



**Imputation of Cognitive Function Variables in the  
Mexican Health and Aging Study 2001-2018  
Version 1**

Prepared By

Nai-Wei Chen

Brian Downer

Alejandra Michaels-Obregón

Lu Chen

Rebeca Wong

Product of the MHAS Working Group  
University of Texas Medical Branch

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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, and 2018. 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. While missing cognitive data is common in large studies like the MHAS, the missing and incomplete data is an inherent problem in cognitive research, with results that may be biased when analyses exclude participants with incomplete information for cognition. Missing data were imputed using demographics, health, and the prior wave cognitive scores for 2003, 2015, and 2018. 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. Introduction

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). Further, the content has been adapted and modified through the MHAS waves to include a more comprehensive cognitive evaluation. 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. 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).

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, and 2018. 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).

### **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 and 2018 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, and 2018. 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 significantly 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.

## References

Daniel RM, Kenward MG, Cousens SN, De Stavola BL. Using causal diagrams to guide analysis in missing data problems. *Statistical methods in medical research*. 2012;21(3):243-56.

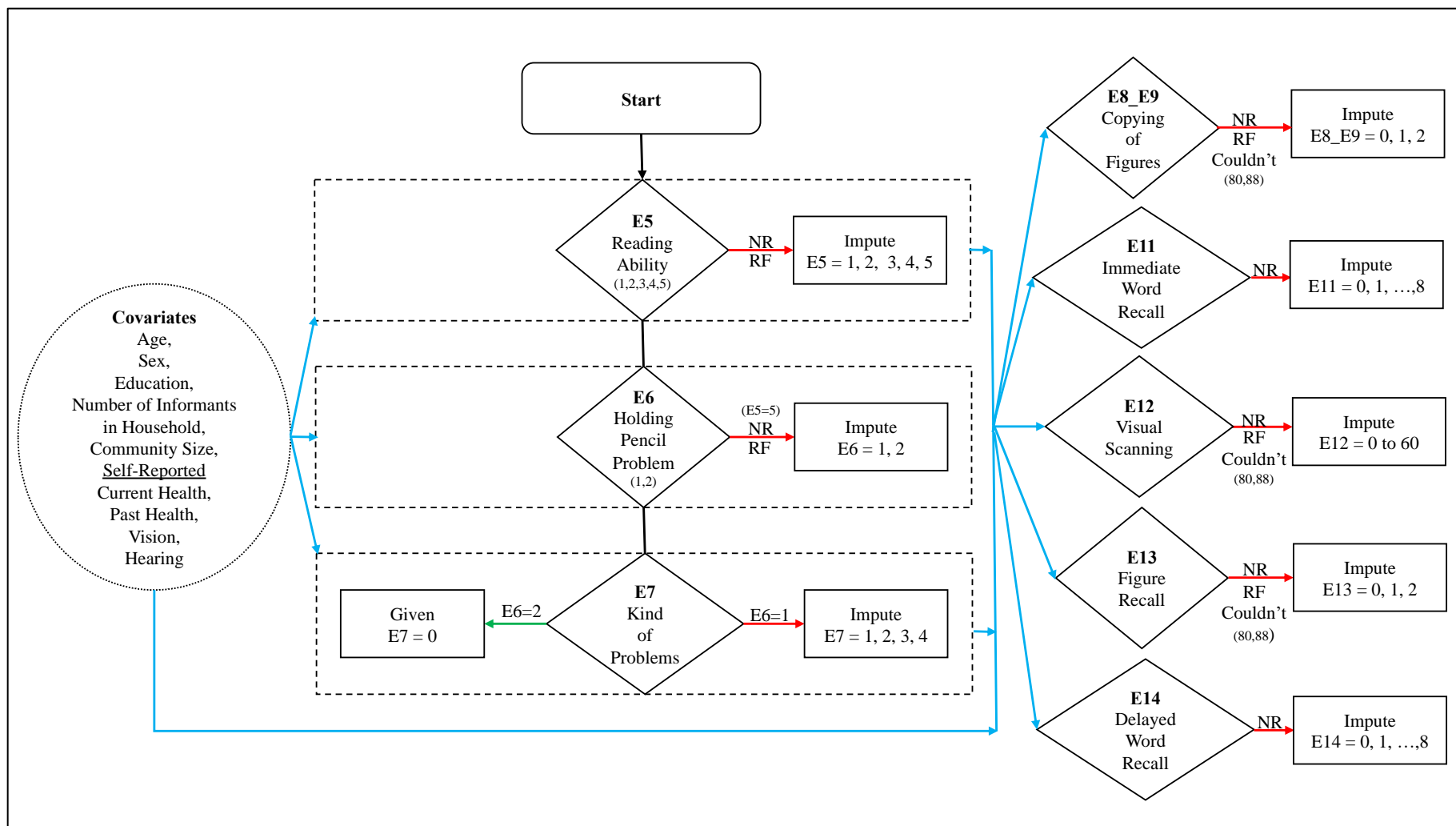
Downer B, Avila JC, Chen NW, Wong R. Imputation Procedures for Cognitive Variables in the Mexican Health and Aging Study: Evaluating the Bias from Excluding Participants with Missing Data. Under Review (2021).

Herzog AR, Wallace RB. Measures of cognitive functioning in the AHEAD Study. *J Gerontol B Psychol Sci Soc Sci*. 1997;52 Spec No:37-48.

Michaels-Obregón A, Mejía-Arango S, Wong R. (2020). The Mexican Health and Aging Study: Cognitive Function Measures Scoring and Classification Across Waves 2001-2015, Version 1. [PDF document] Website: Retrieved from [http://mhasweb.org/Resources/DOCUMENTS/Constructed\\_Imputed/MHAS\\_Cognitive\\_Function\\_Measures\\_Scoring\\_and\\_Classification.pdf](http://mhasweb.org/Resources/DOCUMENTS/Constructed_Imputed/MHAS_Cognitive_Function_Measures_Scoring_and_Classification.pdf) in December 2020.

