```
libname library 'C:\Users\Croissant\Desktop\SAS';

proc format library=library cntlin=library.sasfmts;

run;

/*

proc contents data=library.Rndhrs_p;

run;

*/


/*Merge datasets*/

data library.march;

    merge library.rndhrs_p (keep=hhidpn

r8cogtot r9cogtot r10cogtot r11cogtot /*cognitive function*/

raracem  rahispan                      /*race*/

ragender                        /*gender*/

raeduc                        /*education*/

r8agey_b r9agey_b r10agey_b r11agey_b                            /*age*/

r8bmi r9bmi r10bmi r11bmi                            /*BMI*/

h8atotb h9atotb h10atotb h11atotb     /*money*/

r8smokev r9smokev r10smokev  r11smokev r8smoken r9smoken r10smoken r11smoken
/*baseline smoke*/

r8drinkn r9drinkn r10drinkn r11drinkn r8drinkd  r9drinkd r10drinkd  r11drinkd
r8drink r9drink r10drink r11drink    /*alcohol use*/

r8mstat r9mstat  r10mstat r11mstat     /*marriage status*/

r8cesd r9cesd r10cesd r11cesd/*depression*/

R8SHLT R9SHLT R10SHLT R11SHLT /*self-reported health*/

R8ADLA R9ADLA R10ADLA R11ADLA /*limitations in activities of daily living*/

raehsamp raestrat r8wtresp /*complex sample variables*/

)


    library.h06f3a (keep=hhidpn klb019a klb019b klb019c klb019d klb019e
klb020a klb020b klb020c klb004 klb007 klb011 klb015 klb009a klb009b klb009c
klb013a klb013b klb013c klb017a klb017b klb017c)
```

```
    library.h08f3a (keep=hhidpn llb019a llb019b llb019c llb019d llb019e
llb020a llb020b llb020c llb004 llb007 llb011 llb015 llb009a llb009b llb009c
llb013a llb013b llb013c llb017a llb017b llb017c)

    library.hd10f5d (keep=hhidpn mlb019a mlb019b mlb019c mlb019d mlb019e
mlb020a mlb020b mlb020c mlb004 mlb007 mlb011 mlb015 mlb009a mlb009b mlb009c
mlb013a mlb013b mlb013c mlb017a mlb017b mlb017c)

    library.h12f1a (keep=hhidpn nlb019a nlb019b nlb019c nlb019d nlb019e
nlb020a nlb020b nlb020c nlb004 nlb007 nlb011 nlb015 nlb009a nlb009b nlb009c
nlb013a nlb013b nlb013c nlb017a nlb017b nlb017c)


;


    by hhidpn;


run;


/*Clean dataset and create variables*/

data library.march;

set library.march;

/*eliminate anybody under 50*/

if r8agey_b<65 then delete;

/*create variables*/

totcyn6=n(of klb019a klb019b klb019c klb019d klb019e);

if totcyn6>=2 then cyn6=mean(of klb019a klb019b klb019c klb019d klb019e);

else cyn6=.;

totcyn8=n(of llb019a llb019b llb019c llb019d llb019e);

if totcyn8>=2 then cyn8=mean(of llb019a llb019b llb019c llb019d llb019e);

else cyn8=.;

totcyn10=n(of mlb019a mlb019b mlb019c mlb019d mlb019e);

if totcyn10>=2 then cyn10=mean(of mlb019a mlb019b mlb019c mlb019d mlb019e);

else cyn10=.;

totcyn12=n(of nlb019a nlb019b nlb019c nlb019d nlb019e);

if totcyn12>=2 then cyn12=mean(of nlb019a nlb019b nlb019c nlb019d nlb019e);

else cyn12=.;
```

```
totl6=n(of klb020a, klb020b, klb020c);

if totl6>=2 then lon6= 2 - mean(of klb020a, klb020b, klb020c);

else lon6=.;


totint6=n(of klb009a, klb009b, klb009c, klb013a, klb013b, klb013c, klb017a,
klb017b, klb017c);

if totint6>=8 then int6=mean(of klb009a, klb009b, klb009c, klb013a, klb013b,
klb013c, klb017a, klb017b, klb017c);

