



17

## SPSS® Macro

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## INTRODUCTION

This chapter presents the 19 SPSS® macros used in the previous chapters. These are also available from [www.pisa.oecd.org](http://www.pisa.oecd.org). Table 17.1 presents a summary of the 19 SPSS® macros. The file names are in blue and the macro names as well as their arguments are in black.

## STRUCTURE OF THE SPSS® MACROS

All the macros have five common arguments:

- NREP =
- WGT =
- RWGT =
- CONS =
- INFILE =

The other arguments are specific to a particular macro. These specific arguments were explained in the previous chapters.

All SPSS® macros have the same structure.

- The first step consists of:
  - Reading in the INFILE data file and dropping all variables that are not necessary for the analysis.
- The second step is the iterative part of the macro:
  - The SPSS® procedure for computing the estimate is repeated 81 times or 405 times, depending on the procedure; and
  - At each run, the results are stored in a temporary file. The number of the replicate and the number of the plausible values if needed are then combined in one file.
- The fourth step is devoted to the computation of the final statistic and its respective standard error:
  - The squared differences between the final estimate and the 80 replicates are computed;
  - The sum of the squared difference is computed and divided by 20; and
  - Final estimates, the sampling variance estimates and, in the case of the plausible values, the measurement variance are computed.
- The final step flags the statistics for not reaching minimum sample size requirements that researchers set. This step is not included in some macros.
  - The unweighted numbers of students, the unweighted number of schools and the weighted percentage of the population are firstly computed per population estimates returned by the macro;
  - The unweighted number of schools and the weighted percentage of the population are then compared with the benchmarks provided by the researchers; and
  - If these numbers are below the benchmarks, the results are flagged.

The SPSS® syntax is presented hereafter.



**Table 17.1**  
**Synthesis of the 19 SPSS® macros**

Requested statistics	Without plausible values	With plausible values
Mean, sd, sum, pgt, plt, pin, pout, fgt, flt, fin, fout	<b>MCR_SE_UNIV.sps</b> UNIVAR NREP= / /*default=80*/ STAT= / DEP= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.	<b>MCR_SE_PV.sps</b> PV NREP= / /*default=80*/ STAT= / DEP= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.
Percentiles		<b>MCR_SE_PERCENTILES_PV.sps</b> PCTILE PV= / PTILES= / INFILE= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ NREP= / /*default=80*/ CONS= / /*default=0.05*/
Percentage	<b>MCR_SE_GrpPct.sps</b> GRPPCT NREP= / /*default=80*/ WITHIN= / /*default=NOWITHIN*/ GRP= / WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.	<b>MCR_SE_PctLev.sps</b> PCTLEV NREP= / /*default=80*/ WITHIN= / /*default=NOWITHIN*/ PROFLEV= / WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.
Regression	<b>MCR_SE_REG.sps</b> REGnoPV NREP= / /*default=80*/ IND= / DEP= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.	<b>MCR_SE_REG_PV.sps</b> REG_PV NREP= / /*default=80*/ IND= / DEP= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ PSU= / /*default=SCHOOLID*/ LIMIT_CRITERIA= / /*default=0*/ INFILE= \ \/.
Correlation coefficients	<b>MCR_SE_COR.sps</b> CORnoPV VAR1= / VAR2= / INFILE= / GRP= / /*default=NOGRP*/ LIMIT_CRITERIA= / /*default=0*/ PSU= / /*default=SCHOOLID*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ NREP= / /*default=80*/ CONS= / /*default=0.05*/	<b>MCR_SE_COR_1PV.sps</b> COR_1PV NoPV= / PV= / INFILE= / GRP= / /*default=NOGRP*/ LIMIT_CRITERIA= / /*default=0*/ PSU= / /*default=SCHOOLID*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ NREP= / /*default=80*/ CONS= / /*default=0.05*/  <b>MCR_SE_COR_2PV.sps</b> COR_2PV PV1= / PV2= / INFILE= / GRP= / /*default=NOGRP*/ LIMIT_CRITERIA= / /*default=0*/ PSU= / /*default=SCHOOLID*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ NREP= / /*default=80*/ CONS= / /*default=0.05*/
Differences on mean, sd, sum, pgt, plt, pin, pout, fgt, flt, fin, fout	<b>MCR_SE_DIFF.sps</b> DIFnoPV DEP= / STAT= / COMPARE= / CATEG= / INFILE= / WITHIN= / /*default=NOWITHIN*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ NREP= / /*default=80*/	<b>MCR_SE_DIFF_PV.sps</b> DIF_PV DEP= / STAT= / COMPARE= / CATEG= / INFILE= / WITHIN= / /*default=NOWITHIN*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ NREP= / /*default=80*/
PV mean, sd, sum, pgt, plt, pin, pout, fgt, flt, fin, fout within quarters of WLE indices		<b>MCR_SE_PV_WLEQRT.sps</b> PVWLEQRT PV= / WLE= / STAT= / INFILE= / CNT= / /*default (CNT)*/ GRP= / /*default (NOGRP)*/ PSU= / /*default (SCHOOLID)*/ WGT= / /*default (W_FSTUWT)*/ RWGT= / /*default (W_FSTR)*/ NREP= / /*default (80)*/ CONS= / /*default (0.05)*/ LIMIT_CRITERIA= / /*default=0*/

...



Relative risk	<b>MCR_SE_RR.sps</b> RelRisk OUTCOME= / ANTECEDENT= / INFILE= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ NREP= /. /*default=80*/	<b>MCR_SE_RR_PV.sps</b> RelRisk_PV OUTCOME= / ANTECEDENT= / INFILE= / GRP= / /*default=NOGRP*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= / /*default=0.05*/ NREP= /. /*default=80*/
Effect size	<b>MCR_SE_EFFECT.sps</b> EFFnoPV DEP= / COMPARE= / CATEG= / INFILE= / WITHIN= / /*default=NOWITHIN*/ WGT = / /*default=W_FSTUWT*/ RWGT = / /*default=W_FSTR*/ CONS = / /*default=0.05*/ NREP = /. /*default=80*/	<b>MCR_SE_EFFECT_PV.sps</b> EFF_PV DEP= / COMPARE= / CATEG= / INFILE= / WITHIN= / /*default=NOWITHIN*/ WGT = / /*default=W_FSTUWT*/ RWGT = / /*default=W_FSTR*/ CONS = / /*default=0.05*/ NREP = /. /*default=80*/
Multilevel regression	<b>MCR_ML.sps</b> MIXED_noPV INFILE= / FIXEF= / /*default=EMPTY*/ RANEF= / /*default=NORAN*/ INTEF= / /*default=NOINT*/ DEP= / LEVEL2= / /*default=SCHOOLID*/ GRP= / /*default=NOGRP*/ NREP= / /*default=80*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= /. /*default=0.05*/	<b>MCR_ML_PV.sps</b> MIXED_PV INFILE= / FIXEF= / /*default=EMPTY*/ RANEF= / /*default=NORAN*/ INTEF= / /*default=NOINT*/ DEP= / LEVEL2= / /*default=SCHOOLID*/ GRP= / /*default=NOGRP*/ NREP= / /*default=80*/ WGT= / /*default=W_FSTUWT*/ RWGT= / /*default=W_FSTR*/ CONS= /. /*default=0.05*/



### Box 17.1 [1/4] SPSS® macro of MCR\_SE\_UNI.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

DEFINE univar (nrep = !default(80) !charend('/')/
               stat = !charend('/')/
               dep = !charend('/')/
               grp = !default(NOGRP) !charend('/')/
               wgt = !default(W_FSTUWT) !charend('/')/
               rwgt = !default(W_FSTR) !charend('/')/
               cons = !default(0.05) !charend('/')/
               PSU = !default(SCHOOLID) !charend('/')/
               limit_criteria = !default(0) !charend('/')/
               infile = !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables TEXTS /destination viewer=no /Tag"NoViewer".

/* nGrp is the number of group variables */
!if (!upcase(!grp) "NOGRP") !then
!let !nGrp=!null.
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).
!if (!ngrp=0) !then
!let !x=2.
!else.
/* x is nGrp + 1 */
!let !x=!length(!concat(!blanks(!nGrp), " ")).
!ifend.
title !concat('(number of group variables is ',!nGrp,')(nGrp + 1 = ',!x,')').

dataset close all.
GET FILE !infile
      /KEEP !if(!nGrp>0) !then !grp !ifend !PSU !dep !wgt !do !i= 1 !to !nrep
!concat(!rwgt,!i) !doend.
!if(!nGrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
SORT CASES BY !grp.
compute MISS=0.
!do !d !in (!dep).
if (missing(!d)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\a.sav' /drop=MISS.

*** COMPUTE ESTIMATE ***.

```



### Box 17.1 [2/4] SPSS® macro of MCR\_SE\_UNI.sps

```

oms /select tables /if subtypes='Report' /destination format=sav outfile='c:\temp\
fullwgt.sav'
  /COLUMNS DIMNAMES = ["Variables"] /tag='FullWeight'.
WEIGHT BY !wgt.
means !dep !if (!nGrp>0) !then !do !g !in (!grp) !concat("by ",!g) !doend !else by
!grp !ifend /cells=!stat.
omsend tag=['FullWeight'].

* REPLICATES.
oms /select tables /if subtypes='Report' /destination format=sav numbered="RepWeight"
outfile='c:\temp\repwgt.sav'
  /COLUMNS DIMNAMES = ["Variables"] /tag='RepWeight'.
!do !i= 1 !to !nrep.
WEIGHT BY !concat(!i,!wgt,!i).
means !dep !if (!nGrp>0) !then !do !g !in (!grp) !concat("by ",!g) !doend !else by
!grp !ifend /cells=!stat.
!doend.
omsend tag=['RepWeight'].

*** COMBINE FILES ***.

!if (!ngrp=0) !then !let !ngrp=1 !ifend.

get file='c:\temp\repwgt.sav' .
sort cases by !do !n=1 !to !nGrp !concat("Var",!n) !doend !concat(" Var",!x) .
rename vars (!dep=!do !d !in (!dep) !concat("R_",!d) !doend) .
save outfile='c:\temp\repwgt2.sav' .

get file='c:\temp\fullwgt.sav' .
sort cases by !do !n=1 !to !nGrp !concat("Var",!n) !doend !concat(" Var",!x) .

match files table=* /file='c:\temp\repwgt2.sav' /by !do !n=1 !to !nGrp !concat("
Var",!n) !doend !concat(" Var",!x) .
exe.

rename vars (!concat("Var",!x)=Statistic) .
!do !s !in (!stat)
!if (!upcase(!s)=MEAN) !then recode Statistic ("Mean"="MEAN") !ifend.
!if (!upcase(!s)=STDDEV) !then recode statistic("Std. Deviation"="STDDEV") !ifend.
!if (!upcase(!s)=MEDIAN) !then recode statistic("Median"="MEDIAN") !ifend.
!if (!upcase(!s)=SKEW) !then recode statistic("Skewness"="SKEW") !ifend.
!if (!upcase(!s)=VARIANCE) !then recode statistic("Variance"="VARIANCE") !ifend.
!if (!upcase(!s)=KURT) !then recode statistic("Kurtosis"="KURT") !ifend.
!doend.

!if (!nGrp > 0) !Then
rename vars (!do !n=1 !to !nGrp !concat("Var",!n) !doend =!grp) .
!Ifend.

*** COMPUTE SAMPLING VARIANCE (U) ***.

!do !d !in(!dep)
COMPUTE !concat('var_',!d) = !cons*(!concat('r_',!d) - !d)**2) .
!doend.

AGGREGATE OUTFILE =*
  /PRESORTED /BREAK=!if (!nGrp > 0) !then !grp !ifend Statistic
  /!do !d !in(!dep) !d !doend=MEAN(!do !d !in(!dep) !d !doend)
  /!do !d !in(!dep) !concat('var_',!d) !doend=SUM(!do !d !in(!dep) !concat('var_',!d)
!doend) .

*** COMPUTE SE ***.

!do !d !in(!dep)
COMPUTE !concat('se_',!d) = SQRT(!concat('var_',!d) ).
FORMATS !d (F8.3) / !concat('se_',!d) (F10.6) .
!doend .

```



### Box 17.1 [3/4] SPSS® macro of MCR\_SE\_UNI.sps

```

*** COMPUTE SE ***.

!do !d !in(!dep)
COMPUTE !concat('se_',!d) = SQRT(!concat('var_',!d) ).
FORMATS !d (F8.3) / !concat('se_',!d) (F10.6).
!doend .

*** CREATE MERGE VARIABLE ***.

* Note: This might not work in all languages .
!do !g !in (!grp).
select if (substr(!g,1,3)<>"Tot").
compute !g=rtrim(!g).
!doend.
sort cases by statistic !grp.
compute z=$casenum.
autorecode statistic /into temp.
aggregate /break=temp /max=max(z) /N=N.
compute y=max-z.
compute x=mod(y,z).
do if (temp=1).
compute MERGE=z.
else.
compute MERGE=N-x.
end if.
SORT CASES BY MERGE.
save outfile='c:\temp\z.sav' /DROP=TEMP X Y Z.

*** COMPUTE N ***.

get file='c:\temp\a.sav'.
weight off.
aggregate /break=!if (!z=1) !then !head(!grp)!else !grp !ifend /N_total=sum(!wgt).
filter by VALIDN.
weight by !wgt.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N /N_total=mean(N_total).
aggregate outfile=* /break=!grp /NU_PSU=N /N_total=mean(N_total).
filter off.

match files /file='c:\temp\y.sav' /file=* /by !grp.
Compute MERGE=$casenum.
exe.
delete var !grp.
match files file='c:\temp\z.sav' /TABLE=* /by MERGE.
formats N_cases (f10.0).

omsend Tag="NoViewer".

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then delete var (N_total) !else
!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.

```



### Box 17.1 [4/4] SPSS® macro of MCR\_SE\_UNI.sps

```

!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0) N_total (f10.0).
!ifend.
!doend.
!ifend.
exe.

*** OUTPUT TABLES ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".
!do !s !in (!stat).
Temp.
Select if (Statistic=!quote(!upcase(!s))).

SUMMARIZE
  /TABLES= !if (!upcase(!grp)="NOGRP") !then !else !grp !ifend STATISTIC !do !d
!in(!dep) !d !concat('SE_',!d) !doend
  !if (!limit_criteria=0) !then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT= !if (!nGrp > 0) !then LIST NOCASENUM TOTAL !else LIST NOCASENUM !ifend
  !if (!nGrp=0) !then /TITLE=!quote(!concat(!upcase(!s),' and SE of ',!dep))
  !else /TITLE=!quote(!concat(!upcase(!s),' and SE of ',!dep,' by ',!grp)) !ifend
  /CELLS=NONE.
!doend

OMSEND TAG=["SumNoCaseProc"].

delete variables !if (!upcase(!grp)="NOGRP") !then !grp !ifend !do !d !in(!dep)
!concat(" var_",!d) !doend MERGE max N nu_cases n_cases nu_psu n_total .

save outfile="c:\temp\results.sav".

set mprint=no.
restore.
!enddefine.

```





### Box 17.2 [1/4] SPSS® macro of MCR\_SE\_PV.sps

```

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

set mprint=no.
DEFINE PV (nrep = !default(80) !charend('/')/
          stat = !charend('/')/
          dep = !charend('/')/
          grp = !default(NOGRP) !charend('/')/
          wgt = !default(W_FSTUWT) !charend('/')/
          rwgt = !default(W_FSTR) !charend('/')/
          cons = !default(0.05) !charend('/')/
          PSU = !default(SCHOOLID) !charend('/')/
          limit_criteria = !default(0) !charend('/')/
          infile = !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables TEXTS /destination viewer=no /Tag="NoViewer".

/* nGrp is the number of group variables */
!if (!upcase(!grp)="NOGRP") !then
!let !nGrp=!null.
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).
!if (!ngrp=0) !then
!let !x=2.
!else.
/* x is nGrp + 1 */
!let !x=!length(!concat(!blanks(!nGrp), " ")).
!ifend.
title !concat('(number of group variables is ',!nGrp,')(nGrp + 1 = ',!x,')').

dataset close all.
GET FILE !infile
  /KEEP !if (!nGrp>0) !then !grp !ifend !psu !dep !wgt !do !i= 1 !to !nrep
!concat(!rwgt,!i) !doend.
!if(!nGrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
SORT CASES BY !grp.
compute MISS=0.
!do !d !in (!dep).
if (missing(!d)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\a.sav' /drop=MISS.

*** COMPUTE ESTIMATE ***.

oms /select tables /if subtypes='Report' /destination format=sav outfile='c:\temp\
fullwgt.sav'
  /COLUMNS DIMNAMES = ["Variables"] /tag='FullWeight'.
WEIGHT BY !wgt.
means !dep !if (!nGrp>0) !then !do !g !in (!grp) !concat("by ",!g) !doend !else by
!grp !ifend /cells=!stat.
omsend tag='FullWeight'.

```



### Box 17.2 [2/4] SPSS® macro of MCR\_SE\_PV.sps

```

* REPLICATES.
oms /select tables /if subtypes='Report' /destination format=sav
numbered="RepWeight" outfile='c:\temp\repwgt.sav'
  /COLUMNS DIMNAMES = ["Variables"] /tag='RepWeight'.
!do !i= 1 !to !nrep.
WEIGHT BY !concat(!rwgt,!i).
means !dep !if (!nGrp>0) !then !do !g !in (!grp) !concat("by ",!g) !doend !else by
!grp !ifend /cells=!stat.
!doend.
omsend tag='RepWeight'.

*** COMBINE FILES ***.
!if (!ngrp=0) !then !let !ngrp=1 !ifend.

get file='c:\temp\repwgt.sav' .
sort cases by !do !n=1 !to !nGrp !concat("Var",!n) !doend !concat("Var",!x).
rename vars (!dep=!do !d !in (!dep) !concat("R_",!d) !doend).
save outfile='c:\temp\repwgt2.sav'.

get file='c:\temp\fullwgt.sav' .
sort cases by !do !n=1 !to !nGrp !concat("Var",!n) !doend !concat("Var",!x).

match files table=* /file='c:\temp\repwgt2.sav' /by !do !n=1 !to !nGrp
!concat("Var",!n) !doend !concat("Var",!x).
exe.

rename vars (!concat("Var",!x)=Statistic).
!do !s !in (!stat)
!if (!upcase(!s)=MEAN) !then recode Statistic ("Mean"="MEAN") !ifend.
!if (!upcase(!s)=STDDEV) !then recode statistic("Std. Deviation" "STDDEV") !ifend.
!if (!upcase(!s)=MEDIAN) !then recode statistic("Median" "MEDIAN") !ifend.
!if (!upcase(!s)=SKEW) !then recode statistic("Skewness" "SKEW") !ifend.
!if (!upcase(!s)=VARIANCE) !then recode statistic("Variance" "VARIANCE") !ifend.
!if (!upcase(!s)=KURT) !then recode statistic("Kurtosis" "KURT") !ifend.
!doend.
!if (!nGrp > 0) !Then
rename vars (!do !n=1 !to !nGrp !concat("Var",!n) !doend =!grp).
!Ifend.

*** COMPUTE SAMPLING VARIANCE (U) ***.

!do !d !in(!dep)
COMPUTE !concat('var_',!d) = !cons*(!concat('r_',!d) - !d)**2).
!doend.

AGGREGATE OUTFILE =*
  /PRESORTED /BREAK=!if (!nGrp > 0) !then !grp !ifend Statistic
  /!do !d !in(!dep) !d !doend=MEAN(!do !d !in(!dep) !d !doend)
  /!do !d !in(!dep) !concat('var_',!d) !doend=SUM(!do !d !in(!dep) !concat('var_
',!d) !doend) .

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k,"var_",!d).
!doend.
compute pv_var=mean(!substr(!k,2)).
exe.

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k,"",!d).
!doend.
compute STAT=mean(!substr(!k,2)).

do repeat a=!dep/b=pvar1 to pvar5.
compute b=(a-STAT)**2.
end repeat.

compute pvmerr=.25*(sum(pvar1 to pvar5)).

```



### Box 17.2 [3/4] SPSS® macro of MCR\_SE\_PV.sps

```

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
exe.
FORMATS STAT (F8.3) / SE (F10.6).

