

```
* IVEware Analysis Examples Replication for ASDA 3rd Edition
* Berglund Winter 2025
* Chapter 7 ;
```

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

```
ods listing ;
ods graphics off ;
options nodate nonumber ls=125 ps=68 ;
```

```
*set options and location to call IVEware from SAS session ;
options set=srclib "E:\ive 11feb24\sas" sasautos=('!srclib' sasautos) maautosource ;
```

```
ods rtf style=normalprinter bodytitle file="P:\ASDA3\Replication Iware\Chapter 7\Analysis Example Replication
ASDA3 IVE C7 Code and Results.rtf" ;
```

```
title ;
```

```
data c7_nhanes ;
  set d.nhanes1112 ;
  bpxdi1_1=bpxdi1 ;
  if bpxdi1=0 then bpxdi1_1=. ;
  agec=age-46.36 ;
  agecsq=agec*agec ;
  * age18 plus indicator ;
  age18p=0 ;
  if age >= 18 then age18p=1 ;
```

```
* reverse coding of class variables to match lowest omitted group of Stata.
  IVEware omits highest category by default and does not allow user to specify omitted group in code ;
  rev_race=6-ridreth1 ;
  rev_marc4=4-marc4 ;
  rev_gender=3-riagendr ;
run ;
```

```
* Section 7.5: Application of Linear Regression, Bivariate relationships ;
* Note: IVEware does not offer multivariate tests of groups of variables or levels of class variables but the
testing process is demonstrated here ;
* IVEware uses Jackknife Repeated Replication for variance estimation, results differ slightly from TSL or other
methods ;
```

```
%regress (setup=new, name="Example 7.5 Bivariate Tests", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
  title "Bivariate Testing: Race" ;
  datain c7_nhanes ;
  stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
  by age18p ;
  class rev_race ;
  dependent bpxdi1_1 ;
  predictor rev_race ;
run;
```

```
%regress (setup=new, name="Example 7.5 Bivariate Tests", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
  title "Example 7.5.1 Bivariate Testing: Age " ;
  datain c7_nhanes ;
  stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
  by age18p ;
  dependent bpxdi1_1 ;
  predictor agec ;
run;
```

```
%regress (setup=new, name="Example 7.5 Bivariate Tests", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
  title "Bivariate Testing: Gender " ;
```

```

datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
categorical rev_gender ;
dependent bpxdi1_1 ;
predictor rev_gender ;
run;

```

```

%regress (setup=new, name="Example 7.5 Bivariate Tests", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
title "Bivariate Testing: Marital Status" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_marcat ;
run;

```

```

****;
%regress (setup=new, name="Unweighted OLS Model (Naive Analysis)", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
;
title "Example 7.5 Naive Analysis Table 7.2 " ;
datain c7_nhanes ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec ;
run;

```

```

****;
%regress (setup=new, name="Example 7.5 Weighted Regression ", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
title "Example 7.5 Weighted Regression No Design Variables Table 7.3" ;
datain c7_nhanes ;
/*stratum sdmvstra ; cluster sdmvpsu ;*/
weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec ;
run;

```

```

%regress (setup=new, name="Example 7.5 All Design Features for Initial Main Model", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
title "Example 7.5 Design-Based and Weighted Regression Table 7.4" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender agec rev_marcat ;
plots ; * diagnostic plots are stored in DIR location, see output for complete list of plots ;
run;

```

* Test if weights are informative in initial model ; * Use design variables but no weight but include weight as predictor with interactions ;

```

%regress (setup=new, name="Example 7.5 Test if Weights are Informative", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
title "Example 7.5 Test Weights are Informative" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; *weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;

```

```

predictor rev_race rev_gender agec rev_marcat wtme2yr rev_race*wtme2yr rev_gender*wtme2yr
rev_marcat*wtme2yr agec*wtme2yr ;
run;
* conclude weights are informative in model based on t tests and p values for each interaction plus weight as
main effect, no ability to do custom tests.;

****;
%regress (setup=new, name="Example 7.5 Initial Model with Diagnostics", dir=P:\ASDA3\Replication
Iveware\Chapter 7) ;
title "Section 7.5.5 Initial Model with Diagnostics" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtme2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec ;
plots ; * diagnostic plots are stored in dir location, see output for complete list of plots ;
run;

****;
* Add agec * agec to model to deal with non-linearity of age ;

%regress (setup=new, name="Example 7.5 Initial Model with Age and Age Squared", dir=P:\ASDA3\Replication
Iveware\Chapter 7) ;
title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtme2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq ;
run;

****; * Test Interactions of race*agec and race*agecsq ;
%regress (setup=new, name="Example 7.5 Initial Model with Race X Age and AgeSQ", dir=P:\ASDA3\Replication
Iveware\Chapter 7) ;
title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Race Interactions" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtme2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq rev_race*agec rev_race*agecsq ;
run;

****; * Test Interactions of gender X (agec agecsq) ;
%regress (setup=new, name="Example 7.5 Initial Model with Gender X Age and AgeSQ", dir=P:\ASDA3\Replication
Iveware\Chapter 7) ;
title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Gender Interactions" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtme2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq rev_gender*agec rev_gender*agecsq ;
run;
** Interactions appear to be significantly adding to model, include them ;

ods text="Marginal Predicted Plots are Not Available in IVeware, See Other Software such as SAS or Stata, etc. "
;

****;

```

```

* Design Adjusted Diagnostics for Full Model ;
%regress (setup=new, name="Example 7.5 Full Model with Gender X Age and AgeSQ and Plots",
dir=P:\ASDA3\Replication Iventure\Chapter 7) ;
title "Example 7.5 Full Model With Agec and Agec Squared X Race and Gender Interactions and Plots" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq rev_race*agec rev_race*agecsq rev_gender*agec
rev_gender*agecsq ;
*plots ;
run;

* Additional model diagnostics not available in IVEware, see text for examples in R ;

**;

data c7_nhanes_i ;
set c7_nhanes ;
r1_age=(ridreth1=1)*agec ;
r2_age=(ridreth1=2)*agec ;
r3_age=(ridreth1=3)*agec ;
r4_age=(ridreth1=4)*agec ;
r5_age=(ridreth1=5)*agec ;
r1_age2=(ridreth1=1)*agecsq ;
r2_age2=(ridreth1=2)*agecsq ;
r3_age2=(ridreth1=3)*agecsq ;
r4_age2=(ridreth1=4)*agecsq ;
r5_age2=(ridreth1=5)*agecsq ;
f_age=(riagendr=2)*agec ;
f_age2=(riagendr=2)*agecsq ;
run ;

%regress (setup=new, name="Example 7.5 Final Model", dir=P:\ASDA3\Replication Iventure\Chapter 7) ;
title "Example 7.5 Final Model with Main Effects and Interactions" ;
datain c7_nhanes_i ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdi1_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq r2_age r3_age r4_age r5_age r2_age2 r3_age2 r4_age2
r5_age2 f_age f_age2 ;
run;

****;
title "Section 7.5.9 Use Pfeffermann method (Q weighted)" ;
* Use SAS tools for this section ;
proc glm data=c7_nhanes_i ;
class ridreth1 (ref=first) riagendr (ref=first) marcat (ref=first) ;
model wtmec2yr=ridreth1 riagendr marcat agec agecsq ridreth1*agec ridreth1*agecsq riagendr*agec riagendr*agecsq
/ solution ;
output out=outq predicted=w_hat ;
run ;

* create new weight and re-run final model ;
data c7_nhanes_q ;
set outq ;
if w_hat < 0 then w_hat=4809 ;
q_wtmec2yr=wtmec2yr/w_hat ;
run ;

```

```

proc means ;
  var q_wtmec2yr ;
run ;

* compare to surveyreg, uses TSL ;
proc surveyreg data=c7_nhanes_q ;
  strata sdmvstra ; cluster sdmvpsu ; weight q_wtmec2yr ;
  domain age18p ;
  class rev_race rev_gender rev_marcate ;
  model bpxdi1_1 = rev_race rev_gender rev_marcate agec agecsq rev_race*agec rev_race*agecsq rev_gender*agec
rev_gender*agecsq / solution;
run;

* use IVEware for Q model, uses JRR ;
%regress (setup=new, name="Example 7.5 Final Model with Q weight", dir=P:\ASDA3\Replication Iware\Chapter 7) ;
  title "Example 7.5 Final Model with Main Effects and Interactions with Q Weight" ;
  datain c7_nhanes_q ;
  stratum sdmvstra ; cluster sdmvpsu ; weight q_wtmec2yr ;
  by age18p ;
  class rev_race rev_gender rev_marcate ;
  dependent bpxdi1_1 ;
  predictor rev_race rev_gender rev_marcate agec agecsq rev_race*agec rev_race*agecsq rev_gender*agec
rev_gender*agecsq ;
run;

ods text="BBDesign Data Set Production not repeated here, see Chapters 5 and 6 for Examples of Data Set
Creation.
  See IVEware documentation Chapter 9 for example of using SAS for correct BBDesign combining (not included in
IVEware).";

ods rtf close ;