else int6=.;


totl8=n(of llb020a, llb020b, llb020c);

if totl8>=2 then lon8= 2 - mean(of llb020a, llb020b, llb020c);

else lon8=.;


totint8=n(of llb009a, llb009b, llb009c, llb013a, llb013b, llb013c, llb017a,
llb017b, llb017c);

if totint8>=8 then int8=mean(of llb009a, llb009b, llb009c, llb013a, llb013b,
llb013c, llb017a, llb017b, llb017c);

else int8=.;


totl10=n(of mlb020a, mlb020b, mlb020c);

if totl10>=2 then lon10= 2 - mean(of mlb020a, mlb020b, mlb020c);

else lon10=.;


totint10=n(of mlb009a, mlb009b, mlb009c, mlb013a, mlb013b, mlb013c, mlb017a,
mlb017b, mlb017c);

if totint10>=8 then int10=mean(of mlb009a, mlb009b, mlb009c, mlb013a,
mlb013b, mlb013c, mlb017a, mlb017b, mlb017c);

else int10=.;


totl12=n(of nlb020a, nlb020b, nlb020c);

if totl12>=2 then lon12= 2 - mean(of nlb020a, nlb020b, nlb020c);

else lon12=.;
```

```
totint12=n(of nlb009a, nlb009b, nlb009c, nlb013a, nlb013b, nlb013c, nlb017a,
nlb017b, nlb017c);

if totint12>=8 then int12=mean(of nlb009a, nlb009b, nlb009c, nlb013a,
nlb013b, nlb013c, nlb017a, nlb017b, nlb017c);

else int12=.;


if r8smokev=0 then r8smoke=0;

else if r8smokev=1 AND r8smoken=0 then r8smoke=1;

else if r8smoken=1 then r8smoke=2;

else r8smoke=.;


if r9smokev=0 then r9smoke=0;

else if r9smokev=1 AND r9smoken=0 then r9smoke=1;

else if r9smoken=1 then r9smoke=2;

else r9smoke=.;


if r10smokev=0 then r10smoke=0;

else if r10smokev=1 AND r10smoken=0 then r10smoke=1;

else if r10smoken=1 then r10smoke=2;

else r10smoke=.;


if r11smokev=0 then r11smoke=0;

else if r11smokev=1 AND r11smoken=0 then r11smoke=1;

else if r11smoken=1 then r11smoke=2;

else r11smoke=.;


r8dtot=r8drinkn*r8drinkd;

if ragender=1 and r8drinkn>=5 then r8dkz=2;

else if ragender=2 and r8drinkn>=4 then r8dkz=2;

else if ragender=1 and r8dtot>=15 then r8dkz=2;

else if ragender=2 and r8dtot>=8 then r8dkz=2;
```

```
else if ragender=1 and r8dtot in (1 2 3 4 5 6 7 8 9 10 11 12 13 14) then
r8dkz=1;

else if ragender=2 and r8dtot in (1 2 3 4 5 6 7) then r8dkz=1;

else if r8drink=0 or r8drinkn=0 or r8drinkd=0 then r8dkz=0;

else r8dkz=.;


r9dtot=r9drinkn*r9drinkd;

if ragender=1 and r9drinkn>=5 then r9dkz=2;

else if ragender=2 and r9drinkn>=4 then r9dkz=2;

else if ragender=1 and r9dtot>=15 then r9dkz=2;

else if ragender=2 and r9dtot>=8 then r9dkz=2;

else if ragender=1 and r9dtot in (1 2 3 4 5 6 7 8 9 10 11 12 13 14) then
r9dkz=1;

else if ragender=2 and r9dtot in (1 2 3 4 5 6 7) then r9dkz=1;

else if r9drink=0 or r9drinkn=0 or r9drinkd=0 then r9dkz=0;

else r9dkz=.;


r10dtot=r10drinkn*r10drinkd;

if ragender=1 and r10drinkn>=5 then r10dkz=2;

else if ragender=2 and r10drinkn>=4 then r10dkz=2;

else if ragender=1 and r10dtot>=15 then r10dkz=2;

else if ragender=2 and r10dtot>=8 then r10dkz=2;

else if ragender=1 and r10dtot in (1 2 3 4 5 6 7 8 9 10 11 12 13 14) then
r10dkz=1;

else if ragender=2 and r10dtot in (1 2 3 4 5 6 7) then r10dkz=1;

else if r10drink=0 or r10drinkn=0 or r10drinkd=0 then r10dkz=0;

else r10dkz=.;


r11dtot=r11drinkn*r11drinkd;

if ragender=1 and r11drinkn>=5 then r11dkz=2;