*** CREATE MERGE VARIABLE ***.

* Note: This might not work in all languages .
!do !g !in (!grp).
select if (substr(!g,1,3)<>"Tot").
compute !g=rtrim(!g).
!doend.
sort cases by statistic !grp.
compute z=$casenum.
autorecode statistic /into temp.
aggregate /break=temp /max=max(z) /N=N.
compute y=max-z.
compute x=mod(y,z).
do if (temp=1).
compute MERGE=z.
else.
compute MERGE=N-x.
end if.
SORT CASES BY MERGE.
save outfile='c:\temp\z.sav' /DROP=TEMP X Y Z.
*** COMPUTE N ***.

get file='c:\temp\a.sav'.
weight off.
aggregate /break=!if (!z=1) !then !head(!grp)!else !grp !ifend /N_total=sum(!wgt).
filter by VALIDN.
weight by !wgt.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N /N_total=mean(N_total).
aggregate outfile=* /break=!grp /NU_PSU=N /N_total=mean(N_total).
filter off.

match files /file='c:\temp\y.sav' /file=* /by !grp.
Compute MERGE=$casenum.
exe.
delete var !grp.
match files file='c:\temp\z.sav' /TABLE=* /by MERGE.
formats N_cases (f10.0).
exe.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then delete var N_total !else
!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0) N_total (f10.0).
!ifend.
!doend.
!ifend.
exe.
omsend tag="NoViewer".

```



### Box 17.2 [4/4] SPSS® macro of MCR\_SE\_PV.sps

```

*** OUTPUT TABLES ***.

OMS /SELECT TABLES headings logs
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

!do !s !in (!stat).
Temp.
Select if (Statistic=!quote(!upcase(!s))).

SUMMARIZE
  /TABLES= !if (!upcase(!grp)="NOGRP") !then !else !grp !ifend STATISTIC STAT SE
  !if (!limit_criteria=0) !then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM !if (!nGrp > 0) !then TOTAL !ifend
  !if (!nGrp=0) !then /TITLE=!quote(!concat(!upcase(!s), ' and SE on ', !head(!dep), ' to ',
!substr(!dep, !Index(!dep, PV5))))
  !else /TITLE=!quote(!concat(!upcase(!s), ' and SE on ', !head(!dep), ' to ', !substr
(!dep, !Index(!dep, PV5)), ' by ', !grp)) !ifend
  /CELLS=NONE.
!doend

OMSEND TAG=["SumNoCaseProc"].

delete variables !if (!upcase(!grp)="NOGRP") !then !grp !ifend !dep !do !d !in
(!dep) !concat("var_", !d) !doend
  pv_var pvar1 pvar2 pvar3 pvar4 pvar5 pvmerr merge max N.
restore.

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.

```



### Box 17.3 [1/3] SPSS® macro of MCR\_SE\_PERCENTILES\_PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define pctile (pv      =!charend('/')
              /ptiles=!charend('/')
              /infile=!charend('/')
              /grp     =!default(NOGRP) !charend('/')
              /wgt     =!default(W_FSTUWT) !charend('/')
              /rwgt    =!default(W_FSTR) !charend('/')
              /nrep    =!default(80) !charend('/')
              /cons    =!default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values
mxwarns=0.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

!let !a=!null.
!do !b !in (!ptiles)
!let !a=!concat(!a,!blanks(1)).
!doend.
!let !nptile=!length(!a).

!let !a=!null.
!do !b !in (!grp)
!let !a=!concat(!a,!blanks(1)).
!doend.
!let !ngrp=!length(!a).
!if (!upcase(!grp)=NOGRP) !then !let !ngrp=0 !ifend.
!let !plus1=!length(!concat(!a,!blanks(1))).
!let !plus2=!length(!concat(!a,!blanks(2))).

!let !k=!null.
!do !d !in (!pv).
!let !k=!concat(!k,",",!d).
!doend.
!let !k=!substr(!k,2).

!let !l=!null.
!do !d !in (!pv).
!let !l=!concat(!l,",var_",!d).
!doend.
!let !l=!substr(!l,2).

dataset close all.
get file=!quote(!infile) /keep=!if (!ngrp=0) !then !else !grp !ifend !pv !wgt
!concat(!rwgt,'1') to !concat(!rwgt,!nrep).
!if (!ngrp=0) !then compute !grp=1 !ifend.
sort cases by !grp.
save outfile='c:\temp\sort.sav'.

*** FULL WEIGHT ***.

dataset close all.
get file='c:\temp\sort.sav'.
oms /select tables /if subtype='Statistics' /destination format=sav outfile='c:\
temp\fwgt.sav' /tag='fwgt'.
split file layered by !grp.
weight by !wgt.
fre !pv /format=notable /percentiles !ptiles.
split file off.
omsend tag='fwgt'.
dataset close all.
get file='c:\temp\fwgt.sav' /drop=Command_ Subtype_ Label_ !concat('var',!plus1).
compute temp=number(!concat('var',!plus2),f7.0).
select if not missing (temp).
RENAME VAR (!if (!ngrp=0) !then var1=!grp !else var1 to !concat('var',!ngrp)=!grp)
!ifend.
save outfile='c:\temp\fwgt2.sav'.

```



Box 17.3 [2/3] **SPSS® macro of MCR\_SE\_PERCENTILES\_PV.sps**

```

**** REPLICATE WEIGHTS ***.

dataset close all.
get file='c:\temp\sort.sav'.
oms /select tables /if subtype='Statistics' /destination format=sav outfile='c:\temp\
rwgt.sav' /tag='rwgt'.
split file layered by !grp.
!do !i = 1 !to !nrep.
weight by !concat(!rwgt,!i).
fre !pv /format=notable /percentiles !ptiles.
!doend.
split file off.
omsend tag='rwgt'.
dataset close all.
get file='c:\temp\rwgt.sav' /drop=Command_ Subtype_ Label_ !concat('var',!plus1).
compute temp=number(!concat('var',!plus2),f7.0).
select if not missing (temp).
rename vars (!pv=!do !d !in (!pv) !concat("R_",!d) !doend).
RENAME VAR (!if (!ngrp=0) !then var1=!grp !else var1 to !concat('var',!ngrp)=!grp
!ifend).
sort case by !grp temp.
save outfile='c:\temp\wgt2.sav'.

match files table='c:\temp\fwgt2.sav' /file='c:\temp\wgt2.sav' /by !grp temp.

*** CALCULATION SAMPLING VARIANCE ***.

!do !a !in (!pv).
COMPUTE !concat('var_',!a) = !cons * ((!concat('r_',!a) - !a)**2).
!doend.

AGGREGATE OUTFILE =*
/PRESORTED /BREAK= !grp temp
/!do !d !in (!pv) !d !doend=MEAN(!do !d !in(!pv) !d !doend)
/!do !d !in (!pv) !concat('var_',!d) !doend=SUM(!do !d !in(!pv) !concat('var_',!d)
!doend) .

compute pv_var=mean(!l).
exe.

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute STAT=mean(!k).

do repeat a=!pv/b=pvar1 to pvar5.
compute b=(a-STAT)**2.
end repeat.

compute pvmerr=.25*(sum(pvar1 to pvar5)).
exe.

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
exe.
FORMATS STAT (F8.3) / SE (F10.6).
delete variables !pv !do !d !in (!pv) !concat("var_",!d) !doend pv_var pvar1 pvar2
pvar3 pvar4 pvar5 pvmerr.
formats temp (f3.0).
casestovars /id=!grp /index=temp /groupsby index.
omsend tag="crap".

```



### Box 17.3 [3/3] SPSS® macro of MCR\_SE\_PERCENTILES\_PV.sps

```

*** OUTPUT TABLE ***.

!if (!nptile=1) !then rename var (STAT SE=!concat('STAT.',!ptiles)
!concat('SE.',!ptiles)) !ifend.
!let !var=!null.
!do !p !in (!ptiles).
!let !var=!concat(!var,' STAT.',!p,' SE.',!p).
!doend.

Oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag"case".
SUMMARIZE
  /TABLES= !if (!ngrp=0) !then !else !grp !ifend !var
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Percentiles ",!head(!dep)," to ",!sub
tr(!dep,!Index(!pv,PV5))))
  !else /TITLE=!quote(!concat("Percentiles ",!head(!pv)," to ",!substr(!pv,!Index(!
pv,PV5))," by ",!grp)) !ifend
  /CELLS=NONE.
omsend tag"case".

!if (!ngrp=0) !then delete var !grp !ifend.

save outfile"c:\temp\results.sav".

RESTORE.
!enddefine.

```



### Box 17.4 [1/3] SPSS® macro of MCR\_SE\_GrpPct.sps

```

set mprint=no.

*** Created by Eveline Gebhardt & Alexander Daraganov, Australian Council for
Educational Research ***.

define GRPPCT (nrep = !default(80) !charend('/')/
              within = !default(NOWITHIN) !charend('/')/
              grp = !charend('/')/
              wgt = !default(W_FSTUWT) !charend('/')/
              rwgt = !default(W_FSTR) !charend('/')/
              cons = !default(0.05) !charend('/')/
              PSU = !default(SCHOOLID) !charend('/')/
              limit_criteria = !default(0) !charend('/')/
              infile = !charend('/')).

preserve.
SET Olang=English OVars names ONumbers both TVars names TNumbers both.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)="NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin, " ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

get file !infile /keep !if (!nwithin>0) !then !within !ifend !grp !PSU !wgt
!concat(!rwgt,1) to !concat(!rwgt,!nrep)).
!if (!nwithin=0) !then compute !within = 1 !ifend.
sort cases by !within !grp.
save outfile='c:\temp\sort.sav'.

*** COMPUTE ESTIMATE ***.

weight by !wgt.
aggregate outfile=* mode=addvariables /presorted /break=!within /N_all=n.
aggregate outfile=* /presorted /break=!within !grp /N_cases=n /N_all=mean(N_all)
/NU_cases=NU.
formats N_cases (f10.0).
compute stat=100*(n_cases/n_all).
save outfile=!quote(!concat('c:\temp\',!wgt, '.sav')).

* REPLICATES.

!do !i= 1 !to !nrep.
dataset close ALL.
get file 'c:\temp\sort.sav'.
weight by !concat(!rwgt,!i).
aggregate outfile=* mode=addvariables /presorted /break=!within /N_all=n.
aggregate outfile=* /presorted /break=!within !grp /N_grp=n /N_all=mean(N_all).
compute statr=100*(n_grp/n_all).
save outfile=!quote(!concat('c:\temp\',!rwgt,!i, '.sav')).
!doend.

```





### Box 17.4 [2/3] SPSS® macro of MCR\_SE\_GrpPct.sps

```

*** COMBINE RESULTS ***.

dataset close ALL.
get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')).

!let !ccc=NULL.
!do !e = 2 !to !nrep.
add files file=* /file=!quote(!concat('c:\temp\',!rwgt,!e,'.sav')).
exe.
!if ((!e=50) !or (!e=100) !or (!e=150) !or (!e=200) !or (!e=250) !or (!e=300) !or
(!e=350) !or (!e=400) !or (!e=450)) !then
!let !ccc=(!Concat(!ccc,!Blank(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!length(!ccc),'.sav')).
!let !f=!length(!concat(!blanks(!e),!blanks(1))).
get file =!quote(!concat('C:\temp\',!rwgt,!f,'.sav')).
select if $casenum=0.
!ifend
!if (!e=!nrep) !then
!let !ccc=(!Concat(!ccc,!Blank(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!length(!ccc),'.sav')).
!if (!nrep>50) !then
add files !do !ccc=1 !to !length(!ccc)/file=!quote(!concat('c:\temp\',!rwgt,'_temp_',
!cccc,'.sav')) !doend.
!ifend
!ifend
!Doend

sort cases by !within !grp.
match files file=* /table=!quote(!concat('c:\temp\',!wgt,'.sav')) /by !within !grp.
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
aggregate outfile=* /break=!within !grp NU_cases N_cases/ stat= mean(stat)/
var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute SE=sqrt(var).
formats stat (f8.3)/ SE (f10.6).
sort cases by !within !grp.
save outfile='c:\temp\z.sav' /keep=!within !grp stat se NU_cases N_cases.

*** ADD NUMBER OF SAMPLED SCHOOLS ***.

get file='c:\temp\sort.sav'.
sort cases by !within !grp !PSU.
weight off.
aggregate outfile=* /break=!within !grp !PSU /N=N.
aggregate outfile=* /break=!within !grp /NU_PSU=N.
match files file='c:\temp\z.sav' /file=* /by !within !grp.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.

```



### Box 17.4 [3/3] SPSS® macro of MCR\_SE\_GrpPct.sps

```

!if (!length(!a)=3) !then
aggregate /break=!if (!z=1) !then !head(!within)!else !within !ifend /N_
total=sum(N_cases).
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
exe.

*** OUTPUT RESULTS ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nwithin>0) !then !within !ifend !grp stat se !if (!limit_
criteria=0) !then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE=!quote(!concat('SE on group percentages of ',!grp))
  !else /TITLE=!quote(!concat('SE on group percentages of ',!grp,' within '
!within, (categories') !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

restore.

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.

```



### Box 17.5 [1/4] SPSS® macro of MCR\_SE\_PctLev.sps

```

SET mprint=no.

*** Created by Alexander Daraganov & Eveline Gebhardt, Australian Council for
Educational Research ***.

define PCTLEV (nrep = !default(80) !charend('/')/
              within = !default(NOWITHIN) !charend('/') /
              proflev = !charend('/') /
              wgt = !default(W_FSTUWT) !charend('/') /
              rwgt = !default(W_FSTR) !charend('/') /
              cons = !default(0.05) !charend('/')/
              PSU = !default(SCHOOLID) !charend('/')/
              limit_criteria = !default(0) !charend('/')/
              infile = !charend('/')).

preserve.
SET Olang=English OVars names ONumbers both TVars names TNumbers both.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)"NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin," ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

*** COMPUTE ESTIMATE ***.

!do !j !in (!proflev).
get file !infile /keep !if (!nwithin>0) !then !within !ifend !j !PSU !wgt.
!if (!nwithin=0) !then compute !within = 1 !ifend .
rename vars (!j=proflev).
sort cases by !within proflev .
weight by !wgt.
aggregate outfile=!quote(!concat('c:\temp\',!j, '.sav')) /presorted /break=!within
proflev !/j=n /N_cases=n /NU_cases=NU .
!doend.

match files !do !j !in (!proflev) /file=!quote(!concat('c:\temp\',!j, '.sav')) !doend
/by !within proflev.
aggregate outfile=* mode=addvariables /break=!within/N_all=sum(!head(!proflev)) .

do repeat s=stat1 to stat5 /p=!proflev.
compute s=100*p/N_all.
End repeat.
save outfile=!quote(!concat('c:\temp\',!wgt, '.sav')) /* /keep=!within proflev stat1
to stat5. */

* REPLICATES.

!do !i= 1 !to !nrep.
!do !j !in (!proflev).
dataset close ALL.
get file !infile /keep !if (!nwithin>0) !then !within !ifend !j !concat(!rwgt,!i).
!if (!nwithin=0) !then compute !within = 1 !ifend .
rename vars (!j=proflev).
sort cases by !within proflev .
weight by !concat(!rwgt,!i).
aggregate outfile=!quote(!concat('c:\temp\',!i,!j, '.sav')) /presorted /break=!within
proflev !/j=n.
!doend.

match files !do !j !in (!proflev) /file=!quote(!concat('c:\temp\',!i,!j, '.sav'))
!doend /by !within proflev.
aggregate outfile=* mode=addvariables /break=!within /N_all=sum(!head(!proflev)).

do repeat s=statR1 to statR5 /p=!proflev.
compute s=100*p/N_all.
End repeat.

```



### Box 17.5 [2/4] SPSS® macro of MCR\_SE\_PctLev.sps

```

save outfile=!quote(!concat('c:\temp\',!rwgt,!i,'.sav')) /keep=!within proflev statR1 to
statR5..
!doend.
*** COMBINE RESULTS ***.
dataset close ALL.
/* get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')). */
!let !nper=50.
!if ( !length(!substr(!blanks(!nrep),!length(!concat(!blanks(!nper),!blanks(1))))=0 )
!then
    add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to !nrep
/file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav')) !doend .
!else
    !let !modls=!nrep.
    !let !intgr=0.
    !do !iter=!nrep !to !nper !by -!nper
        add files file= !quote(!concat('C:\temp\',!rwgt,!iter,'.sav')) !do !e=!le
ngth(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks(!iter),!len
gth(!blanks(!nper)))) !by -1 /file=!quote(!concat('C:\temp\',!rwgt,!e,'.
sav')) !doend .
        !let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1),
!blanks(!nper))))).
        !let !intgr=!length(!Concat(!blanks(!intgr),!blanks(1))).
        save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
    !doend
    !if (!modls>0) !then
        !if (!modls>1) !then
            add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do
!e=2 !to !modls /file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav'))
!doend .
            !let !intgr=!length(!Concat(!blanks(!intgr),!blanks(1))).
            save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
        !else
            get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')).
            !let !intgr=!length(!Concat(!blanks(!intgr),!blanks(1))).
            save
            outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
        !ifend
    !ifend
    !if ( !length(!substr(!blanks(!intgr),!length(!concat(!blanks(!nper),
!blanks(1))))=0 ) !then
        add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')) !do !e=2
!to !intgr /file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav'))
!doend .
    !else
        !let !modls=!intgr.
        !let !intgr1=0.
        !do !iter=!intgr !to !nper !by -!nper
            add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_',!iter,'.sav'))
!do !e=!length(!substr(!blanks(!iter),2)) !to !length(!substr
(!blanks(!iter),!length(!blanks(!nper)))) !ny -1
/file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav'))
!doend.
            !let !modls=!length(!substr(!blanks(!modls),!length(!concat
(!blanks(1),!blanks(!nper))))).
            !let !intgr1=!length(!Concat(!blanks(!intgr1),!blanks(1))).
            save
            outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',!intgr1,'.sav')).
        !doend
        !if (!modls>0) !then
            !if (!modls>1) !then
                add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav'))
!do !e=2 !to !modls /file=!quote(!concat('C:\temp\',
!rwgt,'_temp_',!e,'.sav')) !doend .
            !let !intgr1=!length(!Concat(!blanks(!intgr1),!blanks(1))).
            save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
            !else
                get file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')).
                !let !intgr1=!length(!Concat(!blanks(!intgr1),
!blanks(1))).
                save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
            !ifend

```



### Box 17.5 [3/4] SPSS® macro of MCR\_SE\_PctLev.sps

```

!ifend
      add files file= !quote(!concat('c:\temp\',!rwgt,'_tempover_1.sav'))
!do !e=2 !to !intgr1 /file=!quote(!concat('C:\temp\',!rwgt,'_tempover_',!e,'.sav'))
!doend .
      !ifend
!ifend
exe.

sort cases by !within proflev.

match files file=* /table=!quote(!concat('c:\temp\',!wgt,'.sav')) /by !within proflev.
recode stat1 to stat5 statR1 to StatR5 (sysmis=0).
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr1 to statr5/
      b=stat1 to stat5/
      c=var1 to var5.
compute c=(a-b)**2.
end repeat.

aggregate outfile=*/
      break=!within proflev NU_cases N_cases/

      stat1 to stat5= mean(stat1 to stat5)/
      var1 to var5 = sum(var1 to var5).

do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.

compute pv_var=mean(var1 to var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute stat=mean(stat1 to stat5).

do repeat a=stat1 to stat5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.

compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3)/ SE (f10.6).
sort cases by !within proflev.
save outfile='c:\temp\z.sav' /keep=!within proflev stat se NU_cases N_cases.

*** ADD NUMBER OF SAMPLED SCHOOLS ***.

!do !j !in (!proflev).
dataset close ALL.
get file !infile /keep !if (!nwithin>0) !then !within !ifend !j !concat(!rwgt,!i)
!PSU.
!if (!nwithin=0) !then compute !within = 1 !ifend .
rename vars (!j=proflev).
sort cases by !within proflev !PSU.
weight off.
aggregate outfile=!quote(!concat('c:\temp\',!j,'.sav')) /presorted /break=!within
proflev !PSU/!j=N.
!doend.

match files !do !j !in (!proflev) /file=!quote(!concat('c:\temp\',!j,'.sav')) !doend
/by !within proflev !PSU.
aggregate outfile=* /break=!within proflev /NU_PSU=N.
match files file='c:\temp\z.sav' /file=* /by !within proflev.

