

1. Introduction

SUDAAN 11.0.3 contains the following changes from SUDAAN 11.0.1:

- Choice of single-unit stage handling for variance estimation of totals. Default behavior is reverted to SUDAAN 10.0.2.
- Fixed BRR and jackknife replicate variance estimation error for contrasts with multiple tables in DESCRIPT, VARGEN, and RATIO Procedures.
- ‘Programmer errors’ in VARGEN have been fixed.
- SAS-callable SUDAAN is now available for use with SAS 9.4 M5 (released 2017). A separate version of SUDAAN 11.0.3 is available for use with SAS 9.4 M3 or M4.

The platforms supported by SUDAAN 11.0.3 are listed below. We anticipate that these will work with all platforms supported by SUDAAN 11.0.1. For SAS-callable SUDAAN, please select the correct SUDAAN version. SUDAAN for SAS 9.4 M5 does not work with earlier versions of SAS and earlier versions of SUDAAN do not work with SAS 9.4 M5. These platforms were tested:

- Windows 7, 64-bit, SAS-callable SUDAAN with SAS 9.4 M3
- Windows 7, 64-bit, SAS-callable SUDAAN with SAS 9.4 M5
- Windows 7, 64-bit, standalone SAS
- Windows 7, 32-bit, SAS-callable SUDAAN with SAS 9.4 M5
- Red Hat Enterprise Linux 6.4, 64-bit, SAS-callable SUDAAN with SAS 9.4 M5

2. New MISSUNIT option

The MISSUNIT option is available on the NEST statement. It is specified when using Taylor series variance estimation and variance estimates are desired from samples and subgroups containing single-PSU strata or other single-unit stages. This change impacts the results obtained for variances of totals under the DESCRIPT, RATIO, CROSSTAB, and VARGEN procedures.

For releases of SUDAAN prior to version 11.0 a known ‘bug’ existed in the Taylor Series variance estimate computed for Totals when MISSUNIT was specified. As described in the SUDAAN 11 manual (p.99), prior to SUDAAN 11, when the MISSUNIT option was specified and SUDAAN encountered only one sample unit within a stage, the variance contribution of that unit was centered at zero. This is because for most statistics, such as means or ratios, the overall mean of the linearized variate is zero; however, this is not generally true for totals. In SUDAAN 11 it was changed to be centered at the overall mean value for the population for the computation of totals. This is a common approach for handling single-unit stages but it can have unintended consequences.

When SUDAAN started using the sample grand mean to center the variance estimate, it consequently began to include variance contributions from the strata triggering MISSUNIT to estimates for subgroup totals that regardless of whether the subgroup contained the MISSUNIT strata. This is correct under the assumption that there should be subgroup members present in a single-PSU strata. In some case, however, the assumption is poor, for example when subgroups

represent geographic areas or correspond to strata, then it incorrectly inflates variance to totals for subgroups that do not include the single-unit stage. In addition variance contributions from certainty strata are nonzero. Hence, the default behavior for MISSUNIT was reverted to that of SUDAAN 10; however, in order to allow users to specify which approach is appropriate, and option has been provided to use the grand mean as in SUDAAN 11.

Usage

The new option keywords MISSUNIT1 and MISSUNIT2 are available on the NEST statement - they may be used in any SUDAAN procedure with a NEST statement; however, the results will only differ for the impacted statistics listed in Tables 1 to 3 for the descriptive procedures DESCRIPT, CROSSTAB, and VARGEN. MISSUNIT and MISSUNIT1 correspond to MISSUNIT in SUDAAN versions prior to 11 (variance contribution for single-unit stage centered at zero), and MISSUNIT2 corresponds to SUDAAN 11.0.0 and 11.0.1 (variance contribution for single-unit stage centered at sample grand mean).