```

Setup listing:

```

title "Bivariate Testing: Race" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_race ;
dependent bpxdil_1 ;
predictor rev_race ;
run;

```

"Bivariate Testing: Race"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
Cat. var. ref. codes:  rev_race 5
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      1564
Sum weights      37760598.03
Replicates       17
Degr freedom     17

```

```

Sum of squares:
Model            37514076.69
Error            5056315401
Total            5093829478
R-square         0.00736
F-value          0.02523
P-value          0.99965

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	55.8381383	0.5764291	96.86905	0.00000
rev_race.1	2.5456195	1.0014635	2.54190	0.02106
rev_race.2	1.5346097	0.8201595	1.87111	0.07864
rev_race.3	2.8288303	1.6629899	1.70105	0.10715
rev_race.4	1.7490988	1.5398020	1.13592	0.27175

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	55.8381383	54.6219791	57.0542974
rev_race.1	2.5456195	0.4327160	4.6585230
rev_race.2	1.5346097	-0.1957759	3.2649953
rev_race.3	2.8288303	-0.6797721	6.3374328
rev_race.4	1.7490988	-1.4995999	4.9977975

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	0.73167	55.2000000	-1.14284
rev_race.1	1.06950	2.3018051	-9.57780
rev_race.2	0.89705	1.8463576	20.31447
rev_race.3	3.37608	2.2877384	-19.12776
rev_race.4	1.92295	1.5325581	-12.38013

"Bivariate Testing: Race"

By variable Code
 age18p 1

Valid cases 5112
 Sum weights 212747914.3
 Replicates 17
 Degr freedom 17

Sum of squares:
 Model 137998267.1
 Error 2.771066455e+10
 Total 2.784866282e+10
 R-square 0.00496
 F-value 0.01693
 P-value 0.99987

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	69.8040886	0.4444642	157.05223	0.00000
rev_race.1	1.3056136	0.7245169	1.80205	0.08930
rev_race.2	2.2902279	0.6851113	3.34286	0.00386
rev_race.3	2.1846975	0.7788088	2.80518	0.01217
rev_race.4	-0.1548915	1.3801411	-0.11223	0.91196

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	69.8040886	68.8663510	70.7418261
rev_race.1	1.3056136	-0.2229836	2.8342108
rev_race.2	2.2902279	0.8447692	3.7356866
rev_race.3	2.1846975	0.5415543	3.8278406
rev_race.4	-0.1548915	-3.0667351	2.7569520

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	0.70758	69.5166994	-0.41171
rev_race.1	1.18366	1.9861908	52.12700
rev_race.2	1.22820	2.2673586	-0.99856
rev_race.3	1.70015	1.4570997	-33.30428
rev_race.4	3.46732	0.2893842	-286.83024

Setup listing:

```

title "Example 7.5.1 Bivariate Testing: Age " ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
dependent bpxdil_1 ;
predictor agec ;
run;
    
```

"Example 7.5.1 Bivariate Testing: Age "

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          agec
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      1564
Sum weights      37760598.03
Replicates       17
    
```

```

Degr freedom     17
    
```

```

Sum of squares:
Model            302971457.7
Error            4790858020
Total            5093829478
R-square         0.05948
F-value         0.53754
P-value         0.59379
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	91.7923765	4.7444229	19.34743	0.00000
agec	1.0013268	0.1521093	6.58294	0.00000

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	91.7923765	81.7825178	101.8022352
agec	1.0013268	0.6804043	1.3222493

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.99572	95.8266854	4.39504
agec	2.41028	1.1411570	13.96449

"Example 7.5.1 Bivariate Testing: Age "

By variable	Code
age18p	1

Valid cases	5112
Sum weights	212747914.3
Replicates	17

Degr freedom	17
--------------	----

Sum of squares:

Model	100594667.7
Error	2.774806815e+10
Total	2.784866282e+10
R-square	0.00361
F-value	0.03081
P-value	0.96971

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	71.6036334	0.5327586	134.40164	0.00000
agec	0.0394091	0.0187624	2.10042	0.05092

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	71.6036334	70.4796108	72.7276561
agec	0.0394091	-0.0001762	0.0789944

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	10.19311	70.9827924	-0.86705
agec	4.35783	0.0400226	1.55676

Setup listing:

```

title "Bivariate Testing: Gender " ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
categorical rev_gender ;
dependent bpxdil_1 ;
predictor rev_gender ;
run;

```

"Bivariate Testing: Gender "

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_gender
Cat. var. ref. codes:  rev_gender 2
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      1564
Sum weights      37760598.03
Replicates       17
Degr freedom     17

```

```

Sum of squares:
Model            12495589.16
Error            5081333888
Total            5093829478
R-square         0.00245
F-value          0.02090
P-value          0.97934

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	57.3739050	0.8471613	67.72489	0.00000
rev_gender	1.1515524	0.7628070	1.50962	0.14950

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	57.3739050	55.5865508	59.1612593
rev_gender	1.1515524	-0.4578299	2.7609347

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	4.21063	56.5406091	-1.45240
rev_gender	1.69383	0.6191847	-46.23044

"Bivariate Testing: Gender "

By variable	Code
age18p	1

Valid cases	5112
Sum weights	212747914.3
Replicates	17

Degr freedom	17
--------------	----

Sum of squares:

Model	257471688.8
Error	2.759119113e+10
Total	2.784866282e+10
R-square	0.00925
F-value	0.07932
P-value	0.92408

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	72.7255304	0.6243090	116.48965	0.00000
rev_gender	-2.2004481	0.5761419	-3.81928	0.00137

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	72.7255304	71.4083534	74.0427073
rev_gender	-2.2004481	-3.4160014	-0.9848948

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	7.11622	72.1892940	-0.73734
rev_gender	3.00417	-2.3653003	7.49176

Setup listing:

```

title "Bivariate Testing: Marital Status" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_marcat ;
dependent bpxdil_1 ;
predictor rev_marcat ;
run;
    
```

"Bivariate Testing: Marital Status"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_marcat
Cat. var. ref. codes:  rev_marcat 3
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                1
    
```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17
Degr freedom         17
    
```

```

Sum of squares:
Model                39502938.53
Error                2.636315212e+10
Total                2.640265506e+10
R-square             0.00150
F-value              0.00849
P-value              0.99888
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	72.1795504	0.5319458	135.68967	0.00000
rev_marcat.1	-1.1210302	0.9162477	-1.22350	0.23783
rev_marcat.2	-0.1450875	0.7283967	-0.19919	0.84448

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	72.1795504	71.0572427	73.3018581
rev_marcat.1	-1.1210302	-3.0541441	0.8120837
rev_marcat.2	-0.1450875	-1.6818705	1.3916954

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	5.57812	72.1823529	0.00388
rev_marcat.1	4.61870	-1.7853919	59.26349
rev_marcat.2	2.95675	-1.2047410	730.35457

Setup listing:

```

title "Example 7.5 Naive Analysis Table 7.2 " ;
datain c7_nhanes ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcat agec ;
run;
    
```

"Example 7.5 Naive Analysis Table 7.2 "

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcat
                   agec
Cat. var. ref. codes: rev_race 5
                   rev_marcat 3
                   rev_gender 2
By variables:        age18p
    
```

```

By variable          Code
age18p                1
    
```

Valid cases 4845

Degr freedom 4836

```

Sum of squares:
Model      13892.05573
Error     657043.4605
Total     670935.5162
R-square   0.02071
F-value   12.78111
P-value   0.00000
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	72.1628219	0.5676155	127.13328	0.00000
rev_race.1	1.7758163	0.6772102	2.62225	0.00876
rev_race.2	2.5090348	0.6397874	3.92167	0.00009
rev_race.3	0.9420713	0.6103575	1.54347	0.12278
rev_race.4	0.3770451	0.7560289	0.49872	0.61800
rev_gender	-2.5323250	0.3392545	-7.46438	0.00000
rev_marcat.1	-2.4403512	0.4622763	-5.27899	0.00000
rev_marcat.2	-0.6973075	0.4436432	-1.57178	0.11607
agec	-0.0192501	0.0108736	-1.77035	0.07673

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	72.1628219	71.0500377	73.2756062
rev_race.1	1.7758163	0.4481767	3.1034560
rev_race.2	2.5090348	1.2547608	3.7633088
rev_race.3	0.9420713	-0.2545067	2.1386492
rev_race.4	0.3770451	-1.1051149	1.8592051
rev_gender	-2.5323250	-3.1974179	-1.8672322
rev_marcat.1	-2.4403512	-3.3466227	-1.5340797
rev_marcat.2	-0.6973075	-1.5670498	0.1724348
agec	-0.0192501	-0.0405674	0.0020671

Setup listing:

