEN DO;
         e15a_21 = 999;
         e15b_21 = .S; e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
    END;
 END;
 IF e15a_21 = 88 THEN DO;
    IF e15b_21 = 88 AND e15c_21 = 88 THEN DO;
```

```
      e15b_21 = 888;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15b_21 = 99 THEN DO;
      e15b_21 = 888;
       e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
 END;
IF e15b_21 = 88 and (e15a_21 NOT IN (88,99)) THEN DO;
   IF e15c_21 = 81 AND e15d_21=88 THEN DO;
      e15d_21 = 888;
      e15e_21 = .S;
   END;
   IF e15c_21 = 99 THEN DO;
      e15c_21 = 888;
      e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15c_21 = 888 THEN DO;
      e15b_21 = 888;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15c_21 = 88 THEN DO;
      e15b_21 = 888;
        e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
END;
IF e15b_21 = 99 and (e15a_21 NOT IN (88,99)) THEN DO;
   IF e15c_21 = 999 THEN DO;
      e15b_21 = 999;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15c_21 = 0 THEN DO;
      e15b_21 = 999;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15c_21 = 99 THEN DO;
      e15b_21 = 999;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
END;
IF e15c_21 = 9 and (e15b_21 NOT IN (8,9,88,99) and e15a_21 NOT IN (8,9,88,99)) THEN DO;
   IF e15d_21 = 9 THEN DO;
      e15c_21 = 999;
      e15d_21 = .S; e15e_21 = .S;
   END;
END;
IF e15c_21 = 88 and (e15b_21 NOT IN (88,99) and e15a_21 NOT IN (88,99)) THEN DO;
   IF e15d_21 = 99 THEN DO;
      e15d_21 = 888;
      e15e_21 = .S;
   END;
   IF e15d_21 = 88 THEN DO;
      e15c_21 = 888;
      e15d_21 = .S; e15e_21 = .S;
   END;
END;
IF e15c_21 = 99 and (e15b_21 NOT IN (88,99) and e15a_21 NOT IN (88,99)) THEN DO;
   IF e15d_21 = 999 THEN DO;
      e15c_21 = 999;
      e15d_21 = .S; e15e_21 = .S;
   END;
   IF e15d_21 = 99 AND cunicah^=8077 THEN DO;
      e15c_21 = 999;
```

```
      e15d_21 = .S; e15e_21 = .S;
   END;
   IF cunicah=8077 THEN DO;
      e15b_21 = 999;
      e15c_21 = .S; e15d_21 = .S; e15e_21 = .S;
   END;
 END;
 IF e15d_21 = 88 and (e15c_21 NOT IN (88,99) and e15b_21 NOT IN (88,99) and
                      e15a_21 NOT IN (88,99)) THEN DO;
   IF e15e_21 = 88 THEN DO;
      e15d_21 = 888;
      e15e_21 = .S;
   END;
 END;
 IF e15d_21 = 99 and (e15c_21 NOT IN (88,99) and e15b_21 NOT IN (88,99) and
                      e15a_21 NOT IN (88,99)) THEN DO;
   IF e15e_21 = 999 THEN DO;
      e15d_21 = 999;
      e15e_21 = .S;
   END;
   IF e15e_21 = 99 THEN DO;
      e15d_21 = 999;
      e15e_21 = .S;
    END;
 END;
 /*IF (e15e_21 IN (88,99)) and (e15c_21 NOT IN (88,99) and e15b_21 NOT IN
    (88,99) and e15a_21 NOT IN (88,99)) THEN DO;
    IF (cunicah = 473 AND np = 10 )   | (cunicah = 3352 AND np = 10)   |
       (cunicah = 8047 AND np = 20)  | (cunicah = 10318 AND np = 10) |
       (cunicah = 11144 AND np = 20) | (cunicah = 11834 AND np = 20) |
       (cunicah = 12185 AND np = 10) | (cunicah = 12849 AND np = 20) |
       (cunicah = 13266 AND np = 10) | (cunicah = 14209 AND np = 10) |
       (cunicah = 18218 AND np = 10) | (cunicah = 18878 AND np = 10) |
       (cunicah = 16921 AND np = 10) | (cunicah = 17981 AND np = 20)|
       (cunicah = 21817 AND np = 10)| (cunicah = 20195 AND np = 10)
    THEN DO;
       e15e_21 = 999;
      END;
    IF (cunicah = 6218 AND np = 10) THEN DO;
     e15e_21 = 888;
    END;
  END;*/
RUN;

/*
DATA M21_7_A1M;
SET M21_7_A1;
run;
*/
DATA M21_7_A2;
 SET M21_7_A1M;
 ARRAY FT(*) e15a_21 e15b_21 e15c_21 e15d_21 e15e_21;
 DO I = 1 TO DIM(FT);
      IF FT(I) IN (.I,.S,888,999) THEN FT(I) = .;
 END;
 IF e15a_21 = 17 THEN e15a_21_ok = 1;
 ELSE IF e15a_21 not in (.,17) THEN e15a_21_ok = 0;
 ELSE e15a_21_ok = .;
 e15ab_21 = e15a_21-e15b_21;
 IF e15ab_21 = 3 THEN e15b_21_ok = 1;
 ELSE IF e15ab_21 not in (.,3) THEN e15b_21_ok = 0;
 ELSE e15b_21_ok = .;
 e15bc_21 = e15b_21-e15c_21;
```

```
 IF e15bc_21 = 3 THEN e15c_21_ok = 1;
 ELSE IF e15bc_21 not in (.,3) THEN e15c_21_ok = 0;
 ELSE e15c_21_ok = .;
 e15cd_21 = e15c_21-e15d_21;
 IF e15cd_21 = 3 THEN e15d_21_ok = 1;
 ELSE IF e15cd_21 not in (.,3) THEN e15d_21_ok = 0;
 ELSE e15d_21_ok = .;
 e15de_21 = e15d_21-e15e_21;
 IF e15de_21 = 3 THEN e15e_21_ok = 1;
 ELSE IF e15de_21 not in (.,3) THEN e15e_21_ok = 0;
 ELSE e15e_21_ok = .;
 e15ser7_21 = e15a_21_ok+e15b_21_ok+e15c_21_ok+e15d_21_ok+e15e_21_ok;
 DROP /*case*/ I e15a_21 e15b_21 e15c_21 e15d_21 e15e_21 e15ab_21 e15bc_21
      e15cd_21 e15de_21;

RUN;

DATA M21_7_A00;
 RETAIN cunicah np cog_18 e18_samp
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp;
 SET M21_7;
 KEEP   cunicah np cog_18 e18_samp
        e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
        e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
        e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

        e15ser7_18_comp;
 PROC SORT;
  BY cog_18 cunicah np;
RUN;

DATA M21_7_A01;
 SET M21_7_A00;
 ARRAY K1(*) e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp;
 ARRAY K2(*) e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp;
 ARRAY K3(*) ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18;
 IF COG_18 = 1 THEN DO;
    DO I = 1 TO DIM(K1);
       IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
       IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
    END;
 END;
 DROP I;
RUN;

PROC SORT DATA=M21_7_A01 OUT=M21_7_A01_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=M21_7_A2 OUT=M21_7_A2_SORT;
 BY cunicah np;
RUN;

DATA M21_7_A02;
 MERGE M21_7_A2_SORT(IN=A)
```

```
       M21_7_A01_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 DROP e7a1_tot_18_comp e7a2_tot_18_comp e7a3_tot_18_comp e14a_tot_18_comp
      e7b1_tot_18_comp e7b2_tot_18_comp e7b3_tot_18_comp e14b_tot_18_comp
      ;
RUN;

DATA M21_7_A05;
 RETAIN cunicah NP cog_18 e18_samp
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        e15a_21_ok e15b_21_ok e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21
 ;
 SET M21_7_A02;
 KEEP   cunicah NP cog_18 e18_samp
        AGE_21 SEX_21 yrschool tam_loc_21 h5hhresp c1_21 c2a_21 c42_21
        c44_21
        ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18
          e8a_c_18_comp e10_c_18_comp e13a_c_18_comp
          e9a_c_18_comp e9b_c_18_comp
        e11a_18_comp e11b_18_comp e11c_18_comp

            e15ser7_18_comp
        e15a_21_ok e15b_21_ok e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21
 ;
RUN;

PROC SORT DATA=M21_7_A05 OUT=M21_7_V1;
 BY DESCENDING cog_18 cunicah NP;
RUN;

****************;
*** Series-7 ***;
****************;

%MACRO LISTV(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 DROP &DROPVAR;
RUN;
%MEND;

*************************;
*** --- New Sample --- ***;
*************************;

%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15b_21_ok e15c_21_ok e15d_21_ok
e15e_21_ok e15ser7_21, OUD=ALLV1); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15a_21_ok e15c_21_ok e15d_21_ok
e15e_21_ok e15ser7_21, OUD=ALLV2); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15a_21_ok e15b_21_ok e15d_21_ok
e15e_21_ok e15ser7_21, OUD=ALLV3); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15a_21_ok e15b_21_ok e15c_21_ok
e15e_21_ok e15ser7_21, OUD=ALLV4); QUIT;
```

```
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15a_21_ok e15b_21_ok e15c_21_ok
e15d_21_ok e15ser7_21, OUD=ALLV5); QUIT;
%LISTV(DIN=M21_7_V1,DROPVAR=ecom_1i_18--e15ser7_18_comp e15a_21_ok e15b_21_ok e15c_21_ok
e15d_21_ok e15e_21_ok, OUD=ALLV6); QUIT;