else if ragender=2 and r11drinkn>=4 then r11dkz=2;

else if ragender=1 and r11dtot>=15 then r11dkz=2;

else if ragender=2 and r11dtot>=8 then r11dkz=2;
```

```
else if ragender=1 and r11dtot in (1 2 3 4 5 6 7 8 9 10 11 12 13 14) then
r11dkz=1;

else if ragender=2 and r11dtot in (1 2 3 4 5 6 7) then r11dkz=1;

else if r9drink=0 or r11drinkn=0 or r11drinkd=0 then r11dkz=0;

else r11dkz=.;


run;


/*Assumption checking

%macro check(var);

 proc univariate data=library.march;

            var &var;

            histogram / normal(noprint);

            qqplot;

        run;

%mend;

%check(r8cogtot)

%check(r9cogtot)

%check(r10cogtot)

%check(r11cogtot)

%check(r8agey_b)

%check(r9agey_b)

%check(r10agey_b)

%check(r11agey_b)

%check(r8bmi)

%check(r9bmi)

%check(r10bmi)

%check(r11bmi)

%check(h8atotb)

%check(h9atotb)

%check(h10atotb)

%check(h11atotb)
```

```
%check(lon6)
%check(lon8)
%check(lon10)
%check(lon12)
%check(int6)
%check(int8)
%check(int10)
%check(int12)
%check(cyn6)
%check(cyn8)
%check(cyn10)
%check(cyn12)
%check(r8shlt)
%check(r9shlt)
%check(r10shlt)
%check(r11shlt)
%check(r8adla)
%check(r9adla)
%check(r10adla)
%check(r11adla)
*/

/*FREQ of ADL Difficulties, examination
proc freq data=library.march;
table r8adla;
run;*/

/*Transformation of variables not meeting assumptions*/
/*BMI and ADL*/
data library.march; set library.march;
tr8bmi = sqrt(r8bmi);
tr9bmi = sqrt(r9bmi);
```

```
tr10bmi = sqrt(r10bmi);
tr11bmi = sqrt(r11bmi);
if r8adla=0 then r8adl=0;
else if r8adla in (1, 2, 3, 4, 5) then r8adl=1;
else r8adl=.;

if r9adla=0 then r9adl=0;
else if r9adla in (1, 2, 3, 4, 5) then r9adl=1;
else r9adl=.;

if r10adla=0 then r10adl=0;
else if r10adla in (1, 2, 3, 4, 5) then r10adl=1;
else r10adl=.;

if r11adla=0 then r11adl=0;
else if r11adla in (1, 2, 3, 4, 5) then r11adl=1;
else r11adl=.;
run;

/*
%check(tr8bmi)
%check(tr9bmi)
%check(tr10bmi)
%check(tr11bmi)*/
/*check ADL
proc freq data=library.march;
table r8adla r8adl r9adla r9adl r10adla r10adl r11adla r11adl;
run;*/

/*SES*/
/*technique taken from:
http://www.pauldickman.com/teaching/sas/quintiles.php*/
```

```
%macro quint(dsn,var,quintvar);
/* calculate the cutpoints for the quintiles */
proc univariate noprint data=&dsn;
  var &var;
  output out=quintile pctlpts=20 40 60 80 pctlpre=pct;
run;
/* write the quintiles to macro variables */
data _null_;
set quintile;
call symput('q1',pct20) ;
call symput('q2',pct40) ;
call symput('q3',pct60) ;
call symput('q4',pct80) ;
run;

/* create the new variable in the main dataset */
data &dsn;
set &dsn;
       if &var =. then &quintvar = .;
  else if &var le &q1 then &quintvar=1;
  else if &var le &q2 then &quintvar=2;
  else if &var le &q3 then &quintvar=3;
  else if &var le &q4 then &quintvar=4;
  else &quintvar=5;
run;

%mend quint;
%quint(library.march,h8atotb,th8atotb)
%quint(library.march,h9atotb,th9atotb)
%quint(library.march,h10atotb,th10atotb)
%quint(library.march,h11atotb,th11atotb)
/*check assumptions
```

```
%check(th8atotb)
%check(th9atotb)
%check(th10atotb)
%check(th11atotb)*/

/**SPECIFY PARTICIPANTS WITH OUTCOME MEASURE AT MIN 1 WAVE**/