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**

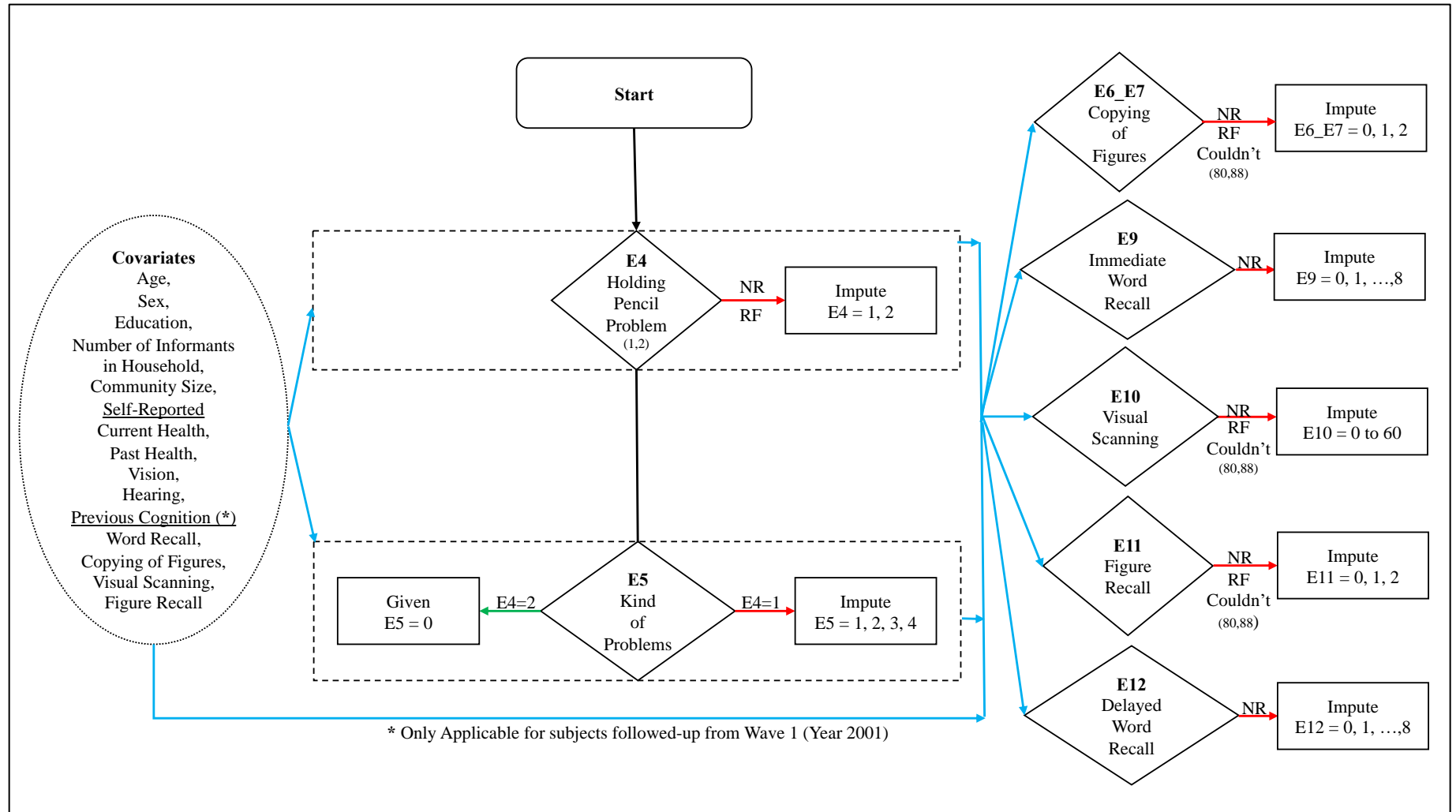