```

title "Example 7.5 Weighted Regression No Design Variables Table 7.3" ;
datain c7_nhanes ;
weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcat agec ;
run;

```

"Example 7.5 Weighted Regression No Design Variables Table 7.3"

```

Regression type:          Linear
Dependent variable:     bpxdil_1
Predictors:              rev_race
                        rev_gender
                        rev_marcat
                        agec
Cat. var. ref. codes:   rev_race  5
                        rev_marcat 3
                        rev_gender 2
By variables:           age18p
Stratum variable:       _STRAT_   Constant 1
Cluster variable:       _CLUST_   Observation number
Weight variable:        WTMEC2YR  Full sample 2 year MEC exam weight

```

```

By variable              Code
age18p                   1

```

```

Valid cases              4845
Sum weights              205481294.6
Replicates               4844

```

```

Degr freedom            4844

```

```

Sum of squares:
Model                   460731181
Error                   2.594192388e+10
Total                   2.640265506e+10
R-square                0.01745
F-value                 9.55888
P-value                 0.00000

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	71.8061730	0.5883766	122.04118	0.00000
rev_race.1	1.2701360	0.7215066	1.76039	0.07840
rev_race.2	2.6191693	0.6822473	3.83903	0.00013
rev_race.3	1.9132786	0.6262507	3.05513	0.00226
rev_race.4	-0.0949772	0.7424638	-0.12792	0.89822
rev_gender	-2.5098112	0.4485024	-5.59598	0.00000
rev_marcat.1	-1.5110334	0.6415811	-2.35517	0.01855
rev_marcat.2	0.2433065	0.6123464	0.39733	0.69114
agec	-0.0075366	0.0139895	-0.53873	0.59010

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	71.8061730	70.6526882	72.9596577
rev_race.1	1.2701360	-0.1443440	2.6846160
rev_race.2	2.6191693	1.2816554	3.9566831
rev_race.3	1.9132786	0.6855435	3.1410138
rev_race.4	-0.0949772	-1.5505427	1.3605884
rev_gender	-2.5098112	-3.3890792	-1.6305431
rev_marcat.1	-1.5110334	-2.7688232	-0.2532436

"Example 7.5 Weighted Regression No Design Variables Table 7.3"

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
rev_marcat.2	0.2433065	-0.9571699	1.4437830
agec	-0.0075366	-0.0349625	0.0198892

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.07449	72.1628219	0.49668
rev_race.1	1.13510	1.7758163	39.81308
rev_race.2	1.13714	2.5090348	-4.20494
rev_race.3	1.05276	0.9420713	-50.76142
rev_race.4	0.96444	0.3770451	-496.98503
rev_gender	1.74775	-2.5323250	0.89703
rev_marcat.1	1.92619	-2.4403512	61.50214
rev_marcat.2	1.90514	-0.6973075	-386.59629
agec	1.65522	-0.0192501	155.42147

Setup listing:

```

title "Example 7.5 Design-Based and Weighted Regression Table 7.4" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecc2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender agec rev_marcat ;
plots ; * diagnostic plots are stored in DIR location, see output for complete
list of plots ;
run;
    
```

"Example 7.5 Design-Based and Weighted Regression Table 7.4"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   agec
                   rev_marcat
Cat. var. ref. codes: rev_race 5
                   rev_marcat 3
                   rev_gender 2
By variables:        age18p
Stratum variable:    sdmvstra Masked variance pseudo-stratum
Cluster variable:    sdmvpsu  Masked variance pseudo-PSU
Weight variable:     WTMECC2YR Full sample 2 year MEC exam weight
    
```

```

By variable          Code
age18p                1
    
```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17
Degr freedom         17
    
```

```

Sum of squares:
Model                460731181
Error                2.594192388e+10
Total                2.640265506e+10
R-square             0.01745
F-value              0.03355
P-value              0.99999
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	71.8061730	0.5974101	120.19578	0.00000
rev_race.1	1.2701360	0.6328741	2.00693	0.06093
rev_race.2	2.6191693	0.5934239	4.41366	0.00038
rev_race.3	1.9132786	0.8026060	2.38383	0.02906
rev_race.4	-0.0949772	1.2004700	-0.07912	0.93786
rev_gender	-2.5098112	0.5507785	-4.55684	0.00028
agec	-0.0075366	0.0205341	-0.36703	0.71813
rev_marcat.1	-1.5110334	0.9889187	-1.52797	0.14491
rev_marcat.2	0.2433065	0.7018754	0.34665	0.73311

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	71.8061730	70.5457477	73.0665982
rev_race.1	1.2701360	-0.0651119	2.6053839
rev_race.2	2.6191693	1.3671542	3.8711844
rev_race.3	1.9132786	0.2199277	3.6066296
rev_race.4	-0.0949772	-2.6277479	2.4377936
rev_gender	-2.5098112	-3.6718525	-1.3477698
agec	-0.0075366	-0.0508598	0.0357866

"Example 7.5 Design-Based and Weighted Regression Table 7.4"

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
rev_marcat.1	-1.5110334	-3.5974697	0.5754029
rev_marcat.2	0.2433065	-1.2375213	1.7241344

Variable	Design Effect	SRS Estimate	% Diff
			SRS v Est
Intercept	1.10774	72.1628219	0.49668
rev_race.1	0.87335	1.7758163	39.81308
rev_race.2	0.86032	2.5090348	-4.20494
rev_race.3	1.72916	0.9420713	-50.76142
rev_race.4	2.52131	0.3770451	-496.98503
rev_gender	2.63574	-2.5323250	0.89703
agec	3.56616	-0.0192501	155.42147
rev_marcat.1	4.57634	-2.4403512	61.50214
rev_marcat.2	2.50295	-0.6973075	-386.59629

Plot titles and image files

Histogram of Residuals\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p001.png

Histogram of Residuals\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p002.png

Histogram of Influences\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p003.png

Histogram of Influences\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p004.png

Normal Probability of the Residuals\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p005.png

Normal Probability of the Residuals\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p006.png

Residuals vs. Predicted Values\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p007.png

Residuals vs. Predicted Values\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p008.png

Residuals vs. WTMEC2YR\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p009.png

Residuals vs. WTMEC2YR\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p010.png

Residuals vs. rev_race\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p011.png

"Example 7.5 Design-Based and Weighted Regression Table 7.4"

Residuals vs. rev_race\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p012.png

Residuals vs. rev_gender\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p013.png

Residuals vs. rev_gender\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p014.png

Residuals vs. agec\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p015.png

Residuals vs. agec\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p016.png

Residuals vs. rev_marcatt\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p017.png

Residuals vs. rev_marcatt\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 All Design Features for Initial Main Model_p018.png

Setup listing:

```

title "Example 7.5 Test Weights are Informative" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; *weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcate ;
dependent bpxdil_1 ;
predictor rev_race rev_gender agec rev_marcate wtmec2yr rev_race*wtmec2yr
rev_gender*wtmec2yr rev_marcate*wtmec2yr agec*wtmec2yr ;
run;

```

"Example 7.5 Test Weights are Informative"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   agec
                   rev_marcate
                   WTMEC2YR Full sample 2 year MEC exam weight
                   XACT1 rev_race*WTMEC2YR
                   XACT2 rev_gender*WTMEC2YR
                   XACT3 rev_marcate*WTMEC2YR
                   XACT4 agec*WTMEC2YR
Cat. var. ref. codes:
                   rev_race 5
                   rev_marcate 3
                   rev_gender 2
By variables:       age18p
Stratum variable:  sdmvstra Masked variance pseudo-stratum
Cluster variable:  sdmvpsu Masked variance pseudo-PSU

```

```

By variable          Code
  age18p              1
Valid cases          4845
Replicates           17
Degr freedom         17