Impacted Statistics

The choice of options will impact all variances of totals when MISSUNIT is specified. Since this variance estimate is also used in several composite statistics (e.g. *t*-tests for the significance of differences and some of the CROSSTAB test statistics), other statistics are indirectly affected by the choice of options. Tables 1 and 2 present a list of all statistics in CROSSTAB and DESCRIPT that were listed in the SUDAAN 11 manual as affected by the change in MISSUNIT for totals from SUDAAN 10 to 11. VARGEN was not available in SUDAAN 10 but variances of totals computed in VARGEN will also be impacted by the choice of MISSUNIT options (Table 3).

Table 1. Statistics in CROSSTAB That Will Be Affected by the Change to MISSUNIT

AADJDF	LLCHISQP
ADDF	LOGARISK
ADF	LOGSRISK
ADJDDF	LOWARISK
APVAL	LOWSRISK
ARISK	SADJDF
ATESTVAL	SDDF
CHIDDF	SDF
CHISQ	SELOGARISK
CHISQDF	SELOGSRISK
CHISQP	SEWGT
CMH	SPVAL
CMHDDF	SRISK
CMHDF	STESTVAL
CMHPVAL	STRDDF
COVWGT	UPARISK
DDFWGT	UPSRISK
DEFFWGT	VARLOGARISK
LLCHISQ	VARLOGSRISK
LLCHISQDF	VARWGT

Table 2. Statistics in DESCRIPT That Will Be Affected by the Change to MISSUNIT

COVTOTAL	SRSTOTAL
DDFTOTAL	TDDF
DEFFTOTAL	UPTOTAL
LOWTOTAL	VARTOTAL
SETOTAL	

Table 3. Statistics in VARGEN That Will Be Affected by the Change to MISSUNIT
 These statistics are impacted only when they apply to estimates from XSUM statements or PARAMETER statements when the parameter requested represents a total.

SEESTIM	VARESTIM
LOWESTIM	UPESTIM
T_ESTIM	DEFFESTIM

3. DESCRIPT, VARGEN, and RATIO Procedures: BRR and Jackknife replicate variance estimation errors for contrasts with multiple tables

In SUDAAN 10.0.1 through 11.0.1, when BRR or Jackknife replicate variance estimation was requested for contrasts in combination with multiple table requests, the number of replicates used for variance estimation was equal to the number of tables rather than the total number of specified replicates.

This affected the statements CONTRAST, DIFFVAR, PAIRWISE, or POLYNOMIAL when requested in combination with multiple table requests via TABLES, CLASS, or SUBGROUP. Note the issue is related to the number of tables requested not the number of variables listed, so for CLASS and SUBGROUP, only the variables interpreted as table requests are counted. For example, the variables for which contrasts are requested do not count toward the number of tables produced even if listed on a CLASS statement, or if a TABLES statement is present this overrides CLASS.

This behavior has been fixed in SUDAAN 11.0.3.

Table 4. Impacted procedures and statistics

Procedure	Affected statistics				
DESCRIPT	SEPERCENT	LOWPCT	UPPCT	T_PCT	P_PCT
	SETOTAL	LOWTOTAL	UPTOTAL	VARPCT	VARTOTAL
	SEMEAN	LOWMEAN	UPMEAN	T_MEAN	P_MEAN
	SEGEOMEAN	VARMEAN	DDFMEAN	DDFPCT	DDFTOTAL
VARGEN	SEESTIM	VARESTIM	LOWESTIM	UPESTIM	T_ESTIM
	P_ESTIM				
RATIO	SERHAT	LOWRHAT	UPRHAT	T_RHAT	P_RHAT
	VARRHAT	DDFRHAT	SEPERCENT	LOWPCT	UPPCT
	T_PCT	P_PCT	SETOTAL	LOWTOTAL	UPTOTAL

VARPCT	VARTOTAL	SEMEAN	LOWMEAN	UPMEAN
T_MEAN	P_MEAN	SEGEOMEAN	VARMEAN	DDFMEAN
DDFTOTAL	DDFPCT			