Figure 3. Flowchart of Imputation Process in 2012

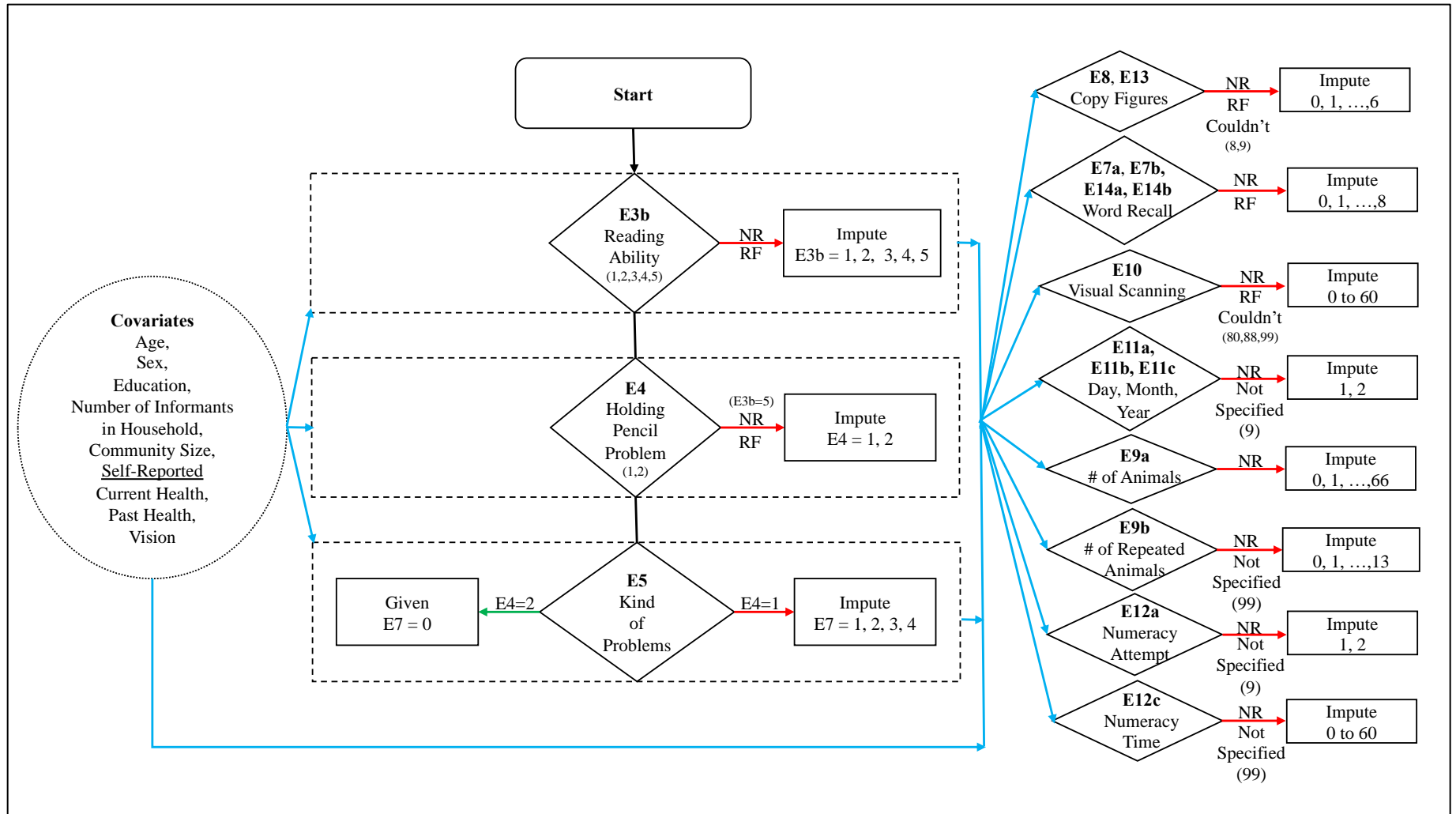