*impute e15a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV1;
%LET DATAOT = MULT_ALLV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e15a_21_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV2;
%LET DATAOT = MULT_ALLV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e15b_21_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15c;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV3;
%LET DATAOT = MULT_ALLV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e15c_21_ok;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15d;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV4;
%LET DATAOT = MULT_ALLV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e15d_21_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15e;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV5;
%LET DATAOT = MULT_ALLV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e15e_21_ok;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15ser7;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_ALLV6;
%LET DATAOT = MULT_ALLV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   age_21 yrschool h5hhresp;
  CATEGORICAL  sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21;
  COUNT        e15ser7_21;
```

```
  BOUNDS       e15ser7_21(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*************************************************************************;

PROC SORT DATA=M21_7_A05 OUT=M21_7_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV1 OUT=MULT_ALLV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV2 OUT=MULT_ALLV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV3 OUT=MULT_ALLV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV4 OUT=MULT_ALLV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV5 OUT=MULT_ALLV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_ALLV6 OUT=MULT_ALLV6_SORT;
 BY cunicah np;
RUN;

DATA MULT_ALL_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e15a_21_ok e15b_21_ok
                  e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21 IN=A)
       MULT_ALLV1_SORT(KEEP=CUNICAH NP e15a_21_ok
                       RENAME=(e15a_21_ok=e15a_21_ok_comp))
       MULT_ALLV2_SORT(KEEP=CUNICAH NP e15b_21_ok
                       RENAME=(e15b_21_ok=e15b_21_ok_comp))
       MULT_ALLV3_SORT(KEEP=CUNICAH NP e15c_21_ok
                       RENAME=(e15c_21_ok=e15c_21_ok_comp))
       MULT_ALLV4_SORT(KEEP=CUNICAH NP e15d_21_ok
                       RENAME=(e15d_21_ok=e15d_21_ok_comp))
       MULT_ALLV5_SORT(KEEP=CUNICAH NP e15e_21_ok
                       RENAME=(e15e_21_ok=e15e_21_ok_comp))
       MULT_ALLV6_SORT(KEEP=CUNICAH NP e15ser7_21
                       RENAME=(e15ser7_21=e15ser3_21_comp))
 ;
 BY cunicah np;
 IF A;
 IF COG_18 = 0;
RUN;

************************;
*** --- Follow-up --- ***;
************************;

%MACRO LISTVA1(DIN= ,DROPVAR= ,OUD= );
```

```
DATA OKIN_&OUD;
 SET &DIN;
 IF COG_18 = 1;
 DROP &DROPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M21_7_V1,DROPVAR=e15b_21_ok e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21,
OUD=COGV1); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e15a_21_ok e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21,
OUD=COGV2); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e15a_21_ok e15b_21_ok e15d_21_ok e15e_21_ok e15ser7_21,
OUD=COGV3); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e15a_21_ok e15b_21_ok e15c_21_ok e15e_21_ok e15ser7_21,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e15a_21_ok e15b_21_ok e15c_21_ok e15d_21_ok e15ser7_21,
OUD=COGV5); QUIT;
%LISTVA1(DIN=M21_7_V1,DROPVAR=e15a_21_ok e15b_21_ok e15c_21_ok e15d_21_ok e15e_21_ok,
OUD=COGV6); QUIT;

*impute e15a;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV1;
%LET DATAOT = MULT_COGV1;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp  e15a_21_ok;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15b;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV2;
%LET DATAOT = MULT_COGV2;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp  e15b_21_ok;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15c;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV3;
%LET DATAOT = MULT_COGV3;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp  e15c_21_ok;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15d;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV4;
%LET DATAOT = MULT_COGV4;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp  e15d_21_ok;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15e;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV5;
%LET DATAOT = MULT_COGV5;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
```

```
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp  e15e_21_ok;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

*impute e15ser7;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB' sasautos)
mautosource;

%LET DATAGO = OKIN_COGV6;
%LET DATAOT = MULT_COGV6;

/* run iveware */
%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    age_21 yrschool h5hhresp  e15ser7_18_comp;
  CATEGORICAL   sex_21 tam_loc_21 c1_21 c2a_21 c42_21 c44_21 e11a_18_comp
                e11b_18_comp e11c_18_comp ;
  COUNT         ecom_1i_18 ecom_2i_18 ecom_3i_18 ecom_4i_18 e8a_c_18_comp
                e10_c_18_comp e13a_c_18_comp e9a_c_18_comp e9b_c_18_comp e15ser7_21;
  BOUNDS        e15ser7_21(>=0,<=5);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 180;
  SEED 512171109;
  RUN;

PROC SORT DATA=MULT_COGV1 OUT=MULT_COGV1_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV2 OUT=MULT_COGV2_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV3 OUT=MULT_COGV3_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV4 OUT=MULT_COGV4_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV5 OUT=MULT_COGV5_SORT;
 BY cunicah np;
RUN;

PROC SORT DATA=MULT_COGV6 OUT=MULT_COGV6_SORT;
 BY cunicah np;
RUN;
```

```
DATA MULT_COG_NEW1;
 MERGE M21_7_SORT(KEEP=CUNICAH NP e18_samp COG_18 e15a_21_ok e15b_21_ok
                  e15c_21_ok e15d_21_ok e15e_21_ok e15ser7_21)
       MULT_COGV1_SORT(KEEP=CUNICAH NP e15a_21_ok
                       RENAME=(e15a_21_ok=e15a_21_ok_comp) IN=A)
       MULT_COGV2_SORT(KEEP=CUNICAH NP e15b_21_ok
                       RENAME=(e15b_21_ok=e15b_21_ok_comp))
       MULT_COGV3_SORT(KEEP=CUNICAH NP e15c_21_ok
                       RENAME=(e15c_21_ok=e15c_21_ok_comp))
       MULT_COGV4_SORT(KEEP=CUNICAH NP e15d_21_ok
                       RENAME=(e15d_21_ok=e15d_21_ok_comp))
       MULT_COGV5_SORT(KEEP=CUNICAH NP e15e_21_ok
                       RENAME=(e15e_21_ok=e15e_21_ok_comp))
       MULT_COGV6_SORT(KEEP=CUNICAH NP e15ser7_21
                       RENAME=(e15ser7_21=e15ser3_21_comp))
 ;
 BY cunicah np;
 IF A;
RUN;

DATA MULT_COG_NEW_S7;
 SET MULT_COG_NEW1 MULT_ALL_NEW1;
RUN;

DATA WW.MULT_COG_NEW_S7_MOD;
 SET MULT_COG_NEW_S7;
RUN;

DATA XVS71;
 SET WW.MULT_COG_NEW_S7_MOD;
 ARRAY VV1(*) e15a_21_ok e15b_21_ok e15c_21_ok e15d_21_ok e15e_21_ok
              e15ser7_21;
 ARRAY VV2(*) elig_e15a_21 elig_e15b_21 elig_e15c_21 elig_e15d_21
              elig_e15e_21 elig_e15s7_21;
 DO I = 1 TO 6;
    IF VV1(I) = . THEN VV2(I) = 1;
    ELSE VV2(I) = 0;
 END;
 DROP I;
series7_sep_21=e15a_21_ok_comp+e15b_21_ok_comp+e15c_21_ok_comp+e15d_21_ok_comp+e15e_21_o
k_comp;
RUN;

proc sort data=xvab1;
by cunicah np;
run;

proc sort data=xvfs1;
by cunicah np;
run;

proc sort data=xvdmy1;
by cunicah np;
run;

proc sort data=xvs71;
by cunicah np;
run;

data ww.v1_cognition_impute_data_2021;
retain cunicah np
elig_e7a1_tot_21 e7a1_tot_21_comp elig_e7a2_tot_21 e7a2_tot_21_comp elig_e7a3_tot_21
e7a3_tot_21_comp elig_e14a_tot_21 e14a_tot_21_comp
```

```
elig_e7b1_tot_21 e7b1_tot_21_comp elig_e7b2_tot_21 e7b2_tot_21_comp elig_e7b3_tot_21
e7b3_tot_21_comp elig_e14b_tot_21 e14b_tot_21_comp
elig_e8a_c_21 e8a_c_21_comp elig_e10_c_21 e10_c_21_comp elig_e10_i_21 e10_i_21_comp
elig_e13_c_21 e13_c_21_comp
elig_e9a_c_21 e9a_c_21_comp elig_e9b_c_21 e9b_c_21_comp
elig_e11a_21 e11a_21_comp elig_e11b_21 e11b_21_comp elig_e11c_21 e11c_21_comp
elig_e15s7_21 e15ser3_21_comp
;
merge xvab1 xvfs1 xvdmy1 xvs71;
by cunicah np;
keep cunicah np
elig_e7a1_tot_21 e7a1_tot_21_comp elig_e7a2_tot_21 e7a2_tot_21_comp elig_e7a3_tot_21
e7a3_tot_21_comp elig_e14a_tot_21 e14a_tot_21_comp
elig_e7b1_tot_21 e7b1_tot_21_comp elig_e7b2_tot_21 e7b2_tot_21_comp elig_e7b3_tot_21
e7b3_tot_21_comp elig_e14b_tot_21 e14b_tot_21_comp
elig_e8a_c_21 e8a_c_21_comp elig_e10_c_21 e10_c_21_comp elig_e10_i_21 e10_i_21_comp
elig_e13_c_21 e13_c_21_comp
elig_e9a_c_21 e9a_c_21_comp elig_e9b_c_21 e9b_c_21_comp
elig_e11a_21 e11a_21_comp elig_e11b_21 e11b_21_comp elig_e11c_21 e11c_21_comp
elig_e15s7_21 e15ser3_21_comp;
IF elig_e11a_21 = 1 THEN elig_e11a_21 = 0;
IF elig_e11b_21 = 1 THEN elig_e11b_21 = 0;
IF elig_e11c_21 = 1 THEN elig_e11c_21 = 0;
run;