```

```

Sum of squares:
  Model              21485.10914
  Error              649450.4071
  Total              670935.5162
  R-square           0.03202
  F-value            0.03124
  P-value            1.00000

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	73.3793050	1.7406597	42.15603	0.00000
rev_race.1	1.7184469	1.8106829	0.94906	0.35589
rev_race.2	0.0920871	2.0964505	0.04393	0.96548
rev_race.3	-2.3473283	1.6362991	-1.43453	0.16956
rev_race.4	1.7081196	2.5625343	0.66657	0.51399
rev_gender	-2.8525970	0.4516062	-6.31656	0.00001
agec	-0.0313646	0.0192886	-1.62607	0.12233
rev_marcate.1	-3.6090847	0.8764755	-4.11772	0.00072
rev_marcate.2	-1.3600012	0.7290910	-1.86534	0.07949
WTMEC2YR	-0.0000319	0.0000416	-0.76702	0.45359
XACT1.1	-0.0000134	0.0000505	-0.26595	0.79348
XACT1.2	0.0001197	0.0000628	1.90745	0.07350
XACT1.3	0.0000529	0.0000418	1.26496	0.22295
XACT1.4	-0.0000529	0.0000475	-1.11234	0.28148
XACT2	0.0000039	0.0000074	0.53156	0.60191
XACT3.1	0.0000300	0.0000172	1.74786	0.09852

"Example 7.5 Test Weights are Informative"

Variable	Estimate	Std Error	T Test	Prob > T
XACT3.2	0.0000248	0.0000126	1.96690	0.06574
XACT4	0.0000004	0.0000003	1.37229	0.18781

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	73.3793050	69.7068336	77.0517764
rev_race.1	1.7184469	-2.1017606	5.5386544
rev_race.2	0.0920871	-4.3310375	4.5152118
rev_race.3	-2.3473283	-5.7996181	1.1049615
rev_race.4	1.7081196	-3.6983560	7.1145952
rev_gender	-2.8525970	-3.8054029	-1.8997910
agec	-0.0313646	-0.0720600	0.0093308
rev_marcat.1	-3.6090847	-5.4582865	-1.7598828
rev_marcat.2	-1.3600012	-2.8982490	0.1782467
WTMEC2YR	-0.0000319	-0.0001197	0.0000558
XACT1.1	-0.0000134	-0.0001200	0.0000931
XACT1.2	0.0001197	-0.0000127	0.0002521
XACT1.3	0.0000529	-0.0000353	0.0001412
XACT1.4	-0.0000529	-0.0001531	0.0000474
XACT2	0.0000039	-0.0000117	0.0000196
XACT3.1	0.0000300	-0.0000062	0.0000662
XACT3.2	0.0000248	-0.0000018	0.0000513
XACT4	0.0000004	-0.0000002	0.0000011

Setup listing:

```

title "Section 7.5.5 Initial Model with Diagnostics" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecc2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcat agec ;
plots ; * diagnostic plots are stored in dir location, see output for complete
list of plots ;
run;
    
```

"Section 7.5.5 Initial Model with Diagnostics"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcat
                   agec
Cat. var. ref. codes: rev_race 5
                   rev_marcat 3
                   rev_gender 2
By variables:        age18p
Stratum variable:    sdmvstra Masked variance pseudo-stratum
Cluster variable:    sdmvpsu  Masked variance pseudo-PSU
Weight variable:     WTMECC2YR Full sample 2 year MEC exam weight
    
```

```

By variable          Code
age18p                1
    
```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17
Degr freedom         17
    
```

```

Sum of squares:
Model                460731181
Error                 2.594192388e+10
Total                 2.640265506e+10
R-square              0.01745
F-value               0.03355
P-value               0.99999
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	71.8061730	0.5974101	120.19578	0.00000
rev_race.1	1.2701360	0.6328741	2.00693	0.06093
rev_race.2	2.6191693	0.5934239	4.41366	0.00038
rev_race.3	1.9132786	0.8026060	2.38383	0.02906
rev_race.4	-0.0949772	1.2004700	-0.07912	0.93786
rev_gender	-2.5098112	0.5507785	-4.55684	0.00028
rev_marcat.1	-1.5110334	0.9889187	-1.52797	0.14491
rev_marcat.2	0.2433065	0.7018754	0.34665	0.73311
agec	-0.0075366	0.0205341	-0.36703	0.71813

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	71.8061730	70.5457477	73.0665982
rev_race.1	1.2701360	-0.0651119	2.6053839
rev_race.2	2.6191693	1.3671542	3.8711844
rev_race.3	1.9132786	0.2199277	3.6066296
rev_race.4	-0.0949772	-2.6277479	2.4377936
rev_gender	-2.5098112	-3.6718525	-1.3477698
rev_marcat.1	-1.5110334	-3.5974697	0.5754029

"Section 7.5.5 Initial Model with Diagnostics"

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
rev_marcat.2	0.2433065	-1.2375213	1.7241344
agec	-0.0075366	-0.0508598	0.0357866

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.10774	72.1628219	0.49668
rev_race.1	0.87335	1.7758163	39.81308
rev_race.2	0.86032	2.5090348	-4.20494
rev_race.3	1.72916	0.9420713	-50.76142
rev_race.4	2.52131	0.3770451	-496.98503
rev_gender	2.63574	-2.5323250	0.89703
rev_marcat.1	4.57634	-2.4403512	61.50214
rev_marcat.2	2.50295	-0.6973075	-386.59629
agec	3.56616	-0.0192501	155.42147

Plot titles and image files

Histogram of Residuals\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p001.png

Histogram of Residuals\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p002.png

Histogram of Influences\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p003.png

Histogram of Influences\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p004.png

Normal Probability of the Residuals\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p005.png

Normal Probability of the Residuals\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p006.png

Residuals vs. Predicted Values\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p007.png

Residuals vs. Predicted Values\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p008.png

Residuals vs. WTMEC2YR\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p009.png

Residuals vs. WTMEC2YR\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p010.png

Residuals vs. rev_race\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p011.png

"Section 7.5.5 Initial Model with Diagnostics"

Residuals vs. rev_race\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p012.png

Residuals vs. rev_gender\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p013.png

Residuals vs. rev_gender\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p014.png

Residuals vs. rev_marcata\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p015.png

Residuals vs. rev_marcata\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p016.png

Residuals vs. agec\nage18p = 1

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p017.png

Residuals vs. agec\nAll by levels

P:\ASDA3\Replication Iveware\Chapter 7\Example 7.5 Initial Model with Diagnostics_p018.png

Setup listing:

```

title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcata ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcata agec agecsq ;
run;
    
```

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcata
                   agec
                   agecsq
Cat. var. ref. codes: rev_race 5
                   rev_marcata 3
                   rev_gender 2
By variables:        age18p
Stratum variable:    sdmvstra Masked variance pseudo-stratum
Cluster variable:    sdmvpsu Masked variance pseudo-PSU
Weight variable:     WTMECL2YR Full sample 2 year MEC exam weight
    
```

```

By variable          Code
age18p                1
    
```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17
    
```

```

Degr freedom         17
    
```

```

Sum of squares:
Model                2599269418
Error                2.380338564e+10
Total                2.640265506e+10
R-square             0.09845
F-value              0.18564
P-value              0.99503
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	74.4613657	0.6410406	116.15702	0.00000
rev_race.1	1.0978333	0.6018294	1.82416	0.08576
rev_race.2	2.0635973	0.5928586	3.48076	0.00286
rev_race.3	1.8217232	0.8356467	2.18002	0.04360
rev_race.4	0.0145334	1.0572772	0.01375	0.98919
rev_gender	-2.2143152	0.5361904	-4.12972	0.00070
rev_marcata.1	1.1353283	0.8457937	1.34232	0.19714
rev_marcata.2	0.5558885	0.6435124	0.86383	0.39970
agec	0.0771555	0.0216863	3.55779	0.00242
agecsq	-0.0116650	0.0009002	-12.95790	0.00000

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	74.4613657	73.1088881	75.8138433
rev_race.1	1.0978333	-0.1719158	2.3675824
rev_race.2	2.0635973	0.8127747	3.3144198
rev_race.3	1.8217232	0.0586625	3.5847838
rev_race.4	0.0145334	-2.2161267	2.2451935

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared"

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
rev_gender	-2.2143152	-3.3455783	-1.0830522
rev_marc1.1	1.1353283	-0.6491407	2.9197973
rev_marc1.2	0.5558885	-0.8018042	1.9135811
agec	0.0771555	0.0314013	0.1229097
agecsq	-0.0116650	-0.0135643	-0.0097657

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.33739	74.9950324	0.71670
rev_race.1	0.87274	1.9289169	75.70217
rev_race.2	0.94874	2.2865547	10.80431
rev_race.3	2.06330	1.7741162	-2.61329
rev_race.4	2.16136	0.4358264	2898.78981
rev_gender	2.76042	-2.6044852	17.62035
rev_marc1.1	3.41380	0.4319823	-61.95089
rev_marc1.2	2.31728	-0.1370604	-124.65609
agec	3.58879	0.0914863	18.57396
agecsq	2.54519	-0.0127384	9.20227

Setup listing:

```

title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec
Squared X Race Interactions" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmecl2yr ;
by age18p ;
class rev_race rev_gender rev_marcacat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcacat agec agecsq rev_race*agec
rev_race*agecsq ;
run;

```

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Rac

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcacat
                   agec
                   agecsq
                   XACT1  rev_race*agec
                   XACT2  rev_race*agecsq
Cat. var. ref. codes:  rev_race 5
                   rev_marcacat 3
                   rev_gender 2
By variables:        age18p
Stratum variable:    sdmvstra  Masked variance pseudo-stratum
Cluster variable:    sdmvpsu  Masked variance pseudo-PSU
Weight variable:     WTMECL2YR  Full sample 2 year MEC exam weight

```

```

By variable          Code
age18p                1

```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17

```

```

Degr freedom         17

```

```

Sum of squares:
Model                2673758374
Error                2.372889669e+10
Total                2.640265506e+10
R-square             0.10127
F-value              0.10642
P-value              0.99999