```



## Box 17.5 [4/4] SPSS® macro of MCR\_SE\_PctLev.sps

```

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
aggregate /break=!if (!z=1) !then !head(!within)!else !within !ifend /N_
total=sum(N_cases).
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
exe.

*** OUTPUT TABLE ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nwithin>0) !then !within !ifend proflev stat se !if (!limit_
criteria=0) !then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE='SE on percentages in proficiency levels'
  !else /TITLE=!quote(!concat('SE on percentages in proficiency levels by ',
!within)) !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

delete variables !if(!upcase(!within)=NOWITHIN) !then !within !ifend .

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.

```



### Box 17.6 [1/4] SPSS® macro of MCR\_SE\_REG.sps

```

set mprint=no.

*** Created by Eveline Gebhardt & Alexander Daraganov, Australian Council for
Educational Research ***.

define REGnoPV (nrep = !default(80) !charend('/')/
               ind = !charend('/') /
               dep = !charend('/') /
               grp = !default(NOGRP) !charend('/') /
               wgt = !default(W_FSTUWT) !charend('/') /
               rwgt = !default(W_FSTR) !charend('/') /
               cons = !default(0.05) !charend('/')/
               PSU = !default(SCHOOLID) !charend('/')/
               limit_criteria = !default(0) !charend('/')/
               infile = !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

/* nGrp is the number of group variables */
!if (!upcase(!grp)=NOGRP) !then
!let !nGrp=!null
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).
title !quote(!concat('Number of group variables = ',!ngrp)).

get file !infile /keep=!if (!ngrp>0) !then !grp !ifend !PSU !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !dep !ind.
!if (!ngrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
sort cases by !grp.
compute MISS = (missing(!dep)).
!do !i !in (!ind).
if (missing(!i)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\sort.sav' /drop=MISS.

*** COMPUTE ESTIMATES ***.

get file 'c:\temp\sort.sav'.
split file by !grp.
weight by !wgt.

oms /select tables /if subtype='Model Summary' /destination format=sav outfile='c:\
temp\R2.sav' /TAG="R2".
REGRESSION
  /missing=listwise
  /DEPENDENT !dep
  /METHOD=ENTER !ind
  /OUTFILE=COVB('C:\temp\coef.sav') .
omsend tag="R2".

get file='C:\temp\coef.sav'.
select if (rowtype_='EST').
rename var(CONST_=@INTERCEPT).
VARSTOCASES /MAKE STAT FROM @INTERCEPT !ind
  /INDEX = ind(stat) /KEEP = !grp /NULL = KEEP.
Recode ind ('@INTERCEPT'=' INTERCEPT').
save outfile='c:\temp\all.sav'.

```



### Box 17.6 [2/4] SPSS® macro of MCR\_SE\_REG.sps

```

get file='c:\temp\R2.sav' /keep=!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp
!concat('var',!n," ") !doend !ifend RSquare.
rename var (!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare=!grp STAT).
formats stat (f8.2).
string IND (a10).
compute IND=" R-SQUARE".
add files file='c:\temp\all.sav' /file=*.
sort cases by !grp ind.
save outfile='c:\temp\all2.sav'.

* REPLICATES.
oms /select tables /if subtype='Model Summary' /destination format=sav outfile='c:\
temp\R2R.sav' /TAG="R2R".
!do !i=1 !to !nrep.
dataset close all.
get file='c:\temp\sort.sav'.

*sort cases by !grp.
split file by !grp.

weight by !concat(!rwgt,!i).
REGRESSION
  /missing=listwise
  /DEPENDENT !dep
  /METHOD=ENTER !ind
  /OUTFILE=COVB('C:\temp\coef.sav') .

get file='c:\temp\coef.sav'.
select if (rowtype_='EST').
rename var(CONST_=@INTERCEPT).
VARSTOCASES /MAKE statR FROM @INTERCEPT !ind
  /INDEX = ind(statR) /KEEP = !grp /NULL = KEEP.
Recode ind ('@INTERCEPT'=' INTERCEPT').

save outfile=!quote(!concat('C:\temp\',!dep,!i,'.sav')).
!doend.
omsend tag="R2R".

*** COMBINE RESULTS ***.

dataset close ALL.
get file =!quote(!concat('C:\temp\',!dep,'1.sav')).

!let !ccc=NULL.
!do !e = 2 !to !nrep.
add files file=* /file=!quote(!concat('c:\temp\',!dep,!e,'.sav')).
exe.
!if ((!e=50) !or (!e=100) !or (!e=150) !or (!e=200) !or (!e=250) !or (!e=300) !or
(!e=350) !or (!e=400) !or (!e=450)) !then
!let !ccc=(!Concat(!ccc,!Blank(1))).
save outfile=!quote(!concat('c:\temp\',!dep,'_temp_',!length(!ccc),'sav')).
!let !f=!length(!concat(!blanks(!e),!blanks(1))).
get file =!quote(!concat('C:\temp\',!dep,!f,'.sav')).
select if $casenum=0.
!ifend
!if (!e=!nrep) !then
!let !ccc=(!Concat(!ccc,!Blank(1))).
save outfile=!quote(!concat('c:\temp\',!dep,'_temp_',!length(!ccc),'sav')).
!if (!nrep>50) !then
add files !do !cccc=1 !to !length(!ccc)/file=!quote(!concat('c:\temp\',!dep,'_temp_',
!cccc,'sav')) !doend.
!ifend
!ifend
!doend
save outfile='c:\temp\rwgt.sav'.

```





### Box 17.6 [3/4] SPSS® macro of MCR\_SE\_REG.sps

```

get file='c:\temp\R2R.sav' /keep=!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp
!concat('var',!n," ") !doend !ifend RSquare.
rename var (!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare=!grp STATR).
formats statr (f8.2).
string IND (a10).
compute IND=" R-SQUARE".
add files file='c:\temp\rwgt.sav' /file=*.
sort cases by !grp ind.
save outfile='c:\temp\rwgt2.sav'.

sort cases by !grp ind.
match files file=* /table='c:\temp\all2.sav' /by !grp ind.
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.

aggregate outfile=* /break=!grp IND /stat= mean(stat) /var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute se=sqrt(var).
formats stat (f8.3)/ SE (f10.6).
save outfile='c:\temp\stats.sav'.

*** COMPUTE N ***.

!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
get file='c:\temp\sort.sav'.
weight by !wgt.
aggregate /break=!if (!z=1) !then !head(!grp) !else !grp !ifend /N_total=N.
filter by VALIDN.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N /N_total=mean(N_total).
aggregate outfile=* /break=!grp /NU_PSU=N /N_total=mean(N_total).
match files /file='c:\temp\y.sav' /file=* /by !grp.
match files file='c:\temp\stats.sav' /TABLE=* /by !grp.
formats N_cases (f10.0).
filter off.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then!else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
compute IND=Ltrim(IND).
exe.
omsend tag="crap".

```



### Box 17.6 [4/4] SPSS® macro of MCR\_SE\_REG.sps

```

*** OUTPUT TABLES ***.
oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= !if (!nGrp>0) !then !grp !ifend IND stat SE !if (!limit_criteria=0)
!then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Regression of ",!dep," on ",!ind))
  !else /TITLE=!quote(!concat("Regression of ",!dep," on ",!ind," by ",!grp))
!ifend
  /CELLS=NONE.
delete variables !if (!limit_criteria=0) !then N_total !ifend !if (!ngrp=0) !then
!grp !ifend var.
omsend tag="case".
restore.
!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.
!enddefine.

```



### Box 17.7 [1/5] SPSS® macro of MCR\_SE\_REG\_PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt & Alexander Daraganov, Australian Council for
Educational Research ***.

define REG_PV (infile = !charend('/')/
               ind = !charend('/')/
               dep = !charend('/')/
               grp = !default(NOGRP) !charend('/')/
               nrep = !default(80) !charend('/')/
               wgt = !default(W_FSTUWT) !charend('/')/
               rwgt = !default(W_FSTR) !charend('/')/
               cons = !default(0.05) !charend('/')/
               PSU = !default(SCHOOLID) !charend('/')/
               limit_criteria = !default(0) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

/* nGrp is the number of group variables */
!let !nGrp=!null
!if (!upcase(!grp)=NOGRP) !then !else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).
title !quote(!concat('Number of group variables = ',!ngrp)).

get file !infile /keep=!if (!ngrp>0) !then !grp !ifend !PSU !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !dep !ind .
!if (!ngrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
sort cases by !grp.
compute MISS = 0.
!do !d !in (!dep).
if (missing(!d)) MISS=1.
!doend.
!do !i !in (!ind).
if (missing(!i)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\sort.sav' /drop=MISS.

*** COMPUTE REGRESSION COEFFICIENTS ***.

get file 'c:\temp\sort.sav'.
split file by !grp.
weight by !wgt.

oms /select tables /if subtype='Model Summary' /destination format=sav numbered=PV
outfile='c:\temp\R2.sav' /TAG="R2".
REGRESSION
  /missing=listwise
  /DEPENDENT !dep
  /METHOD=ENTER !ind
  /OUTFILE=COVB(!quote(!concat('C:\temp\coef.sav'))) .
omsend tag="R2".
get file='C:\temp\coef.sav'.
select if (rowtype_='EST').
rename var(CONST_=@INTERCEPT).
sort cases by !grp depvar_.
VARSTOCASES
  /MAKE s FROM @INTERCEPT !ind
  /INDEX = IND(s) /KEEP = DEPVAR_ !grp /NULL = KEEP.
sort cases by !grp IND depvar_.
casestovars /id=!grp IND /index=depvar_.
rename vars (!dep=stat.1 to stat.5).
Recode ind ('@INTERCEPT'=' INTERCEPT').
save outfile='c:\temp\all.sav'.

```


 Box 17.7 [2/5] **SPSS® macro of MCR\_SE\_REG\_PV.sps**

```

get file='c:\temp\R2.sav'
/keep=PV !if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare.
rename var (!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare=!grp STAT).
formats stat (f8.2).
sort cases by !grp.
casestovars /id=!grp /index=PV.
string IND (a10).
compute IND=" R-SQUARE".
add files file='c:\temp\all.sav' /file=*.
sort cases by !grp ind.
save outfile='c:\temp\all2.sav'.

* REPLICATES.

oms /select tables /if subtype='Model Summary' /destination format=sav
numbered=PVREP outfile='c:\temp\R2R.sav' /TAG="R2R".
!do !i=1 !to !nrep.
dataset close all.
get file 'c:\temp\sort.sav'.
split file by !grp.

weight by !CONCAT(!rwgt,!i).
REGRESSION
/missing=listwise
/DEPENDENT !dep
/METHOD=ENTER !ind
/OUTFILE=COVB(!quote(!concat('C:\temp\rep',!i,'.sav'))).

get file=!quote(!concat('C:\temp\rep',!i,'.sav')).
select if (rowtype_='EST').
rename var(CONST_=@INTERCEPT).
sort cases by !grp depvar_.
VARSTOCASES
/MAKE s FROM @INTERCEPT !ind
/INDEX = IND(s)
/KEEP = DEPVAR_ !grp
/NULL = KEEP.
sort cases by !grp IND depvar_.
casestovars /id=!grp IND /index=depvar_.
rename vars (!dep=statR.1 to statR.5).
Recode ind ('@INTERCEPT'=' INTERCEPT').
save outfile=!quote(!concat('C:\temp\',!rwgt,!i,'.sav')).
!doend.
omsend tag="R2R".

dataset close ALL.

* Combine replicate files.

!let !nper=50.
!if ( !length(!substr(!blanks(!nrep),!length(!concat(!blanks(!nper) ,
!blanks(1))))=0 ) !then
  add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to !nrep /
  file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav')) !doend .
!else
  !let !modls=!nrep.
  !let !intgr=0.
  !do !iter=!nper !to !nper !by -!nper
    add files file= !quote(!concat('C:\temp\',!rwgt,!iter,'.sav')) !do !e=
    !length(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks(!iter),
    !length(!blanks(!nper)))) !by -1 /file=!quote(!concat('C:\temp\',
    !rwgt,!e,'.sav')) !doend .
    !let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1),
    !blanks(!nper))))).
    !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
  !doend
  !if (!modls>0) !then
    !if (!modls>1) !then
      add files

```



## Box 17.7 [3/5] SPSS® macro of MCR\_SE\_REG\_PV.spss

```

file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to !modls /
file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav')) !doend .
!let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
!else
get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')).
!let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
!ifend
!ifend
!if ( !length(!substr(!blanks(!intgr),!length(!concat(!blanks(!nper),
!blanks(1))))=0 ) !then
add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')) !do !e=2 !to
!intgr /file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav')) !doend .
!else
!let !modls=!intgr.
!let !intgr1=0.
!do !iter=!intgr !to !nper !by -!nper
add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_',!iter,'.
sav')) !do !e=!length(!substr(!blanks(!iter),2)) !to
!length(!substr(!blanks(!iter),!length(!blanks(!nper)))) !ny -1
/file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav')) !doend.
!let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1),
!blanks(!nper))))).
!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',!intgr1,'.
sav')).
!doend
!if (!modls>0) !then
!if (!modls>1) !then
add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav'))
!do !e=2 !to !modls /file=!quote(!concat('C:\temp\',
!rwgt,'_temp_',!e,'.sav')) !doend .
!let !intgr1=!length(!Concat(!blanks(!intgr1),
!blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!else
get file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')).
!let !intgr1=!length(!Concat(!blanks(!intgr1),
!blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!ifend
!ifend
add files file= !quote(!concat('c:\temp\',!rwgt,'_tempover_1.sav')) !do !e=2
!to !intgr1 /file=!quote(!concat('C:\temp\',!rwgt,'_tempover_',!e,'.sav'))
!doend .
!ifend
!ifend
exe.
save outfile='c:\temp\rep1.sav'.
get file='c:\temp\R2R.sav'
/keep=PVREP !if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare.
rename var (!if (!ngrp=0) !then var1 !else !do !n=1 !to !nGrp !concat('var',!n," ")
!doend !ifend RSquare=!grp STATR).
formats statR (f8.2).
compute PV=mod(PVREP,5).
recode PV (0=5).
if (PV=5) REP=PVREP/PV.
sort cases by !grp PVREP (d).
!do !j=4 !to 1 !by -1.
if (PV=!j) REP=lag(REP).
exe.
!doend.
formats PV REP (F3.0).
sort cases by !grp REP PV.
delete var PVREP.
casestovars /id=!grp REP/index=PV.
string IND (a10).
compute IND=" R-SQUARE".
add files file=* /file='c:\temp\rep1.sav'.
save outfile='c:\temp\rep2.sav'.
delete var REP.

```


 Box 17.7 [4/5] **SPSS® macro of MCR\_SE\_REG\_PV.sps**

```

SORT CASES BY !grp IND.
match files file=*/table= 'c:\temp\all12.sav'/by !grp IND.
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr.1 to statr.5/
  b=stat.1 to stat.5/
  c=var1 to var5.
compute c=(a-b)**2.
end repeat.

aggregate outfile=*/
  break=!grp IND/
  stat.1 to stat.5= mean(stat.1 to stat.5)/
  var1 to var5 = sum(var1 to var5).

do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.

compute pv_var=mean(var1 to var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute stat=mean(stat.1 to stat.5).
do repeat a=stat.1 to stat.5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.
compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3)/ SE (f10.6).
save outfile='c:\temp\stats.sav'.

*** COMPUTE N ***.

!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
get file='c:\temp\sort.sav'.
weight by !wgt.
aggregate /break=!if (!z=1) !then !head(!grp) !else !grp !ifend /N_total=N.
filter by VALIDN.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N /N_total=mean(N_total).
aggregate outfile=* /break=!grp /NU_PSU=N /N_total=mean(N_total).
match files /file='c:\temp\y.sav' /file=* /by !grp.
match files file='c:\temp\stats.sav' /TABLE=* /by !grp.
formats N_cases (f10.0).
filter off.

```



### Box 17.7 [5/5] SPSS® macro of MCR\_SE\_REG\_PV.sps

```

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
compute IND=Ltrim(IND).
exe.
omsend tag="crap".

*** OUTPUT TABLES ***.

Oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= !if (!ngrp>0) !then !grp !ifend IND stat SE !if (!limit_criteria=0)
!then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Regression of ",!head(!dep)," to ",!su
bstr(!dep,!Index(!dep,PV5))," on ",!ind))
  !else /TITLE=!quote(!concat("Regression of ",!head(!dep)," to ",!substr(!dep,!Ind
ex(!dep,PV5))," on ",!ind," by ",!grp)) !ifend
  /CELLS=NONE.

omsend tag="case".

delete variables !if (!ngrp=0) !then !grp !ifend stat.1 stat.2 stat.3 stat.4 stat.5
var1 var2 var3 var4 var5 pv_var pvar1 pvar2 pvar3 pvar4 pvar5 pvmerr !if
(!limit_criteria=0) !then N_total !ifend .

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.

```

## Box 17.8 [1/3] SPSS® macro of MCR\_SE\_COR.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define CORnoPV (var1 = !charend('/') /
               var2 = !charend('/') /
               infile = !charend('/') /
               grp = !default(NOGRP) !charend('/') /
               limit_criteria = !default(0) !charend('/') /
               PSU = !default(SCHOOLID) !charend('/') /
               wgt = !default(W_FSTUWT) !charend('/') /
               rwgt = !default(W_FSTR) !charend('/') /
               nrep = !default(80) !charend('/') /
               cons = !default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

/* nGrp is the number of group variables */
!if (!upcase(!grp)="NOGRP") !then
!let !nGrp=!null
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).

!if (!nGrp>0) !then
!let !x=!length(!concat(!blanks(!nGrp), " ")).
!let !y=!length(!concat(!blanks(!nGrp), " ")).
!else
!let !x=2.
!let !y=3.
!ifend.
title grp=!grp ngrp=!ngrp x=!x y=!y.

get file !infile /keep !if (!ngrp>0) !then !grp !ifend !PSU !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !var1 !var2.
!if (!nGrp=0) !then compute !grp=1 !ifend.
missing values !grp (.).
SORT CASES by !grp.
compute MISS = (missing(!var1)).
if (missing(!var2)) MISS=1.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\sort.sav' /drop=MISS.

*** COMPUTE ESTIMATE ***.

oms select tables /if subtypes='Correlations' /destination format=sav outfile='c:\
temp\full.sav' /tag="fullweight".
split file layered by !grp.
weight by !wgt.
CORRELATIONS /VARIABLES=!var1 with !var2
/PRINT=TWOTAIL NOSIG .
split file off.
omsend tag="fullweight".

get file='c:\temp\full.sav' /keep= Var1 to !concat('Var',!y) !var2.
rename vars (!var2=STAT).
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
*erase file='c:\temp\fullwgt.sav'.
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp)
!ifend.
save outfile='c:\temp\fullwgt.sav' /drop= !concat('Var',!x) !concat('Var',!y).

```





### Box 17.8 [2/3] SPSS® macro of MCR\_SE\_COR.sps

```

* REPLICATES.
get file='c:\temp\sort.sav'.

oms select tables /if subtypes='Correlations' /destination numbered="RepWeight"
format=sav outfile='c:\temp\rep.sav' /tag="repweight".

!do !i=1 !to !nrep.
split file layered by !grp.
weight by !concat(!rwt,!i).
CORRELATIONS /VARIABLES=!var1 with !var2
  /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
!doend.
omsend tag="RepWeight".

get file='c:\temp\rep.sav' /keep=RepWeight Var1 to !concat('Var',!y) !var2.
rename vars (!var2=statR).
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp)
!ifend.
save outfile='c:\temp\repwgt.sav' /drop= !concat('Var',!x) !concat('Var',!y) .

*** COMBINE RESULTS ***.

match files table='c:\temp\fullwgt.sav' /file='c:\temp\repwgt.sav' /by !if (!nGrp>1)
!then Var1 to !concat('Var',!nGrp) !else Var1 !ifend.
string Correlation (a100).
compute Correlation=!quote(!concat(!var1," * ",!var2)).
rename vars (!if (!nGrp>1) !then Var1 to !concat('Var',!nGrp) !else Var1 !ifend =
!grp ).
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
save outfile = 'c:\temp\regmod.sav'.

aggregate outfile=* / break=!grp/ stat= mean(stat)/ var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute SE=sqrt(var).
formats stat (f8.3)/ SE (f10.6).
save outfile='c:\temp\stats.sav'.

*** COMPUTE N ***.

!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
get file='c:\temp\sort.sav'.
weight by !wgt.
!if (!limit_criteria=0) !then !else
aggregate /break=!if (!z=1) !then !head(!grp) !else !grp !ifend /N_total=N.
!ifend
filter by VALIDN.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N !if (!limit_criteria=0) !then !else /
N_total=mean(N_total) !ifend.
aggregate outfile=* /break=!grp /NU_PSU=N !if (!limit_criteria=0) !then !else /
N_total=mean(N_total) !ifend.
match files /file='c:\temp\y.sav' /file=* /by !grp.
match files file='c:\temp\stats.sav' /TABLE=* /by !grp.
formats N_cases (f10.0).
filter off.

