

# Things Dr. Johnson Never Told Me:

## An Introduction To SAS Dictionary Tables



**SHRUG Nov 25, 2010**

**Peter Eberhardt**

**Fernwood Consulting Group Inc.**

# Things Dr Johnson Never Told Me: An Introduction To SAS Dictionary Tables



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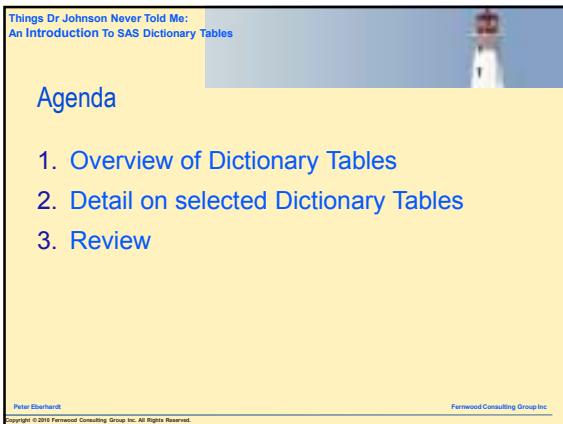
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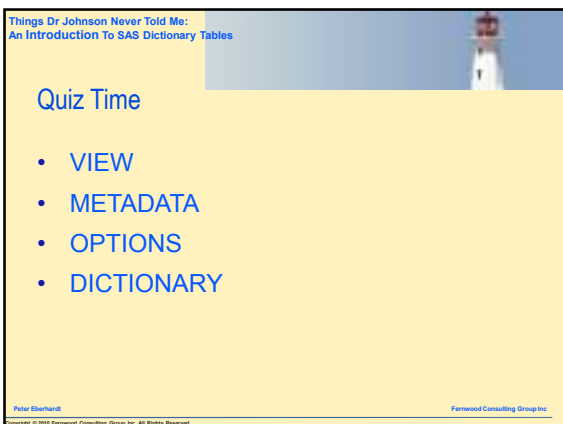
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# Things Dr Johnson Never Told Me: An Introduction To SAS Dictionary Tables

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## Dictionary

1. a reference book containing words usually alphabetically arranged along with information about their forms, pronunciations, functions, etymologies, meanings, and syntactical and idiomatic uses
2. a reference book listing alphabetically terms or names important to a particular subject or activity along with discussion of their meanings and applications
3. a reference book giving for words of one language equivalents in another
4. a list (as of items of data or words) stored in a computer for reference (as for information retrieval or word processing)

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## Dictionary Tables

- Always available
- Maintained by SAS
- Read Only
- Have information on virtually every aspect of your SAS session

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## Dictionary Tables

- Two ways to access them
  1. base table
  2. SASHELP views

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## What Tables are Available

- V9.13
  - 22 DICTIONARY tables
  - 30 SASHELP views
- V9.2
  - 29 DICTIONARY tables
  - 37 SASHELP views

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## Accessing Dictionary Tables

### PROC SQL

- Base Table

```
select *  
from dictionary.columns
```
- SAS View

```
select *  
from sashelp.vcolumn
```

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## Accessing Dictionary Tables

### DATA or PROC step

- SAS View

```
PROC print data = SASHELP.VCOLUMN;  
RUN;
```

```
DATA columns;  
  set SASHELP.VCOLUMN;  
RUN;
```

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## What Tables are Available in V8

Table	Description
CATALOGS	Information about SAS catalogs
COLUMNS	SAS dataset/table variable/column info
EXTFILES	Information about external files
INDEXES	Columns participating in indexes
MACROS	Information about macro variables
MEMBERS	Information common to all memtypes
OPTIONS	Session options
STYLES	ODS Styles
TABLES	Information about datasets/tables
TITLES	Information about titles, footnotes
VIEWS	Information about views

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## What Tables are Added in V9.13