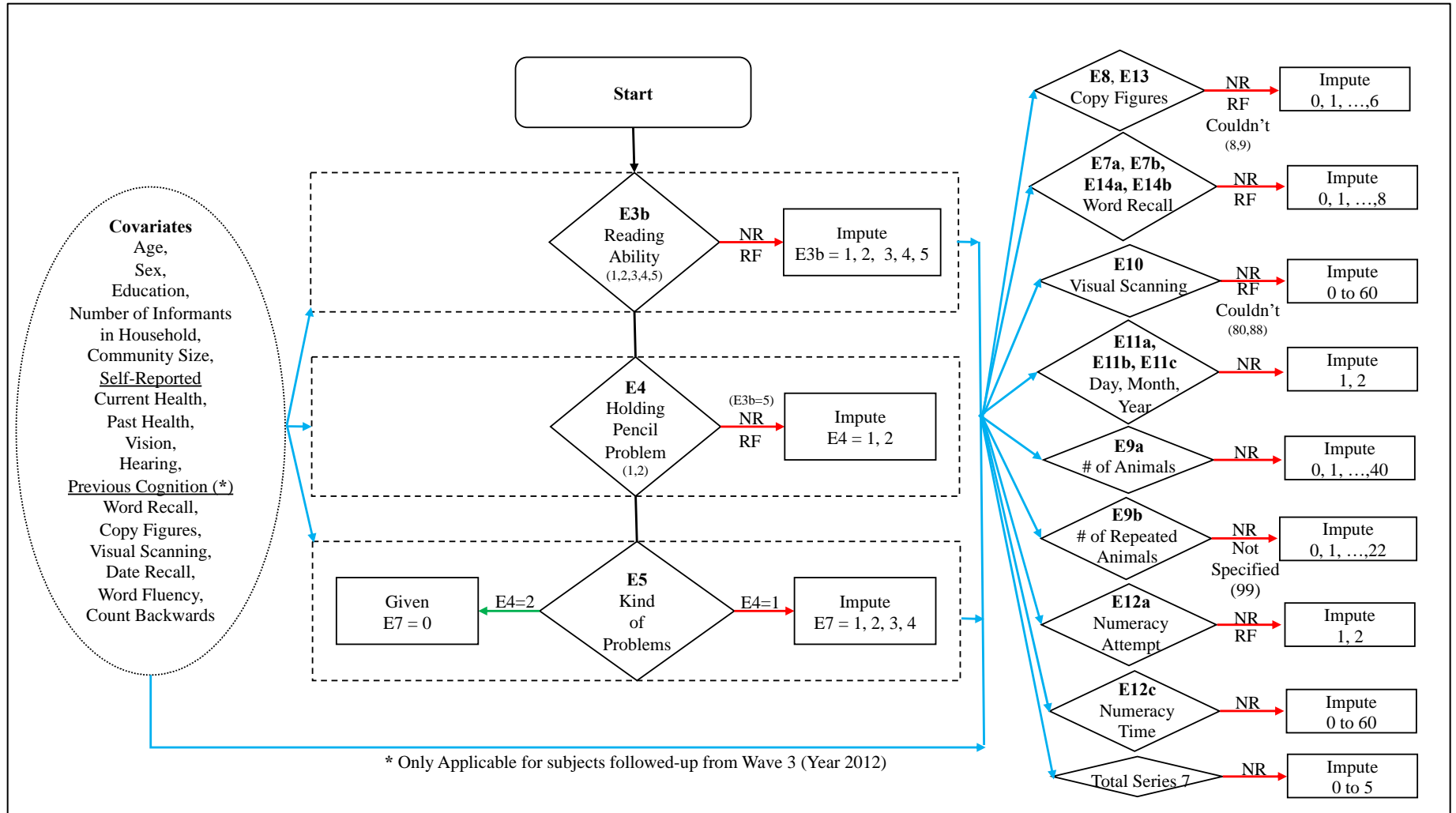
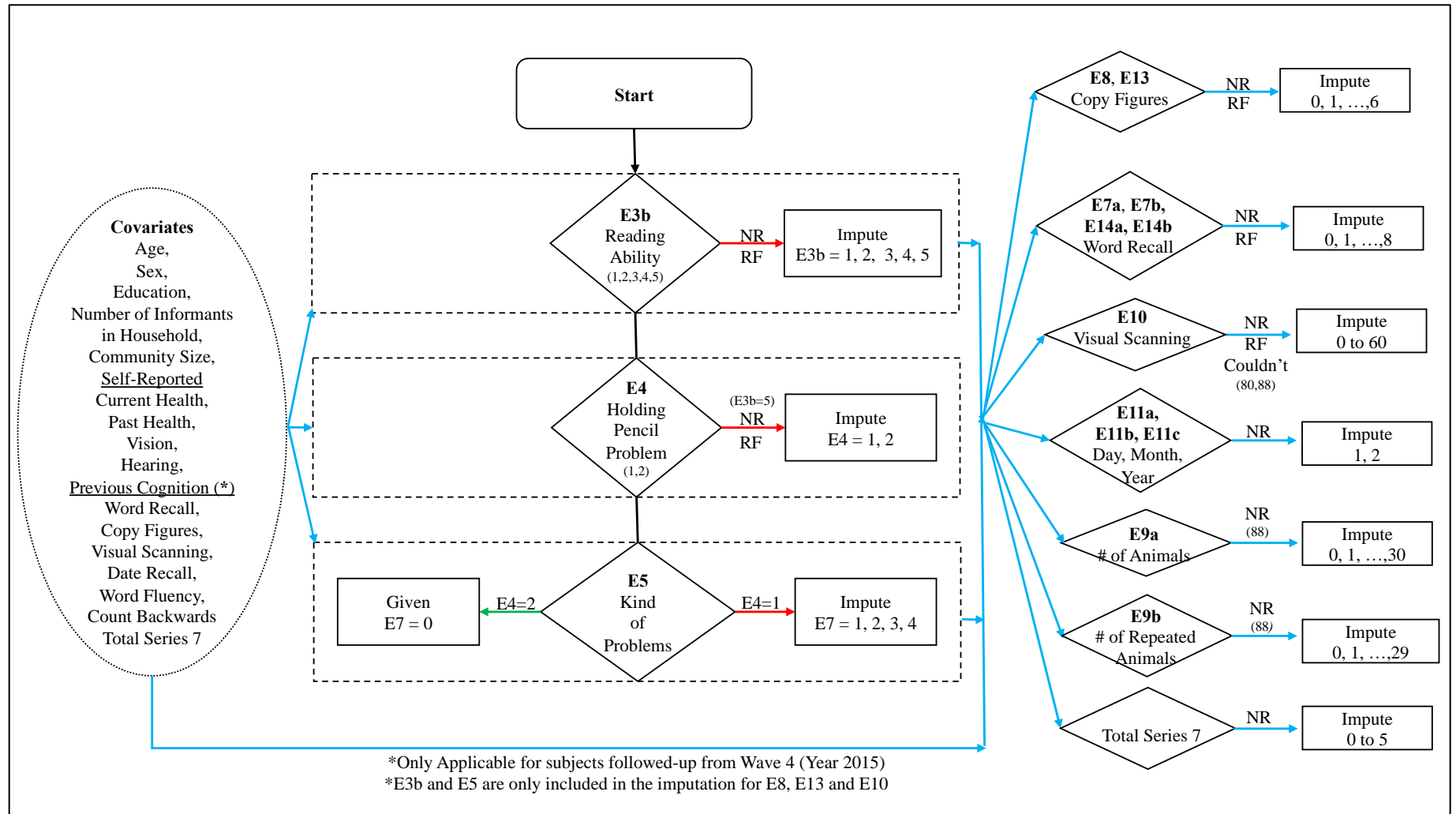


