```
* IVEware (SAS-Callable) Analysis Examples Replication for ASDA 3rd Edition, SAS v9.4 TS1M8 ;
* Berglund Winter 2025 ;
* Chapter 5 ;

libname d "P:\ASDA3\Data Sets for Analysis Examples and Stata R Code" ;

ods listing ;
options nodate nonumber ;

* Note: run this code in the SAS REGULAR PROGRAM EDITOR, NOT THE ENHANCED EDITOR! ;
* Note: IVEware can also be run using the XML editor method, see IVEware website for details and numerous examples! ;

data c5_nhanes ;
  set d.nhanes1112 ;
 if age >= 18 and age ne . then age18p=1 ; else age18p=0 ;
 int_wtmec2yr = int(wtmec2yr) ;
 female=0 ;
 if riagendr=2 then female = 1 ;
 if age > 45 then age45=1 ; else age45=0 ;
run ;

ods rtf style=minimal bodytitle ;

title "Example 5.1 : generate weighted histogram of cholesterol, Plots Not Available in IVEware"  ;
title "Example 5.2:generate weighted boxplot of cholesterol by gender, Plots Not Available in IVEware" ;

title "Example 5.3 : Population totals using NCSR data " ;
data c5_ncsr ;
 set d.ncsr ;
 * create variables needed for NCSR examples ;
 ncsrwtsh_pop = ncsrwtsh * (209128094 / 9282) ;
run ;

* set options and location to call IVEware from SAS session, the path has to match your installation of IVEware! ;

options set=srclib "E:\ive 11feb24\sas" sasautos=('!srclib' sasautos) mautosource ;

* NOTE: Totals are not available in IVEware ;

data c5_hrs ;
 set d.hrs12 ;
 if nfinr=1 then finr=1 ; else if nfinr in (3,5) then finr=0 ; else finr=. ;
 if gender=2 then female=1 ; else female=0 ;
 if nage >=70 then age70=1 ; else age70=0 ;
run ;

proc freq data=c5_hrs ; tables finr*nfinr female age70 ; run ;

title "Figure 5.1 Scatter Plot is not available in IVEware" ;
title "Example 5.4 : Total HH Wealth using HRS 2012 data, Note: Totals are not available in IVEware, PB: double check
this!" ;

****;
title "Example 5.5: Estimating the Mean Value of Household Income using the 2012 HRS Data." ;
%describe (setup=new, name="Example 5.5 Mean HH Income Using HRS Data", dir="P:\ASDA3\Replication Iveware\Chapter 5") ;
 title "Example 5.5, Mean HH Income using HRS Data" ;
 datain c5_hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11itot ;
run;

title "Example 5.5 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with
Complex Sample Features and
 Weights Incorporated into Data Set" ;
%bbdesign (setup=new, name="Example 5.5 BBDesign for Mean HH Income Using HRS Data", dir=P:\ASDA3\Replication
Iveware\Chapter 5) ;
 datain c5_hrs ;
 dataout c5_hrs_bb ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 csamples 5 ;
 wsamples 5 ;
 seed 2025 ;
run;

* check contents of data set;
```

```
proc contents data=c5_hrs_bb ; run ;
* confirm 10*25*original n = 5138500;
proc freq data=c5_hrs_bb ;
 tables _impl_ ;
run ;

ods text="Note that the combining rules for data from BBDesign are different than what is performed in IVEware, see the
IVEware documentation
   at https://smponline.isr.umich.edu/software/iveware-user-guide-chapter-9-iveware-and-sas/#93bbdesign for a full
example.
   Chapter 9 includes SAS code to calculate correct estimates/variances for a continuous variable and linear and
logistic regressions, where MI is performed within the BBDesign
   data set.  We show just the creation of the BBDesign data set in these programs.  Check back for future updates
posted on the ASDA website." ;

****;
title "Example 5.6: Estimating Mean Systolic Blood Pressure using the NHANES Data." ;
%describe (setup=new, name="Example 5.6 Mean Systolic BP Using NHANES Data", dir=P:\ASDA3\Replication Iveware\Chapter
5) ;
 title "Example 5.6, Mean Systolic BP using NHANES Data" ;
 datain c5_nhanes ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age18p ;
 mean bpxsy1 ;
run;

title "Example 5.6 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with
Complex Sample Features Incorporated into Data Set" ;
%bbdesign (setup=new, name="Example 5.6 BBDesign Data for Mean Systolic BP Using NHANES Data", dir=P:\ASDA3\Replication
Iveware\Chapter 5) ;
 datain c5_nhanes ;
 dataout c5_nhanes_bb ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 csamples 5 ;
 wsamples 5 ;
 seed 2025 ;
run;

* check contents of data set;
proc contents data=c5_nhanes_bb ; run ;
* confirm 25*original n = 97560 *10 (default value)  ;
proc freq data=c5_nhanes_bb ;  tables _impl_ ; run ;


****;
title "Example 5.7: Estimating the Mean Value of Total Household Wealth using the HRS Data." ;
%describe (setup=new, name="Example 5.7 Mean HH Wealth Using HRS Data", dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 title "Example 5.7, Mean Total HH Wealth using HRS Data" ;
 datain c5_hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11atota ;
run;

title "Example 5.7 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with
Complex Sample Features Incorporated into Data Set" ;
* Note : use c5_hrs_bb data set already prepared for Example 5.5, see note about analysis of the Synthetic data from
BBDesign" ;

ods text ="Example 5.8: Weighted HH Total Income, HRS Data, No Totals Available in %describe of IVEware";

ods text="Example 5.9: Population Quantiles not Available in IVEware" ;

ods text="Example 5.10: Estimating the Lorenz Curve and Gini Coefficient for the 2012 HRS Population Distribution of
Total Household Wealth. Not available in IVEware" ;

ods text="Figure 5.5 Weighted Scatter Plot not directly available in %describe module in IVEware, see %regress for
alternative approach with simple linear regression" ;

title "Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-
2012 NHANES.";

proc means data=c5_nhanes mean ;
 where age18p=1 ;
```

```
 var lbdhdd lbxtc ;
 weight wtmec2yr ;
run ;
proc corr data=c5_nhanes ;
 where age18p=1 ;
 var lbdhdd lbxtc ;
 weight wtmec2yr ;
run ;

* prepare data set for linear regression in IVEware;
data c5_nhanes_1 ;
 set c5_nhanes ;
 stdlbxtc=(lbxtc - 194.4355)/41.05184 ;
 stdlbdhdd = (lbdhdd - 52.83826) / 14.93157 ;
run ;

%regress(setup=new, name="Example 5.11 Correlation of Adult Total and HDL Cholesterol Using NHANES Data",
dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 title "Example 5.11 Correlation of Adult Total and HDL Cholesterol Using NHANES Data" ;
 datain c5_nhanes_1 ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age18p ;
 dependent stdlbdhdd ;
 predictor stdlbxtc ;
run;

ods text="Example 5.12: Estimating the Population Ratio of High Density to Total Cholesterol for U.S. Adults. Not
available in IVEware (Ratios)";

title "Example 5.13: Estimating the Proportions of Males and Females Age >= 70 with Diabetes Using the HRS Data." ;
%describe (setup=new, name="Example 5.13 Proportions of Males and Females Age 70 Plus with Diabetes",
dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 title "Example 5.13 Proportions of Males and Females Age >= 70 with Diabetes, Using HRS Data" ;
 datain c5_hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgtr ;
 by age70 gender ;
 mean diabetes ;
run;

* NOTE IVEware will halt if any stratum have only 1 cluster:
 Read data
    Only one cluster for stratum 53
    Only one cluster for stratum 55
    Only one cluster for stratum 53 ;

title "Example 5.14: Estimating Mean Systolic Blood Pressure for Males and Females Age > 45 using the 2011-2012 NHANES
data.";
%describe (setup=new,name="Example 5.14 Mean Systolic BP by Gender Age 45 Plus using the NHANES data",
dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 title "Example 5.14 Estimating Mean Systolic Blood Pressure for Males and Females Age 45 Plus using the 2011-2012
NHANES data.";
 datain c5_nhanes ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age45 riagendr ;
 mean bpxsy1 ;
run;

**** ;
title "Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by
Educational Attainment Level."  ;
%describe (setup=new, name="Example 5.15", dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 datain c5_hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11atota ;
 contrast edcat ;
run;


****;
title "Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS
study." ;
```

```
data hrs_2010_2012_c5 ;
 set d.hrs_2010_2012_both ;
 * prepare data for analysis ;
 hhweight = mwgthh ;  if year=2012 then hhweight = nwgthh ;
 totwealth=h10atota ; if year=2012 then totwealth=h11atota ;
 finr2010 = 0 ;  if (year = 2010 & mfinr = 1) then finr2010=1 ;
 finr2012 = 0 ;  if (year = 2012 & nfinr = 1) then finr2012=1 ;
 finr2010_2012 = 0 ; if finr2010 = 1 | finr2012 = 1 then finr2010_2012=1 ;
run ;

%describe (setup=new, name="Example 5.16", dir=P:\ASDA3\Replication Iveware\Chapter 5) ;
 title "Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS
study." ;
 datain hrs_2010_2012_c5 ;
 stratum stratum ;
 cluster secu ;
 weight hhweight;
 by finr2010_2012 ;
 mean totwealth ;
 contrast year ;
 run;
ods rtf close ;
```