DATA one;
SET ww.V1_cognition_impute_data_2021;
ARRAY K1(*) e7a1_tot_21_comp e7a2_tot_21_comp e7a3_tot_21_comp e14a_tot_21_comp;
ARRAY K2(*) e7b1_tot_21_comp e7b2_tot_21_comp e7b3_tot_21_comp e14b_tot_21_comp;
ARRAY K3(*) ecom_1i_21 ecom_2i_21 ecom_3i_21 ecom_4i_21;
DO I = 1 TO DIM(K1);
IF K1(I) = .  AND K2(I) ^= . THEN K3(I) = K2(I);
IF K1(I) ^= . AND K2(I)  = . THEN K3(I) = K1(I);
END;
DROP I;
RUN;

proc means data=one;
var e7a1_tot_21_comp;
run;
```

IX. Appendix F. SAS Program for Imputation of Cognitive Functioning Variables – Proxy Interviews (Section PC)

2001

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

*******************************************************************************;

LIBNAME WW "OOOOOXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXX";
RUN;

*******************************************************************************;

*********************************************;
*** Proxy --> Skip c1_01 c2_01 c45_01 c47_01 ***;
*********************************************;

PROC SORT DATA=WW.Mhas_2001_proxy_cognition_final OUT=YY0(keep=cunicah
codent01 np);
 BY cunicah np;
RUN;

PROC SORT DATA=WW.Mhas_2001_proxy_cognition_v2 OUT=YY1;
 BY cunicah np;
RUN;

DATA YY2;
 SET WW.SECT_C;
 np=ps3*10;
 RENAME unhhid=cunicah;
RUN;

PROC SORT DATA=YY2 OUT=YY3(KEEP=cunicah np c44 rename=(c44=c44_01));
 BY cunicah np;
RUN;

DATA M01_0;
 MERGE YY0(IN=A)
       YY1
       YY3(IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA M01_1;
 SET M01_0;
 ARRAY PCOLD(*) pc1_01 pc5_01--pc52_01;
 ARRAY PCNEW(*) pc1 pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    PCNEW(I) = INPUT(PCOLD(I),3.);
 END;
 KEEP cunicah codent01 np
```

```
      AGE_01 SEX_01 yrschool
      tamloc_01 h1hhresp c44_01 c46_01 ps6_3_01
      pc1 pc5-pc52
 ;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH CODENT01;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah codent01 AGE_01 SEX_01 yrschool tamloc_01 h1hhresp c44_01
      c46_01 ps6_3_01 PC1;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool = 99 THEN yrschool = .;
 IF c44_01 IN (8,9) THEN c44_01 = .;
 IF c46_01 IN (8,9) THEN c46_01 = .;
 IF ps6_3_01 IN (8,9) THEN ps6_3_01 = .;
 IF PC1 IN (8,9) THEN PC1=.;
RUN;

*******************************************************************************;
*******************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "OOOXXX";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01
               ;
  */
  CONTINUOUS   AGE_01 yrschool h1hhresp
               ;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1
               ;
  BOUNDS       yrschool(>=0,<=18)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
```

```
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=OOOXXX);


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 1345671+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
         INDEX_I = RAND("Bernoulli",0.5);
         IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 2976571+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
         INDEX_W = RAND("Bernoulli",0.5);
         WORSE(I) = INDEX_W+1;
    END;
 END;
 END;
 DROP I INDEX_I INDEX_W;
RUN;


DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
```

```
                  PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)    PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                  PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                  PC47_OK PC50_OK;

 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
    END;
    IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
    END;
 END;

 DROP I;

RUN;

DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=NP TAMLOC_01--PC1);
 BY cunicah codent01;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_LIST1_SORT(IN=B)
 ;
 BY cunicah codent01;
 IF A;
 IF ps6_3_01 IN (2,3) THEN ps6_3_01 = 2;
RUN;

*************************************************************************;
*************************************************************************;

%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
```

```
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC5_OK,OUD=A5);  QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC8_OK,OUD=A8);  QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC35_OK,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1 PC50_OK,OUD=A50);QUIT;

*************************************************************************;
*************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;
%LET DATANM = impute_multA5;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC5_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;
%LET DATANM = impute_multA8;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC8_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;
%LET DATANM = impute_multA11;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
```

```
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC11_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;
%LET DATANM = impute_multA14;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC14_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;
%LET DATANM = impute_multA17;

%LET DATADR = OOOXXX;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC17_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;
%LET DATANM = impute_multA20;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC20_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;
%LET DATANM = impute_multA23;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC23_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;
%LET DATANM = impute_multA26;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
```

```
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC26_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;
%LET DATANM = impute_multA29;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC29_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;
%LET DATANM = impute_multA32;

%LET DATADR = OOOXXX;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC32_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;
%LET DATANM = impute_multA35;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC35_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;
%LET DATANM = impute_multA38;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC38_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;
%LET DATANM = impute_multA41;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
```

```
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC41_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;
%LET DATANM = impute_multA44;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC44_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;
%LET DATANM = impute_multA47;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
```

```
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC47_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;
%LET DATANM = impute_multA50;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah codent01;*/
  CONTINUOUS   AGE_01 yrschool h1hhresp;
  CATEGORICAL  SEX_01 tamloc_01 c44_01 c46_01 ps6_3_01 PC1 PC50_OK;
  BOUNDS       yrschool(>=0,<=18);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 154177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*************************************************************************;
*************************************************************************;
```

```
%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah codent01,INVAR=PC5_OK, OUTS=MULT_PC5);
QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah codent01,INVAR=PC8_OK, OUTS=MULT_PC8);
QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah
codent01,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah
codent01,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah
codent01,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah
codent01,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah
codent01,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah
codent01,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah
codent01,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah
codent01,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah
codent01,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah
codent01,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah
codent01,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah
codent01,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah
codent01,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah
codent01,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah codent01;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
```

```
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_01  IMPU_FLAG_PC8_01  IMPU_FLAG_PC11_01
                 IMPU_FLAG_PC14_01 IMPU_FLAG_PC17_01
                 IMPU_FLAG_PC20_01 IMPU_FLAG_PC23_01 IMPU_FLAG_PC26_01
                 IMPU_FLAG_PC29_01 IMPU_FLAG_PC32_01
                 IMPU_FLAG_PC35_01 IMPU_FLAG_PC38_01 IMPU_FLAG_PC41_01
                 IMPU_FLAG_PC44_01 IMPU_FLAG_PC47_01
                 IMPU_FLAG_PC50_01;

 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
 END;

 KEEP cunicah codent01 IMPU_FLAG_PC5_01--IMPU_FLAG_PC50_01;

RUN;

*******************************************************************************;
*******************************************************************************;

PROC SORT DATA=MULT_ALL;
 BY cunicah codent01;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah codent01;
RUN;

DATA M01_7_IMP0;
 MERGE YY0 MULT_ALL M01_7_FLAG0;
 BY cunicah codent01;
RUN;

DATA M01_7_IMP1;

 RETAIN cunicah codent01 np
        IMPU_PC5_01  IMPU_FLAG_PC5_01  IMPU_PC8_01  IMPU_FLAG_PC8_01
        IMPU_PC11_01 IMPU_FLAG_PC11_01
```

```
        IMPU_PC14_01 IMPU_FLAG_PC14_01 IMPU_PC17_01 IMPU_FLAG_PC17_01
        IMPU_PC20_01 IMPU_FLAG_PC20_01
        IMPU_PC23_01 IMPU_FLAG_PC23_01 IMPU_PC26_01 IMPU_FLAG_PC26_01
        IMPU_PC29_01 IMPU_FLAG_PC29_01
        IMPU_PC32_01 IMPU_FLAG_PC32_01 IMPU_PC35_01 IMPU_FLAG_PC35_01
        IMPU_PC38_01 IMPU_FLAG_PC38_01
        IMPU_PC41_01 IMPU_FLAG_PC41_01 IMPU_PC44_01 IMPU_FLAG_PC44_01
        IMPU_PC47_01 IMPU_FLAG_PC47_01
        IMPU_PC50_01 IMPU_FLAG_PC50_01;

 SET M01_7_IMP0;

 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_01  IMPU_PC8_01  IMPU_PC11_01 IMPU_PC14_01
               IMPU_PC17_01 IMPU_PC20_01 IMPU_PC23_01 IMPU_PC26_01
               IMPU_PC29_01 IMPU_PC32_01 IMPU_PC35_01 IMPU_PC38_01
               IMPU_PC41_01 IMPU_PC44_01 IMPU_PC47_01 IMPU_PC50_01;

DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;

DROP I PC5_OK--PC50_OK;

RUN;

DATA WW01.V1_PC_COGNITION_IMPUTE_2001;
 SET M01_7_IMP1;
RUN;
```

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

*************************************************************************
;

LIBNAME WW "OOOOOXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXX";
RUN;

*************************************************************************
;


PROC SORT DATA=WW.Mhas_2003_cognition_final OUT=YY0(keep=cunicah np
age_03);
 BY cunicah np;
RUN;