Figure 4. Flowchart of Imputation Process in 2015

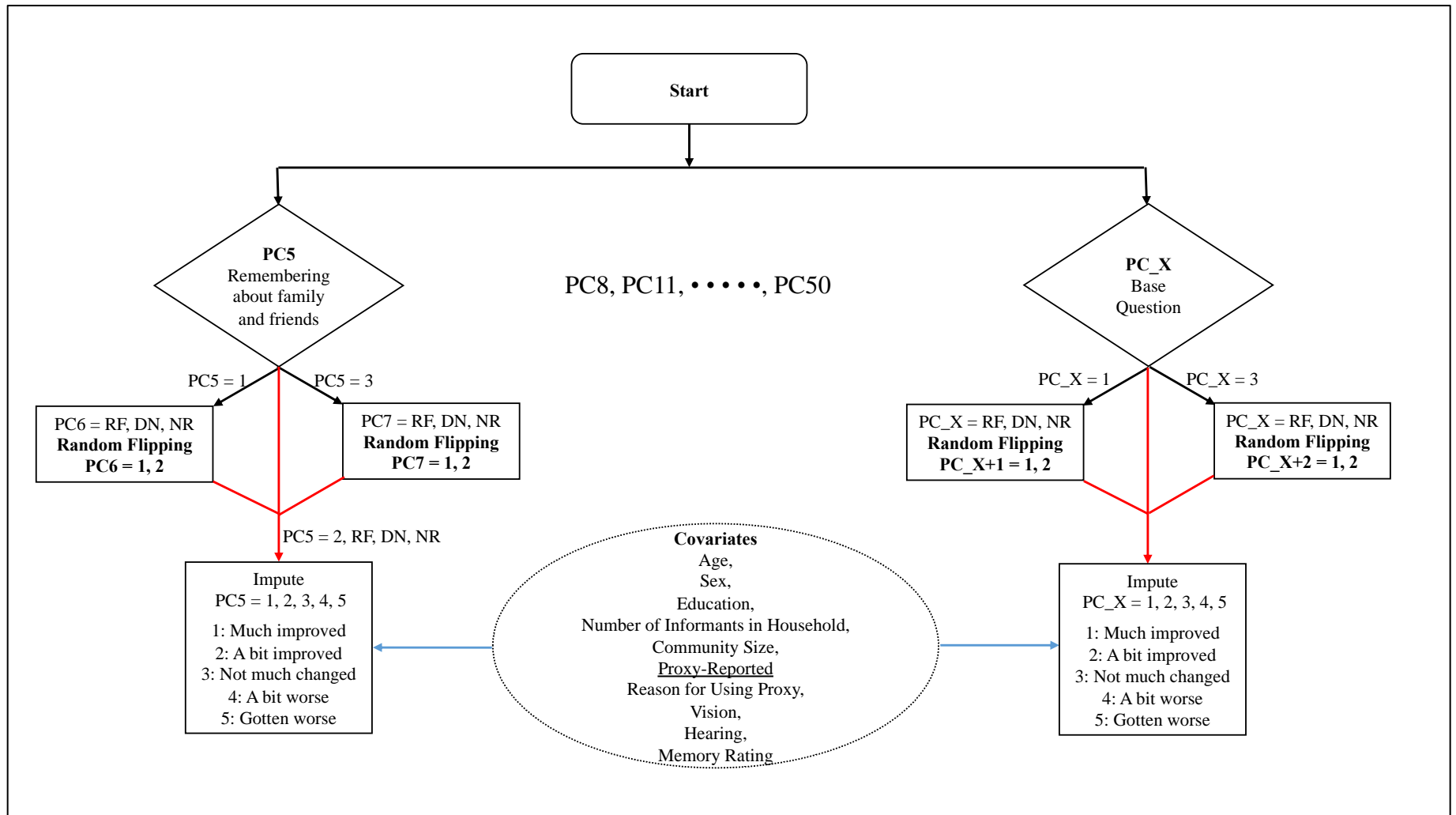


**Figure 5. Flowchart of Imputation Process in 2018**



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
<b>Attempt 2</b>										
	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
<b>Attempt 3</b>										
	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
<b>Delayed</b>	<b>Non-Imputed Cases</b>			<b>Imputed Cases</b>			<b>Total Cases</b>		
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
<b>Attempt 2</b>										
	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
<b>Attempt 3</b>										
	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
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)**

Variables	Non-Imputed Cases			Imputed Cases			Total Cases			Range
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>Immediate Word Recall</b>										
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
<b>Delayed Word Recall</b>										
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
<b>Copying of Figures</b>	12597	1.649	0.646	573	1.204	0.874	13962	1.552	0.734	0,1,2
<b>Figure Recall</b>	12486	0.781	0.818	735	0.522	0.754	13962	0.729	0.813	0,1,2
<b>Visual Scanning</b>	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 %
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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	
<b>Month</b>										
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	
<b>Year</b>										
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)**

Variables	Non-Imputed Cases			Imputed Cases			Total Cases			Range
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>Immediate Word Recall</b>										
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
<b>Delayed Word Recall</b>										
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
<b>Copying of Figures</b>	10922	1.663	0.618	1573	1.353	0.780	12495	1.624	0.649	0,1,2
<b>Figure Recall</b>	10789	0.789	0.814	1706	0.541	0.759	12495	0.755	0.811	0,1,2
<b>Visual Scanning</b>	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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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
<b>Attempt 2</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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	
<b>Month</b>										
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	
<b>Year</b>										
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	
<b>Attempt at Numeracy</b>										
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)**

Variables	Non-Imputed Cases			Imputed Cases			Total Cases			Range
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>Immediate Word Recall</b>										
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
<b>Delayed Word Recall</b>										
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
<b>Copying of Figures</b>	13116	1.083	0.276	1332	1.233	0.423	14448	5.440	1.170	0,1,2
<b>Figure Recall</b>	12938	4.815	1.632	1510	3.864	1.739	14448	4.716	1.669	0,1,2
<b>Visual Scanning</b>	13078	29.106	15.504	1370	19.798	10.803	14448	28.223	15.365	0-60
<b>Number of Different Animals</b>	14020	15.071	5.163	428	14.196	4.785	14448	15.045	5.154	0-66
<b>Number of Repetitions (Animals)</b>	13977	0.871	1.255	471	1.028	1.018	14448	0.876	1.248	0-13
<b>Time for Numeracy (seconds)</b>	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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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	
<b>Month</b>										
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	
<b>Year</b>										
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	
<b>Attempt at Numeracy</b>										
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)**

Variables	Non-Imputed Cases			Imputed Cases			Total Cases			Range
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>Immediate Word Recall</b>										
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
<b>Delayed Word Recall</b>										
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
<b>Copying of Figures</b>	12882	5.564	1.016	968	4.258	1.678	13850	5.473	1.126	0-6
<b>Figure Recall</b>	12758	4.808	1.693	1,092	3.567	1.782	13850	4.710	1.733	0-6
<b>Visual Scanning</b>	12858	29.343	15.913	992	16.130	9.929	13850	28.396	15.929	0-60
<b>Number of Different Animals</b>	13730	15.522	5.247	120	14.642	4.676	13850	15.514	5.243	0-40
<b>Number of Repetitions (Animals)</b>	13730	0.733	1.135	120	0.858	0.964	13850	0.735	1.134	0-22
<b>Time for Numeracy (seconds)</b>	13158	14.476	15.468	692	29.662	14.222	13850	15.235	15.759	0-60
<b>Series 7 (Number of Correctness)</b>	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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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
<b>Attempt 1</b>									
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
<b>Attempt 2</b>									
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
<b>Attempt 3</b>									
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
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	
<b>Month</b>										
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	
<b>Year</b>										
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)**

Variables	Non-Imputed Cases			Imputed Cases			Total Cases			Range
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>Immediate Word Recall</b>										
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
<b>Delayed Word Recall</b>										
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
<b>Copying of Figures</b>	14586	5.608	0.898	1200	4.447	1.585	15786	5.520	1.016	0-6
<b>Figure Recall</b>	14059	4.982	1.480	1727	3.893	1.701	15786	4.862	1.544	0-6
<b>Visual Scanning</b>	14449	31.700	16.075	1337	20.455	12.880	15786	30.747	16.136	0-60
<b>Number of Different Animals</b>	15297	15.753	5.249	489	14.280	5.019	15786	15.708	5.248	0-30
<b>Number of Repetitions (Animals)</b>	15297	0.714	1.181	489	0.796	0.923	15786	0.716	1.174	0-29
<b>Series 7 (Number of Correctness)</b>	11407	3.399	1.505	4379	2.326	1.570	15786	3.102	1.597	0-5

## VII. Appendix D. Codebook

2001

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### 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







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  
Praxis Recall: Flag if Imputed

---

Constructional

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

---

## Section PC

---

-----  
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



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  
of Correct Words (Imputed)

Verbal Learning List A-Trial 1: Number

---

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  
A-Trial 1: Flag if Imputed

Verbal Learning List

---

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  
of Correct Words (Imputed)

Verbal Learning List A-Trial 2: Number

---

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 .