Example 5.3 : Population totals using NCSR data

The FREQ Procedure

Table of finr by nfinr				
finr	nfinr(2012 WHETHER FINANCIAL RESPONDENT)			
Frequency Percent Row Pct Col Pct	1	3	5	Total
0	0 0.00 0.00 0.00	16 0.08 0.25 100.00	6347 30.88 99.75 100.00	6363 30.96
1	14191 69.04 100.00 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	14191 69.04
Total	14191 69.04	16 0.08	6347 30.88	20554 100.00

female	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	8545	41.57	8545	41.57
1	12009	58.43	20554	100.00

age70	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	11980	58.29	11980	58.29
1	8574	41.71	20554	100.00

Example 5.5: Estimating the Mean Value of Household Income using the 2012 HRS Data.

```
IVEware Setup Checker, Fri Feb 28 14:06:48 2025                                  1

Setup listing:

 title "Example 5.5, Mean HH Income using HRS Data" ;
 datain c5 hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11itot ;
run;
```

Example 5.5: Estimating the Mean Value of Household Income using the 2012 HRS Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:06:49 2025    1

"Example 5.5, Mean HH Income using HRS Data"

By variables:           finr
Stratum variable:       stratum  STRATUM ID
Cluster variable:       secu  SAMPLING ERROR COMPUTATION UNIT
Weight variable:        nwgthh  2012 WEIGHT: HOUSEHOLD LEVEL

Analysis description:

         5  Variables
        56  Strata
       112  Secus

    Strata  Model
        56  Multiple PSU
         0  Paired Selection
         0  Successive Differences

