Automatic Referencing SAS® Macro Variables Using Array Processing,
CALL SYMPUT Routine and DO Loops

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ABSTRACT

This paper illustrates how one can use the combination of array processing, SAS® macro facility, CALL SYMPUT routine, and iterative DO loops to automatically assign titles and labels to address corresponding variables in the frequency tables.

In the Adult/Adolescent Spectrum of Diseases (ASD) project at Centers for Diseases Control and Prevention (CDC), there is a need to produce frequency tables for each of the 23 1987-definition AIDS Opportunistic Illnesses (OI). By using the technique described herein, one can set up an array with all 23 AIDS OI names, use SAS macro to set up macro variable for future reference, use CALL SYMPUT routine to assign value to macro variable which can be referred later in the title statement and label statement for each AIDS OI name in the frequency table, and use DO Loops to perform this task repetitively for each of the 23 AIDS OI names.

THE MACRO

The complete macro is presented in Appendix A. Important codes are highlighted here for explanation.

ARRAY DXNAME{23} $ ('CANDLUNG', 'CANDESOP', 'COCCI', 'CRYPTOCO', 'CRYPTOSP', 'CMV', 'CMVRET', 'DEMENTIA', 'HERPES SIMPLEXS', 'HISTO', 'ISOSPORIASIS', 'KS', 'BURKL', 'BRAIN LYMPHOMA', 'MAVIUM', 'TB', 'MYCO', 'PCP', 'PML', 'SALMONELLA', 'TOXOP', 'WASTING');

This technique can be applied widely to any program which requires users to reference multiple variables repetitively in the title and label statement of the frequency procedure or tabulate procedure.

INTRODUCTION

In the Adult/Adolescent Spectrum of Diseases (ASD) project at Centers for Diseases Control and Prevention, there is a need to produce frequency tables for each of the 23 1987-definition AIDS opportunistic Illnesses (OI) by race, sex and mode of exposure.

Instead of changing the title statement in the frequency table for each OI separately and repeat the same process 23 times, SAS array is used to contain all 23 AIDS OI names, and SAS macro is used to set up macro variable for future reference, then CALL SYMPUT routine is used to assign value to macro variable which can be referred later in the title statement and label statement for each AIDS OI in the frequency table, finally DO Loop is used to perform this task repetitively for each of the 23 AIDS OI names.

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DATA _NULL_;  
   SET OI(KEEP=DXNAME&I);  
   CALL SYMPUT('OINAME',  
               PUT(DXNAME&I,$10.));  
RUN;

The above data step use CALL SYMPUT routine to assign value, which was defined in the array statement, to another macro variable OINAME.

PROC FREQ DATA=OI;  
   TITLE1 "ASD- Number of persons with &OINAME";  
   TABLES (OIDX&I ) * (SEX RACE MODE);  
   LABEL OIDX&I="&OINAME";  
RUN;

The above frequency table invokes macro variable &OINAME in title statement and label statement.

CONCLUSION

This technique can be applied widely to any program which requires users to reference multiple variables repetitively in the title and label statement of frequency procedure or tabulate procedure.

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QUESTIONS? COMMENTS?

Your questions and comments are valued and encouraged! Contact the author at:

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APPENDIX A.

/* EXAMPLE OF SAS PROGRAM LISTING*/

*************************************************************************
* CREATED BY: PEI-CHUN WAN (404)639-2044                           *
*                                                           *
* THIS PROGRAM IS WRITTEN FOR ASD                             *
* FREQUENCY OF EACH 1987-DEF. AIDS OI                        *
* - TOTAL AND BY SEX RACE AND MODE IN ASD                    *
* - AMONG PERSONS WHO ARE DEAD AND AMONG PERSONS WITH AIDS   *
*************************************************************************;

OPTIONS LS=80 PS=66 MLOGIC MPRINT SYMBOLOGEN PAGENO=1;  
LIBNAME XYZ 'path';  
%LET MONTH=JUNE;  
%LET YEAR=1996;  

%MACRO DATA;  
   DATA OI(KEEP= OIDX1-OIDX23 DXNAME1-DXNAME23 REP_ST YEAR RACE
SEX  MODE);

SET XYZ.JUNE96( KEEP=OK REP_ST PATNO FORM FRSTDATE STAT SEX RACE
  MODE CANDLUNG CANDESOP COCCI CRYPTOCA CRYPTOSP CMV CMVRET
  DEMENTIA HS HISTO ISO KS BURKL IBL PLB MAVIUM TB MYCO PC PML
  SALS TP WASTING);
  BY REP_ST PATNO;
  WHERE OK = '1' AND FORM NE '0';

ARRAY DX{23} $ CANDLUNG CANDESOP COCCI CRYPTOCA CRYPTOSP CMV
  CMVRET DEMENTIA HS HISTO ISO KS BURKL IBL PLB MAVIUM TB MYCO PC PML
  SALS TP WASTING;

ARRAY DXNAME{23} $
  ('CANDLUNG', 'CANDESOP', 'COCCI', 'CRYPTOCA', 'CRYPTOSP',
  'CMV', 'CMVRET', 'DEMENIA', 'HS', 'HISTO', 'ISO', 'KS',
  'BURKL', 'IBL', 'PLB', 'MAVIUM', 'TB', 'MYCO', 'PC', 'PML', 'SAL', 'TP', 'WASTING');

RETAIN AIDS OIDX1-OIDX23 YEAR MC 0;

IF FIRST.PATNO THEN DO;
  AIDS=0;
  %DO I=1 %TO 23;
    OIDX&I=0;
  %END;
  YEAR=0;
END;

DO I=1 TO 23 ;
  IF DX(I) NE ' ' AND DX(I) NE '8' THEN DO;
    AIDS = 1;
    I=23;
    YEAR=SUBSTR(FRSTDATE,7,2);
  END;
END;

%DO I = 1 %TO 23;
  IF DX(&I) NE ' ' AND DX(&I) NE '8' THEN OIDX&I=1;
%END;

IF LAST.PATNO AND (AIDS=1) AND STAT=2 THEN OUTPUT;
  /* SELECT 1987 DEF. AIDS */
RUN;
%MEND DATA;

%MEND FTABLES;
%MEND FTABLES;
%MEND FTABLES;

%MACRO FTABLES;
%DO I=1 %TO 23;
   DATA _NULL_;
      SET OI(KEEP=DXNAME&I);
      CALL SYMPUT('OINAME',PUT(DXNAME&I,$10.));
RUN;

   PROC FREQ;
      TITLE1 "ASD-NUMBER OF PERSONS WITH &OINAME" ;
      TITLE2 "USING EXACT DATASET - THROUGH &MONTH &YEAR";
      TABLES (OIDX&I) * (SEX RACE MODE)/MISSING;
      LABEL OIDX&I = "&OINAME";
      RUN;
   %END;
%MEND FTABLES;

%DATA;
%FTABLES;
%DATA;
%FTABLES;
%FTABLES;

/* END OF SAS PROGRAM LISTING */