```sas
libname lib1 'C:\Documents and Settings\Library';
options pageno=1 fmtsearch=(lib1) nocenter;

*bootstrap;
sasfile lib1.angclncboot load;
proc surveyselect data=lib1.angclncboot out=lib1.angclncbtrep
seed=19610627 method=pps_wr outhits rep=1000 sampsize=1247;
strata q5/alloc=prop;
size  crnkwgt;
run;
sasfile lib1.angclncboot close;

*Means Macro #2;
%macro mnsbtmc2(vrble=,wgt=,indtbt=,indt=,outdt=);
ods listing close;
*output means from bootstrap to tmp_mns1;
proc means data=&indtbt;by replicate;var &vrble;
weight &wgt;output out=tmp_mns1 mean=mean;run;
*select only one-way means to tmp_mns2;
data tmp_mns2;set tmp_mns1;where _type_=0;run;
*output mean and std of means from bootstrap to tmp_mns3;
proc univariate data=tmp_mns2;var mean;
output out=tmp_mns3 mean=mean std=std;run;
*output mean and std of means from data to tmp_mns43;
proc means data=&indt;var &vrble;weight &wgt;
output out=tmp_mns4 mean=mean_s;run;
*select only two-way means to tmp_mns4;
data tmp_mns5;set tmp_mns4;where _type_=0;run;
ods listing;
data &outdt;
merge tmp_mns3 tmp_mns5;l95ci=mean_s-1.96*std;
u95ci=mean_s+1.96*std;run;
%mend mnsbtmc2;

*************************************************;
*Single cpu usage;
%mnsbtmc2(vrble=deft_af,wgt=crnkwgt,
indtbt=lib1.angclncbtrep,indt=lib1.angelacln,outdt=lib1.deft_af);
proc print data=lib1.deft_af;
title "deft_af";
run;

/*
The THREADS system option enables some legacy SAS processes
that are thread-enabled to take advantage of multiple CPUs
by threading the processing and I/O operations.

# Base SAS engine indexing
# Base SAS procedures: SORT, SUMMARY, MEANS, REPORT, TABULATE, and SQL
# SAS/STAT procedures: GLM, LOESS, REG, ROBUSTREG.

*Using two cpus;
option cpucount=2 threads;
```

```
/*
Log file Single cpu
1000 bootstraps
NOTE: PROCEDURE MEANS used (Total process time):
      real time              17.53 seconds
      cpu time               1.21 seconds
NOTE: DATA statement used (Total process time):
      real time              0.65 seconds
      cpu time               0.01 seconds
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time              0.17 seconds
      cpu time               0.01 seconds
NOTE: PROCEDURE MEANS used (Total process time):
      real time              4.03 seconds
      cpu time               0.03 seconds
NOTE: DATA statement used (Total process time):
      real time              0.01 seconds
      cpu time               0.01 seconds
NOTE: DATA statement used (Total process time):
      real time              0.10 seconds
      cpu time               0.00 seconds
NOTE: PROCEDURE PRINT used (Total process time):
      real time              0.42 seconds
      cpu time               0.06 seconds
*/


/*
*Using two cpus;
option cpucount=2 threads;
NOTE: PROCEDURE MEANS used (Total process time):
      real time              0.38 seconds
      cpu time               0.35 seconds
NOTE: DATA statement used (Total process time):
      real time              0.01 seconds
      cpu time               0.00 seconds
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time              0.01 seconds
      cpu time               0.00 seconds
NOTE: PROCEDURE MEANS used (Total process time):
      real time              0.03 seconds
      cpu time               0.03 seconds
NOTE: DATA statement used (Total process time):
      real time              0.01 seconds
      cpu time               0.00 seconds
NOTE: DATA statement used (Total process time):
      real time              0.00 seconds
      cpu time               0.00 seconds
NOTE: PROCEDURE PRINT used (Total process time):
      real time              0.00 seconds
      cpu time               0.00 seconds
```

```
/*
Little crazy now for 10,000 bootstraps;
**************************************************;
*Single cpu usage;
NOTE: PROCEDURE SORT used (Total process time):
      real time             20:24.70
      cpu time              1:18.28
NOTE: PROCEDURE MEANS used (Total process time):
      real time             25.26 seconds
      cpu time              7.98 seconds
NOTE: DATA statement used (Total process time):
      real time             0.07 seconds
      cpu time              0.00 seconds
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time             0.12 seconds
      cpu time              0.01 seconds


NOTE: PROCEDURE MEANS used (Total process time):
      real time             3.62 seconds
      cpu time              0.06 seconds
NOTE: DATA statement used (Total process time):
      real time             0.07 seconds
      cpu time              0.01 seconds
NOTE: DATA statement used (Total process time):
      real time             0.06 seconds
      cpu time              0.00 seconds
NOTE: PROCEDURE PRINT used (Total process time):
      real time             0.03 seconds
      cpu time              0.00 seconds
**************************************************************;
*Using two cpus;
NOTE: PROCEDURE SURVEYSELECT used (Total process time):
      real time             1:28.68
      cpu time              29.29 seconds
NOTE: There were 12470000 observations read from the data set LIB2.SHRUG2.
NOTE: The data set LIB2.SHRUG2 has 12470000 observations and 25 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time             5:27.40
      cpu time              1:10.40
NOTE: PROCEDURE MEANS used (Total process time):
      real time             20.10 seconds
      cpu time              6.56 seconds
NOTE: DATA statement used (Total process time):
      real time             0.45 seconds
      cpu time              0.03 seconds
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time             0.28 seconds
      cpu time              0.03 seconds
NOTE: PROCEDURE MEANS used (Total process time):
      real time             3.62 seconds
      cpu time              0.18 seconds
NOTE: DATA statement used (Total process time):
      real time             0.25 seconds
      cpu time              0.03 seconds
NOTE: DATA statement used (Total process time):
      real time             0.12 seconds
      cpu time              0.00 seconds
NOTE: PROCEDURE PRINT used (Total process time):
      real time             0.35 seconds
      cpu time              0.01 seconds
```

```
/*
As crazy as I can go;
Computer with 4 processors
NOTE: PROCEDURE SURVEYSELECT used (Total process time):
      real time             19.62 seconds
      cpu time              8.04 seconds
NOTE: PROCEDURE SORT used (Total process time):
      real time             59.51 seconds
      cpu time              22.79 seconds
NOTE: PROCEDURE MEANS used (Total process time):
      real time             3.68 seconds
      cpu time              2.88 seconds
NOTE: DATA statement used (Total process time):
      real time             0.10 seconds
      cpu time              0.01 seconds
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time             0.03 seconds
      cpu time              0.03 seconds
NOTE: PROCEDURE MEANS used (Total process time):
      real time             1.18 seconds
      cpu time              0.10 seconds
NOTE: DATA statement used (Total process time):
      real time             0.03 seconds
      cpu time              0.00 seconds
NOTE: DATA statement used (Total process time):
      real time             0.00 seconds
      cpu time              0.00 seconds
NOTE: PROCEDURE PRINT used (Total process time):
      real time             0.00 seconds
      cpu time              0.00 seconds


*/
```