/*change missing to . in cogtot*/
data dem;
 set library.march;
 Array recode(4)
 /*outcome*/
r8cogtot
r9cogtot
r10cogtot
r11cogtot;
 Do I = 1 to 4;
 If recode(i)=' ' then recode(I)=.;
 If recode(i)=.N then recode(I)=.;
 If recode(i)=.X then recode(I)=.;
 If recode(i)=.S then recode(I)=.;
 If recode(i)=.D then recode(I)=.;
 If recode(i)=.R then recode(I)=.;
 If recode(i)=.M then recode(I)=.;
End;
 Drop I;
Run;

/*
proc means data=library.march;
var
r8cogtot
r9cogtot
```

```
r10cogtot
r11cogtot
r8agey_b
r9agey_b
r10agey_b
r11agey_b
tr8bmi
tr9bmi
tr10bmi
tr11bmi
lon6
lon8
lon10
lon12
int6
int8
int10
int12
cyn6
cyn8
cyn10
cyn12
;
Run;

proc freq data=library.march;
table
raracem
rahispan
ragender
raeduc
r8smoke
```

```
r9smoke
r10smoke
r11smoke
r8dkz
r9dkz
r10dkz
r11dkz
th8atotb
th9atotb
th10atotb
th11atotb
R8ADLA R9ADLA R10ADLA R11ADLA;
run;*/

/*Assess for multicollinearity/correlations
 proc corr data=library.march;

            var
lon6
lon8
lon10
lon12
int6
int8
int10
int12
cyn6
cyn8
cyn10
cyn12;
        Run;
```

```
ods pdf close;
*/

/*Dummy code categorical variables*/
data library.march;
set library.march;
/*REFERENCE WHITE*/
/*1 white, 2 black, 3 other*/
if raracem=2 then black=1;
else if raracem in (1 3) then black=0;
else black=.;
if raracem=3 then other=1;
else if raracem in (1 2) then other=0;
else other=.;

/*REFERENCE MALE*/
/*1 male, 2 female*/
if ragender=2 then gender=1;
else if ragender=1 then gender=0;
else gender=.;

/*REFERENCE HIGH SCHOOL*/
if raeduc=1 then nohs=1;
else if raeduc in (2 3 4 5) then nohs=0;
else nohs=.;

if raeduc=2 then ged=1;
else if raeduc in (1 3 4 5) then ged=0;
else ged=.;
if raeduc=4 then scollege=1;
else if raeduc in (1 2 3 5) then scollege=0;
else scollege=.;
```

```
if raeduc=5 then college=1;
else if raeduc in (1 2 3 4) then college=0;
else college=.;

/*REFERENCE MARRIED/PARTNERED*/
/*directly into array variable names*/
/*2006*/
if r8mstat in (4 5 6) then split1=1;
else if r8mstat in (1 2 3 7 8) then split1=0;
else split1=.;

if r8mstat in (7) then widow1=1;
else if r8mstat in (1 2 3 4 5 6 8) then widow1=0;
else widow1=.;

if r8mstat in (8) then single1=1;
else if r8mstat in (1 2 3 4 5 6 7) then single1=0;
else single1=.;

/*2008*/
if r9mstat in (4 5 6) then split2=1;
else if r9mstat in (1 2 3 7 8) then split2=0;
else split2=.;

if r9mstat in (7) then widow2=1;
else if r9mstat in (1 2 3 4 5 6 8) then widow2=0;
else widow2=.;
if r9mstat in (8) then single2=1;
else if r9mstat in (1 2 3 4 5 6 7) then single2=0;
else single2=.;

/*2010*/
```

```
if r10mstat in (4 5 6) then split3=1;
else if r10mstat in (1 2 3 7 8) then split3=0;
else split3=.;

if r10mstat in (7) then widow3=1;
else if r10mstat in (1 2 3 4 5 6 8) then widow3=0;
else widow3=.;

if r10mstat in (8) then single3=1;
else if r10mstat in (1 2 3 4 5 6 7) then single3=0;
else single3=.;

/*2012*/
if r11mstat in (4 5 6) then split4=1;
else if r11mstat in (1 2 3 7 8) then split4=0;
else split4=.;

if r11mstat in (7) then widow4=1;
else if r11mstat in (1 2 3 4 5 6 8) then widow4=0;
else widow4=.;

if r11mstat in (8) then single4=1;