```



### Box 17.8 [3/3] SPSS® macro of MCR\_SE\_COR.sps

```

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
exe.
omsend tag="NoViewer".

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
/TABLES= !if (!nGrp > 0) !then !grp !ifend stat SE !if (!limit_criteria=0) !then
!else FLAG_std FLAG_sch FLAG_pct !ifend
/FORMAT=LIST NOCASENUM
!if (!ngrp=0) !then /TITLE=!quote(!concat("Correlation ",!var1," with ",!var2))
!else /TITLE=!quote(!concat("Correlation ",!var1," with ",!var2," by ",!grp))
!ifend
/CELLS=NONE.

omsend tag="case".

delete variables var !if (!ngrp=0) !then !grp !ifend.
restore.

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav" .
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav" .
!ifend.

!enddefine.

```



### Box 17.9 [1/4] SPSS® macro of MCR\_SE\_COR\_1PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define COR_1PV (NoPV = !charend('/') /
               PV = !charend('/') /
               infile = !charend('/') /
               grp = !default(NOGRP) !charend('/') /
               limit_criteria = !default(0) !charend('/') /
               PSU = !default(SCHOOLID) !charend('/') /
               wgt = !default(W_FSTUWT) !charend('/') /
               rwgt = !default(W_FSTR) !charend('/') /
               nrep = !default(80) !charend('/') /
               cons = !default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

/* nGrp is the number of group variables */
!if (!upcase(!grp)="NOGRP") !then
!let !nGrp=!null
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).

!if (!nGrp>0) !then
!let !x=!length(!concat(!blanks(!nGrp), " ")).
!let !y=!length(!concat(!blanks(!nGrp), " ")).
!else
!let !x=2.
!let !y=3.
!ifend.
title grp=!grp ngrp=!ngrp x=!x y=!y.
get file !infile /keep !if (!ngrp>0) !then !grp !ifend !PSU !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !NoPV !PV.
!if (!nGrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
SORT CASES by !grp.
compute MISS = (missing(!NoPV)).
!do !p !in (!pv).
if (missing(!p)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\sort.sav' /drop=MISS.

*** COMPUTE ESTIMATE ***.

oms select tables /if subtypes='Correlations' /destination format=sav outfile='c:\
temp\full.sav' /tag="fullweight".
split file layered by !grp.
weight by !wgt.
CORRELATIONS /VARIABLES=!NoPV with !PV
/PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
split file off.
omsend tag="fullweight".

get file='c:\temp\full.sav' /keep= Var1 to !concat('Var',!y) !PV.
rename vars (!PV=stat1 to stat5).
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
*erase file='c:\temp\fullwgt.sav'.
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp)
!ifend.
save outfile='c:\temp\fullwgt.sav' /drop= !concat('Var',!x) !concat('Var',!y).

```



### Box 17.9 [2/4] SPSS® macro of MCR\_SE\_COR\_1PV.sps

```

* REPLICATES.

get file='c:\temp\sort.sav'.

oms select tables /if subtypes='Correlations' /destination numbered="RepWeight"
format=sav outfile='c:\temp\rep.sav' /tag="repweight".

!do !i=1 !to !nrep.
split file layered by !grp.
weight by !concat(!rwgt,!i).
CORRELATIONS /VARIABLES=!NoPV with !PV
/PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
!doend.
omsend tag="RepWeight".

get file='c:\temp\rep.sav' /keep=RepWeight Var1 to !concat('Var',!y) !PV.
rename vars (!PV=statR1 to statR5).
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp)
!ifend.
save outfile='c:\temp\repwgt.sav' /drop= !concat('Var',!x) !concat('Var',!y) .

*** COMBINE RESULTS ***.

match files table='c:\temp\fullwgt.sav' /file='c:\temp\repwgt.sav' /by !if (!nGrp>1)
!then Var1 to !concat('Var',!nGrp) !else Var1 !ifend .
string Correlation (a100).
compute Correlation=!quote(!concat(!NoPV," * ",!PV)).
rename vars (!if (!nGrp>1) !then Var1 to !concat('Var',!nGrp) !else Var1 !ifend =
!grp ).
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr1 to statr5/
      b=stat1 to stat5/
      c=var1 to var5.
compute c=(a-b)**2.
end repeat.
save outfile = 'c:\temp\regmod.sav'.

aggregate outfile=* / break=!grp/ stat1 to stat5= mean(stat1 to stat5)/ var1 to var5 =
sum(var1 to var5).
do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.
compute pv_var=mean(var1 to var5).

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr1 to statr5/
      b=stat1 to stat5/
      c=var1 to var5.
compute c=(a-b)**2.
end repeat.
save outfile = 'c:\temp\regmod.sav'.

aggregate outfile=* / break=!grp/ stat1 to stat5= mean(stat1 to stat5)/ var1 to var5 =
sum(var1 to var5).
do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.
compute pv_var=mean(var1 to var5).

```



### Box 17.9 [3/4] SPSS® macro of MCR\_SE\_COR\_1PV.sps

```

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute stat=mean(stat1 to stat5).
do repeat a=stat1 to stat5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.
compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3)/ SE (f10.6).
save outfile='c:\temp\stats.sav'.

*** COMPUTE N ***.

!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
get file='c:\temp\sort.sav'.
weight by !wgt.
!if (!limit_criteria=0) !then !else
aggregate /break=!if (!z=1) !then !head(!grp) !else !grp !ifend /N_total=N.
!ifend
filter by VALIDN.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N !if (!limit_criteria=0) !then !else /N_
total=mean(N_total) !ifend.
aggregate outfile=* /break=!grp /NU_PSU=N !if (!limit_criteria=0) !then !else /N_
total=mean(N_total) !ifend.
match files /file='c:\temp\y.sav' /file=* /by !grp.
match files file='c:\temp\stats.sav' /TABLE=* /by !grp.
formats N_cases (f10.0).
filter off.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
exe.
omsend tag="NoViewer".

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no /
tag="case".
SUMMARIZE
/TABLES= !if (!nGrp > 0) !then !grp !ifend stat SE !if (!limit_criteria=0) !then
!else FLAG_std FLAG_sch FLAG_pct !ifend
/FORMAT=LIST NOCASENUM
!if (!ngrp=0) !then /TITLE=!quote(!concat("Correlation ",!concat(!NoPV," with ",
!head(!PV)," to ",!substr(!PV,!Index(!PV,PV5))))))
!else /TITLE=!quote(!concat("Correlation ",!concat(!NoPV," with ",!head(!PV)," to ",
!substr(!PV,!Index(!PV,PV5))), " by ",!grp)) !ifend
/CELLS=NONE.

```

Box 17.9 [4/4] **SPSS® macro of MCR\_SE\_COR\_1PV.sps**

```
omsend tag="case".

delete variables !if (!ngrp=0) !then !grp !ifend stat1 stat2 stat3 stat4 stat5 var1
var2 var3 var4 var5 pv_var pvar1 pvar2 pvar3 pvar4 pvar5 pvmerr.
restore.

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.
```



### Box 17.10 [1/4] SPSS® macro of MCR\_SE\_COR\_2PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define COR_2PV (PV1 = !charend('/') /
                PV2 = !charend('/') /
                infile = !charend('/') /
                grp = !default(NOGRP) !charend('/') /
                limit_criteria = !default(0) !charend('/') /
                PSU = !default(SCHOOLID) !charend('/') /
                wgt = !default(W_FSTUWT) !charend('/') /
                rwgt = !default(W_FSTR) !charend('/') /
                nrep = !default(80) !charend('/') /
                cons = !default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

/* nGrp is the number of group variables */
!if (!upcase(!grp)="NOGRP") !then
!let !nGrp=!null
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).

!if (!nGrp>0) !then
!let !x=!length(!concat(!blanks(!nGrp), " ")).
!let !y=!length(!concat(!blanks(!nGrp), " ")).
!else
!let !x=2.
!let !y=3.
!ifend.
title grp=!grp ngrp=!ngrp x=!x y=!y.

get file !infile /keep !if (!ngrp>0) !then !grp !ifend !PSU !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !PV1 !PV2.
!if (!nGrp=0) !then compute !grp=1 !ifend.
missing values !grp ().
SORT CASES by !grp.
compute MISS = 0.
!do !p1 !in (!pv1).
if (missing(!p1)) MISS=1.
!doend.
!do !p2 !in (!pv2).
if (missing(!p2)) MISS=1.
!doend.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\sort.sav' /drop=MISS.

*** COMPUTE ESTIMATE ***.

oms select tables /if subtypes='Correlations' /destination format=sav outfile='c:\
temp\full.sav' /tag="fullweight".
split file layered by !grp.
weight by !wgt.
CORRELATIONS /VARIABLES=!PV2 with !PV1
/PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
split file off.
omsend tag="fullweight".

get file='c:\temp\full.sav' /keep= Var1 to !concat('Var',!y) !PV1.
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
rename vars (!pv1=stat1 to stat5).

```



### Box 17.10 [2/4] SPSS® macro of MCR\_SE\_COR\_2PV.sps

```

!do !p=1 !to 5.
if (index(!concat('var',!x),!quote(!concat("PV",!p)))=0 & index(!concat('var',!x),!quote(!concat("pv",!p)))=0) !concat("stat",!p)=$sysmis.
!doend.
exe.
aggregate /outfile=* /break=!if (!nGrp>1) !then Var1 to !concat('Var',!nGrp) !else Var1
!ifend /stat1 to stat5=mean(stat1 to stat5).
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp) .
!ifend.

*erase file='c:\temp\fullwgt.sav'.
save outfile='c:\temp\fullwgt.sav'.

* REPLICATES.

get file='c:\temp\sort.sav'.

oms select tables /if subtypes='Correlations' /destination numbered="RepWeight"
format=sav outfile='c:\temp\rep.sav' /tag="repweight".

!do !i=1 !to !nrep.
split file layered by !grp.
weight by !concat(!rwgt,!i).
CORRELATIONS /VARIABLES=!PV2 with !PV1
  /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
!doend.
omsend tag="RepWeight".

get file='c:\temp\rep.sav' /keep=RepWeight Var1 to !concat('Var',!y) !PV1.
compute casenum=$casenum.
exe.
select if mod(casenum,3)=1.
exe.
rename vars (!pv1=statR1 to statR5).

!do !p=1 !to 5.
if (index(!concat('var',!x),!quote(!concat("PV",!p)))=0 & index(!concat('var',!x),!quote(!concat("pv",!p)))=0) !concat("statR",!p)=$sysmis.
!doend.
exe.
aggregate /outfile=* /break=!if (!nGrp>1) !then Var1 to !concat('Var',!nGrp) !else Var1
!ifend RepWeight /statR1 to statR5=mean(statR1 to statR5).
!if (!nGrp > 0) !then
sort cases by Var1 to !concat('Var',!nGrp) .
!ifend.
save outfile='c:\temp\repwgt.sav' .

*** COMBINE RESULTS ***.

match files table='c:\temp\fullwgt.sav' /file='c:\temp\repwgt.sav' /by !if (!nGrp>1)
!then Var1 to !concat('Var',!nGrp) !else Var1 !ifend .
string Correlation (a100).
compute Correlation=!quote(!concat(!PV2," * ",!PV1)).
rename vars (!if (!nGrp>1) !then Var1 to !concat('Var',!nGrp) !else Var1 !ifend =
!grp).
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr1 to statr5/
  b=stat1 to stat5/
  c=var1 to var5.
compute c=(a-b)**2.
end repeat.
save outfile = 'c:\temp\regmod.sav' .

```





### Box 17.10 [3/4] SPSS® macro of MCR\_SE\_COR\_2PV.sps

```

aggregate outfile=* / break=!grp / stat1 to stat5= mean(stat1 to stat5) / var1 to var5 =
sum(var1 to var5).
do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.
compute pv_var=mean(var1 to var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute stat=mean(stat1 to stat5).
do repeat a=stat1 to stat5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.
compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3) / SE (f10.6).
save outfile='c:\temp\stats.sav'.

*** COMPUTE N ***.

!let !z=!substr(!limit_criteria,!length(!limit_criteria),1).
get file='c:\temp\sort.sav'.
weight by !wgt.
!if (!limit_criteria=0) !then !else
aggregate /break=!if (!z=1) !then !head(!grp) !else !grp !ifend /N_total=N.
!ifend
filter by VALIDN.
aggregate outfile='c:\temp\y.sav' /break=!grp /NU_cases=NU /N_cases=N.
weight off.
aggregate outfile=* /break=!grp !PSU /N=N !if (!limit_criteria=0) !then !else /N_
total=mean(N_total) !ifend.
aggregate outfile=* /break=!grp /NU_PSU=N !if (!limit_criteria=0) !then !else /N_
total=mean(N_total) !ifend.
match files /file='c:\temp\y.sav' /file=* /by !grp.
match files file='c:\temp\stats.sav' /TABLE=* /by !grp.
formats N_cases (f10.0).
filter off.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a," ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0).
!ifend.
!if (!length(!a)=2) !then.
compute FLAG_sch=(NU_PSU<!b).
formats FLAG_sch (f1.0).
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b).
formats FLAG_pct (f1.0).
!ifend.
!doend.
!ifend.
exe.
omsend tag="NoViewer".

```



Box 17.10 [4/4] **SPSS® macro of MCR\_SE\_COR\_2PV.sps**

```

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= !if (!nGrp > 0) !then !grp !ifend stat SE !if (!limit_criteria=0) !then
!else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT= LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Correlation ",!concat(!head(!PV1)," to",
!substr(!PV1,!Index(!PV1,PV5))," with ",!head(!PV2)," to ",!substr(!PV2,!Index(!PV2
,PV5))))))
  !else /TITLE=!quote(!concat("Correlation ",!concat(!head(!PV1)," to ",!substr(!P
V1,!Index(!PV1,PV5))," with ",!head(!PV2)," to ",!substr(!PV2,!Index(!PV2,PV5))),
" by ",!grp) !ifend
  /CELLS=NONE.

omsend tag="case".

delete variables !if (!ngrp=0) !then !grp !ifend stat1 stat2 stat3 stat4 stat5 var1
var2 var3 var4 var5 pv_var pvar1 pvar2 pvar3 pvar4 pvar5 pvmerr.
restore.

!if (!limit_criteria=0) !then.
save outfile="c:\temp\results.sav" drop= n_cases nu_cases nu_psu.
get file="c:\temp\results.sav".
!else.
save outfile="c:\temp\results.sav" drop=n_cases nu_cases nu_psu n_total.
get file="c:\temp\results.sav".
!ifend.

!enddefine.

```



### Box 17.11 [1/4] SPSS® macro of MCR\_SE\_DIFF.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

*** !!! THE CATEGORIES OF THE 'COMPARE' VARIABLE SHOULD BE NUMBERS, NOT LETTERS OR
WORDS ***.

define DIFnoPV (dep = !charend('/') /
                stat = !charend('/') /
                compare = !charend('/') /
                categ = !charend('/') /
                infile = !charend('/') /
                within = !default(NOWITHIN) !charend('/') /
                wgt = !default(W_FSTUWT) !charend('/') /
                rwgt = !default(W_FSTR) !charend('/') /
                cons = !default(0.05) !charend('/') /
                nrep = !default(80) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)="NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin," ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

/* z is nWithin + 1 */
!if (!nWithin>0) !then
!let !z=!length(!concat(!blanks(!nWithin)," ")).
!else
!let !z=2.
!ifend.
*title !concat('number of Within group variables is ',!nWithin,', plus 1 (z) = ',!z).

/* ncat is the number of categories
!let !nc=!null.
!do !c !in (!categ) !let !nc=!concat(!nc," ") !doend.
!let !ncat=!length(!nc).
*title !concat("Number of categories=",!ncat).

get file !quote(!infile) /keep !dep !if (!nwithin>0) !then !within !ifend !compare
!wgt !concat(!rwgt,1) to !concat(!rwgt,!nrep).
!if (!nwithin=0) !then compute !within=1 !ifend.
compute MISS = (missing(!dep)).
if (missing(!compare)) MISS=1.
!do !w !in (!within).
if (missing(!w)) MISS=1.
!doend.
!let !n=!null.
!do !c !in (!categ)
!let !n=!concat(!n,'| ',!compare,'=',!c,!blanks(1))
!doend.
!let !n=!concat('( ',!substr(!n,2),')').
*title !n.
compute VAL=!n.
if (VAL=0) MISS=1.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\data.sav' /drop=MISS.

```


 Box 17.11 [2/4] **SPSS® macro of MCR\_SE\_DIFF.sps**

```

*----- Next table with counts does not work without licence for CLABELS ---
-----
*!let !q=!null.
*!if (!nwithin>0) !then
*!do !w !in(!within).
*!let !q=!concat(!q,!w,' [C] > ').
*!doend !ifend.
**title !q.
*
*VARIABLE LEVEL !within !compare (NOMINAL).
*string INCLUDED (a3).
*if (validn=0) INCLUDED='No'.
*if (validn=1) INCLUDED='Yes'.
*weight by !wgt.
*CTABLES
* /VLABELS VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
DISPLAY=DEFAULT
* /TABLE !q !compare [C][UCOUNT F40.0, COUNT F40.0] BY INCLUDED [C]
* /CATEGORIES VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
ORDER=A KEY=VALUE EMPTY=EXCLUDE MISSING=INCLUDE
* /TITLES TITLE='Columns "INCLUDED=Yes" give the weighted and unweighted number of
included students'.
*-----
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

*** COMPUTE ESTIMATES ***.

oms /select tables /if subtypes='Report' /destination format=sav outfile=!quote(!con
cat('c:\temp\',!wgt,'_1.sav')) /tag="fullweight".
select if (VALIDN=1).
weight by !wgt.
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=!stat.
omsend tag="fullweight".

Get file=!quote(!concat('c:\temp\',!wgt,'_1.sav')) /keep= Var1 to !concat('var',!z)
!dep .
rename vars (Var1 to !concat('var',!z) = !within !compare).

compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
sort cases by !within !compare.
delete var y.
casestovars /id=!within /index=!compare.

/* This part computes the difference between each pair of categories */.
*-----
-----
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!compare,".",!x,"_",!c)=!concat("cat",!x) - !concat("cat",!c).
!let !vars=!concat(!vars,!concat(!compare,".",!x,"_",!c)," ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
*-----
-----

```



## Box 17.11 [3/4] SPSS® macro of MCR\_SE\_DIFF.sps

```

delete variables !do !c !in (!categ) !concat("cat",!c) !doend.
VARSTOCASES /MAKE stat FROM !vars
  /INDEX = DIFF(stat)
  /KEEP = !within
  /NULL = KEEP.
sort cases by !within DIFF.
save outfile=!quote(!concat('c:\temp\',!wgt, '.sav')).

*** REPLICATES ***.

dataset close all.
get file='c:\temp\data.sav'.
select if (VALIDIDN=1).
oms /select tables /if subtypes='Report' /destination format=sav numbered='REP'
outfile=!quote(!concat('c:\temp\',!rwgt, '_1.sav')) /tag="r".
!do !i=1 !to !nrep.
weight by !concat(!rwgt,!i).
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=!stat.
!doend.
omsend tag="r".

get file=!quote(!concat('c:\temp\',!rwgt, '_1.sav')) /keep= rep Var1 to
!concat('var',!z) !dep .
rename vars (Var1 to !concat('var',!z) = !within !compare).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
sort cases by rep !within !compare.
delete var y.
casestovars /id=rep !within /index=!compare.

/* This part computes the difference between each pair of categories */.
*-----
-----
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!compare,".",!x,"_",!c)=!concat("cat",!x) - !concat("cat",!c).
!let !vars=!concat(!vars,!concat(!compare,".",!x,"_",!c)," ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
*-----
-----
delete variables !do !c !in (!categ) !concat("cat",!c) !doend.
VARSTOCASES /MAKE statR FROM !vars
  /INDEX = DIFF(statR)
  /KEEP = rep !within
  /NULL = KEEP.
sort cases by !within DIFF.

*** COMBINE RESULTS ***.

match files table=!quote(!concat('c:\temp\',!wgt, '.sav')) /file=* /by !within DIFF.

```



### Box 17.11 [4/4] SPSS® macro of MCR\_SE\_DIFF.sps

```

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
aggregate outfile=* / break !within diff / stat= mean(stat) / var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute se=sqrt(var).
exe.

formats stat (f8.3) / SE (f10.6).
omsend tag="NoViewer".