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	74.4546993	0.8242925	90.32558	0.00000
rev_race.1	1.3799756	0.9121610	1.51286	0.14868
rev_race.2	3.3935610	0.9224209	3.67897	0.00186
rev_race.3	1.5524238	0.9011715	1.72267	0.10309
rev_race.4	0.3457130	0.9081309	0.38069	0.70815
rev_gender	-2.2142228	0.5305255	-4.17364	0.00064
rev_marcacat.1	1.1882195	0.8689510	1.36742	0.18930
rev_marcacat.2	0.5488372	0.6624864	0.82845	0.41890
agec	0.0502370	0.0294341	1.70676	0.10606
agecsq	-0.0124453	0.0018908	-6.58186	0.00000
XACT1.1	0.0438456	0.0553465	0.79220	0.43916
XACT1.2	0.0693963	0.0307214	2.25889	0.03732
XACT1.3	0.0111186	0.0512749	0.21684	0.83091
XACT1.4	0.0662619	0.0464459	1.42665	0.17179
XACT2.1	-0.0001547	0.0020038	-0.07722	0.93935
XACT2.2	-0.0039116	0.0019309	-2.02582	0.05877

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Rac

Variable	Estimate	Std Error	T Test	Prob > T
XACT2.3	0.0018498	0.0015729	1.17607	0.25578
XACT2.4	0.0000510	0.0030673	0.01664	0.98692

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	74.4546993	72.7155938	76.1938047
rev_race.1	1.3799756	-0.5445161	3.3044674
rev_race.2	3.3935610	1.4474227	5.3396992
rev_race.3	1.5524238	-0.3488822	3.4537297
rev_race.4	0.3457130	-1.5702760	2.2617020
rev_gender	-2.2142228	-3.3335339	-1.0949118
rev_marcatt.1	1.1882195	-0.6451070	3.0215461
rev_marcatt.2	0.5488372	-0.8488872	1.9465615
agec	0.0502370	-0.0118635	0.1123374
agecsq	-0.0124453	-0.0164346	-0.0084559
XACT1.1	0.0438456	-0.0729254	0.1606165
XACT1.2	0.0693963	0.0045799	0.1342128
XACT1.3	0.0111186	-0.0970621	0.1192992
XACT1.4	0.0662619	-0.0317305	0.1642542
XACT2.1	-0.0001547	-0.0043824	0.0040729
XACT2.2	-0.0039116	-0.0079854	0.0001622
XACT2.3	0.0018498	-0.0014686	0.0051682
XACT2.4	0.0000510	-0.0064203	0.0065224

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.23892	74.7726311	0.42701
rev_race.1	0.99706	1.9852106	43.85838
rev_race.2	1.15845	3.3162582	-2.27792
rev_race.3	1.20515	1.4297773	-7.90032
rev_race.4	0.77553	0.5277149	52.64538
rev_gender	2.70708	-2.6036563	17.58782
rev_marcatt.1	3.53518	0.5213545	-56.12305
rev_marcatt.2	2.43018	-0.1015192	-118.49715
agec	0.77535	0.0533117	6.12040
agecsq	0.83090	-0.0121726	-2.19097
XACT1.1	1.83799	0.0793277	80.92510
XACT1.2	0.65175	0.0659428	-4.97651
XACT1.3	1.88689	-0.0068151	-161.29510
XACT1.4	1.05645	0.0575280	-13.18082
XACT2.1	0.64110	0.0001612	-204.17887
XACT2.2	0.68708	-0.0035468	-9.32540
XACT2.3	0.49292	0.0014799	-19.99815
XACT2.4	1.22733	-0.0004378	-957.91336

Setup listing:

```

title "Example 7.5 Design-Based and Weighted Regression With Agec and Agec
Squared X Gender Interactions" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcata ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcata agec agecsq rev_gender*agec
rev_gender*agecsq ;
run;
    
```

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Gen

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcata
                   agec
                   agecsq
                   XACT1  rev_gender*agec
                   XACT2  rev_gender*agecsq
Cat. var. ref. codes:  rev_race  5
                   rev_marcata  3
                   rev_gender  2
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           1
    
```

```

Valid cases      4845
Sum weights      205481294.6
Replicates       17
Degr freedom     17
    
```

```

Sum of squares:
Model            2695848483
Error            2.370680658e+10
Total            2.640265506e+10
R-square         0.10211
F-value          0.16110
P-value          0.99869
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	74.9687964	0.7022991	106.74767	0.00000
rev_race.1	1.1144157	0.6070668	1.83574	0.08395
rev_race.2	2.1249157	0.5924581	3.58661	0.00227
rev_race.3	1.8370567	0.8200385	2.24021	0.03873
rev_race.4	0.0164345	1.0467624	0.01570	0.98766
rev_gender	-3.0823607	0.7609608	-4.05062	0.00083
rev_marcata.1	1.0564049	0.8431711	1.25290	0.22720
rev_marcata.2	0.2931299	0.6548132	0.44765	0.66005
agec	0.0504735	0.0211446	2.38707	0.02887
agecsq	-0.0133454	0.0009470	-14.09187	0.00000
XACT1	0.0503281	0.0245861	2.04701	0.05644
XACT2	0.0029326	0.0016660	1.76022	0.09635

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	74.9687964	73.4870745	76.4505183

"Example 7.5 Design-Based and Weighted Regression With Agec and Agec Squared X Gen

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
rev_race.1	1.1144157	-0.1663834	2.3952148
rev_race.2	2.1249157	0.8749383	3.3748931
rev_race.3	1.8370567	0.1069265	3.5671868
rev_race.4	0.0164345	-2.1920415	2.2249104
rev_gender	-3.0823607	-4.6878479	-1.4768735
rev_marcata.1	1.0564049	-0.7225309	2.8353406
rev_marcata.2	0.2931299	-1.0884053	1.6746651
agec	0.0504735	0.0058624	0.0950846
agecsq	-0.0133454	-0.0153435	-0.0113474
XACT1	0.0503281	-0.0015440	0.1022003
XACT2	0.0029326	-0.0005824	0.0064476

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.46593	75.4750632	0.67530
rev_race.1	0.89004	1.9264655	72.86777
rev_race.2	0.94922	2.3198900	9.17562
rev_race.3	1.99157	1.7729725	-3.48842
rev_race.4	2.12360	0.4335092	2537.80655
rev_gender	2.73756	-3.4532059	12.03121
rev_marcata.1	3.38038	0.3764379	-64.36613
rev_marcata.2	2.35126	-0.3523956	-220.21822
agec	2.02638	0.0748766	48.34841
agecsq	1.45859	-0.0139930	4.85278
XACT1	1.56676	0.0355959	-29.27233
XACT2	2.38166	0.0024512	-16.41482

Marginal Predicted Plots are Not Available in IVEware, See Other Software such as SAS or Stata, etc.

Setup listing:

```

title "Example 7.5 Full Model With Agec and Agec Squared X Race and Gender
Interactions and Plots" ;
datain c7_nhanes ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq rev_race*agec
rev_race*agecsq rev_gender*agec rev_gender*agecsq ;
*plots ;
run;
    
```