else if r11mstat in (1 2 3 4 5 6 7) then single4=0;
else single4=.;

/*REFERENCE NEVER BEEN A SMOKER*/
/*directly into array variable names*/
/*2006*/
if r8smoke=1 then quit1=1;
else if r8smoke in (0 2) then quit1=0;
else quit1=.;
```

```
if r8smoke=2 then smoker1=1;
else if r8smoke in (0 1) then smoker1=0;
else smoker1=.;
/*2008*/

if r9smoke=1 then quit2=1;
else if r9smoke in (0 2) then quit2=0;
else quit2=.;

if r9smoke=2 then smoker2=1;
else if r9smoke in (0 1) then smoker2=0;
else smoker2=.;
/*2010*/
if r10smoke=1 then quit3=1;
else if r10smoke in (0 2) then quit3=0;
else quit3=.;

if r10smoke=2 then smoker3=1;
else if r10smoke in (0 1) then smoker3=0;
else smoker3=.;

/*2012*/
if r11smoke=1 then quit4=1;
else if r11smoke in (0 2) then quit4=0;
else quit4=.;

if r11smoke=2 then smoker4=1;
else if r11smoke in (0 1) then smoker4=0;
else smoker4=.;

/*REFERENCE MODERATE DRINKERS*/
/*2006*/
```

```
if r8dkz=0 then teatot1=1;
else if r8dkz in (1 2) then teatot1=0;
else teatot1=.;

if r8dkz=2 then atrisk1=1;
else if r8dkz in (0 1) then atrisk1=0;
else atrisk1=.;
/*2008*/
if r9dkz=0 then teatot2=1;
else if r9dkz in (1 2) then teatot2=0;
else teatot2=.;

if r9dkz=2 then atrisk2=1;
else if r9dkz in (0 1) then atrisk2=0;
else atrisk2=.;
/*2010*/
if r10dkz=0 then teatot3=1;
else if r10dkz in (1 2) then teatot3=0;
else teatot3=.;
if r10dkz=2 then atrisk3=1;
else if r10dkz in (0 1) then atrisk3=0;
else atrisk3=.;

/*2012*/
if r11dkz=0 then teatot4=1;
else if r11dkz in (1 2) then teatot4=0;
else teatot4=.;

if r11dkz=2 then atrisk4=1;
else if r11dkz in (0 1) then atrisk4=0;
else atrisk4=.;
```

```
/*SES*/
/*REFERENCE MIDDLE*/

if th8atotb=1 then h8lower=1;
else if th8atotb in (2 3 4 5) then h8lower=0;
else h8lower=.;
if th8atotb=2 then h8lowmid=1;
else if th8atotb in (1 3 4 5) then h8lowmid=0;
else h8lowmid=.;
if th8atotb=4 then h8upmid=1;
else if th8atotb in (1 2 3 5) then h8upmid=0;
else h8upmid=.;
if th8atotb=5 then h8upper=1;
else if th8atotb in (1 2 3 4) then h8upper=0;
else h8upper=.;

if th9atotb=1 then h9lower=1;
else if th9atotb in (2 3 4 5) then h9lower=0;
else h9lower=.;
if th9atotb=2 then h9lowmid=1;
else if th9atotb in (1 3 4 5) then h9lowmid=0;
else h9lowmid=.;
if th9atotb=4 then h9upmid=1;
else if th9atotb in (1 2 3 5) then h9upmid=0;
else h9upmid=.;
if th9atotb=5 then h9upper=1;
else if th9atotb in (1 2 3 4) then h9upper=0;
else h9upper=.;

if th10atotb=1 then h10lower=1;
else if th10atotb in (2 3 4 5) then h10lower=0;
else h10lower=.;
```

```
if th10atotb=2 then h10lowmid=1;
else if th10atotb in (1 3 4 5) then h10lowmid=0;
else h10lowmid=.;
if th10atotb=4 then h10upmid=1;
else if th10atotb in (1 2 3 5) then h10upmid=0;
else h10upmid=.;
if th10atotb=5 then h10upper=1;
else if th10atotb in (1 2 3 4) then h10upper=0;
else h10upper=.;

if th11atotb=1 then h11lower=1;
else if th11atotb in (2 3 4 5) then h11lower=0;
else h11lower=.;
if th11atotb=2 then h11lowmid=1;
else if th11atotb in (1 3 4 5) then h11lowmid=0;
else h11lowmid=.;
if th11atotb=4 then h11upmid=1;
else if th11atotb in (1 2 3 5) then h11upmid=0;