     19990  Cases Read
```

Example 5.5: Estimating the Mean Value of Household Income using the 2012 HRS Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:06:49 2025
2

"Example 5.5, Mean HH Income using HRS Data"

By Condition
           finr
              0

     Problem  1

Degrees of freedom
                           56

         Factor   Covariance of denominator
           None        0.03890

           Mean      Number of         Sum of       Weighted       Standard
        H11ITOT          Cases        Weights           Mean          Error
                          6333   3.020465e+07       98737.91       3007.883

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      92712.38       104763.4       32.82638        0.00000

                    Unweighted           Bias         Design
                          Mean                        Effect
                      77916.39      -21.08767        3.16304

By Condition
           finr
              1

     Problem  2

Degrees of freedom
                           56

         Factor   Covariance of denominator
           None        0.02918

           Mean      Number of         Sum of       Weighted       Standard
        H11ITOT          Cases        Weights           Mean          Error
                         13657   5.896986e+07        71382.4       1937.229

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      67501.66       75263.15       36.84768        0.00000

                    Unweighted           Bias         Design
                          Mean                        Effect
                      55151.22      -22.73835        3.43529
```

Example 5.5 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features and Weights Incorporated into Data Set

```
SRCware BBDesign, Fri Feb 28 14:06:51 2025                              1

Setup listing:

 datain c5 hrs ;
 dataout c5_hrs_bb ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 csamples 5 ;
 wsamples 5 ;
 seed 2025 ;
run;
```

Example 5.5 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features and Weights Incorporated into Data Set

```
SRCware BBDesign, Fri Feb 28 14:07:29 2025                              1

Results:

Variables               22
Observations         20554
Strata                  56
Clusters               112
Cluster samples          5
Weight samples           5
Syn pop size        205540
```

Example 5.5 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features and Weights Incorporated into Data Set

The CONTENTS Procedure

Data Set Name	WORK.C5_HRS_BB	Observations	5138500
Member Type	DATA	Variables	24
Engine	V9	Indexes	0
Created	02/28/2025 14:07:35	Observation Length	120
Last Modified	02/28/2025 14:07:35	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	YES
Label			
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	9429
First Data Page	1
Max Obs per Page	545
Obs in First Data Page	513
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	C:\Users\pberg\AppData\Local\Temp\SAS Temporary Files_TD5684_CMTLOAN1TFQ_\c5_hrs_bb.sas7bdat
Release Created	9.0401M8
Host Created	X64_WIN+PRO
Owner Name	ISR\pberg
File Size	589MB
File Size (bytes)	618004480

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Label
12	H11ATOTA	Num	8	H11ATOTA:W11 Total of all Assets--Cross-wave
13	H11ITOT	Num	8	H11ITOT:W11 Incm: Total HHold / R+Sp only
4	R11BMI	Num	8	R11BMI:W11 Body Mass Index=kg/m2
1	_IMPL_	Num	8	Implicate number
24	_OBS_	Num	8	
23	age70	Num	8	
19	age65p	Num	3	1=Age 65+ 0=Under Age 65
20	arthritis	Num	3	Arthritis 1=Yes 0=No
17	diabetes	Num	3	1=Yes Diabetes 0=No Diabetes
15	edcat	Num	3	Education 1=0-11 Yrs 2=12 Yrs 3=13-15 Yrs 4=16+ Yrs
22	female	Num	8	
21	finr	Num	8	

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Label
7	gender	Num	3	Gender 1=Male 2=Female
2	hhid	Char	6	HHID: HHold ID / 6-Char
14	marcat	Num	3	Marital Status 1=Married 2=Previously Married 3=Never Married
5	nage	Num	4	Age
6	nfinr	Num	3	2012 WHETHER FINANCIAL RESPONDENT
18	numfalls24	Num	3	Number of Falls Past 2 Years
10	nwgthh	Num	4	2012 WEIGHT: HOUSEHOLD LEVEL
11	nwgtr	Num	4	2012 WEIGHT: RESPONDENT LEVEL
3	pn	Char	3	Person Number (CHAR)
16	racecat	Num	3	Race 1=Hispanic 2=NH White 3=NH Black 4=NH Other
8	secu	Num	3	SAMPLING ERROR COMPUTATION UNIT
9	stratum	Num	3	STRATUM ID

Sort Information	
Sortedby	_IMPL_ _OBS_
Validated	YES
Character Set	ANSI

Example 5.5 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features and Weights Incorporated into Data Set

The FREQ Procedure

Implicate number				
IMPL	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	205540	4.00	205540	4.00
2	205540	4.00	411080	8.00
3	205540	4.00	616620	12.00
4	205540	4.00	822160	16.00
5	205540	4.00	1027700	20.00
6	205540	4.00	1233240	24.00
7	205540	4.00	1438780	28.00
8	205540	4.00	1644320	32.00
9	205540	4.00	1849860	36.00
10	205540	4.00	2055400	40.00
11	205540	4.00	2260940	44.00
12	205540	4.00	2466480	48.00
13	205540	4.00	2672020	52.00
14	205540	4.00	2877560	56.00
15	205540	4.00	3083100	60.00
16	205540	4.00	3288640	64.00
17	205540	4.00	3494180	68.00
18	205540	4.00	3699720	72.00
19	205540	4.00	3905260	76.00
20	205540	4.00	4110800	80.00
21	205540	4.00	4316340	84.00
22	205540	4.00	4521880	88.00
23	205540	4.00	4727420	92.00
24	205540	4.00	4932960	96.00
25	205540	4.00	5138500	100.00

Note that the combining rules for data from BBDesign are different than what is performed in IVEware, see the IVEware documentation at https://smponline.isr.umich.edu/software/iveware-user-guide-chapter-9-iveware-and-sas/#93bbdesign for a full example.
Chapter 9 includes SAS code to calculate correct estimates/variances for a continuous variable and linear and logistic regressions, where MI is performed within the BBDesign data set. We show just the creation of the BBDesign data set in these programs. Check back for future updates posted on the ASDA website.