PROC SORT DATA=WW.Mhas_2003_proxy_cognition_v2 OUT=YY1;
 BY cunicah np;
RUN;

DATA M01_0;
 MERGE YY0(IN=A)
       YY1(IN=B)
 ;
 BY cunicah np;
```

```
 IF A AND B;
RUN;

DATA M01_1;
 SET M01_0;
 RENAME SEXO_03 = SEX_03;
 KEEP cunicah np
      AGE_03 SEXO_03 yrschool
      tamloc_01 h2hhresp c41_03 c43_03 ENT7_3_03
      pc1_03 pc5_03--pc52_03
 ;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_03--pc52_03;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_03--pc52_03;
 ATTRIB _ALL_ LABEL = " ";
RUN;




DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_03 SEX_03 yrschool tamloc_01 h2hhresp c41_03 c43_03
      ENT7_3_03 PC1_03;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.M,99) THEN yrschool = .;
 IF age_03 = 999 THEN age_03 = .;
 ARRAY COV(*) c41_03 c43_03 ENT7_3_03 PC1_03;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;

*******************************************************************************
;
*******************************************************************************
;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "OOOXXX";
```

```
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np
               ;
  */
  CONTINUOUS   AGE_03 yrschool h2hhresp
               ;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03
               ;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=OOOXXX);


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*************************************************************************
;
*************************************************************************
;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 1315671+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
         INDEX_I = RAND("Bernoulli",0.5);
         IMPROV(I) = INDEX_I+1;
    END;
 END;
```

```
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 5273571+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
         INDEX_W = RAND("Bernoulli",0.5);
         WORSE(I) = INDEX_W+1;
    END;
 END;
 END;
 DROP I INDEX_I INDEX_W;
RUN;


DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;

 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
    END;
    IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
    END;
 END;

 DROP I;

RUN;

DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;
```

```
PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=age_03--PC1_03);
 BY cunicah np;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_LIST1_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 IF ENT7_3_03 IN (2,3,4) THEN ENT7_3_03 = 2;
RUN;

*************************************************************************
;
*************************************************************************
;

%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC5_OK ,OUD=A5); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC8_OK ,OUD=A8); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC35_OK,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC50_OK,OUD=A50);QUIT;

*************************************************************************
;
*************************************************************************
;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;
%LET DATANM = impute_multA5;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC5_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;
%LET DATANM = impute_multA8;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC8_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;
%LET DATANM = impute_multA11;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC11_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;
%LET DATANM = impute_multA14;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC14_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;
%LET DATANM = impute_multA17;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC17_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;
%LET DATANM = impute_multA20;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC20_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;
%LET DATANM = impute_multA23;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC23_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;
%LET DATANM = impute_multA26;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC26_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;
%LET DATANM = impute_multA29;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC29_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;
%LET DATANM = impute_multA32;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC32_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;
%LET DATANM = impute_multA35;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC35_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;
%LET DATANM = impute_multA38;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC38_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;
%LET DATANM = impute_multA41;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC41_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;
%LET DATANM = impute_multA44;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
```

```
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC44_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;
%LET DATANM = impute_multA47;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC47_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;
%LET DATANM = impute_multA50;

%LET DATADR = OOOXXX;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC50_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*******************************************************************************
;
*******************************************************************************
;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20
MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44
MULT_PC47
       MULT_PC50
 ;
```

```
 BY cunicah np;
RUN;

*************************************************************************
;
*************************************************************************
;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_03  IMPU_FLAG_PC8_03  IMPU_FLAG_PC11_03
                 IMPU_FLAG_PC14_03 IMPU_FLAG_PC17_03
                 IMPU_FLAG_PC20_03 IMPU_FLAG_PC23_03 IMPU_FLAG_PC26_03
                 IMPU_FLAG_PC29_03 IMPU_FLAG_PC32_03
                 IMPU_FLAG_PC35_03 IMPU_FLAG_PC38_03 IMPU_FLAG_PC41_03
                 IMPU_FLAG_PC44_03 IMPU_FLAG_PC47_03
                 IMPU_FLAG_PC50_03;

 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
 END;

 KEEP cunicah np IMPU_FLAG_PC5_03--IMPU_FLAG_PC50_03;

RUN;

*************************************************************************
;
*************************************************************************
;
```

```
PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;

 RETAIN cunicah np
        IMPU_PC5_03  IMPU_FLAG_PC5_03  IMPU_PC8_03  IMPU_FLAG_PC8_03
        IMPU_PC11_03 IMPU_FLAG_PC11_03
        IMPU_PC14_03 IMPU_FLAG_PC14_03 IMPU_PC17_03 IMPU_FLAG_PC17_03
        IMPU_PC20_03 IMPU_FLAG_PC20_03
        IMPU_PC23_03 IMPU_FLAG_PC23_03 IMPU_PC26_03 IMPU_FLAG_PC26_03
        IMPU_PC29_03 IMPU_FLAG_PC29_03
        IMPU_PC32_03 IMPU_FLAG_PC32_03 IMPU_PC35_03 IMPU_FLAG_PC35_03
        IMPU_PC38_03 IMPU_FLAG_PC38_03
        IMPU_PC41_03 IMPU_FLAG_PC41_03 IMPU_PC44_03 IMPU_FLAG_PC44_03
        IMPU_PC47_03 IMPU_FLAG_PC47_03
        IMPU_PC50_03 IMPU_FLAG_PC50_03;

 SET M01_7_IMP0;

 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_03  IMPU_PC8_03  IMPU_PC11_03 IMPU_PC14_03
               IMPU_PC17_03 IMPU_PC20_03 IMPU_PC23_03 IMPU_PC26_03
               IMPU_PC29_03 IMPU_PC32_03 IMPU_PC35_03 IMPU_PC38_03
               IMPU_PC41_03 IMPU_PC44_03 IMPU_PC47_03 IMPU_PC50_03;

DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;

DROP I PC5_OK--PC50_OK;

RUN;

DATA WW01.V1_PC_COGNITION_IMPUTE_2003;
 SET M01_7_IMP1;
RUN;
```

2003

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

*******************************************************************************;

LIBNAME WW "OOOOOXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXX";
RUN;

*******************************************************************************;


PROC SORT DATA=WW.Mhas_2003_cognition_final OUT=YY0(keep=cunicah np age_03);
 BY cunicah np;
RUN;

PROC SORT DATA=WW.Mhas_2003_proxy_cognition_v2 OUT=YY1;
 BY cunicah np;
RUN;

DATA M01_0;
 MERGE YY0(IN=A)
       YY1(IN=B)
 ;
 BY cunicah np;
 IF A AND B;
RUN;

DATA M01_1;
 SET M01_0;
 RENAME SEXO_03 = SEX_03;
 KEEP cunicah np
      AGE_03 SEXO_03 yrschool
      tamloc_01 h2hhresp c41_03 c43_03 ENT7_3_03
      pc1_03 pc5_03--pc52_03
 ;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_03--pc52_03;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_03--pc52_03;
 ATTRIB _ALL_ LABEL = " ";
RUN;


DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_03 SEX_03 yrschool tamloc_01 h2hhresp c41_03 c43_03
```

```
      ENT7_3_03 PC1_03;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.M,99) THEN yrschool = .;
 IF age_03 = 999 THEN age_03 = .;
 ARRAY COV(*) c41_03 c43_03 ENT7_3_03 PC1_03;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;

*******************************************************************************;
*******************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "OOOXXX";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np
               ;
  */
  CONTINUOUS   AGE_03 yrschool h2hhresp
               ;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03
               ;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=OOOXXX);


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*******************************************************************************;
```

```
*************************************************************************;
DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 1315671+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
         INDEX_I = RAND("Bernoulli",0.5);
         IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 5273571+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
         INDEX_W = RAND("Bernoulli",0.5);
         WORSE(I) = INDEX_W+1;
    END;
 END;
 END;
 DROP I INDEX_I INDEX_W;
RUN;


DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;

 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
```

```
            PCOK(I) = 2;
         END;
      END;
      IF PCBASE(I) = 3 THEN DO;
         IF WORSE(I) = 1 THEN DO;
            PCOK(I) = 5;
         END;
         IF WORSE(I) = 2 THEN DO;
            PCOK(I) = 4;
         END;
      END;
  END;

  DROP I;

RUN;

DATA M01_7_LIST2;
  SET M01_7_LIST1;
  DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
  BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=age_03--PC1_03);
  BY cunicah np;
RUN;

DATA M01_7_A1;
  MERGE ZCOV(IN=A)
        M01_7_LIST1_SORT(IN=B)
  ;
  BY cunicah np;
  IF A;
  IF ENT7_3_03 IN (2,3,4) THEN ENT7_3_03 = 2;
RUN;

*************************************************************************;
*************************************************************************;

%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC5_OK ,OUD=A5); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC8_OK ,OUD=A8); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC35_OK,OUD=A35);QUIT;
```

```
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_03 PC50_OK,OUD=A50);QUIT;

*************************************************************************;
*************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;
%LET DATANM = impute_multA5;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC5_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;
%LET DATANM = impute_multA8;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
```

```
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC8_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;
%LET DATANM = impute_multA11;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC11_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;
```

```
%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;
%LET DATANM = impute_multA14;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC14_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;
%LET DATANM = impute_multA17;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC17_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
```

```
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;
%LET DATANM = impute_multA20;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC20_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;
%LET DATANM = impute_multA23;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
```

```
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC23_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;
%LET DATANM = impute_multA26;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC26_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;
```

```
%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;
%LET DATANM = impute_multA29;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC29_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;
%LET DATANM = impute_multA32;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC32_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
```

```
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;
%LET DATANM = impute_multA35;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC35_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;
%LET DATANM = impute_multA38;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
```

```
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC38_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;
%LET DATANM = impute_multA41;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC41_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
```

```
%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;
%LET DATANM = impute_multA44;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC44_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;
%LET DATANM = impute_multA47;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC47_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
```

```
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;
%LET DATANM = impute_multA50;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_03 yrschool h2hhresp;
  CATEGORICAL  SEX_03 tamloc_01 c41_03 c43_03 ENT7_3_03 PC1_03 PC50_OK;
  BOUNDS       AGE_03(>=26,<=103) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 214157909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*************************************************************************;
*************************************************************************;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
```

```
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah np;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_03  IMPU_FLAG_PC8_03  IMPU_FLAG_PC11_03
                 IMPU_FLAG_PC14_03 IMPU_FLAG_PC17_03
                 IMPU_FLAG_PC20_03 IMPU_FLAG_PC23_03 IMPU_FLAG_PC26_03
                 IMPU_FLAG_PC29_03 IMPU_FLAG_PC32_03
                 IMPU_FLAG_PC35_03 IMPU_FLAG_PC38_03 IMPU_FLAG_PC41_03
                 IMPU_FLAG_PC44_03 IMPU_FLAG_PC47_03
                 IMPU_FLAG_PC50_03;

 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
```

```
 END;

 KEEP cunicah np IMPU_FLAG_PC5_03--IMPU_FLAG_PC50_03;

RUN;

*******************************************************************************;
*******************************************************************************;

PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;

 RETAIN cunicah np
        IMPU_PC5_03  IMPU_FLAG_PC5_03  IMPU_PC8_03  IMPU_FLAG_PC8_03
        IMPU_PC11_03 IMPU_FLAG_PC11_03
        IMPU_PC14_03 IMPU_FLAG_PC14_03 IMPU_PC17_03 IMPU_FLAG_PC17_03
        IMPU_PC20_03 IMPU_FLAG_PC20_03
        IMPU_PC23_03 IMPU_FLAG_PC23_03 IMPU_PC26_03 IMPU_FLAG_PC26_03
        IMPU_PC29_03 IMPU_FLAG_PC29_03
        IMPU_PC32_03 IMPU_FLAG_PC32_03 IMPU_PC35_03 IMPU_FLAG_PC35_03
        IMPU_PC38_03 IMPU_FLAG_PC38_03
        IMPU_PC41_03 IMPU_FLAG_PC41_03 IMPU_PC44_03 IMPU_FLAG_PC44_03
        IMPU_PC47_03 IMPU_FLAG_PC47_03
        IMPU_PC50_03 IMPU_FLAG_PC50_03;

 SET M01_7_IMP0;

 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_03  IMPU_PC8_03  IMPU_PC11_03 IMPU_PC14_03
               IMPU_PC17_03 IMPU_PC20_03 IMPU_PC23_03 IMPU_PC26_03
               IMPU_PC29_03 IMPU_PC32_03 IMPU_PC35_03 IMPU_PC38_03
               IMPU_PC41_03 IMPU_PC44_03 IMPU_PC47_03 IMPU_PC50_03;

DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;

DROP I PC5_OK--PC50_OK;

RUN;

DATA WW01.V1_PC_COGNITION_IMPUTE_2003;
 SET M01_7_IMP1;
RUN;
```