else h11upmid=.;
if th11atotb=5 then h11upper=1;
else if th11atotb in (1 2 3 4) then h11upper=0;
else h11upper=.;

/*SELF-REPORTED HEALTH*/
/*REFERENCE GOOD*/

if R8SHLT=1 then r8exhealth=1;
else if R8SHLT in (2 3 4 5) then r8exhealth=0;
else r8exhealth=.;
if R8SHLT=2 then r8vghealth=1;
else if R8SHLT in (1 3 4 5) then r8vghealth=0;
else r8vghealth=.;
```

```
if R8SHLT=4 then r8fhealth=1;
else if R8SHLT in (1 2 3 5) then r8fhealth=0;
else r8fhealth=.;
if R8SHLT=5 then r8phealth=1;
else if R8SHLT in (1 2 3 4) then r8phealth=0;
else r8phealth=.;

if R9SHLT=1 then r9exhealth=1;
else if R9SHLT in (2 3 4 5) then r9exhealth=0;
else r9exhealth=.;
if R9SHLT=2 then r9vghealth=1;
else if R9SHLT in (1 3 4 5) then r9vghealth=0;
else r9vghealth=.;
if R9SHLT=4 then r9fhealth=1;
else if R9SHLT in (1 2 3 5) then r9fhealth=0;
else r9fhealth=.;
if R9SHLT=5 then r9phealth=1;
else if R9SHLT in (1 2 3 4) then r9phealth=0;
else r9phealth=.;

if R10SHLT=1 then r10exhealth=1;
else if R10SHLT in (2 3 4 5) then r10exhealth=0;
else r10exhealth=.;
if R10SHLT=2 then r10vghealth=1;
else if R10SHLT in (1 3 4 5) then r10vghealth=0;
else r10vghealth=.;
if R10SHLT=4 then r10fhealth=1;
else if R10SHLT in (1 2 3 5) then r10fhealth=0;
else r10fhealth=.;
if R10SHLT=5 then r10phealth=1;
else if R10SHLT in (1 2 3 4) then r10phealth=0;
else r10phealth=.;
```

```
if R11SHLT=1 then r11exhealth=1;
else if R11SHLT in (2 3 4 5) then r11exhealth=0;
else r11exhealth=.;
if R11SHLT=2 then r11vghealth=1;
else if R11SHLT in (1 3 4 5) then r11vghealth=0;
else r11vghealth=.;
if R11SHLT=4 then r11fhealth=1;
else if R11SHLT in (1 2 3 5) then r11fhealth=0;
else r11fhealth=.;
if R11SHLT=5 then r11phealth=1;
else if R11SHLT in (1 2 3 4) then r11phealth=0;
else r11phealth=.;
run;

/*checking race dummy coding
proc freq data=library.march;
table
R8SHLT r8exhealth r8vghealth r8fhealth r8phealth
R9SHLT r9exhealth r9vghealth r9fhealth r9phealth
R10SHLT r10exhealth r10vghealth r10fhealth r10phealth
R11SHLT r11exhealth r11vghealth r11fhealth r11phealth
; run;

raracem rahispan black other
raeduc nohs ged scollege college
r8mstat split1 widow1 single1
r9mstat split2 widow2 single2
r10mstat split3 widow3 single3
r11mstat split4 widow4 single4
th8atotb h8lower h8lowmid h8upmid h8upper
th9atotb h9lower h9lowmid h9upmid h9upper
```

```
th10atotb h10lower h10lowmid h10upmid h10upper
th11atotb h11lower h11lowmid h11upmid h11upper

;
run;*/

/*Center continuous variables*/
PROC STANDARD data=library.march MEAN=0 OUT=TEMP;
VAR
r8cogtot
r9cogtot
r10cogtot
r11cogtot
r8agey_b
r9agey_b
r10agey_b
r11agey_b
tr8bmi
tr9bmi
tr10bmi
tr11bmi
lon6
lon8
lon10
lon12
int6
int8
int10
int12
cyn6
cyn8
cyn10
```

```
cyn12
R8ADLA
R9ADLA R10ADLA R11ADLA;
;
RUN;

/*Change data format - horizontal to vertical*/
data temp;
set temp;

cogtot1=r8cogtot;
cogtot2=r9cogtot;
cogtot3=r10cogtot;
cogtot4=r11cogtot;

cyn1=cyn6;
cyn2=cyn8;
cyn3=cyn10;
cyn4=cyn12;

lon1=lon6;
lon2=lon8;
lon3=lon10;
lon4=lon12;

age1=r8agey_b;
age2=r9agey_b;
age3=r10agey_b;
age4=r11agey_b;

bmi1=tr8bmi;
bmi2=tr9bmi;
```

```
bmi3=tr10bmi;
bmi4=tr11bmi;