*** OUTPUT TABLE ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nWithin>0) !then !within !ifend diff stat se
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE=!quote(!concat('SE on difference in ',!uppercase(!dep),
  ' between ',!uppercase(!compare), ' group ',!uppercase(!stat), 's'))
  !else /TITLE=!quote(!concat('SE on difference in ',!uppercase(!dep), ' between ',!upc
ase(!compare), ' group ',!uppercase(!stat), 's by ',!uppercase(!within))) !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

delete variables var !if (!nWithin=0) !then !within !ifend.

restore.

save outfile="c:\temp\results.sav".

!enddefine.

```



### Box 17.12 [1/5] SPSS® macro of MCR\_SE\_DIFF\_PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

*** !!! THE CATEGORIES OF THE 'COMPARE' VARIABLE SHOULD BE NUMBERS, NOT LETTERS OR
WORDS ***.

define DIF_PV (dep = !charend('/') /
               stat = !charend ('/') /
               compare = !charend('/') /
               categ = !charend ('/') /
               infile = !charend('/') /
               within = !default(NOWITHIN) !charend('/') /
               wgt = !default(W_FSTUWT) !charend('/') /
               rwgt = !default(W_FSTR) !charend('/') /
               cons = !default(0.05) !charend('/') /
               nrep = !default(80) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)="NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin," ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

/* z is nWithin + 1 */
!if (!nWithin>0) !then
!let !z=!length(!concat(!blanks(!nWithin)," ")).
!else
!let !z=2.
!ifend.
*title !concat('number of Within group variables is ',!nWithin,', plus 1 (z) = ',
!z).

/* ncat is the number of categories
!let !nc=!null.
!do !c !in (!categ) !let !nc=!concat(!nc," ") !doend.
!let !ncat=!length(!nc).
*title !concat("Number of categories=",!ncat).

get file !quote(!infile) /keep !dep !if (!nwithin>0) !then !within !ifend !compare
!wgt !concat(!rwgt,1) to !concat(!rwgt,!nrep).
!if (!nwithin=0) !then compute !within=1 !ifend.
compute MISS = (missing(!compare)).
!do !d !in (!dep).
if (missing(!d)) MISS=1.
!doend.
!do !w !in (!within).
if (missing(!w)) MISS=1.
!doend.
!let !n=!null.
!do !c !in (!categ)
!let !n=!concat(!n,'| ',!compare,'=',!c,!blanks(1))
!doend.
!let !n=!concat('( ',!substr(!n,2),' )').
*title !n.
compute VAL=!n.
if (VAL=0) MISS=1.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\data.sav' /drop=MISS.

```


 Box 17.12 [2/5] **SPSS® macro of MCR\_SE\_DIFF\_PV.sps**

```

*----- Next table with counts does not work without licence for CLABELS ---
*-----
*!let !q=!null.
*!if (!nwithin>0) !then
*!do !w !in(!within).
*!let !q=!concat(!q,!w,' [C] > ').
*!doend !ifend.
**title !q.
*
*VARIABLE LEVEL !within !compare (NOMINAL).
*string INCLUDED (a3).
*if (validn=0) INCLUDED='No'.
*if (validn=1) INCLUDED='Yes'.
*weight by !wgt.
*CTABLES
* /VLABELS VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
DISPLAY=DEFAULT
* /TABLE !q !compare [C][UCOUNT F40.0, COUNT F40.0] BY INCLUDED [C]
* /CATEGORIES VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
ORDER=A KEY=VALUE EMPTY=EXCLUDE MISSING=INCLUDE
* /TITLES TITLE='Columns "INCLUDED=Yes" give the weighted and unweighted number of
included students'.
*-----
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

*** COMPUTE ESTIMATES ***.

oms /select tables /if subtypes='Report' /destination format=sav outfile=!quote(!con
cat('c:\temp\',!wgt,'_1.sav')) /tag="fullweight".
select if (VALIDN=1).
weight by !wgt.
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=!stat.
omsend tag="fullweight".

Get file=!quote(!concat('c:\temp\',!wgt,'_1.sav')) /keep= Var1 to !concat('var',!z)
!dep .
rename vars (Var1 to !concat('var',!z) = !within !compare).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
sort cases by !within !compare.
delete var y.
sort cases by !within !compare.
casestovars /id=!within /index=!compare /groupby=index.

/* This part computes the difference between each pair of categories */.
*-----
!let !vars1=!null.
!do !d !in (!dep).
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!d,".",!x,"_",!c)=!concat(!d,".cat",!x) - !concat(!d,".cat",!c).
!let !vars1=!concat(!vars1,!concat(!d,".",!x,"_",!c)," ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
!doend.
*-----

```





### Box 17.12 [3/5] SPSS® macro of MCR\_SE\_DIFF\_PV.sps

```

delete variables !do !d !in (!dep) !do !c !in (!categ) !concat(!d, ".cat", !c) !doend
!doend.
VARSTOCASES /MAKE stat FROM !vars1
  /INDEX = !compare(stat)
  /KEEP = !within
  /NULL = KEEP.

!let !q=!length(!concat(!head(!dep), !blanks(2))).
string PV (!concat('a', !length(!head(!dep)))).
compute PV=substr(!compare, 1, !length(!head(!dep))).
compute !compare=substr(!compare, !q).
exe.

!let !f=!null.
!do !d !in (!dep).
!let !f=!concat(!f, " ").
!let !g=!length(!f).
recode PV (!quote(!d)=!quote(!g)).
!doend.
compute PV=concat('PV', PV).
sort cases by !within !compare PV.
casestovars /id= !within !compare /index=PV.
rename vars (pv1 to pv5 = !dep).
save outile=!quote(!concat('c:\temp\', !wgt, '.sav')).

*** REPLICATES ***.

dataset close all.
get file='c:\temp\data.sav'.
select if (VALIDN=1).
oms /select tables /if subtypes='Report' /destination format=sav numbered='REP'
outfile=!quote(!concat('c:\temp\', !rwgt, '_1.sav')) /tag="r".
!do !i=1 !to !nrep.
weight by !concat(!rwgt, !i).
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ", !w) !doend
!else by !within !ifend by !compare /cells=!stat.
!doend.
omsend tag="r".

get file=!quote(!concat('c:\temp\', !rwgt, '_1.sav')) /keep= rep Var1 to
!concat('var', !z) !dep .
rename vars (Var1 to !concat('var', !z) = !within !compare).
compute y=number(!compare, f3.0).
select if (not missing(y)).
compute !compare=concat('cat', !compare).
sort cases by rep !within !compare.
delete var y.
casestovars /id=rep !within /index=!compare.

/* This part computes the difference between each pair of categories */.
*-----
*-----
!let !vars1=!null.
!do !d !in (!dep).
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!d, ".", !x, "_", !c)=!concat(!d, ".cat", !x) - !concat(!d, ".cat", !c).
!let !vars1=!concat(!vars1, !concat(!d, ".", !x, "_", !c), " ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
!doend.
*-----
*-----

```



### Box 17.12 [4/5] SPSS® macro of MCR\_SE\_DIFF\_PV.sps

```

delete variables !do !d !in (!dep) !do !c !in (!categ) !concat(!d, ".cat", !c) !doend
!doend.
VARSTOCASES /MAKE statR FROM !vars1
/INDEX = !compare(statR)
/KEEP = rep !within
/NULL = KEEP.
!let !q=!length(!concat(!head(!dep), !blanks(2))).
string PV (!concat('a', !length(!head(!dep)))).
compute PV=substr(!compare, 1, !length(!head(!dep))).
compute !compare=substr(!compare, !q).
exe.

!let !f=!null.
!do !d !in (!dep).
!let !f=!concat(!f, " ").
!let !g=!length(!f).
recode PV (!quote(!d)=!quote(!g)).
!doend.
compute PV=concat('PV', PV).
sort cases by !within !compare REP PV.
casestovars /id= !within !compare REP /index=PV.
rename vars (pv1 to pv5 = !do !d !in(!dep) !concat('r_', !d) !doend).

*** COMBINE RESULTS ***.

sort cases by !within !compare.
match files table=!quote(!concat('c:\temp\', !wgt, '.sav')) /file=* /by !within
!compare.
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

!do !d !in(!dep)
COMPUTE !concat('var_', !d) = !cons*((!concat('r_', !d) - !d)**2).
!doend.

AGGREGATE OUTFILE =*
/PRESORTED /BREAK= !within !compare
/!do !d !in(!dep) !d !doend=MEAN(!do !d !in(!dep) !d !doend)
/!do !d !in(!dep) !concat('var_', !d) !doend=SUM(!do !d !in(!dep) !concat('var_', !d)
!doend) .

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k, ", var_", !d).
!doend.
compute pv_var=mean(!substr(!k, 2)).
exe.

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k, ", ", !d).
!doend.
compute STAT=mean(!substr(!k, 2)).

do repeat a=!dep/b=pvar1 to pvar5.
compute b=(a-STAT)**2.
end repeat.

compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
exe.
FORMATS STAT (F8.3) / SE (F10.6).
omsend tag="NoViewer".

```



### Box 17.12 [5/5] SPSS® macro of MCR\_SE\_DIFF\_PV.sps

```

*** OUTPUT TABLE ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nWithin>0) !then !within !ifend !compare stat se
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE=!quote(!concat('SE on difference in',!upcase
(!head(!dep)), ' to PV5 between ',!upcase(!compare), ' group ',!upcase(!stat), 's'))
  !else /TITLE=!quote(!concat('SE on difference in ',!upcase(!head(!dep)), ' to PV5
between ',!upcase(!compare), ' group ',!upcase(!stat), 's by ',!upcase(!within)))
  !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

delete variables !dep !do !d !in (!dep) !concat("var_",!d) !doend !if (!nWithin=0)
!then !within !ifend pv_var pvar1 to pvar5 pvmerr .
restore.
save outfile="c:\temp\results.sav".
!enddefine.

```

## Box 17.13 [1/5] SPSS® macro of MCR\_SE\_PV\_WLEQRT.sps

```

set mprint=no.

*** Created by Eveline Gebhardt & Alexander Daragonov, Australian Council for
Educational Research ***.

*** Performance statistics by national quarters of a WLE index variable.
*** A small random value is added to the WLE index variable to make the
*** variable continuous. This is done 5 times. Each of the new 5 continuous
*** variables is transformed into a group variable that indicate national
*** quartiles. Performance and index (WLE) statistics are computed within each
*** quartile where PV1 is paired with quart1, PV2 with quart2, etc.

define PVWLEQRT (pv = !charend('\')
                /wle = !charend('\')
                /stat = !charend('\')
                /infile = !charend('\')
                /cnt = !default(CNT) !charend('\')
                /grp = !default(NOGRP) !charend('\')
                /psu = !default(SCHOOLID) !charend('\')
                /wgt = !default(W_FSTUWT) !charend('\')
                /rwgt = !default(W_FSTR) !charend('\')
                /nrep = !default(80) !charend('\')
                /cons = !default(0.05) !charend('\')
                /limit_criteria = !default(0) !charend('\')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

/* nGrp is the number of group variables */
!if (!upcase(!grp)="NOGRP") !then
!let !nGrp=!null
!Else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrp=!length(!nGrp).
title !ngrp.

get file=!quote(!infile) /keep=!cnt !psu !if (!ngrp>0) !then !grp !ifend !wgt
!concat(!rwgt,1) to !concat(!rwgt,!nrep) !PV !wle.
!if (!ngrp=0) !then compute !grp=1 !ifend.
sort cases by !cnt.
weight off.
aggregate /presorted /break=!cnt /N_TOTAL=sum(!wgt).
select if not missing (!wle).

* COMPUTE CUMULATIVE COUNT WITHIN COUNTRIES.
*-----
autorecode !cnt /into cnt# /print.
!do !s=1 !to 5.
set seed = !s.
!let !v=!concat(!wle,!s).
!let !c=!concat('cumfreq',!s).

compute !v=!wle+rv.normal(0,.01).
sort cases by cnt# !v.

do if ($casenum=1 or lag(cnt#) <> cnt#).
compute !c=w_fstuwt.
else if (cnt#=lag(cnt#)).
compute !c=w_fstuwt + lag(!c).
end if.
sort cases by !cnt.
!doend.
save outfile='C:\temp\temp.sav'.

* DEFINE CUTSCORES.
*-----
weight by w_fstuwt.
aggregate /presorted /break=!cnt /total=max(cumfreq1).
compute cut25=(total/100)*25.
compute cut50=(total/100)*50.
compute cut75=(total/100)*75.
exe.

```


 Box 17.13 [2/5] **SPSS® macro of MCR\_SE\_PV\_WLEQRT.sps**

```

* CREATE PERCENTILE GROUPS.
*-----
do repeat c=cumfreq1 cumfreq2 cumfreq3 cumfreq4 cumfreq5 /q=quart1 quart2 quart3
quart4 quart5.
if (c<cut25) q=1.
if (c>=cut25 & c<cut50) q=2.
if (c>=cut50 & c<cut75) q=3.
if (c>=cut75) q=4.
formats q (f1.0).
end repeat.
save outfile='C:\temp\quarters.sav' /keep=!cnt !psu !grp !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep) !wle !PV
    quart1 quart2 quart3 quart4 quart5 !do !i=1 !to 5 !concat(!wle,!i) !doend
N_TOTAL.

*** COMPUTE STATISTIC ***.

!let !k=!null.
!do !p !in (!pv).
!let !k=!concat(!k," ").
!let !j=!length(!k).

dataset close ALL.
get file='C:\temp\quarters.sav' /keep !cnt !grp !wgt !wle !P !concat('quart',!j).
rename var (!concat('quart',!j)=!concat("Q_",!wle)).
sort cases by !cnt !grp !concat("q_",!wle).
weight by !wgt.
aggregate outfile = !quote(!concat('C:\temp\temp',!j,'.sav')) /presorted /break=!cnt
!grp !concat("q_",!wle)
    /!concat('PV_STAT.',!j)=!stat(!p) /!concat('INDEX_STAT.',!j)=!stat(!wle).
!doend.

match files file='C:\temp\temp1.sav'
    /file='C:\temp\temp2.sav'
    /file='C:\temp\temp3.sav'
    /file='C:\temp\temp4.sav'
    /file='C:\temp\temp5.sav'
    /by !cnt !grp !concat("q_",!wle).
save outfile=!quote(!concat('C:\temp\',!wgt,'.sav')).

*** REPLICATES ***.

!do !i= 1 !to !nrep.

!let !k=!null.
!do !p !in (!pv).
!let !k=!concat(!k," ").
!let !j=!length(!k).
*title !concat(!p," j=",!j," i=",!i).

dataset close all.
get file='C:\temp\quarters.sav' /keep !cnt !grp !concat(!rwgt,!i) !wle !P
!concat('quart',!j).
rename var (!concat('quart',!j)=!concat("Q_",!wle)).
sort cases by !cnt !grp !concat("q_",!wle).
weight by !concat(!rwgt,!i).
aggregate outfile = !quote(!concat('C:\temp\temp',!j,'.sav')) /presorted /break=!cnt
!grp !concat("q_",!wle)
    /!concat('PV_STATR.',!j)=!stat(!p) /!concat('INDEX_STATR.',!j)=!stat(!wle).
!doend.

match files file='C:\temp\temp1.sav'
    /file='C:\temp\temp2.sav'
    /file='C:\temp\temp3.sav'
    /file='C:\temp\temp4.sav'
    /file='C:\temp\temp5.sav'
    /by !cnt !grp !concat("q_",!wle).
save outfile = !quote(!concat('C:\temp\',!rwgt,!i,'.sav')).
!doend.

```

## Box 17.13 [3/5] SPSS® macro of MCR\_SE\_PV\_WLEQRT.sps

```

*** COMBINE RESULTS ***.

dataset close ALL.
!let !nper=50.
!if ( !length(!substr(!blanks(!nrep),!length(!concat(!blanks(!nper) , !blanks(1))))=0 )
!then
    add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to !nrep
/file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav')) !doend .
!else
    !let !modls=!nrep.
    !let !intgr=0.
    !do !iter=!nrep !to !nper !by -!nper
        add files file= !quote(!concat('C:\temp\',!rwgt,!iter,'.sav')) !do !e=!length
(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks(!iter),!length
(!blanks(!nper)))) !by -1 /file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav'))
!doend .
    !let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1) ,!
blanks(!nper))))).
    !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
!doend
!if (!modls>0) !then
!if (!modls>1) !then
    add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to
!modls /file=!quote(!concat('C:\temp\',!rwgt,!e,'.sav')) !doend .
    !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
!else
    get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')).
    !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr,'.sav')).
!ifend
!if ( !length(!substr(!blanks(!intgr),!length(!concat(!blanks(!nper) ,
!blanks(1))))=0 ) !then
    add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')) !do !e=2
!to !intgr /file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav'))
!doend .
!else
    !let !modls=!intgr.
    !let !intgr1=0.
    !do !iter=!intgr !to !nper !by -!nper
        add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_',!iter,'.sav'))
!do !e=!length(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks
(!iter),!length(!blanks(!nper)))) !ny -1 /file=!quote(!concat ('C:\temp\',
!rwgt,'_temp_',!e,'.sav')) !doend.

!let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1) ,!blanks(!nper))))).
!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',!intgr1,'.sav')).
!doend
!if (!modls>0) !then
!if (!modls>1) !then
    add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav'))
!do !e=2 !to !modls /file=!quote(!concat('C:\temp\',!rwgt,
'_temp_',!e,'.sav')) !doend .

!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!else
    get file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')).
!let !intgr1=!length(!Concat(!blanks(!intgr1),
!blanks(1))).
    save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!ifend
!ifend
add files file= !quote(!concat('c:\temp\',!rwgt,'_tempover_1.sav')) !do
!e=2 !to !intgr1 /file=!quote(!concat('C:\temp\',!rwgt,'_tempover_',!e,
'.sav')) !doend .

!ifend
exe.

```



### Box 17.13 [4/5] SPSS® macro of MCR\_SE\_PV\_WLEQRT.sps

```

sort cases by !cnt !grp !concat("q_",!wle).
match files file=*/table= !quote(!concat('C:\temp\' ,!wgt, '.sav'))/by !cnt !grp
!concat("q_",!wle).
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute INDEX_STAT=mean(INDEX_STAT.1,INDEX_STAT.2,INDEX_STAT.3,INDEX_STAT.4,INDEX_
STAT.5).
compute INDEX_STATR=mean(INDEX_STATR.1,INDEX_STATR.2,INDEX_STATR.3,INDEX_
STATR.4,INDEX_STATR.5).
compute INDEX_var=(INDEX_statr-INDEX_stat)**2.

do repeat a=PV_statr.1 PV_statr.2 PV_statr.3 PV_statr.4 PV_statr.5/
b=PV_stat.1 PV_stat.2 PV_stat.3 PV_stat.4 PV_stat.5/
c=PV_var1 to PV_var5.
compute c=(a-b)**2.
end repeat.

aggregate outfile=*/ break=!cnt !grp !concat("q_",!wle)/
PV_stat.1 to PV_stat.5= mean(PV_stat.1 PV_stat.2 PV_stat.3 PV_stat.4 PV_
stat.5)/
PV_var1 to PV_var5 = sum(PV_var1 to PV_var5)/
INDEX_STAT=mean(INDEX_STAT)/
INDEX_VAR=sum(INDEX_VAR).

do repeat a=PV_var1 to PV_var5 INDEX_VAR.
compute a=!cons*a.
end repeat.

compute PV_VAR=mean(PV_var1 to PV_var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute PV_STAT=mean(PV_stat.1 to PV_stat.5).

do repeat a=PV_stat.1 to PV_stat.5/b=PV_pvar1 to PV_pvar5.
compute b=(a-PV_STAT)**2.
end repeat.

compute pvmerr=.25*(sum(PV_pvar1 to PV_pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute PV_SE=sqrt(pv_var+1.2*pvmerr).
compute INDEX_SE=sqrt(INDEX_VAR).
exe.
delete var PV_stat.1 PV_stat.2 PV_stat.3 PV_stat.4 PV_stat.5 PV_var1 PV_var2
PV_var3 PV_var4 PV_var5 INDEX_VAR PV_VAR PV_pvar1 PV_pvar2 PV_pvar3 PV_pvar4
PV_pvar5pvmerr.
formats PV_stat INDEX_STAT (f8.3)/ PV_SE INDEX_SE (f10.6).
save outfile='c:\temp\stats.sav'.
omsend tag="crap".

*** COMPUTE N ***.
!do !n=1 !to 5.
get file='C:\temp\quarters.sav' /keep= !cnt !psu !grp !wgt !concat('quart',!n)
N_TOTAL.
weight off.
rename var (!concat('quart',!n)=QUART).
aggregate /break=!cnt !grp QUART /NU_CASES=N /N_CASES=sum(!wgt).
aggregate outfile=* /break=!cnt !grp QUART !psu /N_TOTAL=mean(N_TOTAL)
/NU_CASES=mean(NU_CASES) /N_CASES=mean(N_CASES).
aggregate outfile=* /break=!cnt !grp QUART /N_TOTAL=mean(N_TOTAL)
/NU_CASES=mean(NU_CASES) /N_CASES=mean(N_CASES) /NU_PSU=N.
save outfile=!quote(!concat('c:\temp\N',!n, '.sav')).
!doend.