2012

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

*******************************************************************************;

LIBNAME WW "OOOOOXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXX";
RUN;

*******************************************************************************;

DATA M01_1;
 SET WW.Mhas_2012_proxy_cognition_v2;
 KEEP cunicah np
      AGE_12 SEX_12 yrschool
      tam_loc_12 h3hhresp c41_12 c43_12 inf4_12
      pc1_12 pc5_12--pc52_12
 ;
 RENAME tam_loc_12 = tamloc_12;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_12--pc52_12;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_12--pc52_12;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_12 SEX_12 yrschool tamloc_12 h3hhresp c41_12 c43_12
inf4_12 PC1_12;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.,99) THEN yrschool = .;
 IF age_12 = 999 THEN age_12 = .;
 ARRAY COV(*) c41_12 c43_12 inf4_12 PC1_12;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;

*******************************************************************************;
*******************************************************************************;
```

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "OOOXXX";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np
               ;
  */
  CONTINUOUS   AGE_12 yrschool h3hhresp
               ;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12
               ;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=OOOXXX);


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 3725981+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
```

```
          CALL STREAMINIT(&KI);
        INDEX_I = RAND("Bernoulli",0.5);
        IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 7172961+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
          CALL STREAMINIT(&KW);
        INDEX_W = RAND("Bernoulli",0.5);
        WORSE(I) = INDEX_W+1;
    END;
 END;
 END;
 DROP I INDEX_I INDEX_W;
RUN;


DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;

 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
     END;
     IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
     END;
 END;

 DROP I;

RUN;
```

```
DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=yrschool--PC1_12);
 BY cunicah np;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_LIST1_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 IF inf4_12 IN (2,3,4) THEN inf4_12 = 2;
RUN;

*************************************************************************;
*************************************************************************;

%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC5_OK ,OUD=A5); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC8_OK ,OUD=A8); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC35_OK,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_12 PC50_OK,OUD=A50);QUIT;

*************************************************************************;
*************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;
```

```
%LET DATANM = impute_multA5;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC5_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;
%LET DATANM = impute_multA8;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC8_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
```

```
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;
%LET DATANM = impute_multA11;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC11_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;
%LET DATANM = impute_multA14;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
```

```
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC14_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;
%LET DATANM = impute_multA17;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC17_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;
%LET DATANM = impute_multA20;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC20_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;
%LET DATANM = impute_multA23;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC23_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;
%LET DATANM = impute_multA26;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC26_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;
%LET DATANM = impute_multA29;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
```

```
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC29_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;
%LET DATANM = impute_multA32;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC32_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = " OOOXXX ";
%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;
%LET DATANM = impute_multA35;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC35_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;
%LET DATANM = impute_multA38;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC38_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;
```

```
%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;
%LET DATANM = impute_multA41;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER  cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC41_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;
%LET DATANM = impute_multA44;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC44_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;
%LET DATANM = impute_multA47;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC47_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;
%LET DATANM = impute_multA50;

%LET DATADR = OOOXXX;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_12 yrschool h3hhresp;
  CATEGORICAL  SEX_12 tamloc_12 c41_12 c43_12 inf4_12 PC1_12 PC50_OK;
  BOUNDS       AGE_12(>=33,<=115) yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 315177909;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*******************************************************************************;
*******************************************************************************;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah np;
RUN;
```

```
*******************************************************************************;
*******************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_12  IMPU_FLAG_PC8_12  IMPU_FLAG_PC11_12
                 IMPU_FLAG_PC14_12 IMPU_FLAG_PC17_12
                 IMPU_FLAG_PC20_12 IMPU_FLAG_PC23_12 IMPU_FLAG_PC26_12
                 IMPU_FLAG_PC29_12 IMPU_FLAG_PC32_12
                 IMPU_FLAG_PC35_12 IMPU_FLAG_PC38_12 IMPU_FLAG_PC41_12
                 IMPU_FLAG_PC44_12 IMPU_FLAG_PC47_12 IMPU_FLAG_PC50_12;

 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
 END;

 KEEP cunicah np IMPU_FLAG_PC5_12--IMPU_FLAG_PC50_12;

RUN;

*******************************************************************************;
*******************************************************************************;

PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;
```

```
DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;

 RETAIN cunicah np
        IMPU_PC5_12  IMPU_FLAG_PC5_12  IMPU_PC8_12  IMPU_FLAG_PC8_12
        IMPU_PC11_12 IMPU_FLAG_PC11_12
        IMPU_PC14_12 IMPU_FLAG_PC14_12 IMPU_PC17_12 IMPU_FLAG_PC17_12
        IMPU_PC20_12 IMPU_FLAG_PC20_12
        IMPU_PC23_12 IMPU_FLAG_PC23_12 IMPU_PC26_12 IMPU_FLAG_PC26_12
        IMPU_PC29_12 IMPU_FLAG_PC29_12
        IMPU_PC32_12 IMPU_FLAG_PC32_12 IMPU_PC35_12 IMPU_FLAG_PC35_12
        IMPU_PC38_12 IMPU_FLAG_PC38_12
        IMPU_PC41_12 IMPU_FLAG_PC41_12 IMPU_PC44_12 IMPU_FLAG_PC44_12
        IMPU_PC47_12 IMPU_FLAG_PC47_12 IMPU_PC50_12 IMPU_FLAG_PC50_12;

 SET M01_7_IMP0;

 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_12  IMPU_PC8_12  IMPU_PC11_12 IMPU_PC14_12
               IMPU_PC17_12 IMPU_PC20_12 IMPU_PC23_12 IMPU_PC26_12
               IMPU_PC29_12 IMPU_PC32_12 IMPU_PC35_12 IMPU_PC38_12
               IMPU_PC41_12 IMPU_PC44_12 IMPU_PC47_12 IMPU_PC50_12;

DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;

DROP I PC5_OK--PC50_OK;

RUN;

DATA WW01.V1_PC_COGNITION_IMPUTE_2012;
 SET M01_7_IMP1;
RUN;
```