---



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  
- Year: Flag if Imputed

Orientation

---

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  
- Year (Imputed)

Orientation

---

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  
family & friends (Imputed)

R's ability to remember things about

---

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  
friends: Flag if Imputed

R's ability to remember things about family &

---

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

---







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

---



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)

**2012**

---

**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
-------------	-------	-------





```

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]
unique values: 2
units: 1
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]
unique values: 2
units: 1
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]
unique values: 1,041
units: 1.000e-08
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]
unique values: 2
units: 1
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]
        unique values: 2
        units: 1
        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]
        unique values: 5
        units: 1
        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]
        unique values: 2
        units: 1
        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]
        unique values: 9
        units: 1
        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  
Number of Correct Words (Imputed)

---

Verbal Learning List A-Trial 3:

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  
List B-Trial 1: Flag if Imputed

---

Verbal Learning

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



---

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  
Second Attempt: Flag if Imputed

Numeracy - Time for First and

---

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  
Praxis Recall: Flag if Imputed

Constructional

---

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  
Number of Correct Words (Imputed)

Verbal Recall List A:

---

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]
unique values:  6
                                units:  1
                                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]
unique values:  2
                                units:  1
                                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]
unique values:  5
                                units:  1
                                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



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



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)



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
```

---

```
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  .
```

---



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



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

---

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)





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:\OOOXXXXOOO";
RUN;

*****;

DATA M01_1;
  RETAIN cunicah codent01
         AGE_01 SEX_01 yrschool_01
         tamloc_01 hlhhresp
         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 hlhhresp
       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 hlhhresp
      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 hlhhresp 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;
```

**RUN;**

```
OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = (!SRCLIB sasautos)
MAUTOSOURCE;
OPTIONS NOFMterr;
```

```
DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/imputeconv/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/imputeconv);
```

```
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 cunichah = 4212 AND codent01 = 2 THEN E10_01 = 2;
  IF cunichah = 7338 AND codent01 = 2 THEN E10_01 = 2;
  KEEP cunichah codent01 E10_01 e11_1i_01 e11_2i_01 e11_3i_01 e14_1i_01;
  PROC SORT;
    BY cunichah codent01;
RUN;

PROC SORT DATA=MULT1R_RETURN6 OUT=ZCOV;
  BY cunichah codent01;
RUN;

PROC SORT DATA=M01_7_LIST1 OUT=M01_7_LIST1_SORT;
  BY cunichah codent01;
RUN;

DATA M01_7_A1;
  MERGE ZCOV(IN=A)
        M01_7_A
        M01_7_LIST1_SORT(DROP=E10_01 IN=B)
  ;
  BY cunichah codent01;
  IF A;
  IF B THEN E10_01 = INDEX_1+1;
  DROP INDEX_1;
RUN;

*****;
*** List A: 3 Attempts ***;
*****;

%MACRO LISTA(DIN= ,DROPPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  DROP &DROPPVAR;
RUN;
%MEND;

%LISTA(DIN=M01_7_A1,DROPPVAR=e11_2i_01 e11_3i_01,OUD=A1); QUIT;
%LISTA(DIN=M01_7_A1,DROPPVAR=e11_1i_01 e11_3i_01,OUD=A2); QUIT;
%LISTA(DIN=M01_7_A1,DROPPVAR=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 hlhhresp;
  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 hlhhresp;
  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 hlhhresp;
  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_ ;
DATA LINES4 ;
TITLE Multiple Imputation ;
DATA IN &DATAGO ;
DATA OUT &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_ ;
DATA LINES4 ;
TITLE Multiple Imputation ;
DATA IN &DATAGO ;
DATA OUT &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 hlhhresp;
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 hlhhresp;
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/impute567/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 hlhhresp
  ;
  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/impute567);

*****;
*** 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/imputeconv/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 hlhhresp
  ;
  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/imputeconv);

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=cunichah codent01 e6_01 IN=A1)
    M01_7A1_SORT(KEEP=cunichah 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=cunichah codent01 e8_e9_01
              RENAME=(e8_e9_01=e8_e9_01_old) IN=B1)
;
BY cunichah codent01;
IF A;
RUN;

*****;
*** Visual Figure Recall ***;
*****;

DATA multe57_13;
  MERGE multe57(IN=A)
    M01_7_SORT(KEEP=cunichah codent01 e13_01 IN=B)
;
BY cunichah 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 cunichah 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 cunichah codent01
;
*/
CONTINUOUS AGE_01 yrschool_01 hlhhresp
;
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 cunichah codent01;
RUN;

PROC SORT DATA=M01_7_A1 OUT=M01_7A1_SORT;
  BY cunichah codent01;
RUN;

PROC SORT DATA=M01_7 OUT=M01_7_SORT;
  BY cunichah codent01;
RUN;

PROC SORT DATA=multe567;
  BY cunichah codent01;
RUN;

PROC SORT DATA=multe5789;
  BY cunichah codent01;
RUN;

PROC SORT DATA=multe5713;
  BY cunichah codent01;
RUN;

DATA multe5712_1;
  MERGE multe5712(IN=A)
    multe5789(KEEP=cunichah codent01 e8_e9_01 IN=A0)
    multe5713(KEEP=cunichah codent01 e13_01)
    multe567(KEEP=cunichah codent01 e6_01 IN=A1)

```

```
M01_7A1_SORT(KEEP=cunichah 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=cunichah 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 cunichah codent01;
IF A;
RUN;
```

```
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 hlhhresp 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 hlhhresp 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_multlr.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=cunichah NPAGE_03 SEXO_03 yrschool_03 tamloc_01
                h2hhresp c1_03 c2_03 c42_03 c44_03)
    YNOCOG_AT_01(KEEP=cunichah 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 cunichah 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:\IWEware\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:\IWEware\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  sex0_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  sex0_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 sex0_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 sex_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  sex0_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

```



```

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= ,DROPPVAR= ,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 &DROPPVAR;
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 sex0_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= ,DROPPVAR= ,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 &DROPPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M03_7_V1,DROPPVAR=e10_03 e11_03, OUD=COGV1); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPPVAR=e6_e7_03 e11_03, OUD=COGV2); QUIT;
%LISTVA1(DIN=M03_7_V1,DROPPVAR=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  sex0_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:\IWEware\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;