Table	Description
CHECK_CONSTRAINTS	Check constraints
CONSTRAINT_COLUMN_USAGE	Constraint column usage
CONSTRAINT_TABLE_USAGE	Constraint table usage
DICTIONARIES	DICTIONARY tables and their columns
ENGINES	Available engines
FORMATS	Available formats
GOPTIONS	SAS/Graph options
LIBNAMES	LIBNAME information
REFERENTIAL_CONSTRAINTS	Referential constraints
REMEMBER	Text to be remembered
TABLE_CONSTRAINTS	Table constraints

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## What Tables are Added in V9.2

Table	Description
DATAITEMS	contains a row for each data item in all of the information maps that are available through the IM engine
DESTINATIONS	Contains information about known ODS destinations
FILTERS	contains a row for each filter in all of the information maps that are available through the IM engine
FUNCTIONS	Contains information about currently accessible functions.
INFOMAPS	contains a row for each information map that is available through the IM
PROMPTS	Contains information about known IM prompts.
PROMPTXML	Contains information about known IM XML prompts.

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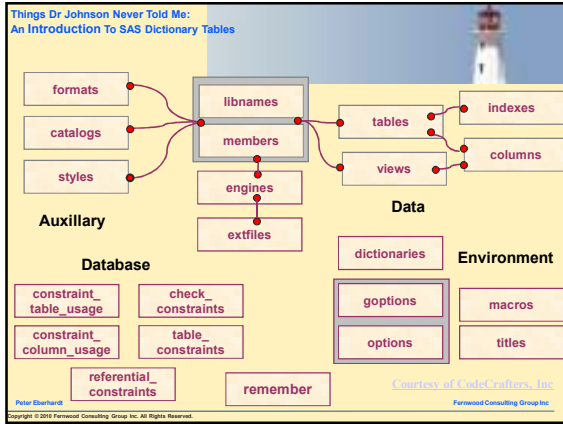
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What Tables are Available

```
proc sql;
create table dictionaries as
select distinct memname
from dictionary.dictionaries
order by memname
;
quit;
```

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What Views are Available

```
proc sql;
create table views as
select distinct memname
from sashelp.v$view
where libname='SASHELP'
and memname like 'V%';
quit;
```

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## What is the Table Structure

```
proc sql;  
describe table DICTIONARY.OPTIONS;  
quit;
```

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## What is the Table Structure

NOTE: SQL table DICTIONARY.OPTIONS was created like:

```
create table DICTIONARY.OPTIONS  
(  
  optname char(32) label='Option Name',  
  opttype char(8) label='Option type',  
  setting char(1024) label='Option Setting',  
  optdesc char(160) label='Option Description',  
  level char(8) label='Option Location',  
  group char(32) label='Option Group'  
);
```

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## How was the VIEW Created

```
proc sql;  
describe view SASHELP.VOPTION;  
quit;
```

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## How was the VIEW Created

NOTE: SQL view SASHELP.VOPTION is defined as:

```
select *  
  from DICTIONARY.OPTIONS;
```

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## How was the VIEW Created

NOTE: SQL view SASHELP.VSTABLE is defined as:

```
select libname, memname  
  from DICTIONARY.MEMBERS  
  where memtype='DATA'  
  order by libname asc, memname asc;
```

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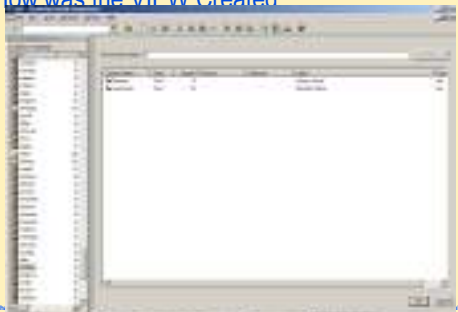
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## How was the VIEW Created



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## How Can I Use Dictionary Tables

- Change style of output
- Search for common columns in a library
- Search for common columns but different characteristic

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTES
- External Files
- Libraries and Tables
- Macro Variables
- Remembered Text

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## What is the Table Structure

```
proc sql;  
describe table DICTIONARY.STYLES;  
quit;
```

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## What is the Table Structure

```
proc sql;
describe table dictionary.styles;
NOTE: SQL table DICTIONARY.STYLES was created like:
create table DICTIONARY.STYLES (
  libname char(8) label='Library Name',
  memname char(32) label='Member Name',
  style char(32) label='Style Name',
  crdate num format=DATETIME informat=DATETIME
  label='Date Created'
); quit;
```

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## What STYLES are available?

```
PROC SQL;
SELECT *
FROM dictionary.styles;
QUIT;
```

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## What STYLES are available?