"Example 7.5 Full Model With Agec and Agec Squared X Race and Gender Interactions

```

Regression type:          Linear
Dependent variable:      bpxdil_1
Predictors:              rev_race
                        rev_gender
                        rev_marcat
                        agec
                        agecsq
                        XACT1  rev_race*agec
                        XACT2  rev_race*agecsq
                        XACT3  rev_gender*agec
                        XACT4  rev_gender*agecsq
Cat. var. ref. codes:    rev_race  5
                        rev_marcat 3
                        rev_gender 2
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                   1
    
```

```

Valid cases              4845
Sum weights              205481294.6
Replicates               17
    
```

```

Degr freedom            17
    
```

```

Sum of squares:
Model                   2769444515
Error                   2.363321054e+10
Total                   2.640265506e+10
R-square                0.10489
F-value                 0.09961
P-value                 1.00000
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	74.9279514	0.8979408	83.44420	0.00000
rev_race.1	1.4164313	0.8978898	1.57751	0.13310
rev_race.2	3.5198661	0.9220709	3.81735	0.00138
rev_race.3	1.6140818	0.9082714	1.77709	0.09345
rev_race.4	0.4060606	0.8988759	0.45174	0.65716
rev_gender	-3.1027738	0.7586554	-4.08983	0.00076
rev_marcat.1	1.1076855	0.8661231	1.27890	0.21811
rev_marcat.2	0.2905908	0.6726145	0.43203	0.67115
agec	0.0281912	0.0343279	0.82123	0.42288
agecsq	-0.0138641	0.0020683	-6.70318	0.00000
XACT1.1	0.0390183	0.0573485	0.68037	0.50543
XACT1.2	0.0646497	0.0320246	2.01875	0.05957
XACT1.3	0.0076904	0.0528904	0.14540	0.88610
XACT1.4	0.0605772	0.0476444	1.27144	0.22069

"Example 7.5 Full Model With Agec and Agec Squared X Race and Gender Interactions

Variable	Estimate	Std Error	T Test	Prob > T
XACT2.1	-0.0003766	0.0021654	-0.17394	0.86397
XACT2.2	-0.0042949	0.0020336	-2.11195	0.04979
XACT2.3	0.0015388	0.0016472	0.93421	0.36327
XACT2.4	-0.0003224	0.0032996	-0.09770	0.92331
XACT3	0.0484726	0.0250409	1.93574	0.06971
XACT4	0.0030105	0.0016596	1.81400	0.08737

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	74.9279514	73.0334617	76.8224411
rev_race.1	1.4164313	-0.4779508	3.3108135
rev_race.2	3.5198661	1.5744664	5.4652658
rev_race.3	1.6140818	-0.3022036	3.5303672
rev_race.4	0.4060606	-1.4904019	2.3025232
rev_gender	-3.1027738	-4.7033969	-1.5021507
rev_marcacat.1	1.1076855	-0.7196747	2.9350457
rev_marcacat.2	0.2905908	-1.1285019	1.7096835
agec	0.0281912	-0.0442344	0.1006168
agecsq	-0.0138641	-0.0182278	-0.0095004
XACT1.1	0.0390183	-0.0819764	0.1600130
XACT1.2	0.0646497	-0.0029163	0.1322157
XACT1.3	0.0076904	-0.1038987	0.1192795
XACT1.4	0.0605772	-0.0399438	0.1610982
XACT2.1	-0.0003766	-0.0049452	0.0041919
XACT2.2	-0.0042949	-0.0085854	-0.0000043
XACT2.3	0.0015388	-0.0019364	0.0050140
XACT2.4	-0.0003224	-0.0072838	0.0066391
XACT3	0.0484726	-0.0043590	0.1013042
XACT4	0.0030105	-0.0004909	0.0065118

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.41336	75.2322804	0.40616
rev_race.1	0.96829	2.0088151	41.82227
rev_race.2	1.15905	3.4065254	-3.22003
rev_race.3	1.22683	1.4738630	-8.68722
rev_race.4	0.76097	0.6140182	51.21343
rev_gender	2.72413	-3.5048242	12.95777
rev_marcacat.1	3.49905	0.4695321	-57.61142
rev_marcacat.2	2.45499	-0.3134081	-207.85202
agec	0.99512	0.0401082	42.27194
agecsq	0.94922	-0.0133193	-3.92982
XACT1.1	1.97629	0.0769323	97.16973
XACT1.2	0.70882	0.0650039	0.54786
XACT1.3	2.01133	-0.0085232	-210.82960
XACT1.4	1.11257	0.0549051	-9.36345
XACT2.1	0.74992	0.0000229	-106.07516
XACT2.2	0.76201	-0.0037945	-11.64943
XACT2.3	0.54137	0.0012790	-16.88003
XACT2.4	1.42071	-0.0007697	138.77763

"Example 7.5 Full Model With Agec and Agec Squared X Race and Gender Interactions

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
XACT3	1.62530	0.0318807	-34.22942
XACT4	2.36060	0.0026438	-12.17889

Setup listing:

```

title "Example 7.5 Final Model with Main Effects and Interactions" ;
datain c7_nhanes_i ;
stratum sdmvstra ; cluster sdmvpsu ; weight wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcat ;
dependent bpxdil_1 ;
predictor rev_race rev_gender rev_marcat agec agecsq r2_age r3_age r4_age r5_age
r2_age2 r3_age2 r4_age2 r5_age2 f_age f_age2 ;
run;

```

"Example 7.5 Final Model with Main Effects and Interactions"

```

Regression type:      Linear
Dependent variable:  bpxdil_1
Predictors:          rev_race
                   rev_gender
                   rev_marcat
                   agec
                   agecsq
                   r2_age
                   r3_age
                   r4_age
                   r5_age
                   r2_age2
                   r3_age2
                   r4_age2
                   r5_age2
                   f_age
                   f_age2
Cat. var. ref. codes:  rev_race 5
                   rev_marcat 3
                   rev_gender 2
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                1

```

```

Valid cases          4845
Sum weights          205481294.6
Replicates           17

```