```



### Box 17.13 [5/5] SPSS® macro of MCR\_SE\_PV\_WLEQRT.sps

```

add files /file='c:\temp\N1.sav'
         /file='c:\temp\N2.sav'
         /file='c:\temp\N3.sav'
         /file='c:\temp\N4.sav'
         /file='c:\temp\N5.sav' .
aggregate outfile=* /break=!cnt !grp QUART / N_TOTAL NU_CASES N_CASES NU_PSU=
  mean(N_TOTAL NU_CASES N_CASES NU_PSU) .

rename var (QUART=!concat('Q_',!wle)).
match files file='c:\temp\stats.sav' /file=* /by !cnt !grp !concat('Q_',!wle) .
formats N_TOTAL NU_CASES N_CASES NU_PSU (f10.0) .
exe.

*** FLAGGING FOR OECD ***.

!if (!limit_criteria=0) !then !else
!let !a=!null.
!do !b !in (!limit_criteria).
!let !a=!concat(!a, " ").
!if (!length(!a)=1) !then.
compute FLAG_std=(NU_cases<!b).
formats FLAG_std (f1.0) .
!ifend.
!if (!length(!a)=2) !then
compute FLAG_sch=(NU_PSU<!b) .
formats FLAG_sch (f1.0) .
!ifend.
!if (!length(!a)=3) !then
compute FLAG_pct=((100*N_cases/N_total)<!b) .
formats FLAG_pct (f1.0) .
!ifend.
!doend.
!ifend.

*** OUTPUT RESULTS ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= !cnt !if (!nGrp > 0) !then !grp !ifend !concat("Q_",!wle) INDEX_STAT
INDEX_SE PV_STAT PV_SE
  !if (!limit_criteria=0) !then !else FLAG_std FLAG_sch FLAG_pct !ifend
  /FORMAT=LIST NOCASENUM
  !if (!nGrp > 0) !then /
TITLE=!quote(!concat("Performance by national quartiles of ",!wle," and by ",
!upcase(!grp), ".")
  !else /TITLE=!quote(!concat("Performance by national quartiles of ",!wle, ".")
!ifend
  /CELLS=NONE.

omsend tag="case".
!if (!ngrp=0) !then delete var !grp !ifend.
restore.

save outfile="c:\temp\results.sav" /drop = nu_cases n_cases nu_psu n_total.
get file="c:\temp\results.sav" .

!enddefine .

```





### Box 17.14 [1/3] SPSS® macro of MCR\_SE\_RR.sps

```

set mprint=no.
define RelRisk (outcome = !charend('\')/
                antecedent = !charend('\')/
                infile = !charend('\')/
                grp = !default(NOGRP) !charend('\')/
                wgt = !default(W_FSTUWT) !charend('\')/
                rwgt = !default(W_FSTR) !charend('\')/
                cons = !default(0.05) !charend('\')/
                nrep = !default(80) !charend('\')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

/* nOut is the number of outcome variables (1 or 5) */
!let !nOut=!null.
!do !o !in (!outcome)
!let !nOut=!concat(!nOut,!blanks(1)).
!doend.
!let !nOut=!length(!nOut).
title Number of outcome variables= !nOut.

/* nAnt is the number of antecedent variable (1 or 5) */
!let !nAnt=!null.
!do !o !in (!antecedent)
!let !nAnt=!concat(!nAnt,!blanks(1)).
!doend.
!let !nAnt=!length(!nAnt).
title Number of antecedent variables= !nAnt.

/* nGrp is the number of group variables */
!let !nGrp=!null.
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp,!blanks(1))
!doend.
!let !nGrp=!length(!nGrp).
!if (!upcase(!grp)=NOGRP) !then !let !ngrp=0 !ifend.
title Number of group variables = !ngrp.

*** COMPUTE RELATIVE RISK ***.

get file !quote(!infile) /keep !if (!ngrp=0) !then !else !grp !ifend !outcome
!antecedent !wgt !concat(!rwgt,1) to !concat(!rwgt,!nrep) .
!if (!ngrp=0) !then compute !grp=1 !ifend.

!if (!nOut=1 & !nAnt=1) !then
select if (not missing(!antecedent)).
select if (not missing(!outcome)).
weight by !wgt.
aggregate outfile=* /break=!GRP !outcome !antecedent /n=N.
!ifend
exe.
sort cases by !grp !antecedent !outcome.
casestovars /id=!grp /index=!antecedent !outcome.
compute STAT=(N.1.1/(N.1.0+N.1.1))/(N.0.1/(N.0.0+N.0.1)) .
save outfile=!quote(!concat('c:\temp\','!wgt','!nrep')) /keep=!grp STAT.

*** REPLICATION ***.

!do !i=1 !to !nrep.
get file !quote(!infile) /keep !if (!ngrp=0) !then !else !grp !ifend !outcome
!antecedent !wgt !concat(!rwgt,1) to !concat(!rwgt,!nrep) .
!if (!ngrp=0) !then compute !grp=1 !ifend.

```

## Box 17.14 [2/3] SPSS® macro of MCR\_SE\_RR.sps

```

!if (!nOut=1 & !nAnt=1) !then
select if (not missing(!antecedent)).
select if (not missing(!outcome)).
weight by !concat(!rwgt, !i).
aggregate outfile=* /break=!GRP !outcome !antecedent /n=N.
!ifend
exe.
sort cases by !grp !antecedent !outcome.
casestovars /id=!grp /index=!antecedent !outcome.
compute STATR=(N.1.1/(N.1.0+N.1.1))/(N.0.1/(N.0.0+N.0.1)).
save outfile=!quote(!concat('c:\temp\', !rwgt, !i, '.sav')) /keep=!grp STATR.
!doend.

* Combine replicate files.

!let !nper=50.
!if ( !length(!substr(!blanks(!nrep), !length(!concat(!blanks(!nper) ,
!blanks(1))))=0 ) !then
  add files file= !quote(!concat('C:\temp\', !rwgt, '1.sav')) !do !e=2 !to !nrep
  /file=!quote(!concat('C:\temp\', !rwgt, !e, '.sav')) !doend .
!else
  !let !modls=!nrep.
  !let !intgr=0.
  !do !iter=!nrep !to !nper !by -!nper
    add files file= !quote(!concat('C:\temp\', !rwgt, !iter, '.sav')) !do !e=
length(!substr(!blanks(!iter), 2)) !to !length(!substr(!blanks(!iter),
!length(!blanks(!nper)))) !by -1 /file=!quote(!concat('C:\temp\',
!rwgt, !e, '.sav')) !doend .
    !let !modls=!length(!substr(!blanks(!modls), !length(!concat(!blanks(1),
!blanks(!nper))))).
    !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
    save outfile=!quote(!concat('c:\temp\', !rwgt, '_temp_', !intgr, '.sav')).
  !doend
  !if (!modls>0) !then
    !if (!modls>1) !then
      add files file= !quote(!concat('C:\temp\', !rwgt, '1.sav')) !do
!e=2 !to !modls /file=!quote(!concat('C:\temp\', !rwgt, !e,
'.sav')) !doend .
      !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
      save outfile=!quote(!concat('c:\temp\', !rwgt, '_temp_', !intgr, '.sav')).
    !else
      get file =!quote(!concat('C:\temp\', !rwgt, '1.sav')).
      !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
      save outfile=!quote(!concat('c:\temp\', !rwgt, '_temp_', !intgr, '.sav')).
    !ifend
  !if ( !length(!substr(!blanks(!intgr), !length(!concat(!blanks(!nper) ,
!blanks(1))))=0 ) !then
    add files file= !quote(!concat('C:\temp\', !rwgt, '_temp_1.sav')) !do
!e=2 !to !intgr /file=!quote(!concat('C:\temp\', !rwgt, '_temp_', !e, '.sav')) !doend .
  !else
    !let !modls=!intgr.
    !let !intgr1=0.
    !do !iter=!intgr !to !nper !by -!nper
      add files file= !quote(!concat('C:\temp\', !rwgt, '_temp_', !iter, '.sav'))
!do !e=!length(!substr(!blanks(!iter), 2)) !to !length(!substr(
!blanks(!iter),
!length(!blanks(!nper)))) !ny -1 /file=!quote(!concat('C:\temp\',
!rwgt, '_temp_', !e, '.sav')) !doend.

!let !modls=!length(!substr(!blanks(!modls), !length(!concat(!blanks(1), !blanks(!nper))))).
!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
save outfile=!quote(!concat('c:\temp\', !rwgt, '_tempover_',
!intgr1, '.sav')).
!doend
!if (!modls>0) !then
!if (!modls>1) !then

```



### Box 17.14 [3/3] SPSS® macro of MCR\_SE\_RR.sps

```

add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')) !do !e=2 !to !modls
/file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e,'.sav')) !doend .
        !let !intgr1=!length(!Concat(!blanks(!intgr1),
        !blanks(1))).
        save outfile=!quote(!concat('c:\temp\',!rwgt,'_
tempover_',!intgr1,'.sav')).
    !else
        get file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')).
        !let !intgr1=!length(!Concat(!blanks(!intgr1),
        !blanks(1))).
        save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
        !intgr1,'.sav')).
    !ifend
    !ifend
    add files file= !quote(!concat('c:\temp\',!rwgt,'_tempover_1.sav'))
    !do !e=2 !to !intgr1 /file=!quote(!concat('C:\temp\',!rwgt,'_
tempover_',!e,'.sav')) !doend .
!ifend
!ifend
exe.
sort cases by !grp.
save outfile='c:\temp\rep.sav'.

match files /table=!quote(!concat('c:\temp\',!wgt,'.sav')) /file='c:\temp\rep.sav'
/by !grp.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
aggregate outfile=* /break=!grp /stat= mean(stat) /var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute se=sqrt(var).
formats stat (f8.3)/ SE (f10.6).
save outfile='c:\temp\stats.sav'.

omsend tag="crap".

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= !if (!nGrp>0) !then !grp !ifend stat SE
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Relative risk with ",!antecedent,' as
antecedent and ',!outcome,' as outcome variable'))))
  !else /TITLE=!quote(!concat("Relative risk with ",!antecedent,' as antecedent and ',
!outcome,' as outcome variable by ',!grp)) !ifend
  /CELLS=NONE.

delete variables !if (!ngrp=0) !then !grp !ifend var.
omsend tag="case".
restore.

save outfile="c:\temp\results.sav".

!enddefine.

```


 Box 17.15 [1/4] **SPSS® macro of MCR\_SE\_RR\_PV.sps**

```

set mprint=no.
define RelRisk_pv (outcome = !charend('/')/
  antecedent = !charend('/')/
  infile = !charend('/')/
  grp = !default(NOGRP) !charend('/')/
  wgt = !default(W_FSTUWT) !charend('/')/
  rwgt = !default(W_FSTR) !charend('/')/
  cons = !default(0.05) !charend('/')/
  nrep = !default(80) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

/* nGrp is the number of group variables */
!let !nGrp=!null.
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp,!blanks(1))
!doend.
!let !nGrp=!length(!nGrp).
!if (!upcase(!grp)=NOGRP) !then !let !ngrp=0 !ifend.
title Number of group variables = !ngrp.

get file !quote(!infile)
  /keep !if (!ngrp=0) !then !else !grp !ifend !outcome !antecedent !wgt
!concat(!rwgt,1) to !concat(!rwgt,!nrep) .
!if (!ngrp=0) !then compute !grp=1 !ifend.

!let !p=!null.
!do !o !in (!outcome).
!let !p=!concat(!p,!blanks(1)).
select if (not missing(!o)).
rename var (!o=!concat('OUT',!length(!p))).
!doend.

!let !p=!null.
!do !a !in (!antecedent).
!let !p=!concat(!p,!blanks(1)).
select if (not missing(!a)).
rename var (!a=!concat('ANT',!length(!p))).
!doend.

!do !j=1 !to 5.
sort cases by !grp !concat('ANT',!j) !concat('OUT',!j).
save outfile=!quote(!concat('c:\temp\a',!j, '.sav'))
  /keep !grp !concat('ANT',!j) !concat('OUT',!j) !wgt !concat(!rwgt,1) to
!concat(!rwgt,!nrep).
!doend.

*** COMPUTE RELATIVE RISK ***.

!do !j=1 !to 5.
dataset close all.
get file=!quote(!concat('c:\temp\a',!j, '.sav')).
weight by !wgt.
aggregate outfile=* /PRESORTED /break=!GRP !concat('ANT',!j) !concat('OUT',!j)/n=N.
  casestovars /id=!grp /index=!concat('ANT',!j) !concat('OUT',!j).
compute !concat('STAT.',!j)=(N.1.1/(N.1.0+N.1.1))/(N.0.1/(N.0.0+N.0.1)).
save outfile=!quote(!concat('c:\temp\',!wgt,!j, '.sav')) /keep=!grp
!concat('STAT.',!j).
!doend.

match files !do !j=1 !to 5/file=!quote(!concat('c:\temp\',!wgt,!j, '.sav')) !doend /by
!grp.
save outfile=!quote(!concat('c:\temp\',!wgt, '.sav')).

```



## Box 17.15 [2/4] SPSS® macro of MCR\_SE\_RR\_PV.sps

```

*** REPLICATION ***.

!do !i=1 !to !nrep.
!do !j=1 !to 5.
dataset close all.
get file=!quote(!concat('c:\temp\a',!j, '.sav')).
weight by !concat(!rwgt,!i).
aggregate outfile=* /PRESORTED /break=!GRP !concat('ANT',!j) !concat('OUT',!j)/n=N.
casestovars /id=!grp /index=!concat('ANT',!j) !concat('OUT',!j).
compute !concat('STATR.',!j)=(N.1.1/(N.1.0+N.1.1))/(N.0.1/(N.0.0+N.0.1)).
save outfile=!quote(!concat('c:\temp\',!rwgt,!i,!j, '.sav')) /keep=!grp
!concat('STATR.',!j).
!doend.
match files !do !j=1 !to 5/file=!quote(!concat('c:\temp\',!rwgt,!i,!j, '.sav')) !doend
/by !grp.
save outfile=!quote(!concat('c:\temp\',!rwgt,!i, '.sav')).
!doend.

* Combine replicate files.

!let !nper=50.
!if ( !length(!substr(!blanks(!nrep),!length(!concat(!blanks(!nper),!blanks(1))))))=0 )
!then
    add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2 !to !nrep
    /file=!quote(!concat('C:\temp\',!rwgt,!e, '.sav')) !doend .
!else
    !let !modls=!nrep.
    !let !intgr=0.
    !do !iter=!nrep !to !nper !by -!nper
        add files file= !quote(!concat('C:\temp\',!rwgt,!iter, '.sav')) !do !e=
        !length(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks(!iter),
        !length(!blanks(!nper)))) !by -1 /file=!quote(!concat('C:\temp\',
        !rwgt,!e, '.sav')) !doend .
        !let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1),
        !blanks(!nper))))).
        !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
        save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr, '.sav')).
    !doend
    !if (!modls>0) !then
        !if (!modls>1) !then
            add files file= !quote(!concat('C:\temp\',!rwgt,'1.sav')) !do !e=2
            !to !modls /file=!quote(!concat('C:\temp\',!rwgt,!e, '.sav'))
            !doend .
            !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
            save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr, '.sav')).
            !else
                get file =!quote(!concat('C:\temp\',!rwgt,'1.sav')).
                !let !intgr=!length(!Concat(!blanks(!intgr), !blanks(1))).
                save outfile=!quote(!concat('c:\temp\',!rwgt,'_temp_',!intgr, '.sav')).
            !ifend
        !ifend
    !if ( !length(!substr(!blanks(!intgr),!length(!concat(!blanks(!nper),
    !blanks(1))))))=0 ) !then
        add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')) !do !e=2
        !to !intgr /file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e, '.sav'))
        !doend .
    !else
        !let !modls=!intgr.
        !let !intgr1=0.
        !do !iter=!intgr !to !nper !by -!nper

add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_',!iter, '.sav')) !do !e=!length
(!substr(!blanks(!iter),2)) !to !length(!substr(!blanks(!iter),!length(!blanks(!nper))))
!ny -1 /file=!quote(!concat('C:\temp\',!rwgt,'_temp_',!e, '.sav')) !doend.

```



### Box 17.15 [3/4] SPSS® macro of MCR\_SE\_RR\_PV.sps

```

!let !modls=!length(!substr(!blanks(!modls),!length(!concat(!blanks(1),!blanks(!nper))))).
!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!doend
!if (!modls>0) !then
!if (!modls>1) !then
add files file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav'))
!do !e=2 !to !modls /file=!quote(!concat('C:\temp\',!rwgt,
'_temp_',!e,'.sav')) !doend .
!let !intgr1=!length(!Concat(!blanks(!intgr1), !blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!else
get file= !quote(!concat('C:\temp\',!rwgt,'_temp_1.sav')).
!let !intgr1=!length(!Concat(!blanks(!intgr1),
!blanks(1))).
save outfile=!quote(!concat('c:\temp\',!rwgt,'_tempover_',
!intgr1,'.sav')).
!ifend
!ifend
add files file= !quote(!concat('c:\temp\',!rwgt,'_tempover_1.sav')) !do
!e=2 !to !intgr1 /file=!quote(!concat('C:\temp\',!rwgt,'_tempover_',
!e,'.sav')) !doend .
!ifend
!ifend
exe.
sort cases by !grp.
save outfile='c:\temp\rep.sav'.

match files /table=!quote(!concat('c:\temp\',!wgt,'.sav')) /file='c:\temp\rep.sav' /by
!grp.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr.1 to statr.5/
b=stat.1 to stat.5/
c=var1 to var5.
compute c=(a-b)**2.
end repeat.

aggregate outfile=*/
break=!grp /stat.1 to stat.5= mean(stat.1 to stat.5) /var1 to var5 =
sum(var1 to var5).

do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.

compute pv_var=mean(var1 to var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute stat=mean(stat.1 to stat.5).
do repeat a=stat.1 to stat.5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.
compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3)/ SE (f10.6).
exe.
omsend tag="crap".

```

Box 17.15 [4/4] **SPSS® macro of MCR\_SE\_RR\_PV.sps**

```
*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no /
tag="case".
SUMMARIZE
  /TABLES= !if (!nGrp>0) !then !grp !ifend stat SE
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Relative risk with ",!antecedent,' as
antecedent and ',!outcome,' as outcome variables'))
  !else /TITLE=!quote(!concat("Relative risk with ",!antecedent,' as antecedent and ',
!outcome,' as outcome variables by ',!grp)) !ifend
  /CELLS=NONE.

delete variables !if (!ngrp=0) !then !grp !ifend stat.1 stat.2 stat.3 stat.4 stat.5
var1 var2 var3 var4 var5 pv_var pvar1 pvar2 pvar3 pvar4 pvar5 pvmerr.
omsend tag="case".
restore.

save outfile="c:\temp\results.sav".

!enddefine.
```



### Box 17.16 [1/4] SPSS® macro of MCR\_SE\_EFFECT.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

*** !!! THE 'COMPARE' VARIABLE SHOULD BE NUMERIC, NOT STRING ***.

define EFFnoPV (dep = !charend('/') /
                compare = !charend('/') /
                categ = !charend('/') /
                infile = !charend('/') /
                within = !default(NOWITHIN) !charend('/') /
                wgt = !default(W_FSTUWT) !charend('/') /
                rwgt = !default(W_FSTR) !charend('/') /
                cons = !default(0.05) !charend('/') /
                nrep = !default(80) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)="NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin, " ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

/* z is nWithin + 1 */
!if (!nWithin>0) !then
!let !z=!length(!concat(!blanks(!nWithin), " ")).
!else
!let !z=2.
!ifend.
**title !concat('number of Within group variables is ',!nWithin,', plus 1 (z) = ',!z).