Example 5.6: Estimating Mean Systolic Blood Pressure using the NHANES Data.

```
IVEware Setup Checker, Fri Feb 28 14:07:44 2025                                1

Setup listing:

 title "Example 5.6, Mean Systolic BP using NHANES Data" ;
 datain c5 nhanes ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age18p ;
 mean bpxsy1 ;
run;
```

Example 5.6: Estimating Mean Systolic Blood Pressure using the NHANES Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:07:46 2025    1

"Example 5.6, Mean Systolic BP using NHANES Data"

By variables:           age18p
Stratum variable:       sdmvstra  Masked variance pseudo-stratum
Cluster variable:       sdmvpsu  Masked variance pseudo-PSU
Weight variable:        WTMEC2YR  Full sample 2 year MEC exam weight

Analysis description:

         5  Variables
        14  Strata
        31  Secus

    Strata  Model
        14  Multiple PSU
         0  Paired Selection
         0  Successive Differences

      9338  Cases Read
```

Example 5.6: Estimating Mean Systolic Blood Pressure using the NHANES Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:07:46 2025
2

"Example 5.6, Mean Systolic BP using NHANES Data"

By Condition
         age18p
              0

     Problem  1

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.07479

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          1624   3.897599e+07       105.8484      0.2854116

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      105.2463       106.4506      370.86243        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      105.3978       -0.42574        1.30886

By Condition
         age18p
              1

     Problem  2

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.06226

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          5132   2.134132e+08       122.0292      0.6163389

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      120.7289       123.3296      197.99050        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      123.5281        1.22825        6.46071
```

Example 5.6 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features Incorporated into Data Set

```
SRCware BBDesign, Fri Feb 28 14:07:47 2025                              1

Setup listing:

 datain c5 nhanes ;
 dataout c5_nhanes_bb ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 csamples 5 ;
 wsamples 5 ;
 seed 2025 ;
run;
```

Example 5.6 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features Incorporated into Data Set

```
SRCware BBDesign, Fri Feb 28 14:07:57 2025                              1

Results:

Variables               42
Observations          9756
Strata                  14
Clusters                31
Cluster samples          5
Weight samples           5
Syn pop size         97560
```

Example 5.6 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features Incorporated into Data Set

The CONTENTS Procedure

Data Set Name	WORK.C5_NHANES_BB	Observations	2439000
Member Type	DATA	Variables	44
Engine	V9	Indexes	0
Created	02/28/2025 14:08:01	Observation Length	208
Last Modified	02/28/2025 14:08:01	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	YES
Label			
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	7768
First Data Page	1
Max Obs per Page	314
Obs in First Data Page	284
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	C:\Users\pberg\AppData\Local\Temp\SAS Temporary Files_TD5684_CMTLOAN1TFQ_\c5_nhanes_bb.sas7bdat
Release Created	9.0401M8
Host Created	X64_WIN+PRO
Owner Name	ISR\pberg
File Size	486MB
File Size (bytes)	509149184

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Label
13	BPXDI1	Num	4	Diastolic: Blood pres (1st rdg) mm Hg
15	BPXDI2	Num	4	Diastolic: Blood pres (2nd rdg) mm Hg
17	BPXDI3	Num	4	Diastolic: Blood pres (3rd rdg) mm Hg
19	BPXDI4	Num	4	Diastolic: Blood pres (4th rdg) mm Hg
12	BPXSY1	Num	4	Systolic: Blood pres (1st rdg) mm Hg
14	BPXSY2	Num	4	Systolic: Blood pres (2nd rdg) mm Hg
16	BPXSY3	Num	4	Systolic: Blood pres (3rd rdg) mm Hg
18	BPXSY4	Num	4	Systolic: Blood pres (4th rdg) mm Hg
5	RIDRETH1	Num	3	1=mex 2=oth hisp 3=white 4=black 5=other
7	WTINT2YR	Num	8	Full sample 2 year interview weight
8	WTMEC2YR	Num	8	Full sample 2 year MEC exam weight
1	_IMPL_	Num	8	Implicate number

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Label
44	_OBS_	Num	8	
31	ag60	Num	3	Age 60+
28	ag1829	Num	3	Age 18-29
29	ag3044	Num	3	Age 30-44
30	ag4559	Num	3	Age 45-59
24	age	Num	3	Age at Interview in Years
43	age45	Num	8	
40	age18p	Num	8	
35	black	Num	3	Black
20	bmxbmi	Num	8	Body Mass Index (kg/m**2)
27	bp_cat	Num	3	Blood Pressure: 1=Normal 2=Pre-Hypertension 3=Hypertension Stage 1 4=Hypertensio
6	dmdmartl	Num	3	Marital status
23	edcat	Num	3	1=0-11 2=12 3=13-15 4=16+ Years of Education
42	female	Num	8	
11	indfmpir	Num	8	Ratio of family income to poverty
41	int_wtmec2yr	Num	8	
22	irregular	Num	3	1=yes 0=no
37	lbdhdd	Num	4	Direct HDL-Cholesterol (mg/dL)
38	lbdhddsi	Num	8	Direct HDL-Cholesterol (mmol/L)
39	lbdtcsi	Num	8	Total Cholesterol(mmol/L)
21	lbxtc	Num	4	Total Cholesterol(mg/dL)
25	marcat	Num	3	1=married 2=prev married 3=never married
32	mex	Num	3	Mexican
36	other	Num	3	Other Race/Ethnicity
33	othhis	Num	3	Other Hispanic
26	pre_hibp	Num	3	Indicator of Pre-hypertension/Hypertension: 1=Yes 0=No
4	riagendr	Num	3	Gender
3	ridstatr	Num	3	Interview/Examination status
9	sdmvpsu	Num	3	Masked variance pseudo-PSU
10	sdmvstra	Num	4	Masked variance pseudo-stratum
2	seqn	Num	6	Respondent sequence number
34	white	Num	3	White

