Creating Reports Again and Again ... and Again with Macro

Creating Reports Demo **3**

Demonstration: Creating Multiple Reports with %DO loops and Sending to Microsoft Excel 4

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Creating Reports Demo

The purpose of this demo is to use the **RatingsReport** macro definition to create a variety of reports based on the **ProductReviews** table and send them to Microsoft Excel.

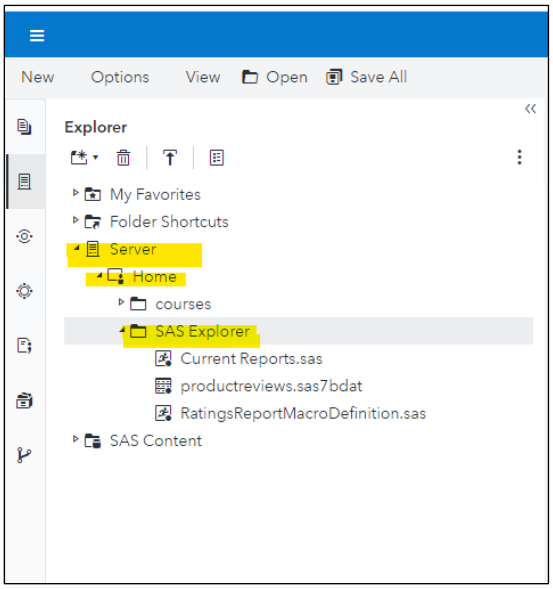
Note: This program assumes that users will spell state names correctly.

Here are the three report varieties:

- one summarized report that shows overall information about ratings
- a report for every state showing overall information about ratings
- one report for a selected state showing overall information about ratings

Here's how to access the files for the demo:

1. From the Windows taskbar, launch Google Chrome. When the browser opens, select **SAS Studio** from the bookmarks bar.
2. The user ID and password should be prefilled. If not perform these steps:
   a. Enter **student** in the **User ID** field.
   b. Enter **Metadata0** in the **Password** field.
3. Click **Sign in**.
4. When asked "Do you want to opt in to all of your assumable groups?" click **Yes**.
5. On the left, in the Explorer pane, select **Server** > **Home** > **SAS Explorer** to access the three files used for this demo.



Note: The programs currently have LIBNAME statement paths to match the path listed above. If you have a different path, you will need to adjust the LIBNAME statement accordingly.

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Creating Multiple Reports with %DO loops and Sending to Microsoft Excel

1. Open **Starter Macro Definition Program.** Run the program to create the **RatingsReport** macro definition and see the results of the macro definition call.

Average Overall Satisfaction Rating By Product Group

Product Group	Average Overall Rating
Eclipse Clothing	3.01343
Eclipse Shoes	2.99893
Green Tomato	2.99802
Knitwear	2.98466
LSF	2.97355
Leisure	2.99501
Massif	2.95109
Orion	2.98590
Orion Clothing	3.00188
Osprey	3.02465
Shoes	2.99971
Shorts	2.92915
Stockings & Socks	2.95863
Street Wear	3.01651
T-Shirts	3.02077
Tracker Clothes	2.99670
Tracker Shoes	3.03441
Twain	2.86131

Ratings below 3 stars are shaded red

Satisfaction Ratings by Product Group
Overall Satisfaction - 1 to 5 Stars Ratings

Frequency

Table of Product_Group by Overall						
	Overall					
Product_Group(Product Group)	1	2	3	4	5	Total
Eclipse Clothing	1306	3851	6801	3782	1456	17196
Eclipse Shoes	909	2411	4527	2421	898	11166
Green Tomato	90	212	406	212	89	1009
Knitwear	314	813	1368	796	295	3586
LSF	158	457	772	437	142	1966
Leisure	155	396	705	401	148	1805
Massif	23	29	78	42	12	184
Orion	287	716	1342	735	254	3334
Orion Clothing	165	475	847	475	167	2129
Osprey	126	339	633	338	146	1582
Shoes	275	756	1434	751	277	3493
Shorts	39	124	204	87	40	494
Stockings & Socks	102	259	440	254	81	1136
Street Wear	158	500	857	478	187	2180
T-Shirts	117	252	518	313	100	1300
Tracker Clothes	1083	3142	5593	2968	1147	13933
Tracker Shoes	307	952	1790	1018	350	4417
Twain	31	65	108	51	19	274
Total	5645	15749	28423	15559	5808	71184

2. Add **State** as a positional parameter to the **RatingsReport** macro definition.

```
%macro RatingsReport(State, RatingType=Overall, StarLow=1, StarHigh=5);
```