*****;

```



```

    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= ,DROPPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  DROP &DROPPVAR;
RUN;
%MEND;

*****;
*** --- New Sample --- ***;
*****;

%LISTV(DIN=M03_7_V1,DROPPVAR=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,DROPPVAR=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,DROPPVAR=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;

%LISTVAL (DIN=M03_7_V1,DROPVAR=e13b_03 e13c_03, OUD=COGV1); QUIT;
%LISTVAL (DIN=M03_7_V1,DROPVAR=e13a_03 e13c_03, OUD=COGV2); QUIT;
%LISTVAL (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;

```

2012

```
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=Multlr_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;

```

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%LISTA(DIN=M12_7_A1,DROPVAR=e7a_1_12 e7a_2_12 e7a_3_12,OULD=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;

```





```

OPTIONS SET = SRCLIB "C:\IVEware\srclib" SASAUTOS = ('!SRCLIB' sasautos)
MAUTOSOURCE;
OPTIONS NOFMterr;

DATA _NULL_;
  INFILE DATALINES;
  FILENAME setup "C:/Users/nachen/Desktop/impute345/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/impute345);

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;

```



```

%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_;
DATA LINES4;
TITLE Multiple Imputation;
DATA IN &DATAGO;
DATA OUT &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.NOCO_G_AT_12;
  SET WVPNS_2_FN;
RUN;

DATA YCOG_AT_12;
  SET WW.COG_AT_12;
  COG_12 = 1;
RUN;

DATA YNOCO_G_AT_12;
  SET WW.NOCO_G_AT_12;
  COG_12 = 0;
RUN;

DATA M15_7;
  SET YCOG_AT_12
    YNOCO_G_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_multlr.set";
  FILE setup;
  INPUT;
  PUT _INFILE_;
  DATALINES4;
  TITLE Multiple Imputation;
  DATAIN M15_7_COV1;
  DATAOUT multlr;
  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_multlr, 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 (.,.1,8);
  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.Multlr_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;

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%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= ,DROPPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  IF COG_12 = 1;
  DROP &DROPPVAR;
RUN;
%MEND;

%LISTA1(DIN=M15_7_A1,DROPPVAR=e7a_2_15 e7a_3_15 e14a_15, OUD=COGA1); QUIT;
%LISTA1(DIN=M15_7_A1,DROPPVAR=e7a_1_15 e7a_3_15 e14a_15, OUD=COGA2); QUIT;
%LISTA1(DIN=M15_7_A1,DROPPVAR=e7a_1_15 e7a_2_15 e14a_15, OUD=COGA3); QUIT;
%LISTA1(DIN=M15_7_A1,DROPPVAR=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 --- ***;
*****;

%LISTAT(DIN=M15_7_B1,DROPVAR=e7b_2_15 e7b_3_15 e14b_15, OUD=COGB1); QUIT;
%LISTAT(DIN=M15_7_B1,DROPVAR=e7b_1_15 e7b_3_15 e14b_15, OUD=COGB2); QUIT;
%LISTAT(DIN=M15_7_B1,DROPVAR=e7b_1_15 e7b_2_15 e14b_15, OUD=COGB3); QUIT;
%LISTAT(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 cunichah 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=cunichah 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 cunichah 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 cunichah 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;

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%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;

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%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/impute_cov15/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/impute_cov15);

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;

%LISTVAL (DIN=M15_7_V1,DROPVAR=e10_15 e13_15 e9a_15 e9b_15, OUD=COGV1); QUIT;
%LISTVAL (DIN=M15_7_V1,DROPVAR= e8_15 e13_15 e9a_15 e9b_15, OUD=COGV2); QUIT;
%LISTVAL (DIN=M15_7_V1,DROPVAR= e8_15 e10_15 e9a_15 e9b_15, OUD=COGV3); QUIT;
%LISTVAL (DIN=M15_7_V1,DROPVAR= e8_15 e10_15 e13_15 e9b_15 e3b_15 e5_15,
OUD=COGV4); QUIT;
%LISTVAL (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;

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```

%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

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                                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;

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%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))

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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;
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;
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;

```

```

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 LISTVAL(DIN= ,DROPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  IF COG_12 = 1;
  DROP &DROPVAR;
RUN;
%MEND;

%LISTVAL(DIN=M15_7_V1,DROPVAR=e15b_15_ok e15c_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV1); QUIT;
%LISTVAL(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15c_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV2); QUIT;
%LISTVAL(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15d_15_ok e15e_15_ok
e15ser7_15, OUD=COGV3); QUIT;
%LISTVAL(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15c_15_ok e15e_15_ok
e15ser7_15, OUD=COGV4); QUIT;
%LISTVAL(DIN=M15_7_V1,DROPVAR=e15a_15_ok e15b_15_ok e15c_15_ok e15d_15_ok
e15ser7_15, OUD=COGV5); QUIT;
%LISTVAL(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 cunicalh 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 cunicalh 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.Multlr_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_li_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_li_15--e15ser7_15_comp e7a2_tot_18 e7a3_tot_18
e14a_tot_18, OUD=ALLA1); QUIT;
%LISTA(DIN=M18_7_A1, DROPVAR=ecom_li_15--e15ser7_15_comp e7a1_tot_18 e7a3_tot_18
e14a_tot_18, OUD=ALLA2); QUIT;
%LISTA(DIN=M18_7_A1, DROPVAR=ecom_li_15--e15ser7_15_comp e7a1_tot_18 e7a2_tot_18
e14a_tot_18, OUD=ALLA3); QUIT;
%LISTA(DIN=M18_7_A1, DROPVAR=ecom_li_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;

*impute 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 animals, 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 animals, 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 animals, 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 animals, 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_li_15--e15ser7_15_comp e7b1_tot_18 e7b3_tot_18
e14b_tot_18, OUD=ALLB2); QUIT;
%LISTA(DIN=M18_7_B1,DROPVAR=ecom_li_15--e15ser7_15_comp e7b1_tot_18 e7b2_tot_18
e14b_tot_18, OUD=ALLB3); QUIT;
%LISTA(DIN=M18_7_B1,DROPVAR=ecom_li_15--e15ser7_15_comp e7b1_tot_18 e7b2_tot_18
e7b3_tot_18, OUD=ALLB4); QUIT;

*impute 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;

*impute 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 cunichah np;
RUN;

PROC SORT DATA=WW.MULT_COG_NEWB_LA OUT=XVB;
  BY cunichah np;
RUN;

DATA XVAB;
  MERGE XVA(IN=A)
    XVB(KEEP=cunichah 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 cunichah 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 cunichah 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_li_15--e15ser7_15_comp e11b_18 e11c_18, OUD=ALLV1);
QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_li_15--e15ser7_15_comp e11a_18 e11c_18, OUD=ALLV2);
QUIT;
%LISTV(DIN=M18_7_V1,DROPVAR=ecom_li_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;

%LISTV1(DIN=M18_7_V1,DROPVAR=e11b_18 e11c_18, OUD=COGV1); QUIT;
%LISTV1(DIN=M18_7_V1,DROPVAR=e11a_18 e11c_18, OUD=COGV2); QUIT;
%LISTV1(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;
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.Multlr_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_li_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_li_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_li_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_li_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_li_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;