Sort Information	
Sortedby	_IMPL_ _OBS_
Validated	YES
Character Set	ANSI

Example 5.6 Alternative Bayesian Bootstrap Approach, Creates Synthetic Output Data for Bayesian Bootstrap with Complex Sample Features Incorporated into Data Set

The FREQ Procedure

Implicate number				
IMPL	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	97560	4.00	97560	4.00
2	97560	4.00	195120	8.00
3	97560	4.00	292680	12.00
4	97560	4.00	390240	16.00
5	97560	4.00	487800	20.00
6	97560	4.00	585360	24.00
7	97560	4.00	682920	28.00
8	97560	4.00	780480	32.00
9	97560	4.00	878040	36.00
10	97560	4.00	975600	40.00
11	97560	4.00	1073160	44.00
12	97560	4.00	1170720	48.00
13	97560	4.00	1268280	52.00
14	97560	4.00	1365840	56.00
15	97560	4.00	1463400	60.00
16	97560	4.00	1560960	64.00
17	97560	4.00	1658520	68.00
18	97560	4.00	1756080	72.00
19	97560	4.00	1853640	76.00
20	97560	4.00	1951200	80.00
21	97560	4.00	2048760	84.00
22	97560	4.00	2146320	88.00
23	97560	4.00	2243880	92.00
24	97560	4.00	2341440	96.00
25	97560	4.00	2439000	100.00

Example 5.7: Estimating the Mean Value of Total Household Wealth using the HRS Data.

```
IVEware Setup Checker, Fri Feb 28 14:08:04 2025                                  1

Setup listing:

 title "Example 5.7, Mean Total HH Wealth using HRS Data" ;
 datain c5 hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11atota ;
run;
```

Example 5.7: Estimating the Mean Value of Total Household Wealth using the HRS Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:05 2025    1

"Example 5.7, Mean Total HH Wealth using HRS Data"

By variables:           finr
Stratum variable:       stratum  STRATUM ID
Cluster variable:       secu  SAMPLING ERROR COMPUTATION UNIT
Weight variable:        nwgthh  2012 WEIGHT: HOUSEHOLD LEVEL

Analysis description:

         5  Variables
        56  Strata
       112  Secus

    Strata  Model
        56  Multiple PSU
         0  Paired Selection
         0  Successive Differences

     19990  Cases Read
```

Example 5.7: Estimating the Mean Value of Total Household Wealth using the HRS Data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:05 2025
2

"Example 5.7, Mean Total HH Wealth using HRS Data"

By Condition
           finr
              0

     Problem  1

Degrees of freedom
                           56

         Factor   Covariance of denominator
           None        0.03890

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          6333   3.020465e+07       563269.1       26670.34

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      509841.8       616696.3       21.11968        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      462263.5      -17.93203        3.15363

By Condition
           finr
              1

     Problem  2

Degrees of freedom
                           56

         Factor   Covariance of denominator
           None        0.02918

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                         13657   5.896986e+07       428470.8       17353.77

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      393706.9       463234.6       24.69035        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      341639.1      -20.26548        3.31574
```

Example 5.8: Weighted HH Total Income, HRS Data, No Totals Available in IVEware
Example 5.9: Population Quantiles not Available in IVEware
Example 5.10: Estimating the Lorenz Curve and Gini Coefficient for the 2012 HRS Population Distribution of Total Household Wealth not available in IVEware
Figure 5.5 Weighted Scatter Plot not directly available in IVEware, see alternative approach with simple linear regression

Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-2012 NHANES.

The MEANS Procedure

Variable	Label	Mean
lbdhdd	Direct HDL-Cholesterol (mg/dL)	52.8382631
lbxtc	Total Cholesterol(mg/dL)	194.4354654

Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-2012 NHANES.

The CORR Procedure

2 Variables:	lbdhdd lbxtc
Weight Variable:	WTMEC2YR

Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
lbdhdd	5187	52.83826	3066	1.15527E10	14.00000	175.00000	Direct HDL-Cholesterol (mg/dL)
lbxtc	5187	194.43547	8428	4.25118E10	59.00000	523.00000	Total Cholesterol(mg/dL)

Pearson Correlation Coefficients, N = 5187 Prob > |r| under H0: Rho=0		
	lbdhdd	lbxtc
lbdhdd Direct HDL-Cholesterol (mg/dL)	1.00000	0.24144 <.0001
lbxtc Total Cholesterol(mg/dL)	0.24144 <.0001	1.00000

Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-2012 NHANES.

```
IVEware Setup Checker, Fri Feb 28 14:08:07 2025                    1

Setup listing:

 title "Example 5.11 Correlation of Adult Total and HDL Cholesterol Using NHANES
 Data" ;
 datain c5 nhanes 1 ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age18p ;
 dependent stdlbdhdd ;
 predictor stdlbxtc ;
run;
```

Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-2012 NHANES.