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3. Revise the macro definition text to run existing code if no value is entered for **State** when **RatingsReport** is called.
   a. Under the %MACRO statement, add a %IF/%THEN/%DO statement to submit the code only when **State** is null
   b. Before the %MEND statement, add a %END statement.

```
%macro RatingsReport(State, RatingType=Overall, StarLow=1, StarHigh=5);

%if &State= %then %do;

    /*---------------------Report 1 - Average Satisfaction Rating  (Choose Rating Type)----------------------*/
    proc sql;
            create table Average&RatingType as
            Select Product_Group, avg( &RatingType) as Average "Average &Ratingtype Rating"
            from productreviews
            group by Product_Group;
    quit;

    proc format;
    value underperform 0 - < 3 = "salmon";
    run;

    title1 "Average &Ratingtype Satisfaction Rating By Product Group";
    footnote "Ratings below 3 stars are shaded red";
    proc print data=Average&Ratingtype noobs label;
        var Product_Group Average / style={background=underperform.};
    run;
    footnote;

    /*------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

    title1 "Satisfaction Ratings by Product Group";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
        where &StarLow <= &RatingType <= &StarHigh;
    run;
%end;

%mend ratingsreport;

%ratingsreport()
```

4. Submit the code to ensure that results remain the same.

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5. Revise the macro definition text to run a new block of code if a state name is entered in the parenthesis when **RatingsReport** is called.
   a. After the %IF/%THEN-%DO group, add a %ELSE/%DO statement and a %END statement.
   b. Copy and paste the previous report code between the %ELSE/%DO and %END statements.
   c. In the PROC SQL step, add a WHERE clause to filter the **State_Province** column based on the value entered in the parentheses when **RatingsReport** is called
   d. In the TITLE1 statement of the PROC PRINT report, add **and State** to the end of the title.
   e. Add an additional title to the PROC PRINT report that lists the state name that is entered.
   f. In the TITLE1 statement of the PROC FREQ report, add **and State** to the end of the title.
   g. Add an additional title to the PROC FREQ report that lists the state name that is entered.
   h. In the WHERE statement in the PROC FREQ step, include an additional filter for **State_Province** to equal the value entered for **State**.

```
%end;

%else %do;

    /*--------------------Report 1 - Average Satisfaction Rating  (Choose Rating Type)----------------------*/
    proc sql;
            create table Average&RatingType as
            Select Product_Group, avg( &RatingType) as Average "Average &Ratingtype Rating"
            from productreviews
            where State_Province = "&State"
            group by Product_Group;
    quit;

    proc format;
    value underperform 0 - < 3 = "salmon";
    run;

    title1 "Average &Ratingtype Satisfaction Rating By Product Group and State";
    title2 "&State";
    footnote "Ratings below 3 stars are shaded red";
    proc print data=Average&Ratingtype noobs label;
        var Product_Group Average / style={background=underperform.};
    run;
    footnote;

    /*------------------------------------------ Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

    title1 "Satisfaction Ratings by Product Group and State";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";
    title3 "&State";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
        where &StarLow <= &RatingType <= &StarHigh and State_Province="&State";
    run;
%end;

%mend ratingsreport;
```

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6. Run the program and confirm that the program successfully works.

   Call **RatingsReport** using **Ohio** between the parentheses.

```
%ratingsreport(Ohio)
```

Average Overall Satisfaction Rating By Product Group and State
Ohio

Product Group	Average Overall Rating
Eclipse Clothing	3.03892
Eclipse Shoes	2.95946
Green Tomato	3.09677
Knitwear	3.01575
LSF	2.88679
Leisure	2.85294
Massif	3.25000
Orion	3.09091
Orion Clothing	3.13115
Osprey	3.07692
Shoes	2.94118
Shorts	3.00000
Stockings & Socks	2.97727
Street Wear	3.02632
T-Shirts	3.16667
Tracker Clothes	2.95474
Tracker Shoes	3.04706
Twain	2.72727

Ratings below 3 stars are shaded red

Satisfaction Ratings by Product Group and State
Overall Satisfaction - 1 to 5 Stars Ratings
Ohio

Frequency

Table of Product_Group by Overall

	Overall					
Product_Group(Product Group)	1	2	3	4	5	Total
Eclipse Clothing	38	139	239	112	63	591
Eclipse Shoes	32	81	150	84	23	370
Green Tomato	1	8	14	3	5	31
Knitwear	7	26	56	34	4	127
LSF	5	15	17	13	3	53
Leisure	8	13	31	13	3	68
Massif	0	2	2	4	0	8
Orion	9	20	51	33	8	121
Orion Clothing	5	10	25	14	7	61
Osprey	7	14	19	17	8	65
Shoes	9	22	46	16	9	102
Shorts	0	2	10	2	0	14
Stockings & Socks	6	11	12	8	7	44
Street Wear	5	23	22	17	9	76
T-Shirts	3	9	18	13	5	48
Tracker Clothes	34	117	175	112	26	464
Tracker Shoes	15	32	66	44	13	170
Twain	1	3	5	2	0	11
Total	185	547	958	541	193	2424