/* ncat is the number of categories */
!let !nc=!null.
!do !c !in (!categ) !let !nc=!concat(!nc, " ") !doend.
!let !ncat=!length(!nc).
**title !concat("Number of categories=",!ncat).

get file !quote(!infile) /keep !dep !if (!nwithin>0) !then !within !ifend !compare
!wgt !concat(!rwgt,1) to !concat(!rwgt,!nrep).
!if (!nwithin=0) !then compute !within=1 !ifend.
compute MISS = (missing(!dep)).
if (missing(!compare)) MISS=1.
!do !w !in (!within).
if (missing(!w)) MISS=1.
!doend.
!let !n=!null.
!do !c !in (!categ)
!let !n=!concat(!n, '| ', !compare, '=', !c, !blanks(1))
!doend.
!let !n=!concat('(', !substr(!n,2), ')').
**title !n.
compute VAL=!n.
if (VAL=0) MISS=1.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\data.sav' /drop=MISS VAL.

*----- Next table with counts does not work without licence for CLABELS ---
-----
**!let !q=!null.
**!if (!nwithin>0) !then
**!do !w !in (!within).
**!let !q=!concat(!q, !w, ' [C] > ').
**!doend !ifend.
**title !q.

```





## Box 17.16 [2/4] SPSS® macro of MCR\_SE\_EFFECT.sps

```

*
*VARIABLE LEVEL !within !compare (NOMINAL).
*string INCLUDED (a3).
*if (validn=0) INCLUDED='No'.
*if (validn=1) INCLUDED='Yes'.
*weight by !wgt.
*CTABLES
* /VLABELS VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
DISPLAY=DEFAULT
* /TABLE !q !compare [C][UCOUNT F40.0, COUNT F40.0] BY INCLUDED [C]
* /CATEGORIES VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
ORDER=A KEY=VALUE EMPTY=EXCLUDE MISSING=INCLUDE
* /TITLES TITLE='Columns "INCLUDED=Yes" give the weighted and unweighted number of
included students'.
*-----
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

*** COMPUTE ESTIMATES ***.

oms /select tables /if subtypes='Report' /destination format=sav outfile=!quote(!con
cat('c:\temp\',!wgt,'_1.sav')) /tag="fullweight".
select if (VALIDN=1).
weight by !wgt.
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=MEAN VARIANCE.
omsend tag="fullweight".

Get file=!quote(!concat('c:\temp\',!wgt,'_1.sav')) /keep= Var1 to !concat('var',!z)
Mean Variance.
rename vars (Var1 to !concat('var',!z) = !within !compare).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
sort cases by !within !compare.
delete var y.
casestovars /id=!within /index=!compare.

/* This part computes the Difference between each pair of categories */.
*-----
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!compare,".",!x,"_",!c)=(!concat("Mean.cat",!x) - !concat("Mean.
cat",!c))
/sqrt((!concat("Variance.cat",!x)+!concat("Variance.cat",!c))/2).
!let !vars=!concat(!vars,!concat(!compare,".",!x,"_",!c)," ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
*-----
delete variables !do !c !in (!categ) !concat("Mean.cat",!c,' Variance.cat',!c)
!doend.
VARSTOCASES /MAKE stat FROM !vars
/INDEX = EFF(stat)
/KEEP = !within
/NULL = KEEP.
sort cases by !within EFF.
save outile=!quote(!concat('c:\temp\',!wgt,'.sav')).

```



### Box 17.16 [3/4] SPSS® macro of MCR\_SE\_EFFECT.sps

```

*** REPLICATES ***.

dataset close all.
get file='c:\temp\data.sav'.
select if (VALIDN=1).
oms /select tables /if subtypes='Report' /destination format=sav numbered='REP'
outfile=!quote(!concat('c:\temp\',!rwgt,'_1.sav')) /tag="r".
!do !i=1 !to !nrep.
weight by !concat(!rwgt,!i).
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=MEAN VARIANCE.
!doend.
omsend tag="r".

get file=!quote(!concat('c:\temp\',!rwgt,'_1.sav')) /keep= rep Var1 to
!concat('var',!z) MEAN VARIANCE.
rename vars (Var1 to !concat('var',!z) = !within !compare).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
sort cases by rep !within !compare.
delete var y.
casestovars /id=rep !within /index=!compare.

/* This part computes the Difference between each pair of categories */.
*-----
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!compare,".",!x,"_",!c)=(!concat("Mean.cat",!x) - !concat("Mean.
cat",!c))
/sqrt((!concat("Variance.cat",!x)+!concat("Variance.cat",!c))/2).
!let !vars=!concat(!vars,!concat(!compare,".",!x,"_",!c)," ").
!ifend !doend
!let !a=!tail(!a).
!doend.
exe.
*-----

delete variables !do !c !in (!categ) !concat("Mean.cat",!c,' Variance.cat',!c)
!doend.
VARSTOCASES /MAKE statR FROM !vars
/INDEX = EFF(statR)
/KEEP = rep !within
/NULL = KEEP.
sort cases by !within EFF.

*** COMBINE RESULTS ***.

match files table=!quote(!concat('c:\temp\',!wgt,'.sav')) /file=* /by !within EFF.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
aggregate outfile=* /break !within EFF/ stat= mean(stat)/ var=sum(var).
compute var=!cons*var.

*** COMPUTE SE ***.

compute se=sqrt(var).
exe.

formats stat (f8.3)/ SE (f10.6).
omsend tag="NoViewer".

```



### Box 17.16 [4/4] SPSS® macro of MCR\_SE\_EFFECT.sps

```

*** OUTPUT TABLE ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nWithin>0) !then !within !ifend EFF stat se
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE=!quote(!concat('SE on effect size in ',!upcase(!dep),
  ` between ',!upcase(!compare), ` groups'))
  !else /TITLE=!quote(!concat('SE on effect size in ',!upcase(!dep), ` between ',
  !upcase(!compare), ` groups by ',!upcase(!within))) !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

delete variables var !if (!nWithin=0) !then !within !ifend.
save outfile="c:\temp\results.sav".
restore.

!enddefine.

```



Box 17.17 [1/5] **SPSS® macro of MCR\_SE\_EFFECT\_PV.sps**

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

*** !!! THE 'COMPARE' VARIABLE SHOULD BE NUMERIC, NOT STRING ***.

define EFF_PV  (dep = !charend('/') /
               compare = !charend('/') /
               categ = !charend('/') /
               infile = !charend('/') /
               within = !default(NOWITHIN) !charend('/') /
               wgt = !default(W_FSTUWT) !charend('/') /
               rwgt = !default(W_FSTR) !charend('/') /
               cons = !default(0.05) !charend('/') /
               nrep = !default(80) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.

/* nWithin is the number of within group variables */
!if (!upcase(!within)="NOWITHIN") !then
!let !nWithin=!null
!Else
!do !w !in (!within)
!let !nwithin=!concat(!nWithin, " ")
!doend !ifend.
!let !nwithin=!length(!nwithin).

/* z is nWithin + 2 */
!if (!nWithin>0) !then
!let !z=!length(!concat(!blanks(!nWithin), !blanks(2))).
!else
!let !z=3.
!ifend.
*title !concat('number of Within group variables is ', !nWithin, ', plus 2 (z) = ', !z).

/* ncat is the number of categories
!let !nc=!null.
!do !c !in (!categ) !let !nc=!concat(!nc, " ") !doend.
!let !ncat=!length(!nc).
*title !concat("Number of categories=", !ncat).

get file !quote(!infile) /keep !dep !if (!nwithin>0) !then !within !ifend !compare
!wgt !concat(!rwgt,1) to !concat(!rwgt, !nrep).
!if (!nwithin=0) !then compute !within=1 !ifend.
compute MISS = (missing(!compare)).
!do !d !in (!dep).
if (missing(!d)) MISS=1.
!doend.
!do !w !in (!within).
if (missing(!w)) MISS=1.
!doend.
!let !n=!null.
!do !c !in (!categ)
!let !n=!concat(!n, '| ', !compare, '=', !c, !blanks(1))
!doend.
!let !n=!concat('( ', !substr(!n,2), ')').
*title !n.
compute VAL=!n.
if (VAL=0) MISS=1.
compute VALIDN=1-MISS.
formats VALIDN (f1.0).
save outfile='c:\temp\data.sav' /drop=MISS.

```



Box 17.17 [2/5] **SPSS® macro of MCR\_SE\_EFFECT\_PV.sps**

```

*----- Next table with counts does not work without licence for CLABELS ---
-----
*!let !q=!null.
*!if (!nwithin>0) !then
*!do !w !in(!within).
*!let !q=!concat(!q,!w,' [C] > ').
*!doend !ifend.
**title !q.
*
*VARIABLE LEVEL !within !compare (NOMINAL).
*string INCLUDED (a3).
*if (validn=0) INCLUDED='No'.
*if (validn=1) INCLUDED='Yes'.
*weight by !wgt.
*CTABLES
* /VLABELS VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
DISPLAY=DEFAULT
* /TABLE !q !compare [C][UCOUNT F40.0, COUNT F40.0] BY INCLUDED [C]
* /CATEGORIES VARIABLES=!if (!nwithin>0) !then !within !ifend !compare INCLUDED
ORDER=A KEY=VALUE EMPTY=EXCLUDE MISSING=INCLUDE
* /TITLES TITLE='Columns "INCLUDED=Yes" give the weighted and unweighted number of
included students'.
*-----
oms /select tables headings texts/destination viewer=no /tag="NoViewer".

*** COMPUTE ESTIMATES ***.

oms /select tables /if subtypes='Report' /destination format=sav outfile=!quote
(!concat('c:\temp\',!wgt,'_1.sav')) /tag="fullweight".
select if (VALIDN=1).
weight by !wgt.
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=MEAN VARIANCE.
omsend tag="fullweight".

Get file=!quote(!concat('c:\temp\',!wgt,'_1.sav')) /keep= Var1 to !concat('var',!z)
!dep .
rename vars (Var1 to !concat('var',!z) = !within !compare TEMP).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
string S (a3).
if (mod($casenum,2)=1) S='MN'.
if (mod($casenum,2)=0) S='VAR'.
sort cases by !within !compare S.
delete var y TEMP.
casestovars /id=!within /index=!compare S/groupby=index.

/* This part computes the difference between each pair of categories */.
*-----
-----
!let !vars1=!null.
!do !d !in (!dep).
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!d,".",!x,"_",!c)=(!concat(!d,".cat",!x,'.MN') - !concat(!d,".cat",
!c,'.MN'))/
sqrt((!concat(!d,".cat",!x,'.VAR') + !concat(!d,".cat",!c,'.VAR'))/2).
!let !vars1=!concat(!vars1,!concat(!d,".",!x,"_",!c)," ").
*title !d # !x # !c.
!ifend !doend.
!let !a=!tail(!a).
!doend.
!doend.
*title 'End of 3 loops'.
exe.
*-----
-----

```


 Box 17.17 [3/5] **SPSS® macro of MCR\_SE\_EFFECT\_PV.sps**

```

!let !vars2=!null.
!do !d !in (!dep) !do !c !in (!categ)
!let !vars2=!concat(!vars2,!d,\.cat',!c,\.MN ',!d,\.cat',!c,\.VAR ').
!doend !doend
delete var !vars2.

VARSTOCASES
  /MAKE STAT FROM !vars1
  /INDEX=TEMP(STAT)
  /KEEP=!within
  /NULL=KEEP.
!let !q=!length(!concat(!head(!dep),!blanks(2))).
string PV (!concat('a',!length(!head(!dep)))).
compute PV=substr(TEMP,1,!length(!head(!dep))).
string !upcase(!compare) (a10).
compute !compare=substr(TEMP,!q).
exe.

!let !f=!null.
!do !d !in (!dep).
!let !f=!concat(!f,!blanks(1)).
!let !g=!length(!f).
recode PV (!quote(!d)=!quote(!concat('PV',!g))).
!doend.
sort cases by !within !compare PV.
delete var TEMP.
casestovars /id= !within !compare /index=PV.
rename vars (pv1 to pv5 = !dep).
save outfile=!quote(!concat('c:\temp\',!wgt,\.sav')).

**** REPLICATES ***.

dataset close all.
get file='c:\temp\data.sav'.
select if (VALIDN=1).
oms /select tables /if subtypes='Report' /destination format=sav numbered='REP'
outfile=!quote(!concat('c:\temp\',!rwgt,\'_1.sav')) /tag="r".
!do !i=1 !to !nrep.
weight by !concat(!rwgt,!i).
means !dep !if (!nWithin>0) !then !do !w !in (!within) !concat("by ",!w) !doend
!else by !within !ifend by !compare /cells=MEAN VARIANCE.
!doend.
omsend tag="r".

get file=!quote(!concat('c:\temp\',!rwgt,\'_1.sav')) /keep= REP Var1 to
!concat('var',!z) !dep .
rename vars (Var1 to !concat('var',!z) = !within !compare TEMP).
compute y=number(!compare,f3.0).
select if (not missing(y)).
compute !compare=concat('cat',!compare).
string S (a3).
if (mod($casenum,2)=1) S='MN'.
if (mod($casenum,2)=0) S='VAR'.
sort cases by !within REP !compare S.
delete var y TEMP.
casestovars /id=!within REP /index=!compare S/groupby=index.

/* This part computes the difference between each pair of categories */.
*-----
*-----
!let !vars1=!null.
!do !d !in (!dep).
!let !vars=!null.
!let !a=!categ.
!do !x !in (!categ)
!do !c !in (!tail(!a))
!if (!tail(!a) > !null) !then
compute !concat(!d,\. ",!x,\. ",!c)=(!concat(!d,\.cat",!x,\.MN') - !concat(!d,\.cat",
!c,\.MN'))/

```



Box 17.17 [4/5] **SPSS® macro of MCR\_SE\_EFFECT\_PV.sps**

```

sqrt(!concat(!d, ".cat", !x, '.VAR') + !concat(!d, ".cat", !c, '.VAR'))/2).
!let !vars1=!concat(!vars1, !concat(!d, ".", !x, "_", !c), " ").
*title !d # !x # !c.
!ifend !doend.
!let !a=!tail(!a).
!doend.
!doend.
*title 'End of 3 loops'.
exe.
*-----
-----
!let !vars2=!null.
!do !d !in (!dep) !do !c !in (!categ)
!let !vars2=!concat(!vars2, !d, '.cat', !c, '.MN ', !d, '.cat', !c, '.VAR ').
!doend !doend
delete var !vars2.

VARSTOCASES
  /MAKE STATR FROM !vars1
  /INDEX=TEMP(STATR)
  /KEEP=!within REP
  /NULL=KEEP.
!let !q=!length(!concat(!head(!dep), !blanks(2))).
string PV (!concat('a', !length(!head(!dep)))).
compute PV=substr(TEMP, 1, !length(!head(!dep))).
string !upcase(!compare) (a10).
compute !compare=substr(TEMP, !q).
exe.

!let !f=!null.
!do !d !in (!dep).
!let !f=!concat(!f, !blanks(1)).
!let !g=!length(!f).
recode PV (!quote(!d)=!quote(!concat('PV', !g))).
!doend.
sort cases by !within !compare REP PV.
delete var TEMP.
casestovars /id= !within !compare REP /index=PV.
rename vars (pv1 to pv5 = !do !d !in(!dep) !concat('r_', !d) !doend).

*** COMBINE RESULTS ***.

sort cases by !within !compare.
match files table=!quote(!concat('c:\temp\', !wgt, '.sav')) /file=* /by !within
!compare.
exec.

*** COMPUTE SAMPLING VARIANCE (U) ***.

!do !d !in(!dep)
COMPUTE !concat('var_', !d) = !cons*(!concat('r_', !d) - !d)**2).
!doend.

AGGREGATE OUTFILE =*
  /PRESORTED /BREAK= !within !compare
  /!do !d !in(!dep) !d !doend=MEAN(!do !d !in(!dep) !d !doend)
  /!do !d !in(!dep) !concat('var_', !d) !doend=SUM(!do !d !in(!dep) !concat('var_',
!d) !doend) .

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k, ", var_", !d).
!doend.
compute pv_var=mean(!substr(!k, 2)).
exe.

```



Box 17.17 [5/5] **SPSS® macro of MCR\_SE\_EFFECT\_PV.sps**

```

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

!let !k=!null.
!do !d !in (!dep)
!let !k=!concat(!k, ",", !d).
!doend.
compute STAT=mean(!substr(!k,2)).

do repeat a=!dep/b=pvar1 to pvar5.
compute b=(a-STAT)**2.
end repeat.

compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
exe.
FORMATS STAT (F8.3) / SE (F10.6).
omsend tag="NoViewer".

*** OUTPUT TABLE ***.

OMS /SELECT TABLES headings
  /IF COMMANDS = ["Summarize"] SUBTYPES = ["Case Processing Summary"]
  /DESTINATION VIEWER = NO /TAG = "SumNoCaseProc".

SUMMARIZE
  /TABLES=!if (!nWithin>0) !then !within !ifend !compare stat se
  /FORMAT=LIST NOCASENUM NOTOTAL
  !if (!nwithin=0) !then /TITLE=!quote(!concat('SE on effect size in ',
!upcase(!head(!dep)), ' to PV5 between ', !upcase(!compare), ' groups'))
  !else /TITLE=!quote(!concat('SE on effect size in ', !upcase(!head(!dep)), ' to PV5 between ',
!upcase(!compare), ' groups by ', !upcase(!within))) !ifend
  /CELLS=NONE.
OMSEND TAG=["SumNoCaseProc"].

delete variables !dep !do !d !in (!dep) !concat("var_", !d) !doend !if (!nWithin=0)
!then !within !ifend pv_var pvar1 to pvar5 pvmerr .
save outfile="c:\temp\results.sav".
restore.

!enddefine.

```





## Box 17.18 [1/4] SPSS® macro of MCR\_ML.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define MIXED_noPV (infile = !charend('/')/
  fixef = !default(EMPTY) !charend('/')/
  ranef = !default(NORAN) !charend('/')/
  intef = !default(NOINT) !charend('/')/
  dep = !charend('/')/
  level2 = !default(SCHOOLID) !charend('/')/
  grp = !default(NOGRP) !charend('/')/
  nrep = !default(80) !charend('/')/
  wgt = !default(W_FSTUWT) !charend('/')/
  rwgt = !default(W_FSTR) !charend('/')/
  cons = !default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

!let !fixup=!uppercase(!fixef).
!let !ranup=!uppercase(!ranef).
!let !intup=!uppercase(!intef).
!let !grpup=!uppercase(!grp).

* nGrp is the number of group variables.
!let !nGrp=!null
!if (!uppercase(!grp)=NOGRP) !then !else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp, " ")
!doend !ifend.
!let !nGrpp=!length(!concat(!ngrp,!blanks(1))).
!let !nGrp=!length(!nGrp).

*** PREPARE DATA ***.

DATASET CLOSE ALL.
get file=!quote(!infile) /keep=!level2 !if (!fixup=EMPTY) !then !else !fixef !ifend
!dep !if (!grpup=NOGRP) !then !else !grp !ifend !wgt !concat(!rwgt,'1') to
!concat(!rwgt,!nrep).
!if (!grpup=NOGRP) !then compute NOGRP=1 !ifend.

* Normalise weights.
weight by !wgt.
aggregate /break=!grp /POPSIZE=N /SAMPsize=NU.
compute !wgt=(!wgt/POPSIZE)*SAMPsize.
do repeat a= !concat(!rwgt,'1') to !concat(!rwgt,!nrep).
compute a=(a/POPSIZE)*SAMPsize.
end repeat.
weight off.

* Listwise deletion.
compute DEL=0.
!if (!fixup=EMPTY) !then !else
!do !f !in (!fixef).
if (missing(!f)) DEL=1.
!doend !ifend.
if (missing(!dep)) DEL=1.
select if DEL=0.
sort cases by !grp !level2.
save outfile='C:\temp\norm.sav' /drop=DEL SAMPsize POPSIZE.