IVEware Jackknife Regression Procedure, Fri Feb 28 14:08:08 2025 1

"Example 5.11 Correlation of Adult Total and HDL Cholesterol Using NHANES Data"

Regression type: Linear
Dependent variable: stdlbdhdd
Predictors: stdlbxtc
By variables: age18p
Stratum variable: sdmvstra Masked variance pseudo-stratum
Cluster variable: sdmvpsu Masked variance pseudo-PSU
Weight variable: WTMEC2YR Full sample 2 year MEC exam weight

By variable	Code
age18p	0

Valid cases	1801
Sum weights	42172649.23
Replicates	17
Degr freedom	17

Sum of squares:

Model	1410279.07
Error	23204743.56
Total	24615022.63
R-square	0.05729
F-value	0.51659
P-value	0.60562

Variable	Estimate	Std Error	T Test	Prob > |T|
Intercept	0.2149614	0.0692603	3.10367	0.00645
stdlbxtc	0.2724514	0.0559067	4.87332	0.00014

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	0.2149614	0.0688348	0.3610879
stdlbxtc	0.2724514	0.1544986	0.3904043

Variable	Design Effect	SRS Estimate	% Diff SRS v Est
Intercept	6.07765	0.2931265	36.36240
stdlbxtc	4.83614	0.3025651	11.05286

Example 5.11: Estimation of the Correlation of Adults' Total and High-Density Cholesterol Measures in the 2011-2012 NHANES.

IVEware Jackknife Regression Procedure, Fri Feb 28 14:08:09 2025 2

"Example 5.11 Correlation of Adult Total and HDL Cholesterol Using NHANES Data"

By variable	Code
age18p	1

Valid cases	5187
Sum weights	218642035.7
Replicates	17
Degr freedom	17

Sum of squares:

Model	12743275.27
Error	205856703.7
Total	218599979
R-square	0.05829
F-value	0.52618
P-value	0.60017

Variable	Estimate	Std Error	T Test	Prob > |T|
Intercept	0.0000004	0.0348597	0.00001	0.99999
stdlbxtc	0.2414436	0.0122344	19.73482	0.00000

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	0.0000004	-0.0735471	0.0735479
stdlbxtc	0.2414436	0.2156312	0.2672559

Variable	Design Effect	SRS Estimate	% Diff SRS v Est
Intercept	6.84574	-0.0158677	-3872012.53576
stdlbxtc	0.88388	0.2090949	-13.39803

Example 5.12: Estimating the Population Ratio of High Density to Total Cholesterol for U.S. Adults. Not available in IVEware (Ratios)

Example 5.13 run was stopped due to singleton PSUs. IVEware does not allow these types of PSU's but collapsing is a Manual option.

Example 5.14: Estimating Mean Systolic Blood Pressure for Males and Females Age > 45 using the 2011-2012 NHANES data.

```
IVEware Setup Checker, Fri Feb 28 14:08:13 2025                                  1

Setup listing:

 title "Example 5.14 Estimating Mean Systolic Blood Pressure for Males and
 Females Age 45 Plus using the 2011-2012 NHANES data.";
 datain c5_nhanes ;
 stratum sdmvstra ;
 cluster sdmvpsu ;
 weight wtmec2yr ;
 by age45 riagendr ;
 mean bpxsy1 ;
run;
```

Example 5.14: Estimating Mean Systolic Blood Pressure for Males and Females Age > 45 using the 2011-2012 NHANES data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:14 2025    1

"Example 5.14 Estimating Mean Systolic Blood Pressure for Males and Females Age 45 P

By variables:           age45
By variables:           riagendr  Gender
Stratum variable:       sdmvstra  Masked variance pseudo-stratum
Cluster variable:       sdmvpsu  Masked variance pseudo-PSU
Weight variable:        WTMEC2YR  Full sample 2 year MEC exam weight

Analysis description:

         6  Variables
        14  Strata
        31  Secus

    Strata  Model
        14  Multiple PSU
         0  Paired Selection
         0  Successive Differences

      9338  Cases Read
```

Example 5.14: Estimating Mean Systolic Blood Pressure for Males and Females Age > 45 using the 2011-2012 NHANES data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:14 2025
2

"Example 5.14 Estimating Mean Systolic Blood Pressure for Males and Females Age 45 Plus using the 2011-2012 NHANES
data."

By Condition
          age45       riagendr
              0              1

     Problem  1

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.04890

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          2078   7.197895e+07       115.9131      0.4550489

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                       114.953       116.8731      254.72664        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      114.4841       -1.23278        2.86778

By Condition
          age45       riagendr
              0              2

     Problem  2

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.06125

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          2006   7.104621e+07       109.7915      0.4919168

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                       108.7536       110.8293      223.19119        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      108.4197       -1.24941        3.32053

By Condition
          age45       riagendr
              1              1
```

Example 5.14: Estimating Mean Systolic Blood Pressure for Males and Females Age > 45 using the 2011-2012 NHANES data.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:14 2025
3

"Example 5.14 Estimating Mean Systolic Blood Pressure for Males and Females Age 45 Plus using the 2011-2012 NHANES
data."