7. Revise the macro definition text to run a new block of code if **DETAILS** is entered in the parenthesis when **RatingsReport** is called.

   a. Before the %ELSE/%DO block, add a %ELSE/%IF/%THEN-%DO statement to check whether **DETAILS** is added into the parenthesis when **RatingsReport** is called.

   b. Put a %UPCASE function around **&State** to ensure that casing will not be an issue.

   c. Copy and paste the code for report 2 between the %ELSE/%IF/%THEN-%DO and %END statements.

```
%end;


%else %if %upcase(&State)= DETAILS %then %do;

    /*------------------------------------------ Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

    title1 "Satisfaction Ratings by Product Group";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
         where &StarLow <= &RatingType <= &StarHigh;
    run;
%end;




%else %do;
```

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8. Under the %ELSE/ %IF/%THEN-%DO statement, add PROC SQL code to create macro variables to represent each state name.

```
%else %if %upcase(&State)= DETAILS %then %do;

    proc sql;
        select distinct State_Province
        into :StateName1-
        from productreview;
    quit;

    /*------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

    title1 "Satisfaction Ratings by Product Group";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
        where &StarLow <= &RatingType <= &StarHigh;
    run;
%end;
```

9. Create a %DO loop to loop through the report 2 code for as many states as there are in the data.
   a. After the PROC SQL step, add a %DO loop statement to go from 1 to **&sqlobs**.
   b. At the end of the report 2 code, add a %END statement

```
%else %if %upcase(&State)= DETAILS %then %do;

    proc sql;
        select distinct State_Province
        into :StateName1-
        from productreview;
    quit;

    %do i=1 %to &sqlobs;
        /*------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

        title1 "Satisfaction Ratings by Product Group";
        title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";

        proc freq data=productreviews;
            tables Product_Group * &RatingType /norow nocol nopercent ;
            where &StarLow <= &RatingType <= &StarHigh;
        run;
    %end;
%end;
```

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10. Use an indirect reference to insert the state name into the WHERE statement for the PROC FREQ step and the additional TITLE statement.
    a. Revise the WHERE statement in the PROC FREQ step to include the following: **where State_Province="&&StateName&I"**
    b. Add an additional TITLE statement to include the indirect reference.
    c. Revise first title to include **and State**.

```
%else %if %upcase(&State)= DETAILS %then %do;

    proc sql;
        select distinct State_Province
        into :StateName1-
        from productreviews;
    quit;

    %do i=1 %to &sqlobs;
        /*------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

        title1 "Satisfaction Ratings by Product Group and State";
        title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";
        title3 "&&StateName&i";

        proc freq data=productreviews;
            tables Product_Group * &RatingType /norow nocol nopercent ;
            where &StarLow <= &RatingType <= &StarHigh and State_Province="&&StateName&i" ;
        run;
    %end;
%end;
```

11. Run the program and confirm that it was successful. You should see a satisfaction report listed for each state in the table

```
%ratingsreport(Details)
```

12. Modify the code to have the reports sent to Excel when the macro definition is called.
    a. After the ODS NOPROCTITLE statement, add an ODS EXCEL statement to create an Excel file for the reports to be sent to. (Your path might differ.)

```
options mcompilenote=all;
ods noproctitle;

ods excel file="/home/student/SAS Explorer/ReviewReport.xlsx";

%macro RatingsReport(State, RatingType=Overall, StarLow=1, StarHigh=5);
```

    b. Add the ODS EXCEL CLOSE statement before the %MEND statement to close the Excel destination

```
%end;

ods excel close;

%mend ratingsreport;
```

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13. Add ODS EXCEL options to include embedded titles, footnotes, and names for the worksheets for each version of the report.