2015

```
OPTIONS PS=100 LS=100 NODATE NONUMBER FORMCHAR='|_______+=|-/\><*';

*************************************************************************
;

LIBNAME WW "OOOOOXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXX";
RUN;

*************************************************************************;

DATA M01_1;
 SET WW.Mhas_2015_proxy_cognition_v2;
 KEEP cunicah np
      AGE_15 SEX_15 yrschool
      tam_loc_15 h4hhresp c41_15 c43_15 inf4_15
      pc1_15 pc5_15--pc52_15
 ;
 RENAME tam_loc_15 = tamloc_15;
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_15--pc52_15;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    IF PCOLD(I) = .S THEN DO;
       PCOLD(I) = .;
    END;
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_15--pc52_15;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_15 SEX_15 yrschool tamloc_15 h4hhresp c41_15 c43_15
      inf4_15 PC1_15;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.,.M,99) THEN yrschool = .;
 ARRAY COV(*) c41_15 c43_15 inf4_15 PC1_15;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;

*************************************************************************;
```

```
*******************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "OOOXXX";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np
               ;
  */
  CONTINUOUS   AGE_15 yrschool h4hhresp
               ;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15
               ;
  BOUNDS       yrschool(>=0,<=20)
               ;
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=impute_mult1r, DIR=OOOXXX);


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*******************************************************************************;
*******************************************************************************;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
```

```
    %LET KI = 5196271+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
       INDEX_I = RAND("Bernoulli",0.5);
       IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 9325641+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
       INDEX_W = RAND("Bernoulli",0.5);
       WORSE(I) = INDEX_W+1;
     END;
 END;
 END;
 DROP I INDEX_I INDEX_W;
RUN;

DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;

 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
    END;
    IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
     END;
 END;

 DROP I;
```

```
RUN;

DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=yrschool--PC1_15);
 BY cunicah np;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_LIST1_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 IF inf4_15 IN (2,3,4) THEN inf4_15 = 2;
RUN;

*******************************************************************************;
*******************************************************************************;

%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC5_OK ,OUD=A5); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC8_OK ,OUD=A8); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC35_OK,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--PC1_15 PC50_OK,OUD=A50);QUIT;

*******************************************************************************;
*******************************************************************************;

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A5;
```

```
%LET DATAOT = MULT_A5;
%LET DATANM = impute_multA5;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC5_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;
%LET DATANM = impute_multA8;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC8_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
```

```
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;
%LET DATANM = impute_multA11;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC11_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;
%LET DATANM = impute_multA14;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
```

```
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC14_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;
%LET DATANM = impute_multA17;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC17_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;
```

```
%LET DATANM = impute_multA20;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC20_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;
%LET DATANM = impute_multA23;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC23_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
```

```
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;
%LET DATANM = impute_multA26;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC26_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;
%LET DATANM = impute_multA29;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
```

```
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC29_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;
%LET DATANM = impute_multA32;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC32_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;
```

```
%LET DATANM = impute_multA35;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC35_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;
%LET DATANM = impute_multA38;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC38_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
```

```
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;
%LET DATANM = impute_multA41;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC41_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;
%LET DATANM = impute_multA44;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
```

```
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC44_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;
%LET DATANM = impute_multA47;

%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC47_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);


OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMTERR;

%LET ALIST = "OOOXXX";
%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;
%LET DATANM = impute_multA50;
```

```
%LET DATADR = OOOXXX;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME SETUP &ALIST;
  FILE SETUP;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  /*TRANSFER   cunicah np;*/
  CONTINUOUS   AGE_15 yrschool h4hhresp;
  CATEGORICAL  SEX_15 tamloc_15 c41_15 c43_15 inf4_15 PC1_15 PC50_OK;
  BOUNDS       yrschool(>=0,<=20);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
;;;;

%IMPUTE(NAME=&DATANM,DIR=&DATADR);

*******************************************************************************;
*******************************************************************************;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah np;
RUN;
```

```
*************************************************************************;
*************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_15  IMPU_FLAG_PC8_15  IMPU_FLAG_PC11_15
                 IMPU_FLAG_PC14_15 IMPU_FLAG_PC17_15
                 IMPU_FLAG_PC20_15 IMPU_FLAG_PC23_15 IMPU_FLAG_PC26_15
                 IMPU_FLAG_PC29_15 IMPU_FLAG_PC32_15
                 IMPU_FLAG_PC35_15 IMPU_FLAG_PC38_15 IMPU_FLAG_PC41_15
                 IMPU_FLAG_PC44_15 IMPU_FLAG_PC47_15 IMPU_FLAG_PC50_15;

 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
 END;

 KEEP cunicah np IMPU_FLAG_PC5_15--IMPU_FLAG_PC50_15;

RUN;

*************************************************************************;
*************************************************************************;

PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;
```

```
DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;

 RETAIN cunicah np
        IMPU_PC5_15  IMPU_FLAG_PC5_15  IMPU_PC8_15  IMPU_FLAG_PC8_15
        IMPU_PC11_15 IMPU_FLAG_PC11_15
        IMPU_PC14_15 IMPU_FLAG_PC14_15 IMPU_PC17_15 IMPU_FLAG_PC17_15
        IMPU_PC20_15 IMPU_FLAG_PC20_15
        IMPU_PC23_15 IMPU_FLAG_PC23_15 IMPU_PC26_15 IMPU_FLAG_PC26_15
        IMPU_PC29_15 IMPU_FLAG_PC29_15
        IMPU_PC32_15 IMPU_FLAG_PC32_15 IMPU_PC35_15 IMPU_FLAG_PC35_15
        IMPU_PC38_15 IMPU_FLAG_PC38_15
        IMPU_PC41_15 IMPU_FLAG_PC41_15 IMPU_PC44_15 IMPU_FLAG_PC44_15
        IMPU_PC47_15 IMPU_FLAG_PC47_15 IMPU_PC50_15 IMPU_FLAG_PC50_15;

 SET M01_7_IMP0;

 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_15  IMPU_PC8_15  IMPU_PC11_15 IMPU_PC14_15
               IMPU_PC17_15 IMPU_PC20_15 IMPU_PC23_15 IMPU_PC26_15
               IMPU_PC29_15 IMPU_PC32_15 IMPU_PC35_15 IMPU_PC38_15
               IMPU_PC41_15 IMPU_PC44_15 IMPU_PC47_15 IMPU_PC50_15;

DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;

DROP I PC5_OK--PC50_OK;

RUN;

DATA WW01.V1_PC_COGNITION_IMPUTE_2015;
 SET M01_7_IMP1;
RUN;
```

2018

```
LIBNAME WW "D:\LuChen\MHAS\Data\Cognition\2018_sect_e";
RUN;

LIBNAME WW01 "D:\LuChen\MHAS\Data\Cognition\2018_sect_pc";
RUN;

*************************************************************************;

DATA M01_1;
 SET WW.mhas_2018_cognition_final;
 KEEP cunicah np
      AGE_18 SEX_18 yrschool
      tam_loc_18 h5hhresp c41_18 c43_18 reason_proxy_18
      pc1_18 pc5_18--pc52_18
 ;
 RENAME tam_loc_18 = tamloc_18;
 if tipent_18 in (3,4);
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_18--pc52_18;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    IF PCOLD(I) = .S THEN DO;
       PCOLD(I) = .;
    END;
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_18--pc52_18;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_18 SEX_18 yrschool tamloc_18 h5hhresp c41_18 c43_18
      reason_proxy_18 PC1_18;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.,.M,99) THEN yrschool = .;
 ARRAY COV(*) c41_18 c43_18 reason_proxy_18 PC1_18;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;
/*
proc means data=M01_7_COV1;
var yrschool;
run;
*/
*************************************************************************;
```

```
*************************************************************************;

options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18;
*pc1:memory rating;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 5196271+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
       INDEX_I = RAND("Bernoulli",0.5);
       IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 9325641+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
       INDEX_W = RAND("Bernoulli",0.5);
       WORSE(I) = INDEX_W+1;
     END;
 END;
```

```
 END;
 DROP I INDEX_I INDEX_W;
RUN;

DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;
 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
    END;
    IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
     END;
 END;
 DROP I;
RUN;

DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=yrschool--PC1_18);
 BY cunicah np;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
       M01_7_LIST1_SORT(IN=B)
```

```
 ;
 BY cunicah np;
 IF A;
 IF reason_proxy_18 IN (2,3,4) THEN reason_proxy_18 = 2;
RUN;

*******************************************************************************;
*******************************************************************************;
%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC5_OK ,OUD=A5); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC8_OK ,OUD=A8); QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC11_OK,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC14_OK,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC17_OK,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC20_OK,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC23_OK,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC26_OK,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC29_OK,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC32_OK,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC35_OK,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC38_OK,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC41_OK,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC44_OK,OUD=A44);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC47_OK,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_18 PC50_OK,OUD=A50);QUIT;

*******************************************************************************;
*******************************************************************************;
*impute pc5;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18 PC5_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc8;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A8;
```

```
%LET DATAOT = MULT_A8;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18 PC8_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc11;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC11_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc14;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC14_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
```

```
*impute pc17;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC17_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc20;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC20_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc23;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC23_OK;
  BOUNDS       yrschool(>=0,<=19);
```

```
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc26;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC26_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc29;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC29_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc32;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
```

```
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC32_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc35;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC35_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc38;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC38_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc41;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;
```

```
%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC41_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc44;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A44;
%LET DATAOT = MULT_A44;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC44_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc47;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_18 yrschool h5hhresp;
  CATEGORICAL  SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC47_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
```

```
  RUN;

*impute pc50;
options set = SRCLIB 'C:\Program Files\Srcware\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_18 yrschool h5hhresp;
  CATEGORICAL   SEX_18 tamloc_18 c41_18 c43_18 reason_proxy_18 PC1_18
PC50_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*******************************************************************************;
*******************************************************************************;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah np;
RUN;

*******************************************************************************;
```

```
*************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_18  IMPU_FLAG_PC8_18  IMPU_FLAG_PC11_18
                 IMPU_FLAG_PC14_18 IMPU_FLAG_PC17_18
                 IMPU_FLAG_PC20_18 IMPU_FLAG_PC23_18 IMPU_FLAG_PC26_18
                 IMPU_FLAG_PC29_18 IMPU_FLAG_PC32_18
                 IMPU_FLAG_PC35_18 IMPU_FLAG_PC38_18 IMPU_FLAG_PC41_18
                 IMPU_FLAG_PC44_18 IMPU_FLAG_PC47_18 IMPU_FLAG_PC50_18;
 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
       IF PROCDW(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
       ELSE DO;
          IMPUTE(I) = 0;
       END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 1;
  END;
  ELSE DO;
          IMPUTE(I) = 0;
  END;
 END;
 KEEP cunicah np IMPU_FLAG_PC5_18--IMPU_FLAG_PC50_18;
RUN;

PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;
 RETAIN cunicah np
```

```
        IMPU_PC5_18  IMPU_FLAG_PC5_18  IMPU_PC8_18  IMPU_FLAG_PC8_18
        IMPU_PC11_18 IMPU_FLAG_PC11_18
        IMPU_PC14_18 IMPU_FLAG_PC14_18 IMPU_PC17_18 IMPU_FLAG_PC17_18
        IMPU_PC20_18 IMPU_FLAG_PC20_18
        IMPU_PC23_18 IMPU_FLAG_PC23_18 IMPU_PC26_18 IMPU_FLAG_PC26_18
        IMPU_PC29_18 IMPU_FLAG_PC29_18
        IMPU_PC32_18 IMPU_FLAG_PC32_18 IMPU_PC35_18 IMPU_FLAG_PC35_18
        IMPU_PC38_18 IMPU_FLAG_PC38_18
        IMPU_PC41_18 IMPU_FLAG_PC41_18 IMPU_PC44_18 IMPU_FLAG_PC44_18
        IMPU_PC47_18 IMPU_FLAG_PC47_18 IMPU_PC50_18 IMPU_FLAG_PC50_18;
 SET M01_7_IMP0;
 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_18  IMPU_PC8_18  IMPU_PC11_18 IMPU_PC14_18
               IMPU_PC17_18 IMPU_PC20_18 IMPU_PC23_18 IMPU_PC26_18
               IMPU_PC29_18 IMPU_PC32_18 IMPU_PC35_18 IMPU_PC38_18
               IMPU_PC41_18 IMPU_PC44_18 IMPU_PC47_18 IMPU_PC50_18;
DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;
DROP I PC5_OK--PC50_OK;
RUN;

DATA WW01.PC_COGNITION_IMPUTED_DATA_2018;
 SET M01_7_IMP1;
RUN;
/*
proc freq data=M01_7_IMP1;
where IMPU_flag_PC50_18=0;
tables IMPU_PC50_18;
run;
*/
```

