



User's Guide for Windows with Stata, SAS, and R

Table of Contents

1.0	Introduction	3
2.0	Setup	4
3.0	Basics of StatTag	5
3.1	Manage	6
3.2	Support.....	18
4.0	Tag Structure and Syntax	20
4.1	Values.....	20
4.2	Tables	20
4.3	Figures.....	21
4.4	Verbatim	21
4.5	Syntax.....	22
5.0	Formatting tags.....	22
5.1	Values.....	23
5.2	Tables	23
5.3	Formatting after insertion	23
6.0	Troubleshooting.....	24
7.0	Acknowledgements.....	26
	Appendix A. Licenses.....	27




1.0 Introduction

StatTag is user-friendly software that integrates statistical code with document preparation in Microsoft Word. StatTag facilitates reproducible research by connecting Word documents, such as a manuscript, to associated statistical code. Word documents prepared with StatTag are reproducible dynamic documents: statistical results in the document can be automatically updated if either statistical code or data change. In addition, StatTag allows statistical code to be edited directly from Microsoft Word.

StatTag is provided as a free Word plug-in written in C#. Once installed, StatTag is accessible from the Word toolbar. This user's guide covers use of StatTag within a Windows environment for Microsoft Word partnered with Stata (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP), SAS (SAS. 2002-2012. SAS Institute Inc: Release 9.4. Cary, NC), and R (R Foundation for Statistical Computing. 2015. R version 3.5.1. Vienna, Austria) statistical software.

2.0 Setup

For use with all statistical software, the StatTag plug-in must be installed. Additional steps are required for Stata ONLY.

Setup Instruction			
Install the StatTag Plugin	Steps 1-3	Steps 1-3	Steps 1-3
Enable the Stata Automation API ¹	Steps 4-8		


Install the StatTag Plug-In:

1. Download the StatTag setup.exe file at <http://www.stattag.org>
2. When prompted, click “Run” and follow the InstallShield Wizard.
3. Open Microsoft Word. If StatTag has installed successfully, your Word toolbar will include a “StatTag” tab that will look like this:

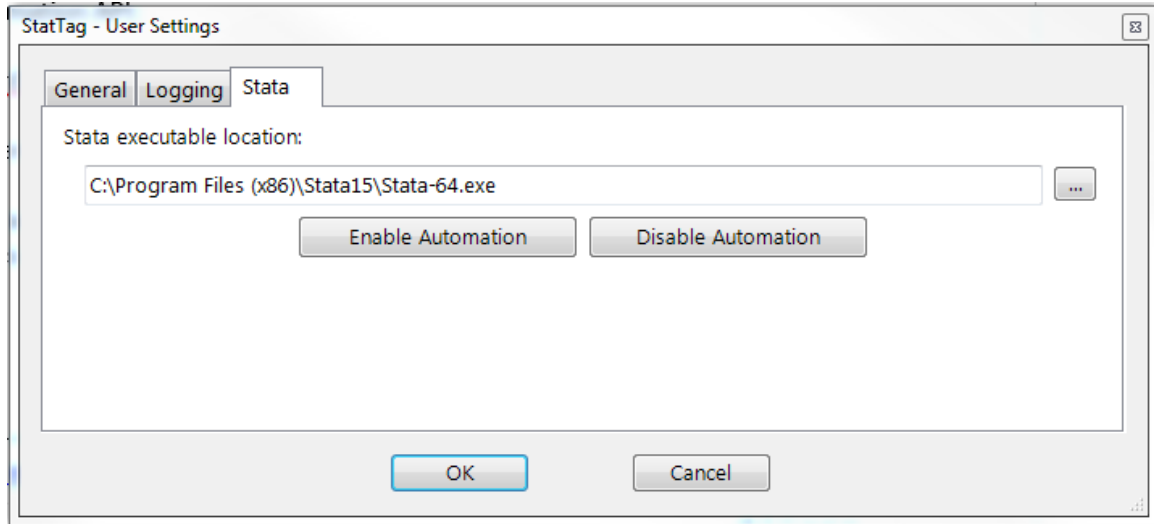


Steps 4-8 are for Stata users ONLY

Enable the Stata Automation API:

4. Select the “StatTag” tab on the top tool bar.
5. Select the “User Settings” icon 
6. Under the Stata tab, “Stata executable location,” enter the file path for Stata on your computer. This may be something like C:\Program Files (x86)\Stata15\StataSE-64.exe.