Library Name	Member Name	Style Name
SASHELP	TMPLMST	Base Template Style
SASHELP	TMPLMST	Styles Analysis
SASHELP	TMPLMST	Styles Astronomy
SASHELP	TMPLMST	Styles Bankier
SASHELP	TMPLMST	Styles BarrettsBlue
SASHELP	TMPLMST	Styles Beige
SASHELP	TMPLMST	Styles Brick
SASHELP	TMPLMST	Styles Brown
SASHELP	TMPLMST	Styles Curve
SASHELP	TMPLMST	Styles D3d
SASHELP	TMPLMST	Styles Default

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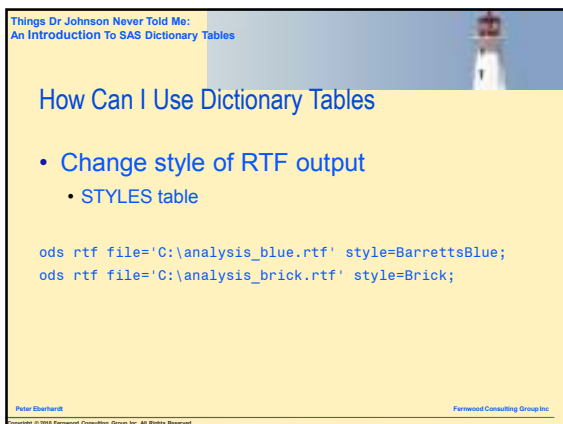
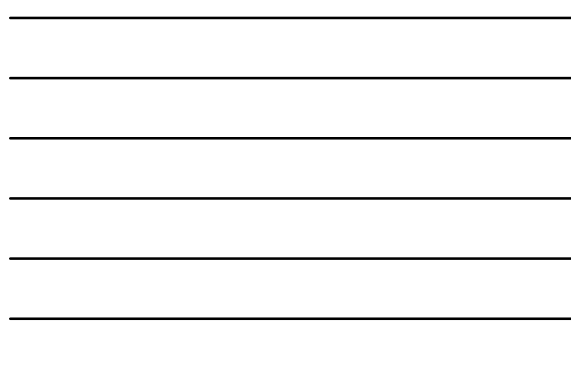
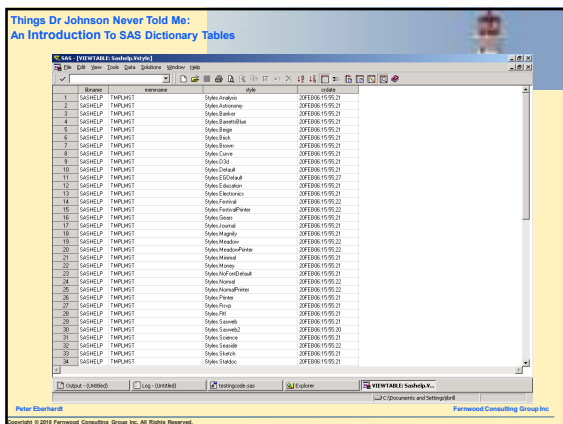
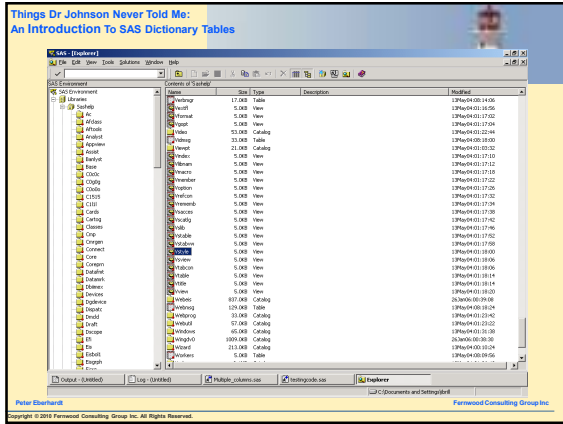
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## How Can I Use Dictionary Tables

```
%macro  
setStyle(style=Default,type=html,body=c:\temp\Peter.html);  
%let style=%upcase(&style);  
%let checkStyle = STYLES.&style ;  
proc sql noprint;  
SELECT style  
FROM dictionary.styles  
WHERE upcase(style)="&checkStyle";  
%let found=&sqlOBS;  
QUIT;
```