2021

```
libname WW 'C:\Users\bbogrady\OneDrive - University of Texas Medical
Branch\Desktop\MHAS 2021\Cognition\2021_sect_e';
libname WW01 'C:\Users\bbogrady\OneDrive - University of Texas Medical
Branch\Desktop\MHAS 2021\Cognition\2021_sect_pc';
*************************************************************************;

DATA M01_1;
 SET WW.mhas_2021_cognition_final;
 KEEP cunicah np
      AGE_21 SEX_21 yrschool
      tam_loc_21 h5hhresp c41_21 c43_21 reason_proxy_21
      pc1_21 pc5_21--pc52_21
 ;
 RENAME tam_loc_21 = tamloc_21;
 if tipent_21 in (3,4);
RUN;

PROC SORT DATA=M01_1 OUT=M01_1_SORT;
 BY CUNICAH NP;
RUN;

DATA M01_7;
 SET M01_1_SORT;
 ARRAY PCOLD(*) pc5_21--pc52_21;
 ARRAY PCNEW(*) pc5-pc52;
 DO I = 1 TO DIM(PCOLD);
    IF PCOLD(I) = .S THEN DO;
       PCOLD(I) = .;
    END;
    PCNEW(I) = PCOLD(I);
 END;
 DROP I pc5_21--pc52_21;
 ATTRIB _ALL_ LABEL = " ";
RUN;

DATA M01_7_COV0;
 SET M01_7;
 KEEP cunicah NP AGE_21 SEX_21 yrschool tamloc_21 h5hhresp c41_21 c43_21
      reason_proxy_21 PC1_21;
RUN;

DATA M01_7_COV1;
 SET M01_7_COV0;
 IF yrschool IN (.,.M,99) THEN yrschool = .;
 ARRAY COV(*) c41_21 c43_21 reason_proxy_21 PC1_21;
 DO I = 1 TO DIM(COV);
    IF COV(I) IN (8,9) THEN COV(I) = .;
 END;
 DROP I;
RUN;
/*
proc means data=M01_7_COV1;
var yrschool;
run;
*/
*************************************************************************;
*************************************************************************;
```

```
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN M01_7_COV1;
  DATAOUT mult1r;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21;
*pc1:memory rating;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;


DATA MULT1R_RETURN6;
 SET MULT1R;
RUN;

DATA WW01.MULT1R_RETURN6_COV;
 SET MULT1R_RETURN6;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_LIST0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;

 DO I = 1 TO DIM(PCBASE);
 IF PCBASE(I) = 1 THEN DO;
    %LET KI = 5196271+500*I;
    IF IMPROV(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KI);
       INDEX_I = RAND("Bernoulli",0.5);
       IMPROV(I) = INDEX_I+1;
    END;
 END;
 IF PCBASE(I) = 3 THEN DO;
    %LET KW = 9325641+500*I;
    IF WORSE(I) IN (8,9,.) THEN DO;
         CALL STREAMINIT(&KW);
       INDEX_W = RAND("Bernoulli",0.5);
       WORSE(I) = INDEX_W+1;
     END;
 END;
 END;
```

```
 DROP I INDEX_I INDEX_W;
RUN;

DATA M01_7_LIST1;

 SET M01_7_LIST0;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY IMPROV(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY WORSE(*)  PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY PCOK(*)   PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK
                 PC26_OK PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK
                 PC47_OK PC50_OK;
 DO I = 1 TO DIM(PCBASE);
    IF PCBASE(I) = 2 THEN DO;
         PCOK(I) = 3;
    END;
    IF PCBASE(I) IN (.,8,9) THEN DO;
         PCOK(I) = .;
    END;
    IF PCBASE(I) = 1 THEN DO;
       IF IMPROV(I) = 1 THEN DO;
          PCOK(I) = 1;
       END;
       IF IMPROV(I) = 2 THEN DO;
          PCOK(I) = 2;
       END;
    END;
    IF PCBASE(I) = 3 THEN DO;
       IF WORSE(I) = 1 THEN DO;
          PCOK(I) = 5;
       END;
       IF WORSE(I) = 2 THEN DO;
          PCOK(I) = 4;
       END;
     END;
 END;
 DROP I;
RUN;

DATA M01_7_LIST2;
 SET M01_7_LIST1;
 DROP PC5-PC52;
RUN;

proc contents data = M01_7_LIST2; run;

PROC SORT DATA=WW01.Mult1r_return6_cov OUT=ZCOV;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_LIST2 OUT=M01_7_LIST1_SORT(DROP=yrschool--PC1_21);
 BY cunicah np;
RUN;

DATA M01_7_A1;
 MERGE ZCOV(IN=A)
```

```
       M01_7_LIST1_SORT(IN=B)
 ;
 BY cunicah np;
 IF A;
 IF reason_proxy_21 IN (2,3,4) THEN reason_proxy_21 = 2;
RUN;

proc contents data = M01_7_A1; run;
*******************************************************************************;
*******************************************************************************;
%MACRO LISTA(DIN= ,KEEPVAR= ,OUD= );
DATA OKIN_&OUD;
 SET &DIN;
 KEEP &KEEPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC5_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21,OUD=A5);
QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC8_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21,OUD=A8);
QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC11_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A11);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC14_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A14);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC17_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A17);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC20_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A20);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC23_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A23);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC26_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A26);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC29_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A29);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC32_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A32);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC35_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A35);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC38_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A38);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC41_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A41);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC44_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A44);QUIT;
```

```
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC47_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A47);QUIT;
%LISTA(DIN=M01_7_A1,KEEPVAR=cunicah--reason_proxy_21 PC50_OK AGE_21 yrschool
h5hhresp SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21
PC1_21,OUD=A50);QUIT;

proc contents data = OKIN_A5; run;
*******************************************************************************;
*******************************************************************************;
*impute pc5;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A5;
%LET DATAOT = MULT_A5;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21 PC5_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc8;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A8;
%LET DATAOT = MULT_A8;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21 PC8_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc11;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A11;
%LET DATAOT = MULT_A11;

%impute(name=impute,dir=.,setup=new)
```

```
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC11_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc14;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A14;
%LET DATAOT = MULT_A14;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC14_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc17;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A17;
%LET DATAOT = MULT_A17;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC17_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc20;
```

```
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A20;