```

Degr freedom         17

```

```

Sum of squares:
Model                2769444515
Error                2.363321054e+10
Total                2.640265506e+10
R-square             0.10489
F-value              0.09961
P-value              1.00000

```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	74.9279514	0.8979408	83.44420	0.00000
rev_race.1	1.4164313	0.8978898	1.57751	0.13310
rev_race.2	3.5198661	0.9220709	3.81735	0.00138
rev_race.3	1.6140818	0.9082714	1.77709	0.09345
rev_race.4	0.4060606	0.8988759	0.45174	0.65716
rev_gender	-3.1027738	0.7586554	-4.08983	0.00076
rev_marcat.1	1.1076855	0.8661231	1.27890	0.21811
rev_marcat.2	0.2905908	0.6726145	0.43203	0.67115

"Example 7.5 Final Model with Main Effects and Interactions"

Variable	Estimate	Std Error	T Test	Prob > T
agec	0.0281912	0.0343279	0.82123	0.42288
agecsq	-0.0138641	0.0020683	-6.70318	0.00000
r2_age	0.0605772	0.0476444	1.27144	0.22069
r3_age	0.0076904	0.0528904	0.14540	0.88610
r4_age	0.0646497	0.0320246	2.01875	0.05957
r5_age	0.0390183	0.0573485	0.68037	0.50543
r2_age2	-0.0003224	0.0032996	-0.09770	0.92331
r3_age2	0.0015388	0.0016472	0.93421	0.36327
r4_age2	-0.0042949	0.0020336	-2.11195	0.04979
r5_age2	-0.0003766	0.0021654	-0.17394	0.86397
f_age	0.0484726	0.0250409	1.93574	0.06971
f_age2	0.0030105	0.0016596	1.81400	0.08737

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	74.9279514	73.0334617	76.8224411
rev_race.1	1.4164313	-0.4779508	3.3108135
rev_race.2	3.5198661	1.5744664	5.4652658
rev_race.3	1.6140818	-0.3022036	3.5303672
rev_race.4	0.4060606	-1.4904019	2.3025232
rev_gender	-3.1027738	-4.7033969	-1.5021507
rev_marcats.1	1.1076855	-0.7196747	2.9350457
rev_marcats.2	0.2905908	-1.1285019	1.7096835
agec	0.0281912	-0.0442344	0.1006168
agecsq	-0.0138641	-0.0182278	-0.0095004
r2_age	0.0605772	-0.0399438	0.1610982
r3_age	0.0076904	-0.1038987	0.1192795
r4_age	0.0646497	-0.0029163	0.1322157
r5_age	0.0390183	-0.0819764	0.1600130
r2_age2	-0.0003224	-0.0072838	0.0066391
r3_age2	0.0015388	-0.0019364	0.0050140
r4_age2	-0.0042949	-0.0085854	-0.0000043
r5_age2	-0.0003766	-0.0049452	0.0041919
f_age	0.0484726	-0.0043590	0.1013042
f_age2	0.0030105	-0.0004909	0.0065118

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.41336	75.2322804	0.40616
rev_race.1	0.96829	2.0088151	41.82227
rev_race.2	1.15905	3.4065254	-3.22003
rev_race.3	1.22683	1.4738630	-8.68722
rev_race.4	0.76097	0.6140182	51.21343
rev_gender	2.72413	-3.5048242	12.95777
rev_marcats.1	3.49905	0.4695321	-57.61142
rev_marcats.2	2.45499	-0.3134081	-207.85202
agec	0.99512	0.0401082	42.27194
agecsq	0.94922	-0.0133193	-3.92982
r2_age	1.11257	0.0549051	-9.36345
r3_age	2.01133	-0.0085232	-210.82960

"Example 7.5 Final Model with Main Effects and Interactions"

Variable	Design Effect	SRS Estimate	% Diff SRS v Est
r4_age	0.70882	0.0650039	0.54786
r5_age	1.97629	0.0769323	97.16973
r2_age2	1.42071	-0.0007697	138.77763
r3_age2	0.54137	0.0012790	-16.88003
r4_age2	0.76201	-0.0037945	-11.64943
r5_age2	0.74992	0.0000229	-106.07516
f_age	1.62530	0.0318807	-34.22942
f_age2	2.36060	0.0026438	-12.17889

Section 7.5.9 Use Pfeffermann method (Q weighted)

The GLM Procedure

Class Level Information		
Class	Levels	Values
RIDRETH1	5	2 3 4 5 1
riagendr	2	2 1
marcat	3	2 3 1

Number of Observations Read	9756
Number of Observations Used	5553

Section 7.5.9 Use Pfeffermann method (Q weighted)

The GLM Procedure

Dependent Variable: WTMEC2YR Full sample 2 year MEC exam weight

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	19	4.3054236E12	226601240345	258.28	<.0001
Error	5533	4.8542759E12	877331630.43		
Corrected Total	5552	9.1596995E12			

R-Square	Coeff Var	Root MSE	WTMEC2YR Mean
0.470040	73.45559	29619.78	40323.39

Source	DF	Type I SS	Mean Square	F Value	Pr > F
RIDRETH1	4	3.5292256E12	882306397211	1005.67	<.0001
riagendr	1	12129803571	12129803571	13.83	0.0002
marcat	2	113031192065	56515596032	64.42	<.0001
agec	1	147575393276	147575393276	168.21	<.0001
agecsq	1	186548961768	186548961768	212.63	<.0001
agec*RIDRETH1	4	54134477780	13533619445	15.43	<.0001
agecsq*RIDRETH1	4	246215561116	61553890279	70.16	<.0001
agec*riagendr	1	8283860012.3	8283860012.3	9.44	0.0021
agecsq*riagendr	1	8278728124.9	8278728124.9	9.44	0.0021

Source	DF	Type III SS	Mean Square	F Value	Pr > F
RIDRETH1	4	2.8348035E12	708700862519	807.79	<.0001
riagendr	1	824013043.06	824013043.06	0.94	0.3325
marcat	2	47853721405	23926860702	27.27	<.0001
agec	1	43245363313	43245363313	49.29	<.0001
agecsq	1	30582278657	30582278657	34.86	<.0001
agec*RIDRETH1	4	114388542676	28597135669	32.60	<.0001
agecsq*RIDRETH1	4	244318779789	61079694947	69.62	<.0001
agec*riagendr	1	2228906884.6	2228906884.6	2.54	0.1110
agecsq*riagendr	1	8278728124.9	8278728124.9	9.44	0.0021

Parameter		Estimate	Standard Error	t Value	Pr > t
Intercept		32315.18290	B 1895.411804	17.05	<.0001
RIDRETH1	2	-4653.54773	B 2554.045200	-1.82	0.0685
RIDRETH1	3	59412.63335	B 2057.361081	28.88	<.0001
RIDRETH1	4	-11703.61979	B 2148.990496	-5.45	<.0001
RIDRETH1	5	-13289.52225	B 2283.051870	-5.82	<.0001
RIDRETH1	1	0.00000	B .	.	.
riagendr	2	1115.57550	B 1151.102026	0.97	0.3325
riagendr	1	0.00000	B .	.	.
marcat	2	-7724.56387	B 1070.552699	-7.22	<.0001
marcat	3	235.52872	B 1161.446575	0.20	0.8393
marcat	1	0.00000	B .	.	.
agec		-661.50610	B 85.570761	-7.73	<.0001
agecsq		-5.29310	B 5.288776	-1.00	0.3170
agec*RIDRETH1	2	73.79500	B 111.960371	0.66	0.5098
agec*RIDRETH1	3	827.26387	B 92.571373	8.94	<.0001
agec*RIDRETH1	4	478.21231	B 94.884483	5.04	<.0001
agec*RIDRETH1	5	625.82484	B 101.333166	6.18	<.0001
agec*RIDRETH1	1	0.00000	B .	.	.
agecsq*RIDRETH1	2	4.06945	B 6.793924	0.60	0.5492
agecsq*RIDRETH1	3	-46.97763	B 5.567961	-8.44	<.0001
agecsq*RIDRETH1	4	-2.37028	B 5.808526	-0.41	0.6832
agecsq*RIDRETH1	5	0.22115	B 6.210219	0.04	0.9716
agecsq*RIDRETH1	1	0.00000	B .	.	.
agec*riagendr	2	78.30835	B 49.129690	1.59	0.1110
agec*riagendr	1	0.00000	B .	.	.
agecsq*riagendr	2	8.22324	B 2.676968	3.07	0.0021
agecsq*riagendr	1	0.00000	B .	.	.

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

Section 7.5.9 Use Pfeffermann method (Q weighted)

The MEANS Procedure

Analysis Variable : q_wtmec2yr				
N	Mean	Std Dev	Minimum	Maximum
9756	2.3662065	3.6221510	0	143.4679704

Section 7.5.9 Use Pfeffermann method (Q weighted)

The SURVEYREG Procedure

Regression Analysis for Dependent Variable bpxdi1_1

Data Summary	
Number of Observations	4845
Sum of Weights	5257.3
Weighted Mean of bpxdi1_1	71.42965
Weighted Sum of bpxdi1_1	375525.8

Design Summary	
Number of Strata	14
Number of Clusters	31

Fit Statistics	
R-Square	0.1293
Root MSE	11.1087
Denominator DF	17

Class Level Information		
CLASS Variable	Levels	Values
rev_race	5	1 2 3 4 5
rev_gender	2	1 2
rev_marcat	3	1 2 3

Tests of Model Effects			
Effect	Num DF	F Value	Pr > F
Model	17	752.82	<.0001
Intercept	1	24655.4	<.0001
rev_race	4	3.68	0.0245
rev_gender	1	29.25	<.0001
rev_marcat	2	0.83	0.4548
agec	1	21.14	0.0003
agecsq	1	125.75	<.0001
agec*rev_race	4	5.51	0.0049
agecsq*rev_race	4	3.28	0.0362
agec*rev_gender	1	1.14	0.3014
agecsq*rev_gender	1	2.34	0.1445

Note: The denominator degrees of freedom for the F tests is 17.

Estimated Regression Coefficients				
Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	75.4368178	0.96942072	77.82	<.0001
rev_race 1	1.1733746	1.00124212	1.17	0.2574
rev_race 2	3.4063892	1.05201137	3.24	0.0048
rev_race 3	1.4061444	1.06995774	1.31	0.2062
rev_race 4	0.7328702	0.97780642	0.75	0.4638
rev_race 5	0.0000000	0.00000000	.	.
rev_gender 1	-3.4370648	0.63550149	-5.41	<.0001
rev_gender 2	0.0000000	0.00000000	.	.
rev_marcat 1	0.5494005	0.59248384	0.93	0.3668
rev_marcat 2	-0.2501659	0.51670812	-0.48	0.6345
rev_marcat 3	0.0000000	0.00000000	.	.
agec	0.0410982	0.04311872	0.95	0.3539
agecsq	-0.0140742	0.00280844	-5.01	0.0001
agec*rev_race 1	0.0397136	0.05961101	0.67	0.5142
agec*rev_race 2	0.0712220	0.03910169	1.82	0.0862
agec*rev_race 3	-0.0015387	0.05977033	-0.03	0.9798
agec*rev_race 4	0.0231397	0.06318301	0.37	0.7187
agec*rev_race 5	0.0000000	0.00000000	.	.
agecsq*rev_race 1	0.0009378	0.00293890	0.32	0.7536
agecsq*rev_race 2	-0.0031053	0.00304195	-1.02	0.3217
agecsq*rev_race 3	0.0020717	0.00229824	0.90	0.3800
agecsq*rev_race 4	-0.0031420	0.00486729	-0.65	0.5272
agecsq*rev_race 5	0.0000000	0.00000000	.	.
agec*rev_gender 1	0.0313806	0.02944131	1.07	0.3014
agec*rev_gender 2	0.0000000	0.00000000	.	.
agecsq*rev_gender 1	0.0028660	0.00187391	1.53	0.1445
agecsq*rev_gender 2	0.0000000	0.00000000	.	.

Note: The degrees of freedom for the t tests is 17.
Matrix X'WX is singular and a generalized inverse was used to solve the normal equations. Estimates are not unique.

Section 7.5.9 Use Pfeffermann method (Q weighted)

The SURVEYREG Procedure

age18p=1

Domain Regression Analysis for Variable bpxdi_1

Domain Summary	
Number of Observations	4845
Number of Observations in Domain	4845
Number of Observations Not in Domain	0
Sum of Weights in Domain	5257.3
Weighted Mean of bpxdi_1	71.42965
Weighted Sum of bpxdi_1	375525.8

Fit Statistics	
R-Square	0.1293
Root MSE	11.1087
Denominator DF	17

Tests of Model Effects			
Effect	Num DF	F Value	Pr > F
Model	17	752.82	<.0001
Intercept	1	24655.4	<.0001
rev_race	4	3.68	0.0245
rev_gender	1	29.25	<.0001
rev_marcat	2	0.83	0.4548
agec	1	21.14	0.0003
agecsq	1	125.75	<.0001
agec*rev_race	4	5.51	0.0049
agecsq*rev_race	4	3.28	0.0362
agec*rev_gender	1	1.14	0.3014
agecsq*rev_gender	1	2.34	0.1445

Note: The denominator degrees of freedom for the F tests is 17.

Estimated Regression Coefficients				
Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	75.4368178	0.96942072	77.82	<.0001
rev_race 1	1.1733746	1.00124212	1.17	0.2574
rev_race 2	3.4063892	1.05201137	3.24	0.0048
rev_race 3	1.4061444	1.06995774	1.31	0.2062
rev_race 4	0.7328702	0.97780642	0.75	0.4638
rev_race 5	0.0000000	0.00000000	.	.
rev_gender 1	-3.4370648	0.63550149	-5.41	<.0001
rev_gender 2	0.0000000	0.00000000	.	.
rev_marcat 1	0.5494005	0.59248384	0.93	0.3668
rev_marcat 2	-0.2501659	0.51670812	-0.48	0.6345
rev_marcat 3	0.0000000	0.00000000	.	.

Estimated Regression Coefficients				
Parameter	Estimate	Standard Error	t Value	Pr > t
agec	0.0410982	0.04311872	0.95	0.3539
agecsq	-0.0140742	0.00280844	-5.01	0.0001
agec*rev_race 1	0.0397136	0.05961101	0.67	0.5142
agec*rev_race 2	0.0712220	0.03910169	1.82	0.0862
agec*rev_race 3	-0.0015387	0.05977033	-0.03	0.9798
agec*rev_race 4	0.0231397	0.06318301	0.37	0.7187
agec*rev_race 5	0.0000000	0.00000000	.	.
agecsq*rev_race 1	0.0009378	0.00293890	0.32	0.7536
agecsq*rev_race 2	-0.0031053	0.00304195	-1.02	0.3217
agecsq*rev_race 3	0.0020717	0.00229824	0.90	0.3800
agecsq*rev_race 4	-0.0031420	0.00486729	-0.65	0.5272
agecsq*rev_race 5	0.0000000	0.00000000	.	.
agec*rev_gender 1	0.0313806	0.02944131	1.07	0.3014
agec*rev_gender 2	0.0000000	0.00000000	.	.
agecsq*rev_gender 1	0.0028660	0.00187391	1.53	0.1445
agecsq*rev_gender 2	0.0000000	0.00000000	.	.

Note: The degrees of freedom for the t tests is 17.
Matrix X'WX is singular and a generalized inverse was used to solve the normal equations. Estimates are not unique.

Section 7.5.9 Use Pfeffermann method (Q weighted)

IVEware Setup Checker, Sun Mar 02 13:10:50 2025

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Setup listing:

```
title "Example 7.5 Final Model with Main Effects and Interactions with Q Weight"
;
datain c7_nhanes_q ;
stratum sdmvstra ; cluster sdmvpsu ; weight q_wtmec2yr ;
by age18p ;
class rev_race rev_gender rev_marcata ;
dependent bpxd1l_1 ;
predictor rev_race rev_gender rev_marcata agec agecsq rev_race*agec
rev_race*agecsq rev_gender*agec rev_gender*agecsq ;
run;
```

Section 7.5.9 Use Pfeffermann method (Q weighted)

IVEware Jackknife Regression Procedure, Sun Mar 02 13:10:50 2025

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"Example 7.5 Final Model with Main Effects and Interactions with Q Weight"

```

Regression type:      Linear
Dependent variable:  bpxd11_1
Predictors:          rev_race
                    rev_gender
                    rev_marcacat
                    agec
                    agecsq
                    XACT1  rev_race*agec
                    XACT2  rev_race*agecsq
                    XACT3  rev_gender*agec
                    XACT4  rev_gender*agecsq
Cat. var. ref. codes:  rev_race  5
                    rev_marcacat 3
                    rev_gender  2
By variables:        age18p
Stratum variable:    sdmvstra  Masked variance pseudo-stratum
Cluster variable:    sdmvpsu   Masked variance pseudo-PSU
Weight variable:     q_wtmec2yr
    
```

```

By variable          Code
age18p                1
    
```

```

Valid cases          4845
Sum weights          5257.282205
Replicates           17
    
```

```

Degr freedom         17
    
```

```

Sum of squares:
Model                95941.33807
Error                646091.1655
Total                742032.5035
R-square             0.12930
F-value              0.12622
P-value              0.99998
    
```

Variable	Estimate	Std Error	T Test	Prob > T
Intercept	75.4368178	0.8877017	84.97992	0.00000
rev_race.1	1.1733746	1.0145036	1.15660	0.26343
rev_race.2	3.4063892	0.9550835	3.56659	0.00238
rev_race.3	1.4061444	0.9886141	1.42234	0.17302
rev_race.4	0.7328702	0.8754654	0.83712	0.41414
rev_gender	-3.4370648	0.6263472	-5.48747	0.00004
rev_marcacat.1	0.5494005	0.6181267	0.88882	0.38651
rev_marcacat.2	-0.2501659	0.5242326	-0.47720	0.63929
agec	0.0410982	0.0364081	1.12882	0.27465
agecsq	-0.0140742	0.0021529	-6.53731	0.00001
XACT1.1	0.0397136	0.0525502	0.75573	0.46016
XACT1.2	0.0712220	0.0311295	2.28793	0.03523
XACT1.3	-0.0015387	0.0557929	-0.02758	0.97832
XACT1.4	0.0231397	0.0662682	0.34918	0.73124

Section 7.5.9 Use Pfeffermann method (Q weighted)

IVEware Jackknife Regression Procedure, Sun Mar 02 13:10:51 2025

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"Example 7.5 Final Model with Main Effects and Interactions with Q Weight"

Variable	Estimate	Std Error	T Test	Prob > T
XACT2.1	0.0009378	0.0023228	0.40372	0.69145
XACT2.2	-0.0031053	0.0024047	-1.29134	0.21387
XACT2.3	0.0020717	0.0015894	1.30341	0.20981
XACT2.4	-0.0031420	0.0046270	-0.67906	0.50624
XACT3	0.0313806	0.0292621	1.07240	0.29853
XACT4	0.0028660	0.0018203	1.57447	0.13380

Variable	Estimate	95% Confidence Interval	
		Lower	Upper
Intercept	75.4368178	73.5639306	77.3097049
rev_race.1	1.1733746	-0.9670412	3.3137904
rev_race.2	3.4063892	1.3913389	5.4214395
rev_race.3	1.4061444	-0.6796494	3.4919382
rev_race.4	0.7328702	-1.1142006	2.5799411
rev_gender	-3.4370648	-4.7585422	-2.1155875
rev_marcat.1	0.5494005	-0.7547331	1.8535341
rev_marcat.2	-0.2501659	-1.3562003	0.8558684
agec	0.0410982	-0.0357161	0.1179125
agecsq	-0.0140742	-0.0186165	-0.0095320
XACT1.1	0.0397136	-0.0711578	0.1505849
XACT1.2	0.0712220	0.0055445	0.1368995
XACT1.3	-0.0015387	-0.1192514	0.1161740
XACT1.4	0.0231397	-0.1166741	0.1629535
XACT2.1	0.0009378	-0.0039629	0.0058384
XACT2.2	-0.0031053	-0.0081787	0.0019682
XACT2.3	0.0020717	-0.0012817	0.0054250
XACT2.4	-0.0031420	-0.0129041	0.0066201
XACT3	0.0313806	-0.0303569	0.0931182
XACT4	0.0028660	-0.0009745	0.0067066

Variable	Design Effect	SRS	% Diff
		Estimate	SRS v Est
Intercept	1.38131	75.2322804	-0.27114
rev_race.1	1.23614	2.0088151	71.19981
rev_race.2	1.24353	3.4065254	0.00400
rev_race.3	1.45347	1.4738630	4.81590
rev_race.4	0.72185	0.6140182	-16.21733
rev_gender	1.85681	-3.5048242	1.97143
rev_marcat.1	1.78216	0.4695321	-14.53737
rev_marcat.2	1.49130	-0.3134081	25.28007
agec	1.11938	0.0401082	-2.40886
agecsq	1.02849	-0.0133193	-5.36435
XACT1.1	1.65942	0.0769323	93.71788
XACT1.2	0.66975	0.0650039	-8.73058
XACT1.3	2.23814	-0.0085232	453.92298
XACT1.4	2.15236	0.0549051	137.27648
XACT2.1	0.86289	0.0000229	-97.55995
XACT2.2	1.06547	-0.0037945	22.19719
XACT2.3	0.50408	0.0012790	-38.25976
XACT2.4	2.79378	-0.0007697	-75.50189

Section 7.5.9 Use Pfeffermann method (Q weighted)

IVEware Jackknife Regression Procedure, Sun Mar 02 13:10:51 2025

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"Example 7.5 Final Model with Main Effects and Interactions with Q Weight"

Variable	Design Effect	SRS Estimate	% Diff SRS v Est
XACT3	2.21945	0.0318807	1.59363
XACT4	2.84007	0.0026438	-7.75387

BBDesign Data Set Production not repeated here, see Chapters 5 and 6 for Examples of Data Set Creation. See IVEware documentation Chapter 9 for example of using SAS for correct BBDesign combining (not included in IVEware).