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## How Can I Use Dictionary Tables

```
%if &found=0  
%then %let style=Default;  
ods &type style=&style body="&body";  
  
%mend;  
%setstyle(style=BarretsBlue);  
...  
ods html close;
```

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## How Can I Use Dictionary Tables

- Search for common columns in a library
  - **COLUMNS** table

```
PROC SQL;  
Create table multiColCnt as  
select name, count(*) as occurrences  
from dictionary.columns  
where libname = 'IN'  
group by name  
having count(*) > 1  
order by name;
```

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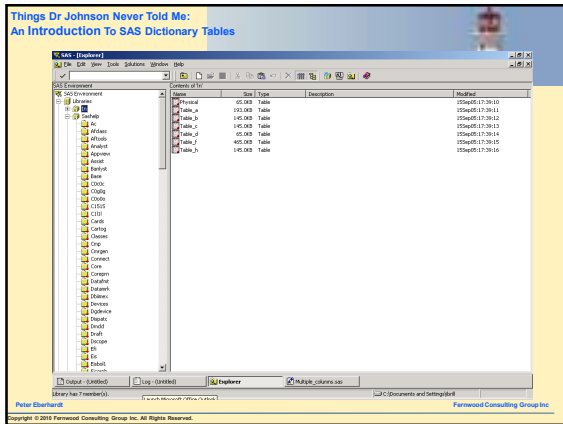
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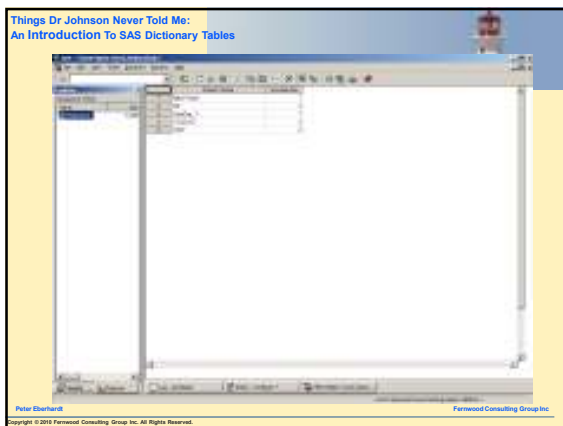
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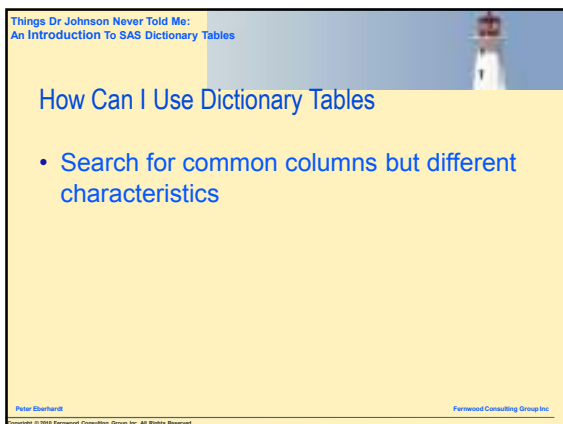
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## How Can I Use Dictionary Tables