```



```

%LISTVAL(DIN=M18_7_V1,DROPVAR= e8a_c_18 e10_c_18 e9a_c_18 e9b_c_18, OUD=COGV3); QUIT;
%LISTVAL(DIN=M18_7_V1,DROPVAR= e8a_c_18 e10_c_18 e13a_c_18 e9b_c_18 e3b_18 e5_18,
OUD=COGV4); QUIT;
%LISTVAL(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;
  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.Multlr_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) |

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(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

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    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

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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_li_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_li_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_li_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_li_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_li_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_li_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= ,DROPPVAR= ,OUD= );
DATA OKIN_&OUD;
  SET &DIN;
  IF COG_15 = 1;
  DROP &DROPPVAR;
RUN;
%MEND;

%LISTVA1(DIN=M18_7_V1,DROPPVAR=e15b_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV1); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPPVAR=e15a_18_ok e15c_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV2); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPPVAR=e15a_18_ok e15b_18_ok e15d_18_ok e15e_18_ok e15ser7_18,
OUD=COGV3); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPPVAR=e15a_18_ok e15b_18_ok e15c_18_ok e15e_18_ok e15ser7_18,
OUD=COGV4); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPPVAR=e15a_18_ok e15b_18_ok e15c_18_ok e15d_18_ok e15ser7_18,
OUD=COGV5); QUIT;
%LISTVA1(DIN=M18_7_V1,DROPPVAR=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;

```



**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 hlhhresp 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 hlhhresp 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 multlr;
  DEFAULT TRANSFER;
  /*TRANSFER cunicah codent01
      ;
  */
  CONTINUOUS AGE_01 yrschool hlhhresp
      ;
  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;
  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.Multlr_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 hlhhresp;
  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 hlhhresp;
```

```
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 hlhhresp;
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 hlhhresp;
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 hlhhresp;
  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 hlhhresp;
  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 hlhhresp;
```

```
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 hlhhresp;
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 hlhhresp;
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 hlhhresp;
  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 hlhhresp;
  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;
```

```
DATIN &DATAGO;
```

```
DATAOUT &DATAOT;
```

```
DEFAULT TRANSFER;
```

```
/*TRANSFER cunicah codent01;*/
```

```
CONTINUOUS AGE_01 yrschool hlhhresp;
```

```
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;
```

```
DATIN &DATAGO;
```

```
DATAOUT &DATAOT;
```

```
DEFAULT TRANSFER;
```

```
/*TRANSFER cunicah codent01;*/
```

```

CONTINUOUS AGE_01 yrschool hlhhresp;
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 hlhhresp;
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 hlhhresp;
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 hlhhresp;
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

```



```

IMPV_PC14_01 IMPV_FLAG_PC14_01 IMPV_PC17_01 IMPV_FLAG_PC17_01
IMPV_PC20_01 IMPV_FLAG_PC20_01
IMPV_PC23_01 IMPV_FLAG_PC23_01 IMPV_PC26_01 IMPV_FLAG_PC26_01
IMPV_PC29_01 IMPV_FLAG_PC29_01
IMPV_PC32_01 IMPV_FLAG_PC32_01 IMPV_PC35_01 IMPV_FLAG_PC35_01
IMPV_PC38_01 IMPV_FLAG_PC38_01
IMPV_PC41_01 IMPV_FLAG_PC41_01 IMPV_PC44_01 IMPV_FLAG_PC44_01
IMPV_PC47_01 IMPV_FLAG_PC47_01
IMPV_PC50_01 IMPV_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(*) IMPV_PC5_01 IMPV_PC8_01 IMPV_PC11_01 IMPV_PC14_01
IMPV_PC17_01 IMPV_PC20_01 IMPV_PC23_01 IMPV_PC26_01
IMPV_PC29_01 IMPV_PC32_01 IMPV_PC35_01 IMPV_PC38_01
IMPV_PC41_01 IMPV_PC44_01 IMPV_PC47_01 IMPV_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 "OOOOXXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOXXXXXXXXXX";
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;
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;
END;

DROP I;

RUN;

DATA M01_7_LIST2;
  SET M01_7_LIST1;
  DROP PC5-PC52;
RUN;

```

```

PROC SORT DATA=WW01.Multlr_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;
END;

DROP I;

RUN;

DATA M01_7_LIST2;
    SET M01_7_LIST1;
    DROP PC5-PC52;
RUN;

PROC SORT DATA=WW01.Multlr_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;

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```

%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;

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%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;

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%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;

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```

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;

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```

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 "OOOOOXXXXXXXXXX";
RUN;

LIBNAME WW01 "OOOOOXXXXXXXXXX";
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.Multlr_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 = "OOOXX";
%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;
*pcl: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;

```

```

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;

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%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) maautosource;

%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) maautosource;

%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) maautosource;

%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);

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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;

```



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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;

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```

%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;
*/

```