     Problem  3

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.09910

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          1329    5.16879e+07       128.3005      0.8687054

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      126.4677       130.1334      147.69167        0.00000

                    Unweighted           Bias         Design
                          Mean                       Effect
                      131.0233        2.12219        2.89363

By Condition
          age45       riagendr
              1              2

     Problem  4

Degrees of freedom
                           17

         Factor   Covariance of denominator
           None        0.09866

           Mean      Number of         Sum of       Weighted       Standard
         BPXSY1          Cases        Weights           Mean          Error
                          1343   5.767615e+07        128.182      0.9460163

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      126.1861       130.1779      135.49658        0.00000

                    Unweighted           Bias         Design
                          Mean                       Effect
                      130.7476        2.00153        3.16297
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Setup Checker, Fri Feb 28 14:08:16 2025                                  1

Setup listing:

 datain c5 hrs ;
 stratum stratum ;
 cluster secu ;
 weight nwgthh ;
 by finr ;
 mean h11atota ;
 contrast edcat ;
run;
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025    1

By variables:           finr
Stratum variable:       stratum  STRATUM ID
Cluster variable:       secu  SAMPLING ERROR COMPUTATION UNIT
Weight variable:        nwgthh  2012 WEIGHT: HOUSEHOLD LEVEL

Analysis description:

         6  Variables
        56  Strata
       112  Secus

    Strata  Model
        56  Multiple PSU
         0  Paired Selection
         0  Successive Differences

     19990  Cases Read
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
2

By Condition
finr
0

Problem 1

Degrees of freedom
56

Factor	Covariance of denominator
edcat	0.06409
1	

Mean	Number of	Sum of	Weighted	Standard
H11ATOTA	Cases	Weights	Mean	Error
	1328	4561289	204494.3	24332.84

Lower	Upper	T Test	Prob > |T|
Bound	Bound		
155749.7	253239	8.40405	0.00000

Unweighted	Bias	Design
Mean		Effect
169866.2	-16.93352	1.52809

Factor	Covariance of denominator
edcat	0.04133
2	

Mean	Number of	Sum of	Weighted	Standard
H11ATOTA	Cases	Weights	Mean	Error
	2025	9353909	353230.8	19839.34

Lower	Upper	T Test	Prob > |T|
Bound	Bound		
313487.7	392973.9	17.80457	0.00000

Unweighted	Bias	Design
Mean		Effect
339621.4	-3.85282	1.96803

Factor	Covariance of denominator
edcat	0.04918
3	

Mean	Number of	Sum of	Weighted	Standard
H11ATOTA	Cases	Weights	Mean	Error
	1493	7537091	542872.6	36362.98

Lower	Upper	T Test	Prob > |T|
Bound	Bound		
470028.6	615716.6	14.92927	0.00000

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
3

                  Unweighted           Bias         Design
                        Mean                      Effect
                    477962.5      -11.95679        2.06486

        Factor   Covariance of denominator
         edcat         0.06209
             4

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         1457        8625180        1001318       62451.34

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                     876212.6        1126423       16.03357        0.00000

                  Unweighted           Bias         Design
                        Mean                      Effect
                    886289.2      -11.48774        1.80637

      Contrast
         edcat
             1 versus
             2

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         3353    1.39152e+07      -148736.5        30809.3

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    -210455.1       -87017.84       -4.82765        0.00001

                  Unweighted           Bias         Design
                        Mean                      Effect
                   -169755.2        14.13152        1.61578

      Contrast
         edcat
             1 versus
             3

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         2821    1.209838e+07      -338378.3       46268.72

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    -431065.9       -245690.6       -7.31333        0.00000

                  Unweighted           Bias         Design
                        Mean                      Effect
                   -308096.2        -8.94917        2.08282
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
4

       Contrast
          edcat
              1 versus
              4

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          2785   1.318647e+07      -796823.7       73108.92

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -943278.9      -650368.5      -10.89913        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                      -716423      -10.09015        2.09885

       Contrast
          edcat
              2 versus
              3

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          3518     1.6891e+07      -189641.8       33872.75

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -257497.3      -121786.3       -5.59865        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                      -138341      -27.05140        1.36532

       Contrast
          edcat
              2 versus
              4

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          3482   1.797909e+07      -648087.2       60064.67

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -768411.6      -527762.9      -10.78982        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                     -546667.8      -15.64904        1.52928
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
5

       Contrast
          edcat
              3 versus
              4

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          2950   1.616227e+07      -458445.4       71525.22

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -601728.1      -315162.8       -6.40956        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                     -408326.7      -10.93231        1.82743

By Condition
             finr
                1

     Problem  2

Degrees of freedom
                           56

         Factor   Covariance of denominator
          edcat        0.05546
              1

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          2870        9008461       122088.6        10595.6

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                        100863       143314.2       11.52258        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                      102439.2      -16.09443        2.89969

         Factor   Covariance of denominator
          edcat        0.02508
              2

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          4222   1.751405e+07       259027.2        9802.47

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                      239390.4       278663.9       26.42468        0.00000
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
6

                  Unweighted           Bias         Design
                        Mean                      Effect
                    244636.9       -5.55552        1.64560

        Factor   Covariance of denominator
         edcat         0.03571
             3

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         3265   1.458619e+07       336308.6       17201.79

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                     301849.2         370768       19.55080        0.00000

                  Unweighted           Bias         Design
                        Mean                      Effect
                    296625.7      -11.79956        2.17117

        Factor   Covariance of denominator
         edcat         0.04868
             4

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         3232   1.757661e+07         834141       46477.79

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                     741034.5       927247.5       17.94709        0.00000

                  Unweighted           Bias         Design
                        Mean                      Effect
                      729984      -12.48673        2.15678

      Contrast
         edcat
             1 versus
             2

         Mean      Number of         Sum of       Weighted       Standard
      H11ATOTA          Cases        Weights           Mean          Error
                         7092   2.652251e+07      -136938.5       12525.38

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    -162029.9      -111847.1      -10.93288        0.00000

                  Unweighted           Bias         Design
                        Mean                      Effect
                   -142197.7        3.84053        1.61557
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
7

       Contrast
          edcat
              1 versus
              3

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          6135   2.359465e+07        -214220       17182.46