- Search for common columns in a library

```
PROC SQL;  
create table MultiColCnt as  
select name, count(*) as occurrences  
from dictionary.columns  
where libname in ('IN')  
group by name  
having count(*) > 1  
order by name;
```

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## How Can I Use Dictionary Tables

- Get the characteristics

```
PROC SQL;  
create table MultiColTables as  
select c.name, c.libname, c.memname, c.type,  
       c.length, c.label, c.format  
from dictionary.columns as c, MultiColCnt as m  
where m.name = c.name  
and c.libname in ('IN')  
order by upcase(c.name), c.libname, c.memname;  
quit;
```

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## How Can I Use Dictionary Tables

- Get the characteristics

```
PROC SQL;  
create table MultiColTables as  
select c.name, c.libname, c.memname, c.type,  
       c.length, c.label, c.format  
from dictionary.columns as c, MultiColCnt as m  
where m.name = c.name  
and c.libname in ('IN')  
order by upcase(c.name), c.libname, c.memname;  
quit;
```

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## Check For Differences

Column Name	Library Name	Member Name	Column Type	Column Length	Column Label	Column Format
BatchTrack	IN	PHYSICAL	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_A	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_B	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_C	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_D	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_F	char	30	BatchTrack	\$30
BatchTrack	IN	TABLE_H	char	30	BatchTrack	\$30
DataGrp_1	IN	PHYSICAL	char	14	DataGrp_1	\$14
DataGrp_1	IN	TABLE_A	char	18	DataGrp_1	\$18
DataGrp_1	IN	TABLE_B	char	18	DataGrp_1	\$18

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## Automate the process

```
%macro checkLengths;
* get a list of column names and length;
proc sql;
create table lengthList as
select distinct name, length
from MultiColTables
order by name, length
;
```

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## Automate the process

```
* now see if any column has more than one entry;
create table LengthDiffs as
select name, count(*) as recs
from lengthList
group by name
having recs > 1
;
* capture the number of rows returned;
%let diffs = &sql0bs;
```

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## Automate the process

```
* now see if any column has more than one entry;  
create table LengthDiffs as  
select name, count(*) as recs  
from lengthList  
group by name  
having recs > 1  
;  
* capture the number of rows returned;  
%let diffs = &sqlObs;
```

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## Automate the process

```
* Check any multiple lengths, retrieve the attributes;  
%if &diffs > 0 %then %do;  
create table LengthCheck as  
select c.name, c.libname, c.memname, c.type,  
c.length, c.label, c.format  
from dictionary.columns as c, LengthDiffs as m  
where m.name = c.name  
and c.libname = 'IN'  
order by upcase(c.name), c.libname, c.memname;  
quit;  
%end;
```

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## Automate the process

```
* Check any multiple lengths, retrieve the attributes;  
%if &diffs > 0 %then %do;  
create table LengthCheck as  
select c.name, c.libname, c.memname, c.type,  
c.length, c.label, c.format  
from dictionary.columns as c, LengthDiffs as m  
where m.name = c.name  
and c.libname = 'IN'  
order by upcase(c.name), c.libname, c.memname;  
quit;  
%end;
```

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## Automate the process

```
%else  
%do;  
* probably want to store this in a dataset;  
%put -----;  
%put All columns have the same length;  
%put -----;  
%end;  
%mend;
```

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTES
  - TITLES table

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTES
  - Save the current set to titles and footnotes

```
DATA __oldtitles;  
  set sashelp.vtitle;  
RUN;
```

- Set your own titles and footnotes

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTES ...cont
  - Restore the previous titles and footnotes

```
DATA __null__;  
  SET __oldtitles END=done;  
  length title $12.;  
  length newtext $258.;  
  anum = compress(put(number, 2.));  
  newtext = '' || text;  
  l = length(newtext);  
  substr(newtext, l+1,1) = '';
```

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## How Can I Use Dictionary Tables

- Resetting **TITLES** or FOOTNOTES ...cont
  - Restore the previous titles and footnotes

```
DATA __null__;  
  SET __oldtitles END=done;  
  length title $12.;  
  length newtext $258.;  
  anum = compress(put(number, 2.));  
  newtext = '' || text;  
  l = length(newtext);  
  substr(newtext, l+1,1) = '';
```