    a. In the %DO group for **&State=**, add ODS EXCEL OPTIONS statements about the TITLE statements for the PROC PRINT and PROC FREQ steps .

```
%if &State= %then %do;

    /*--------------------Report 1 - Average Satisfaction Rating  (Choose Rating Type)----------------------*/
    proc sql;
            create table Average&RatingType as
            Select Product_Group, avg( &RatingType) as Average "Average &Ratingtype Rating"
            from productreviews
            group by Product_Group;
    quit;

    proc format;
    value underperform 0 - < 3 = "salmon";
    run;

    ods excel options (embedded_titles="yes" embedded_footnotes="yes" Sheet_Name="&RatingType Satisfaction");

    title1 "Average &Ratingtype Satisfaction Rating By Product Group";
    footnote "Ratings below 3 stars are shaded red";
    proc print data=Average&Ratingtype noobs label;
        var Product_Group Average / style={background=underperform.};
    run;
    footnote;

    /*--------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/
    ods excel options (embedded_titles="yes" embedded_footnotes="yes" Sheet_Name="Star Distribution");

    title1 "Satisfaction Ratings by Product Group";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
        where &StarLow <= &RatingType <= &StarHigh;
    run;
%end;
```

    b. In the %DO group for **%upcase(&State)=DETAILS**, add an ODS EXCEL OPTIONS statement about the TITLE statements for the PROC FREQ step.

```
%else %if %upcase(&State)= DETAILS %then %do;

    proc sql;
        select distinct State_Province
        into :StateName1-
        from productreviews;
    quit;

    %do i=1 %to &sqlobs;
        /*--------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/
            ods excel options (embedded_titles="yes" embedded_footnotes="yes" Sheet_Name="Star Dist. &&StateName&i");


        title1 "Satisfaction Ratings by Product Group and State";
        title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";
        title3 "&&StateName&i";

        proc freq data=productreviews;
            tables Product_Group * &RatingType /norow nocol nopercent ;
            where &StarLow <= &RatingType <= &StarHigh and State_Province="&&StateName&i" ;
        run;
    %end;
%end;
```

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c. In the %ELSE/%DO group, add ODS EXCEL OPTIONS statements about the TITLE statements for the PROC PRINT and PROC FREQ steps.

```
%else %do;

    /*--------------------Report 1 - Average Satisfaction Rating  (Choose Rating Type)----------------------*/
    proc sql;
            create table Average&RatingType as
            Select Product_Group, avg( &RatingType) as Average "Average &Ratingtype Rating"
            from productreviews
            where State_Province = "&State"
            group by Product_Group;
    quit;

    proc format;
    value underperform 0 - < 3 = "salmon";
    run;

    ods excel options (embedded_titles="yes" embedded_footnotes="yes" Sheet_Name="&RatingType Satisfaction: &State");


    title1 "Average &Ratingtype Satisfaction Rating By Product Group and State";
    title2 "&State";
    footnote "Ratings below 3 stars are shaded red";
    proc print data=Average&Ratingtype noobs label;
        var Product_Group Average / style={background=underperform.};
    run;
    footnote;

    /*------------------------------------------- Report 2 -  Breakdown of Satisfaction Ratings ------------------*/

        ods excel options (embedded_titles="yes" embedded_footnotes="yes" Sheet_Name="Star Dist: &State");


    title1 "Satisfaction Ratings by Product Group and State";
    title2 "&RatingType Satisfaction - &StarLow to &StarHigh Stars Ratings";
    title3 "&State";

    proc freq data=productreviews;
        tables Product_Group * &RatingType /norow nocol nopercent ;
        where &StarLow <= &RatingType <= &StarHigh and State_Province="&State";
    run;
%end;
```

14. Run the program calling **RatingsReport** with no value, a single state name, and then **Details**.

```
%ratingsreport(Details)
```

Satisfaction Ratings by Product Group and State
Overall Satisfaction - 1 to 5 Stars Ratings
Alabama

Table of Product_Group by Overall

Product_Group(Product Group)	Overall					
Frequency	1	2	3	4	5	Total
Eclipse Clothing	18	42	67	41	8	176
Eclipse Shoes	10	27	54	22	12	125
Green Tomato	0	1	8	3	0	12
Knitwear	6	9	14	9	2	40
LSF	3	3	10	3	1	20
Leisure	3	7	5	6	0	21
Massif	0	0	0	2	0	2
Orion	4	4	18	6	6	38
Orion Clothing	4	6	5	4	0	19
Osprey	1	6	2	6	1	16
Shoes	2	10	10	7	3	32
Shorts	0	0	3	0	1	4
Stockings & Socks	0	2	5	3	0	10
Street Wear	0	4	6	3	1	14
T-Shirts	1	0	4	5	0	10
Tracker Clothes	10	29	38	27	12	116
Tracker Shoes	1	5	23	13	2	44
Twain	0	0	2	0	0	2
Total	63	155	274	160	49	701

Star Dist. Alabama | Star Dist. Alaska | Star Dist. Arizona | Star Dist. Arkansas | Star Dist. California

End of Demonstration

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