¹ <http://www.stata.com/automation/>



Tip: To locate the file path of your Stata program, open Stata, and type 'sysdir' in the command line. This returns the installation pathway. Open the folder in Windows Explorer to verify the pathway and identify the name of your Stata executable (.exe) file.

7. After the file path has been set, click 'Enable Automation' to allow StatTag and Stata to communicate via the Stata Automation API. **You must click 'Enable Automation' in order for StatTag to work.**
8. Click 'OK' to return to the main screen.



Note: You must install the StatTag plug-in first, before enabling the Stata Automation API. Both installation of the StatTag plug-in and enabling the Stata Automation API require administrator access on your computer. The Stata Automation Application Program Interface (API) allows StatTag and Stata to exchange information. StatTag sends 'calls' to Stata to execute statistical code, and Stata in turn sends back the results of the code to be inserted in the Word document. You only have to do this step on initial installation of StatTag. Updates to StatTag will not require re-enabling Stata Automation.

3.0 Basics of StatTag

The StatTag program will link any code file written for Stata (.do), SAS (.sas), or R (.R) with your Word document, will run the code file from Word, and will insert any tagged results. We recommend that you begin with a code file that already contains your working statistical code and generates the results of interest. With StatTag, it is possible to write your statistical code directly from Word, but not as convenient as writing your code files in the statistical program's editor.

There are three main steps to using StatTag:

1. Connect a Word document to files containing statistical code (i.e. .do, .sas, or .R file).
2. Annotate the code files to tag results, tables, or figures that are of interest.
3. Instruct StatTag where to insert those results within the Word document itself.



Note: This guide uses example code files to explain the use of StatTag. The example code files are available from <https://github.com/StatTag/Simple-Code-Examples>, along with raw data and a Word document ready for tags to be embedded. To follow along with the User Guide, open the Word document.

3.1 Manage

Connecting and annotating code files, and inserting results are accomplished using the first two functions on the StatTag toolbar: *Code Files* and *Tags*. Through *Code Files*, the user is able to link statistical code to the Word document. Through *Tags*, the user is able to tag results, tables, and figures within the statistical code, and manage insertion and update of those tagged results in the Word document.

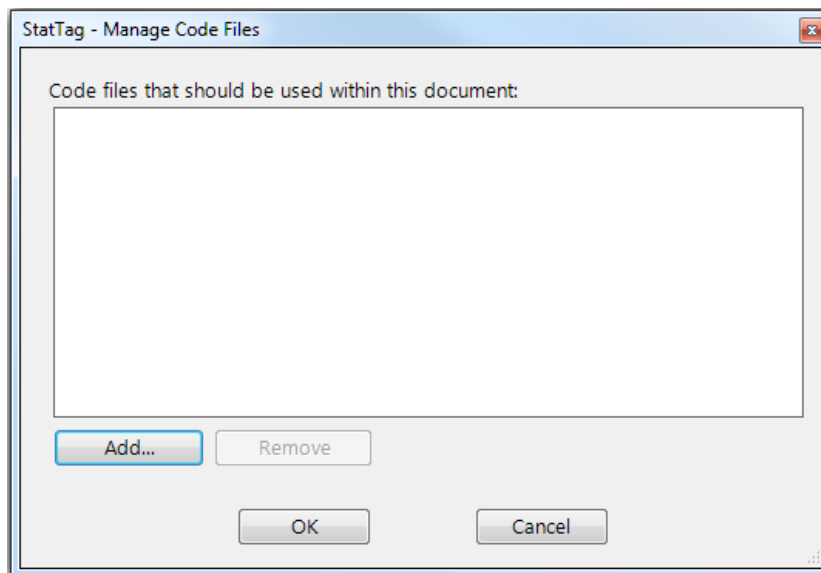
Code Files

The *Code Files* function enables linking one or more code files with your Word document. The first step to using StatTag is to connect your Word document with your statistical code. Note that it is possible to connect multiple code files to one Word document, and you may use code files from Stata, SAS and/or R in a single document. To link a code file:

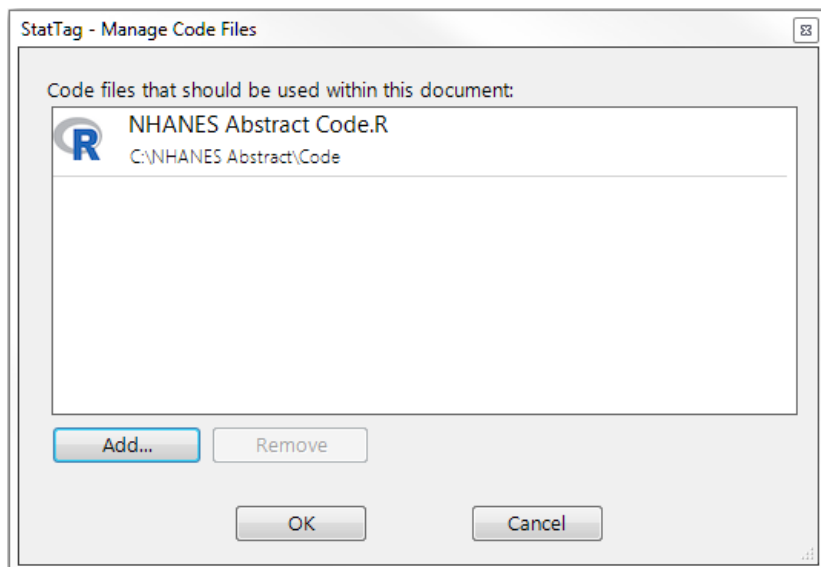
1. Click on “*Code Files*”



2. A new dialog box will open. Select “Add...”.



3. A Windows Explorer box will open, allowing you to navigate to the appropriate code file. This should be a .do, .sas, or .R file.
4. Locate the statistical code file on your computer or system and click "Open".
5. After clicking "Open", the file will appear in the selection window, and the default program will be chosen to run the code in. For example, if a .R file is selected, R will be chosen by default.



6. Click "OK".



Note: You can connect multiple code files to a single Word document.

Tags


After a code file has been connected, the *Tags* function becomes available. Once you have connected your statistical code file to your Word document, you are ready to create tags.

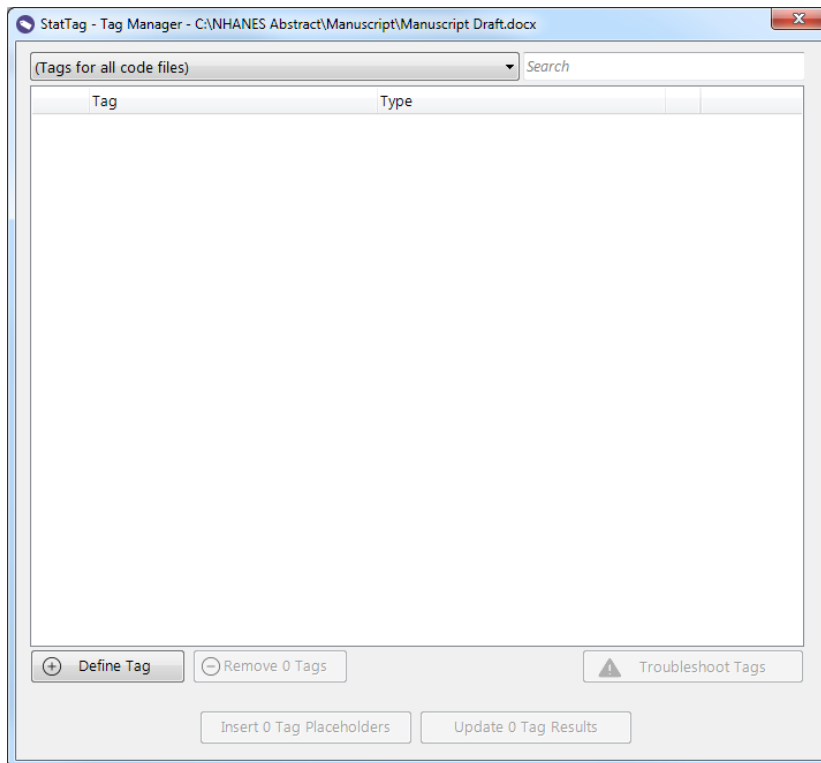
Tags in your code file(s) identify numbers, tables, figures, or verbatim output (i.e. raw output from the statistical program console) that you would like to embed in your Word document. Tags can be inserted through StatTag, using the following instructions, or for the more advanced user, can be directly written into your code files using a text editor of the user's choice. Tags are specifically formatted text that Stata, SAS, or R interpret as comments, but that allows StatTag to pull results into Word.