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# Things Dr Johnson Never Told Me: An Introduction To SAS Dictionary Tables

Things Dr Johnson Never Told Me:  
An Introduction To SAS Dictionary Tables



## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTEs ...cont

```
if type = "T"  
  then  
    do;  
      title = "TITLE" || anum;  
      titletext = title || newtext;  
/* TITLE: "This is the original Title"; */  
      call symput(title, titletext);  
    end;
```

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTEs ...cont

```
else if type = "F"  
  then do;  
    title = "FOOTNOTE" || anum;  
    titletext = title || newtext;  
    call symput(title, text);  
  end;
```

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTEs ...cont

```
if done  
  then  
    do;  
      call symput("titlevars", put(_n_, 2.));  
    end;  
run;
```

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTEs ...cont

```
%do i = 1 %to &titlevars;  
  &&title&i;  
  %symdel title&i;  
%end;  
  
%symdel titlevars;
```

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## How Can I Use Dictionary Tables

- Resetting TITLES or FOOTNOTEs ...cont

```
%do i = 1 %to &titlevars;  
  &&title&i;  
  %symdel title&i;  
%end;  
  
%symdel titlevars;
```

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## How Can I Use Dictionary Tables

- Documentation ([External Files](#))
  - Get the path of an external file for a FOOTNOTE

```
PROC SQL;  
SELECT xpath into :path  
FROM DICTIONARY.EXTFILES  
WHERE fileref = "MYFILEREFF";  
quit;  
%let path = %trim(&path);  
FOOTNOTE "Data were read from &path";
```

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## How Can I Use Dictionary Tables

- Documentation ([External Files](#))
  1. Get the path of an external file for a FOOTNOTE

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WHERE fileref = "MYFILEREFF";  
quit;  
%let path = %trim(&path);  
FOOTNOTE "Data were read from &path";
```

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## How Can I Use Dictionary Tables

- Documentation ([libraries](#) and [tables](#))
  1. Get the path and creation date for a dataset

```
PROC SQL;  
SELECT l.path, t.crdate, t.moddate  
into :path, :crdate, :moddate  
FROM DICTIONARY.libnames as l inner join  
DICTIONARY.tables as t  
ON l.libname = t.libname  
AND l.libname = "WORK"  
AND t.memname = "TEST";
```

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## How Can I Use Dictionary Tables

- Documentation ([libraries](#) and [tables](#))
  1. Get the path and creation date for a dataset

```
PROC SQL;  
SELECT l.path, t.crdate, t.moddate  
into :path, :crdate, :moddate  
FROM DICTIONARY.libnames as l inner join  
DICTIONARY.tables as t  
ON l.libname = t.libname  
AND l.libname = "WORK"  
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```

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## How Can I Use Dictionary Tables

- Clearing GLOBAL `macro` variables

```
proc sql noprint;
select name into :globals separated by ' '
from dictionary.macros
where offset = 0
and scope = "GLOBAL"
;
quit;
%syndel &globals;
```

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## How Can I Use Dictionary Tables

- Remembering Things

```
PROC SQL;
CREATE VIEW REMEMBER AS
SELECT *
FROM SASHELP.CLASS
remembering ('some text')
;
```

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## REVIEW

- Dictionary Tables
  - Always available
  - Read only
  - Cover virtually every aspect of your SAS session
  - Accessible though SQL or data step

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## REVIEW

Feature	Dictionary Tables	Xbox
Remembers what you tell it	YES	NO
Easy to query	YES	NO
Fun to use	YES	YES
Makes programming easier	YES	NO
Lets you play DOOM	YES *	YES

\* actually NO, but it does free up your time so you can play

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## TIME'S UP ??Questions??