int1=int6;
int2=int8;
int3=int10;
int4=int12;

lower1=h8lower;
lowmid1=h8lowmid;
upmid1=h8upmid;
upper1=h8upper;

lower2=h9lower;
lowmid2=h9lowmid;
upmid2=h9upmid;
upper2=h9upper;

lower3=h10lower;
lowmid3=h10lowmid;
upmid3=h10upmid;
upper3=h10upper;

lower4=h11lower;
lowmid4=h11lowmid;
upmid4=h11upmid;
upper4=h11upper;


eh1=r8exhealth;
eh2=r9exhealth;
eh3=r10exhealth;
```

```
eh4=r11exhealth;
vh1=r8vghealth;
vh2=r9vghealth;
vh3=r10vghealth;
vh4=r11vghealth;
fh1=r8fhealth;
fh2=r9fhealth;
fh3=r10fhealth;
fh4=r11fhealth;
ph1=r8phealth;
ph2=r9phealth;
ph3=r10phealth;
ph4=r11phealth;

ad1=R8ADL;
ad2=R9ADL;
ad3=R10ADL;
ad4=R11ADL;

array cogtot[4];
array cyn[4];
array lon[4];
array age[4];
array bmi[4];
array int[4];
array ad[4];

array split[4];
array widow[4];
array single[4];

array quit[4];
```

```
array smoker[4];

array teatot[4];
array atrisk[4];

array lower[4];
array lowmid[4];
array upmid[4];
array upper[4];

array eh[4];
array vh[4];
array fh[4];
array ph[4];


do time = 1 to 4;

CT=cogtot[time];
CH=cyn[time];
L=lon[time];
AGEr=age[time];
BMIr=bmi[time];
INTr=int[time];
splitr=split[time];
widowr=widow[time];
singler=single[time];
quitr=quit[time];
smokerr=smoker[time];
teatotr=teatot[time];
atriskr=atrisk[time];
low=lower[time];
```

```
lmid=lowmid[time];
umid=upmid[time];
up=upper[time];
excellent=eh[time];
verygood=vh[time];
fair=fh[time];
poor=ph[time];
activity=ad[time];

output;
end;

keep hhidpn time CT CH L AGEr BMIr INTr
splitr widowr singler quitr smokerr teatotr atriskr
black other rahispan gender nohs ged scollege college
low lmid umid up
excellent verygood fair poor
activity
;

run;

/*Shifting time points so that the first time point is 0*/
data temp; set temp;
time=time-1;
run;

/*Find covariance structure*/
/*With curvilinear time*/
PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time time*time / SOLUTION DDFM=BW;
```

```
RANDOM INTERCEPT time / SUB=HHIDPN TYPE=UN;
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time time*time / SOLUTION DDFM=BW;
RANDOM INTERCEPT time / SUB=HHIDPN TYPE=TOEP;
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time time*time / SOLUTION DDFM=BW;
RANDOM time / SUB=HHIDPN TYPE=VC;
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN TIME;
MODEL CT = time time*time / SOLUTION DDFM=BW;
REPEATED TIME / SUB=HHIDPN TYPE=CS;
RUN;

PROC MIXED COVTEST INFO DATA=TEMP;
CLASS HHIDPN TIME;
MODEL CT = time time*time / SOLUTION DDFM=BW;
REPEATED TIME / SUB=HHIDPN TYPE=AR(1);
RUN;

/*Without curvilinear time*/
PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time / SOLUTION DDFM=BW;
RANDOM INTERCEPT time / SUB=HHIDPN TYPE=UN;
```

```
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time / SOLUTION DDFM=BW;
RANDOM INTERCEPT time / SUB=HHIDPN TYPE=TOEP;
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN;
MODEL CT = time / SOLUTION DDFM=BW;
RANDOM time / SUB=HHIDPN TYPE=VC;
RUN;

PROC MIXED COVTEST INFO data=temp;
CLASS HHIDPN TIME;
MODEL CT = time / SOLUTION DDFM=BW;
REPEATED TIME / SUB=HHIDPN TYPE=CS;
RUN;

PROC MIXED COVTEST INFO DATA=TEMP;
CLASS HHIDPN TIME;