%LET DATAOT = MULT_A20;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC20_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc23;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A23;
%LET DATAOT = MULT_A23;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC23_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc26;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A26;
%LET DATAOT = MULT_A26;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC26_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
```

```
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc29;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A29;
%LET DATAOT = MULT_A29;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC29_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc32;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A32;
%LET DATAOT = MULT_A32;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS    AGE_21 yrschool h5hhresp;
  CATEGORICAL   SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC32_OK;
  BOUNDS        yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc35;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A35;
%LET DATAOT = MULT_A35;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
```

```
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC35_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc38;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A38;
%LET DATAOT = MULT_A38;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC38_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc41;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A41;
%LET DATAOT = MULT_A41;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC41_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc44;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A44;
```

```
%LET DATAOT = MULT_A44;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC44_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc47;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A47;
%LET DATAOT = MULT_A47;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC47_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;

*impute pc50;
options set = SRCLIB 'C:\Program Files\Srclib\sas' sasautos = ('!SRCLIB'
sasautos) mautosource;

%LET DATAGO = OKIN_A50;
%LET DATAOT = MULT_A50;

%impute(name=impute,dir=.,setup=new)
  TITLE Multiple Imputation;
  DATAIN &DATAGO;
  DATAOUT &DATAOT;
  DEFAULT TRANSFER;
  CONTINUOUS   AGE_21 yrschool h5hhresp;
  CATEGORICAL  SEX_21 tamloc_21 c41_21 c43_21 reason_proxy_21 PC1_21
PC50_OK;
  BOUNDS       yrschool(>=0,<=19);
  ITERATIONS 5;
  MULTIPLES 1;
  MAXLOGI 150;
  SEED 512171109;
  RUN;
```

```
*************************************************************************;
*************************************************************************;

%MACRO SORTA(DINS= ,BYVAR= ,INVAR= ,OUTS=);
PROC SORT DATA=&DINS OUT=&OUTS(KEEP=&BYVAR &INVAR);
 BY &BYVAR;
RUN;
%MEND;

%SORTA(DINS=MULT_A5, BYVAR=cunicah np,INVAR=PC5_OK, OUTS=MULT_PC5); QUIT;
%SORTA(DINS=MULT_A8, BYVAR=cunicah np,INVAR=PC8_OK, OUTS=MULT_PC8); QUIT;
%SORTA(DINS=MULT_A11,BYVAR=cunicah np,INVAR=PC11_OK,OUTS=MULT_PC11);QUIT;
%SORTA(DINS=MULT_A14,BYVAR=cunicah np,INVAR=PC14_OK,OUTS=MULT_PC14);QUIT;
%SORTA(DINS=MULT_A17,BYVAR=cunicah np,INVAR=PC17_OK,OUTS=MULT_PC17);QUIT;
%SORTA(DINS=MULT_A20,BYVAR=cunicah np,INVAR=PC20_OK,OUTS=MULT_PC20);QUIT;
%SORTA(DINS=MULT_A23,BYVAR=cunicah np,INVAR=PC23_OK,OUTS=MULT_PC23);QUIT;
%SORTA(DINS=MULT_A26,BYVAR=cunicah np,INVAR=PC26_OK,OUTS=MULT_PC26);QUIT;
%SORTA(DINS=MULT_A29,BYVAR=cunicah np,INVAR=PC29_OK,OUTS=MULT_PC29);QUIT;
%SORTA(DINS=MULT_A32,BYVAR=cunicah np,INVAR=PC32_OK,OUTS=MULT_PC32);QUIT;
%SORTA(DINS=MULT_A35,BYVAR=cunicah np,INVAR=PC35_OK,OUTS=MULT_PC35);QUIT;
%SORTA(DINS=MULT_A38,BYVAR=cunicah np,INVAR=PC38_OK,OUTS=MULT_PC38);QUIT;
%SORTA(DINS=MULT_A41,BYVAR=cunicah np,INVAR=PC41_OK,OUTS=MULT_PC41);QUIT;
%SORTA(DINS=MULT_A44,BYVAR=cunicah np,INVAR=PC44_OK,OUTS=MULT_PC44);QUIT;
%SORTA(DINS=MULT_A47,BYVAR=cunicah np,INVAR=PC47_OK,OUTS=MULT_PC47);QUIT;
%SORTA(DINS=MULT_A50,BYVAR=cunicah np,INVAR=PC50_OK,OUTS=MULT_PC50);QUIT;

DATA MULT_ALL;
 MERGE MULT_PC5  MULT_PC8  MULT_PC11 MULT_PC14 MULT_PC17 MULT_PC20 MULT_PC23
       MULT_PC26
       MULT_PC29 MULT_PC32 MULT_PC35 MULT_PC38 MULT_PC41 MULT_PC44 MULT_PC47
       MULT_PC50
 ;
 BY cunicah np;
RUN;

*************************************************************************;
*************************************************************************;

DATA M01_7_FLAG0;

 SET M01_7;

 ARRAY PCBASE(*) PC5 PC8  PC11 PC14 PC17 PC20 PC23 PC26 PC29 PC32 PC35 PC38
                 PC41 PC44 PC47 PC50;
 ARRAY PROCDI(*) PC6 PC9  PC12 PC15 PC18 PC21 PC24 PC27 PC30 PC33 PC36 PC39
                 PC42 PC45 PC48 PC51;
 ARRAY PROCDW(*) PC7 PC10 PC13 PC16 PC19 PC22 PC25 PC28 PC31 PC34 PC37 PC40
                 PC43 PC46 PC49 PC52;
 ARRAY IMPUTE(*) IMPU_FLAG_PC5_21  IMPU_FLAG_PC8_21  IMPU_FLAG_PC11_21
                 IMPU_FLAG_PC14_21 IMPU_FLAG_PC17_21
                 IMPU_FLAG_PC20_21 IMPU_FLAG_PC23_21 IMPU_FLAG_PC26_21
                 IMPU_FLAG_PC29_21 IMPU_FLAG_PC32_21
                 IMPU_FLAG_PC35_21 IMPU_FLAG_PC38_21 IMPU_FLAG_PC41_21
                 IMPU_FLAG_PC44_21 IMPU_FLAG_PC47_21 IMPU_FLAG_PC50_21;
 DO I = 1 TO DIM(PCBASE);
  IF PCBASE(I) = 1 THEN DO;
       IF PROCDI(I) IN (8,9,.) THEN DO;
          IMPUTE(I) = 2;
       END;
```

```
        ELSE DO;
           IMPUTE(I) = 0;
        END;
  END;
  ELSE IF PCBASE(I) = 3 THEN DO;
        IF PROCDW(I) IN (8,9,.) THEN DO;
           IMPUTE(I) = 2;
        END;
        ELSE DO;
           IMPUTE(I) = 0;
        END;
  END;
  ELSE IF PCBASE(I) IN (8,9,.) THEN DO;
           IMPUTE(I) = 1;
  END;
  ELSE DO;
           IMPUTE(I) = 0;
  END;
 END;
 KEEP cunicah np IMPU_FLAG_PC5_21--IMPU_FLAG_PC50_21;
RUN;

PROC SORT DATA=MULT_ALL;
 BY cunicah np;
RUN;

PROC SORT DATA=M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP0;
 MERGE MULT_ALL M01_7_FLAG0;
 BY cunicah np;
RUN;

DATA M01_7_IMP1;
 RETAIN cunicah np
        IMPU_PC5_21  IMPU_FLAG_PC5_21  IMPU_PC8_21  IMPU_FLAG_PC8_21
        IMPU_PC11_21 IMPU_FLAG_PC11_21
        IMPU_PC14_21 IMPU_FLAG_PC14_21 IMPU_PC17_21 IMPU_FLAG_PC17_21
        IMPU_PC20_21 IMPU_FLAG_PC20_21
        IMPU_PC23_21 IMPU_FLAG_PC23_21 IMPU_PC26_21 IMPU_FLAG_PC26_21
        IMPU_PC29_21 IMPU_FLAG_PC29_21
        IMPU_PC32_21 IMPU_FLAG_PC32_21 IMPU_PC35_21 IMPU_FLAG_PC35_21
        IMPU_PC38_21 IMPU_FLAG_PC38_21
        IMPU_PC41_21 IMPU_FLAG_PC41_21 IMPU_PC44_21 IMPU_FLAG_PC44_21
        IMPU_PC47_21 IMPU_FLAG_PC47_21 IMPU_PC50_21 IMPU_FLAG_PC50_21;
 SET M01_7_IMP0;
 ARRAY PCOK(*) PC5_OK PC8_OK PC11_OK PC14_OK PC17_OK PC20_OK PC23_OK PC26_OK
               PC29_OK PC32_OK PC35_OK PC38_OK PC41_OK PC44_OK PC47_OK
               PC50_OK;
 ARRAY PCIM(*) IMPU_PC5_21  IMPU_PC8_21  IMPU_PC11_21 IMPU_PC14_21
               IMPU_PC17_21 IMPU_PC20_21 IMPU_PC23_21 IMPU_PC26_21
               IMPU_PC29_21 IMPU_PC32_21 IMPU_PC35_21 IMPU_PC38_21
               IMPU_PC41_21 IMPU_PC44_21 IMPU_PC47_21 IMPU_PC50_21;
DO I = 1 TO DIM(PCOK);
   PCIM(I) = PCOK(I);
END;
DROP I PC5_OK--PC50_OK;
RUN;
```

```
DATA WW01.V1_PC_COGNITION_IMPUTE_2021;
 SET M01_7_IMP1;
RUN;

proc freq data=M01_7_IMP1;
where IMPU_flag_PC50_21=0;
tables IMPU_PC50_21;
run;
```