DATASET CLOSE ALL.
get file='C:\temp\norm.sav'.

```



### Box 17.18 [2/4] SPSS® macro of MCR\_ML.sps

```

*** COMPUTE ESTIMATES ***.

split file layered by !grp.
oms /select tables /if subtype='Parameter Estimates' /destination format=sav
outfile='c:\temp\fixful.sav' /tag='ff'.
oms /select tables /if subtype='Covariance Parameter Estimates' /destination
format=sav outfile='c:\temp\ranful.sav' /tag='rf'.
weight off.
MIXED !dep !if (!fixup=EMPTY) !then !else with !fixef !ifend
  /FIXED=INTERCEPT !if (!fixup=EMPTY) !then !else !fixef !ifend !if (!intup=NOINT)
!then !else !intef !ifend
  /METHOD=ML
  /PRINT=G SOLUTION
  /RANDOM=INTERCEPT !if (!ranup=NORAN) !then !else !ranef !ifend | SUBJECT(!level2)
  /REGWGT=!wgt.
omsend tag='ff'.
omsend tag='rf'.
split file off.

DATASET CLOSE ALL.
get file='c:\temp\fixful.sav'
/keep=label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
=EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STAT).
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\1.SAV' .

DATASET CLOSE ALL.
get file='c:\temp\ranful.sav'
/keep=label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
=EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STAT).
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\2.SAV' .

aggregate /break=effect !if (!ngrp=0) !then !else !grp !ifend /TOTAL=sum(STAT).
select if substr(PARAMETER,1,9)='Intercept'.
compute STAT=STAT/TOTAL.
compute PARAMETER = ' Intra-class correlation'.
exe.
delete var total.

ADD FILES FILE='C:\TEMP\1.SAV' /FILE='C:\TEMP\2.SAV' /FILE=*.
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
SAVE OUTFILE=!quote(!concat('C:\TEMP\',!wgt, '.sav')).

*** REPLICATES ***.

DATASET CLOSE ALL.
get file='c:\temp\norm.sav'.
split file layered by !grp.
oms /select tables /if subtype='Parameter Estimates' /destination numbered=REP
format=sav outfile='c:\temp\fixrep.sav' /tag='fr'.
oms /select tables /if subtype='Covariance Parameter Estimates' /destination
numbered=REP format=sav outfile='c:\temp\ranrep.sav' /tag='rr'.
!do !i=1 !to !nrep.
weight off.

```



## Box 17.18 [3/4] SPSS® macro of MCR\_ML.sps

```

MIXED !dep !if (!fixup=EMPTY) !then !else with !fixef !ifend
  /FIXED=INTERCEPT !if (!fixup=EMPTY) !then !else !fixef !ifend !if (!intup=NOINT)
!then !else !intef !ifend
  /METHOD=ML
  /PRINT=G SOLUTION
  /RANDOM=INTERCEPT !if (!ranup=NORAN) !then !else !ranef !ifend | SUBJECT(!level2)
  /REGWGT=!concat(!rwgt,!i).
!doend.
omsend tag='fr'.
omsend tag='rr'.
split file off.

DATASET CLOSE ALL.
get file='c:\temp\fixrep.sav'
  /keep=REP label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
  =EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STATR).
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\1r.SAV'.

DATASET CLOSE ALL.
get file='c:\temp\ranrep.sav'
  /keep=REP label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
  =EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STATR).
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\2r.SAV'.

aggregate /break=REP effect !if (!ngrp=0) !then !else !grp !ifend /
TOTAL=sum(STATR).
select if substr(PARAMETER,1,9)='Intercept'.
compute STATR=STATR/TOTAL.
compute PARAMETER = ` Intra-class correlation'.
exe.
delete var total .

ADD FILES FILE='C:\TEMP\1r.SAV' /FILE='C:\TEMP\2r.SAV' /FILE=*.
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
SAVE OUTFILE=!quote(!concat('C:\TEMP\',!rwgt, '.sav')).

match files /table=!quote(!concat('C:\TEMP\',!wgt, '.sav')) /file=!quote(!concat('C:\TEMP\',
!rwgt, '.sav'))
  /by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
exe.

*** COMPUTE SAMPLING VARIANCE (U) ***.

compute var=(statr-stat)**2.
save outfile = 'c:\temp\regmod.sav'.

aggregate outfile=* /break=!if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER
/STAT= mean(stat) /var=sum(var).
compute var=!cons*var.

```



### Box 17.18 [4/4] SPSS® macro of MCR\_ML.sps

```

*** COMPUTE SE ***.

compute SE=sqrt(var).
formats stat (f8.3)/ SE (f10.6).
!if (!ngrp=0) !then compute NOGRP=1 !ifend.
save outfile='c:\temp\stats.sav'.
omsend tag="crap".

*** COMPUTE N ***.

DATASET CLOSE ALL.
get file='C:\temp\norm.sav'.
sort cases by !grp !level2.
weight OFF.
aggregate /presorted /break=!grp /NU_lev1=N.
aggregate outfile=* /presorted /break=!grp !level2 /NU_lev1=mean(NU_lev1).
aggregate outfile=* /presorted /break=!grp /NU_lev1=mean(NU_lev1) /NU_lev2=N.
match files file='c:\temp\stats.sav' /table=* /by !grp.

if (substr(parameter,1,9)='Intercept' | substr(parameter,1,8)='Residual')
parameter=concat(' ',parameter).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
compute PARAMETER=ltrim(PARAMETER).
EXE.

formats NU_lev1 NU_lev2 (f8.0).
delete variables var !if (!ngrp=0) !then !grp !ifend.

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= EFFECT PARAMETER !if (!nGrp>0) !then !grp !ifend stat SE NU_lev1 NU_lev2
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Multi-level model with ",!dep," on ",
!fixup))
  !else /TITLE=!quote(!concat("Multi-level model with ",!dep," on ",!fixup," by ",
!grp)) !ifend
  /CELLS=NONE.

save outfile="c:\temp\results.sav" / drop nu_lev1 nu_lev2.
get file="c:\temp\results.sav".

omsend tag="case".
restore.
!enddefine.

```



## Box 17.19 [1/5] SPSS® macro of MCR\_ML\_PV.sps

```

set mprint=no.

*** Created by Eveline Gebhardt, Australian Council for Educational Research ***.

define MIXED_PV (infile = !charend('/')/
                fixef = !default(EMPTY) !charend('/')/
                ranef = !default(NORAN) !charend('/')/
                intef = !default(NOINT) !charend('/')/
                dep = !charend('/')/
                level2 = !default(SCHOOLID) !charend('/')/
                grp = !default(NOGRP) !charend('/')/
                nrep = !default(80) !charend('/')/
                wgt = !default(W_FSTUWT) !charend('/')/
                rwgt = !default(W_FSTR) !charend('/')/
                cons = !default(0.05) !charend('/')).

preserve.
SET Olang=English OVars names ONumbers values TVars names TNumbers values.
omsend.
oms /select headings tables texts/destination viewer=no /tag="crap".

!let !fixup=!upcase(!fixef).
!let !ranup=!upcase(!ranef).
!let !intup=!upcase(!intef).
!let !grpup=!upcase(!grp).

* nGrp is the number of group variables.
!let !nGrp=!null
!if (!upcase(!grp)=NOGRP) !then !else
!do !g !in (!grp)
!let !nGrp=!concat(!nGrp," ")
!doend !ifend.
!let !nGrpp=!length(!concat(!ngrp,!blanks(1))).
!let !nGrp=!length(!nGrp).

*** PREPARE DATA ***.

DATASET CLOSE ALL.
get file=!quote(!infile) /keep=!level2 !if (!fixup=EMPTY) !then !else !fixef !ifend
!dep !if (!grpup=NOGRP) !then !else !grp !ifend
!wgt !concat(!rwgt,'1') to !concat(!rwgt,!nrep).
!if (!grpup=NOGRP) !then compute NOGRP=1 !ifend.

* Normalise weights.
weight by !wgt.
aggregate /break=!grp /POPsize=N /SAMPsize=NU.
compute !wgt=(!wgt/POPsize)*SAMPsize.
do repeat a= !concat(!rwgt,'1') to !concat(!rwgt,!nrep).
compute a=(a/POPsize)*SAMPsize.
end repeat.
weight off.

* Listwise deletion.
compute DEL=0.
!if (!fixup=EMPTY) !then !else
!do !f !in (!fixef).
if (missing(!f)) DEL=1.
!doend !ifend.
!do !d !in (!dep).
if (missing(!d)) DEL=1.
!doend.
select if DEL=0.
sort cases by !grp !level2.
save outfile='C:\temp\norm.sav' /drop=DEL SAMPsize POPsize.

```

## Box 17.19 [2/5] SPSS® macro of MCR\_ML\_PV.sps

```

DATASET CLOSE ALL.
get file='C:\temp\norm.sav'.

*** COMPUTE ESTIMATES ***.

split file layered by !grp.
oms /select tables /if subtype='Parameter Estimates' /destination numbered=PV
format=sav outfile='c:\temp\fixful.sav' /tag='ff'.
oms /select tables /if subtype='Covariance Parameter Estimates' /destination
numbered=PV format=sav outfile='c:\temp\ranful.sav' /tag='rf'.
weight off.
!do !d !in (!dep).
MIXED !d !if (!fixup=EMPTY) !then !else with !fixef !ifend
  /FIXED=INTERCEPT !if (!fixup=EMPTY) !then !else !fixef !ifend !if (!intup=NOINT)
!then !else !intef !ifend
  /METHOD=ML
  /PRINT=G SOLUTION
  /RANDOM=INTERCEPT !if (!ranup=NORAN) !then !else !ranef !ifend | SUBJECT(!level2)
  /REGWGT=!wgt.
!doend.
omsend tag='ff'.
omsend tag='rf'.
split file off.

DATASET CLOSE ALL.
get file='c:\temp\fixful.sav'
/keep=PV label_ !if (!ngrp=0) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!ngrp=0) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate
=EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STAT).
alter type EFFECT PARAMETER (a50).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER PV.
casestovars /ID=!if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER /index=PV.
SAVE OUTFILE='C:\TEMP\1.SAV'.

DATASET CLOSE ALL.
get file='c:\temp\ranful.sav'
/keep=PV label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
=EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STAT).
alter type EFFECT PARAMETER (a50).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER PV.
casestovars /ID=!if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER /index=PV.
SAVE OUTFILE='C:\TEMP\2.SAV'.

aggregate /break=effect !if (!ngrp=0) !then !else !grp !ifend /TOTAL.1 TOTAL.2
TOTAL.3 TOTAL.4 TOTAL.5
=sum(STAT.1 STAT.2 STAT.3 STAT.4 STAT.5).
select if substr(PARAMETER,1,9)='Intercept'.
do repeat STAT=STAT.1 STAT.2 STAT.3 STAT.4 STAT.5 /TOTAL=TOTAL.1 TOTAL.2 TOTAL.3
TOTAL.4 TOTAL.5.
compute STAT=STAT/TOTAL.
end repeat.
compute PARAMETER = ' Intra-class correlation'.
exe.
delete var TOTAL.1 TOTAL.2 TOTAL.3 TOTAL.4 TOTAL.5.
ADD FILES FILE='C:\TEMP\1.SAV' /FILE='C:\TEMP\2.SAV' /FILE=*.
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
SAVE OUTFILE=!quote(!concat('C:\TEMP\',!wgt, '.sav')).

```



## Box 17.19 [3/5] SPSS® macro of MCR\_ML\_PV.sps

```

*** REPLICATES ***.

DATASET CLOSE ALL.
get file='C:\temp\norm.sav'.
split file layered by !grp.
oms /select tables /if subtype='Parameter Estimates' /destination numbered=PVREP
format=sav outfile='c:\temp\fixrep.sav' /tag='fr'.
oms /select tables /if subtype='Covariance Parameter Estimates' /destination
numbered=PVREP format=sav outfile='c:\temp\ranrep.sav' /tag='rr'.
!do !i=1 !to !nrep.
weight off.
!do !d !in (!dep).
MIXED !d !if (!fixup=EMPTY) !then !else with !fixef !ifend
  /FIXED=INTERCEPT !if (!fixup=EMPTY) !then !else !fixef !ifend !if (!intup=NOINT)
!then !else !intef !ifend
  /METHOD=ML
  /PRINT=G SOLUTION
  /RANDOM=INTERCEPT !if (!ranup=NORAN) !then !else !ranef !ifend | SUBJECT(!level2)
  /REGWGT=!concat(!rwtg,!i).
!doend.
!doend.
omsend tag='fr'.
omsend tag='rr'.
split file off.

DATASET CLOSE ALL.
get file='c:\temp\fixrep.sav'
  /keep=PVREP label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate.
rename var (label_ !if (!ngrp=0) !then Var2 !else Var1 to !concat('var',!nGrpp)
!ifend Estimate
  =EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STATR).
compute PV=mod(PVREP,5).
recode PV (0=5).
if (PV=5) REP=PVREP/PV.
sort cases by !if (!ngrp=0) !then !else !grp !ifend PVREP (d).
!do !j=4 !to 1 !by -1.
if (PV=!j) REP=lag(REP).
exe.
!doend.
formats PV REP (F3.0).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER REP PV.
delete var PVREP.
casestovars /id=!if (!ngrp=0)!then !else !grp !ifend EFFECT PARAMETER REP/
index=PV.
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\1r.SAV'.

DATASET CLOSE ALL.
get file='c:\temp\ranrep.sav'
  /keep=PVREP label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate.
rename var (label_ !if (!grpup=NOGRP) !then Var2 !else Var1 to
!concat('var',!nGrpp) !ifend Estimate
  =EFFECT !if (!grpup=NOGRP) !then PARAMETER !else !GRPUP PARAMETER !ifend STATR).
compute PV=mod(PVREP,5).
recode PV (0=5).
if (PV=5) REP=PVREP/PV.
sort cases by !if (!ngrp=0) !then !else !grp !ifend PVREP (d).
!do !j=4 !to 1 !by -1.
if (PV=!j) REP=lag(REP).
exe.
!doend.

```



### Box 17.19 [4/5] SPSS® macro of MCR\_ML\_PV.sps

```

formats PV REP (F3.0).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER REP PV.
delete var PVREP.
casestovars /id=!if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER REP/
index=PV.
alter type EFFECT PARAMETER (a50).
SAVE OUTFILE='C:\TEMP\2r.SAV'.

aggregate /break=REP effect !if (!ngrp=0) !then !else !grp !ifend /TOTAL.1 TOTAL.2
TOTAL.3 TOTAL.4 TOTAL.5
  =sum(STATR.1 STATR.2 STATR.3 STATR.4 STATR.5).
select if substr(PARAMETER,1,9)='Intercept'.
do repeat STATR=STATR.1 STATR.2 STATR.3 STATR.4 STATR.5 /TOTAL=TOTAL.1 TOTAL.2
TOTAL.3 TOTAL.4 TOTAL.5.
compute STATR=STATR/TOTAL.
end repeat.
compute PARAMETER = ' Intra-class correlation'.
exe.
delete var TOTAL.1 TOTAL.2 TOTAL.3 TOTAL.4 TOTAL.5.
ADD FILES FILE='C:\TEMP\1r.SAV' /FILE='C:\TEMP\2r.SAV' /FILE=*.
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
SAVE OUTFILE=!quote(!concat('C:\TEMP\',!rwgt, '.sav')).

match files /table=!quote(!concat('C:\TEMP\',!wgt, '.sav')) /file=!quote(!concat('C:\TEMP\',
!rwgt, '.sav'))
/by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
exe.

*** COMPUTE SAMPLING VARIANCE (U) ***.

do repeat a=statr.1 to statr.5/
  b=stat.1 to stat.5/
  c=var1 to var5.
compute c=(a-b)**2.
end repeat.
save outfile = 'c:\temp\regmod.sav'.

aggregate outfile=* /PRESORTED
  /break=!if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER
  /stat.1 to stat.5= mean(stat.1 to stat.5)
  /var1 to var5 = sum(var1 to var5).

do repeat a=var1 to var5.
compute a=!cons*a.
end repeat.

compute pv_var=mean(var1 to var5).

*** CALCULATING MEASUREMENT VARIANCE (Bm) ***.

compute STAT=mean(stat.1 to stat.5).
do repeat a=stat.1 to stat.5/b=pvar1 to pvar5.
compute b=(a-stat)**2.
end repeat.
compute pvmerr=.25*(sum(pvar1 to pvar5)).

*** COMPUTE SE [V = U + (1+1/M)Bm] ***.

compute SE=sqrt(pv_var+1.2*pvmerr).
formats stat (f8.3)/ SE (f10.6).
!if (!ngrp=0) !then compute !grp=1 !ifend.
save outfile='c:\temp\stats.sav'.

omsend tag="crap".

```





### Box 17.19 [5/5] SPSS® macro of MCR\_ML\_PV.sps

```

*** COMPUTE N ***.

DATASET CLOSE ALL.
get file='C:\temp\norm.sav'.
sort cases by !grp !level2.
weight OFF.
aggregate /presorted /break=!grp /NU_lev1=N.
aggregate outfile=* /presorted /break=!grp !level2 /NU_lev1=mean(NU_lev1).
aggregate outfile=* /presorted /break=!grp /NU_lev1=mean(NU_lev1) /NU_lev2=N.
match files file='c:\temp\stats.sav' /table=* /by !grp.

if (substr(parameter,1,9)='Intercept' | substr(parameter,1,8)='Residual')
parameter=concat(' ',parameter).
sort cases by !if (!ngrp=0) !then !else !grp !ifend EFFECT PARAMETER.
compute PARAMETER=ltrim(PARAMETER).
EXE.

formats NU_lev1 NU_lev2 (f8.0).
delete variables stat.1 to stat.5 var1 to var5
      pv_var pvar1 to pvar5 pvmerr !if (!ngrp=0) !then !grp !ifend.

*** OUTPUT TABLES ***.

oms /select tables /if subtypes='Case Processing Summary' /destination viewer=no
/tag="case".
SUMMARIZE
  /TABLES= EFFECT PARAMETER !if (!nGrp>0) !then !grp !ifend stat SE NU_lev1 NU_lev2
  /FORMAT=LIST NOCASENUM
  !if (!ngrp=0) !then /TITLE=!quote(!concat("Multi-level model with ",!head(!dep)," to ",
!substr(!dep,!Index(!dep,PV5))," on ",!fixup))
  !else /TITLE=!quote(!concat("Multi-level model with ",!head(!dep)," to ",!substr
(!dep,!Index(!dep,PV5))," on ",!fixup," by ",!grp)) !ifend
  /CELLS=NONE.

omsend tag="case".

save outfile="c:\temp\results.sav" / drop nu_lev1 nu_lev2.
get file="c:\temp\results.sav".

restore.
!enddefine.

```



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# User's Guide

## Preparation of data files

All data files (in text format) and the SPSS® control files are available on the PISA website ([www.pisa.oecd.org](http://www.pisa.oecd.org)).

## SPSS® users

By running the SPSS® control files, the PISA data files are created in the SPSS® format. Before starting analysis in the following chapters, save the PISA 2000 data files in the folder of "c:\pisa2000\data\", the PISA 2003 data files in "c:\pisa2003\data\", and the PISA 2006 data files in "c:\pisa2006\data\".

## SPSS® syntax and macros

All syntaxes and macros in this manual can be copied from the PISA website ([www.pisa.oecd.org](http://www.pisa.oecd.org)). These macros were developed for SPSS 17.0. The 19 SPSS® macros presented in Chapter 17 need to be saved under "c:\pisa\macro\", before starting analysis. Each chapter of the manual contains a complete set of syntaxes, which must be done sequentially, for all of them to run correctly, within the chapter.

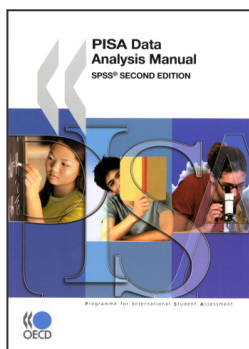
## Rounding of figures

In the tables and formulas, figures were rounded to a convenient number of decimal places, although calculations were always made with the full number of decimal places.

## Country abbreviations used in this manual

AUS	Australia	FRA	France	MEX	Mexico
AUT	Austria	GBR	United Kingdom	NLD	Netherlands
BEL	Belgium	GRC	Greece	NOR	Norway
CAN	Canada	HUN	Hungary	NZL	New Zealand
CHE	Switzerland	IRL	Ireland	POL	Poland
CZE	Czech Republic	ISL	Iceland	PRT	Portugal
DEU	Germany	ITA	Italy	SVK	Slovak Republic
DNK	Denmark	JPN	Japan	SWE	Sweden
ESP	Spain	KOR	Korea	TUR	Turkey
FIN	Finland	LUX	Luxembourg	USA	United States





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