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## PROC SQL

```
PROC SQL;  
<CREATE TABLE library.newmember AS>  
SELECT <list of fields>  
FROM library.member  
WHERE <condition is true>  
ORDER BY <list of fields>  
;  
quit
```

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## COLUMNS Table

- Information about the columns/variables in a table/dataset/view
  - libname
  - memname
  - name (in V9, name is now mixed case)
  - type ('char' or 'num')
  - label
  - format
  - length

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## TITLES Table

- Information about the TITLES and FOOTNOTEs currently set

```
create table DICTIONARY:TITLES  
(  
  type char(1) label='Title Location',  
  number num label='Title Number',  
  text char(256) label='Title Text'  
);
```

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## EXTFILES Table

- Information about the External Files (filerefs) currently set

```
create table DICTIONARY.EXTFILES
(
  fileref   char(8)   label='Fileref',
  xpath    char(1024) label='Path Name',
  engine    char(8)   label='Engine Name'
);
```

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## LIBNAMES Table

- Information about the librefs currently set

```
create table DICTIONARY.LIBNAMES
(
  libname   char(8)   label='Library Name',
  engine    char(8)   label='Engine Name',
  path      char(1024) label='Path Name',
  level     num       label='Library Concatenation Level',
  fileformat char(8)   label='Default File Format',
  readonly  char(3)   label='Read-only?',
  sequential char(3)   label='Sequential?',
  sysdesc   char(1024) label='System Information Description',
  sysname   char(1024) label='System Information Name',
  sysvalue  char(1024) label='System Information Value' );
```

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## TABLES Table

- Information about the tables/datasets

```
create table DICTIONARY.TABLES
(libname   char(8)   label='Library Name',
 memname   char(32)  label='Member Name',
 memtype   char(8)   label='Member Type',
 dbms_memtype char(32) label='DBMS Member Type',
 memlabel  char(256) label='Dataset Label',
 typemem   char(8)   label='Dataset Type',
 crdate    num       format=DATETIME informat=DATETIME
           label='Date Created',
 modate    num       format=DATETIME informat=DATETIME
           label='Date Modified',
 nobs      num       label='Number of Physical Observations');
```

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## TABLES Table

```
obslen num label='Observation Length',
nvar num label='Number of Variables',
protect char(3) label='Type of Password Protection',
compress char(8) label='Compression Routine',
encrypt char(8) label='Encryption',
npage num label='Number of Pages',
filesize num label='Size of File',
pcompress num label='Percent Compression',
reuse char(3) label='Reuse Space',
bufsize num label='Bufsize',
delobs num label='Number of Deleted Observations',
nlobs num label='Number of Logical Observations',
maxvar num label='Longest variable name',
maxlabel num label='Longest label',
```

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## TABLES Table

```
Maxgen num label='Maximum number of generations',
gen num label='Generation number',
attr char(3) label='Dataset Attributes',
indxtype char(9) label='Type of Indexes',
datarep char(32) label='Data Representation',
Sortname char(8) label='Name of Collating Sequence',
Sorttype char(4) label='Sorting Type',
sortchar char(8) label='Charset Sorted By',
reqvector char(24) format=$HEX48 informat=$HEX48 label='Requirements Vector',
datarepname char(170) label='Data Representation Name',
encoding char(256) label='Data Encoding',
```

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## TABLES Table

```
audit char(3) label='Audit Trail Active?',
audit_before char(3) label='Audit Before Image?',
audit_admin char(3) label='Audit Admin Image?',
audit_error char(3) label='Audit Error Image?',
audit_data char(3) label='Audit Data Image?'
);
```

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## MACROS Table

- Information about the macro variables currently defined

```
create table DICTIONARY.MACROS
(
  scope   char(32)  label='Macro Scope',
  name    char(32)  label='Macro Variable Name',
  offset  num       label='Offset into Macro Variable',
  value   char(200) label='Macro Variable Value'
);
```

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## REMEMBER TABLE

- Information about remembered text

```
create table DICTIONARY.REMEMBER
(
  libname char(8)  label='Library Name',
  memname char(32) label='Member Name',
  offset  num       label='Offset into Text Remembered',
  rtext   char(200) label='Text Remembered',
  pw      char(8)   label='Password'
);
```

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