MODEL CT = time / SOLUTION DDFM=BW;
REPEATED TIME / SUB=HHIDPN TYPE=AR(1);
RUN;

ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_0.pdf';

/*SELECTED UNSTRUCTURED, NO CURVILINEAR TIME*/

/*Unconditional model*/
```

```
proc mixed covtest info data=temp;

class hhidpn;

model ct=time/solution ddfm=bw;

random intercept time/ SUB=HHIDPN TYPE=UN;

RUN;


ods pdf close;

ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_1.pdf';


/*Intercepts and slopes as outcomes model*/

/*Model 1 - just predictors of interest*/

PROC MIXED COVTEST INFO DATA=temp;

CLASS HHIDPN;

MODEL CT = L CH time time*L time*CH/ SOLUTION DDFM=BW cl;

RANDOM INTERCEPT TIME / SUB=HHIDPN TYPE=UN;

RUN;


ods pdf close;

ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_2.pdf';


/*Model 2 - add demographics*/

PROC MIXED COVTEST INFO DATA=temp;

CLASS HHIDPN

black other rahispan

gender nohs ged scollege college

low lmid umid up;

MODEL CT =

/*dem*/

black other rahispan

gender

nohs ged scollege college
```

```
ager

low lmid umid up

/*time*/

time

/*psychosocial*/

L CH time*L time*CH/ SOLUTION DDFM=BW cl;

RANDOM INTERCEPT TIME / SUB=HHIDPN TYPE=UN;

RUN;


ods pdf close;

ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_3.pdf';


/*Model 3 - add health/limitations*/

PROC MIXED COVTEST INFO DATA=temp;

CLASS HHIDPN black other rahispan

gender nohs ged scollege college

low lmid umid up

excellent verygood fair poor

activity;

MODEL CT =

/*dem*/

black other rahispan

gender

nohs ged scollege college

ager

low lmid umid up

/*health and limitations*/

excellent verygood fair poor

activity

/*time*/

time
```

```
/*psychosocial*/
L CH time*L time*CH/ SOLUTION DDFM=BW cl;
RANDOM INTERCEPT TIME / SUB=HHIDPN TYPE=UN;
RUN;

ods pdf close;
ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_4.pdf';

/*Model 4 - add social*/
PROC MIXED COVTEST INFO DATA=temp;
CLASS HHIDPN
black other rahispan
gender nohs ged scollege college
low lmid umid up
excellent verygood fair poor
activity
splitr widowr singler;
MODEL CT =
/*dem*/
black other rahispan
gender
nohs ged scollege college
ager
low lmid umid up
/*health and limitations*/
excellent verygood fair poor
activity
/*time*/
time
/*psychosocial*/
splitr widowr singler
```

```
intr

L CH time*L time*CH/ SOLUTION DDFM=BW cl;

RANDOM INTERCEPT TIME / SUB=HHIDPN TYPE=UN;

RUN;


ods pdf close;

ods pdf file='C:\Users\Croissant\Desktop\Thesis Pub\Take
2\Revision\Materials\Results Files\Model_5.pdf';


/*Model 5 - add social as predictor of cognitive decline*/

PROC MIXED COVTEST INFO DATA=temp;

CLASS HHIDPN black other rahispan

gender nohs ged scollege college

low lmid umid up

excellent verygood fair poor

activity

splitr widowr singler;

MODEL CT =

/*dem*/

black other rahispan

gender

nohs ged scollege college

ager

low lmid umid up

/*health and limitations*/

excellent verygood fair poor

activity

/*time*/

time

/*psychosocial*/

splitr widowr singler

intr
```

```
L CH time*L time*CH intr*time/ SOLUTION DDFM=BW cl;
RANDOM INTERCEPT TIME / SUB=HHIDPN TYPE=UN;
RUN;

ods pdf close;
```