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -248640.7      -179799.3      -12.46736        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                     -194186.5       -9.35181        1.68704

       Contrast
          edcat
              1 versus
              4

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          6102   2.658507e+07      -712052.4       48886.06

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -809983.2      -614121.5      -14.56555        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                     -627544.9      -11.86815        2.29728

       Contrast
          edcat
              2 versus
              3

           Mean      Number of         Sum of       Weighted       Standard
       H11ATOTA          Cases        Weights           Mean          Error
                          7487   3.210024e+07      -77281.46       16244.94

                         Lower          Upper         T Test     Prob > |T|
                         Bound          Bound
                     -109824.1      -44738.85       -4.75726        0.00001

                   Unweighted           Bias         Design
                         Mean                      Effect
                     -51988.84      -32.72792        1.35556
```

Example 5.15: Estimating Differences in Mean Total Household Wealth Between HRS Subpopulations Defined by Educational Attainment Level.

IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:17 2025
8

Contrast
edcat
2 versus
4

Mean H11ATOTA	Number of Cases	Sum of Weights	Weighted Mean	Standard Error
	7454	3.509066e+07	-575113.8	47089.55

Lower Bound	Upper Bound	T Test	Prob > |T|
-669445.8	-480781.9	-12.21319	0.00000

Unweighted Mean	Bias	Design Effect
-485347.2	-15.60850	2.09197

Contrast
edcat
3 versus
4

Mean H11ATOTA	Number of Cases	Sum of Weights	Weighted Mean	Standard Error
	6497	3.21628e+07	-497832.4	46277.45

Lower Bound	Upper Bound	T Test	Prob > |T|
-590537.5	-405127.2	-10.75756	0.00000

Unweighted Mean	Bias	Design Effect
-433358.3	-12.95095	1.88212

Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study.

```
IVEware Setup Checker, Fri Feb 28 14:08:20 2025                                  1

Setup listing:

 title "Example 5.16: Estimating Differences in Mean Total Household Wealth from
 2010 to 2012 using Data from the HRS study." ;
 datain hrs_2010_2012_c5 ;
 stratum stratum ;
 cluster secu ;
 weight hhweight;
 by finr2010 2012 ;
 mean totwealth ;
 contrast year ;
 run;
```

Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:22 2025    1

"Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 20

By variables:           finr2010 2012
Stratum variable:       stratum  STRATUM ID
Cluster variable:       secu  SAMPLING ERROR COMPUTATION UNIT
Weight variable:        hhweight

Analysis description:

         6  Variables
        56  Strata
       112  Secus

    Strata  Model
        56  Multiple PSU
         0  Paired Selection
         0  Successive Differences

     37291  Cases Read
```

Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:22 2025
2

"Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study."

By Condition
  finr2010 2012
              0

     Problem  1

Degrees of freedom
                          56

         Factor   Covariance of denominator
           year        0.03893
           2010

           Mean      Number of         Sum of       Weighted       Standard
      totwealth          Cases        Weights           Mean          Error
                          6189   2.857366e+07         553669       24171.51

                          Lower          Upper         T Test     Prob > |T|
                          Bound          Bound
                       505247.5       602090.5       22.90585        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                       472303.3      -14.69573        3.03972

         Factor   Covariance of denominator
           year        0.04023
           2012

           Mean      Number of         Sum of       Weighted       Standard
      totwealth          Cases        Weights           Mean          Error
                          5920   2.844828e+07       569090.1       25820.99

                          Lower          Upper         T Test     Prob > |T|
                          Bound          Bound
                       517364.3       620815.9       22.03983        0.00000

                    Unweighted           Bias         Design
                          Mean                      Effect
                       471522.1      -17.14457        2.72217

       Contrast
           year
           2010 versus
           2012

           Mean      Number of         Sum of       Weighted       Standard
      totwealth          Cases        Weights           Mean          Error
                         12109   5.702193e+07      -15421.08       13599.34
```

Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study.

```
IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:22 2025
3

"Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study."

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    -42663.92       11821.75       -1.13396        0.26164

                   Unweighted           Bias         Design
                         Mean                      Effect
                     781.2626     -105.06620        0.42308

By Condition
  finr2010_2012
              1

     Problem  2

Degrees of freedom
                           56

         Factor   Covariance of denominator
           year        0.02839
           2010

           Mean      Number of         Sum of       Weighted       Standard
      totwealth          Cases        Weights           Mean          Error
                         12676   5.316295e+07       432829.6       16010.53

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    400756.5       464902.6       27.03405        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                     353736.5      -18.27348        2.74525

         Factor   Covariance of denominator
           year        0.02857
           2012

           Mean      Number of         Sum of       Weighted       Standard
      totwealth          Cases        Weights           Mean          Error
                         12506   5.411467e+07       437807.6       17016.29

                        Lower          Upper         T Test     Prob > |T|
                        Bound          Bound
                    403719.8       471895.5       25.72873        0.00000

                   Unweighted           Bias         Design
                         Mean                      Effect
                     349801.7      -20.10151        2.83033
```

Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study.

IVEware Design-Based Descriptive Statistics Procedure, Fri Feb 28 14:08:22 2025
4

"Example 5.16: Estimating Differences in Mean Total Household Wealth from 2010 to 2012 using Data from the HRS study."

Contrast year 2010 versus 2012

Mean totwealth	Number of Cases	Sum of Weights	Weighted Mean	Standard Error
	25182	1.072776e+08	-4978.066	7936.797

Lower Bound	Upper Bound	T Test	Prob > |T|
-20877.43	10921.29	-0.62721	0.53307

Unweighted Mean	Bias	Design Effect
3934.83	-179.04333	0.32192