Define Tags

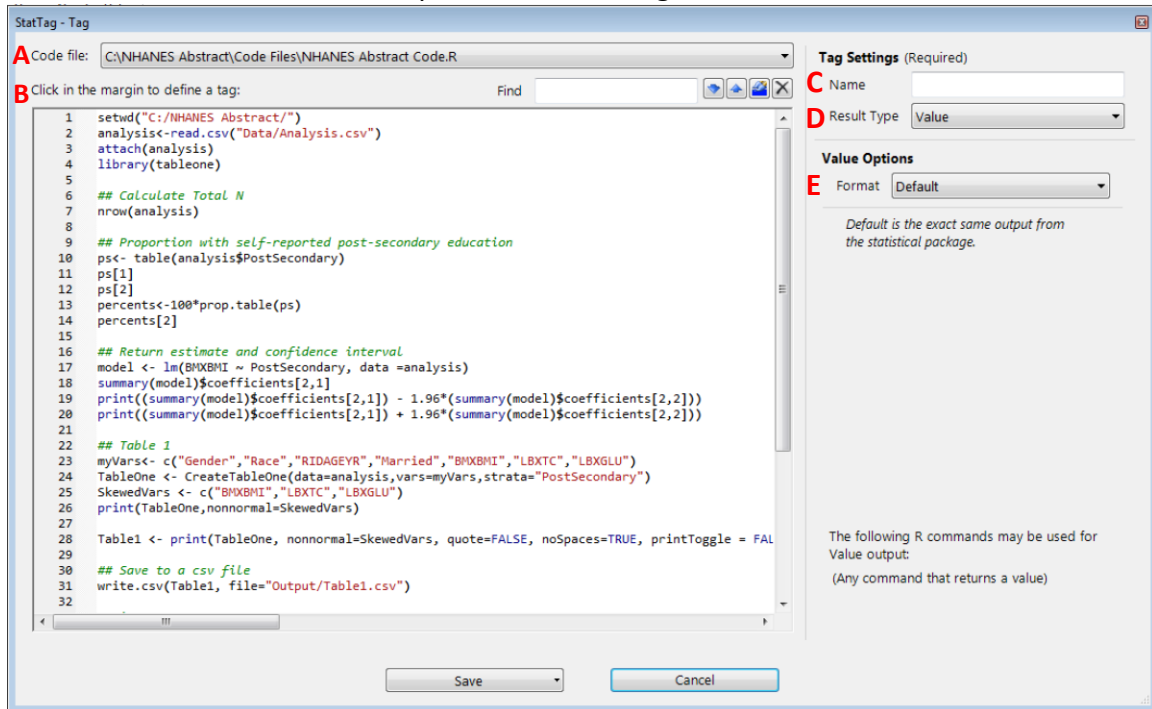
In the following example, we create a tag for a single value. [Section 4](#) covers additional information on creating tags for tables, figures, and verbatim output and the corresponding commands that must be present in your statistical code.

To create a tag through StatTag:

1. Click “Tags” 
2. The Tag Manager window will appear. The Tag Manager is the primary StatTag interface from which tags are defined and managed.



3. Select “Define Tag” on the bottom left of the Tag Manager.
4. The linked statistical code will open in a new dialog box.



5. The dialog box has the following components:

A. Code File

- i. If you have only 1 code file linked to your Word document, this will be automatically selected in the drop down menu
- ii. If you have 2 or more code files linked to your document, use the drop down menu to select the code file you are using to make the new tags.

B. Text editor showing the statistical code

- i. The statistical code may be edited directly through StatTag. Any changes you make are made to the file itself and are saved once you press the “Save” button.

C. Name

- i. The tag name is the unique name of the result of interest, and should only be used once within each code file to identify a result. StatTag will warn you if you try to use a tag name more than once.
- ii. The tag name can contain any string of characters including special characters (with the exception of the pipe, |) and spaces.

D. Result Type

- i. This section informs StatTag if the tag will be a value, figure, table, or verbatim output.
- ii. More information on tags for tables, figures and verbatim output is provided in [Section 4](#).




E. Format

StatTag Windows Version 4.0 User's Guide

- i. Formatting options are specific to the type of result inserted.
 - ii. More information on formatting is provided in [Section 5](#).
6. Enter a tag name for your new tag. For this example, we will create a new tag called "Total N", which will insert the total number of participants in the example study.
7. Use the text editor window to locate the statistical result of interest.



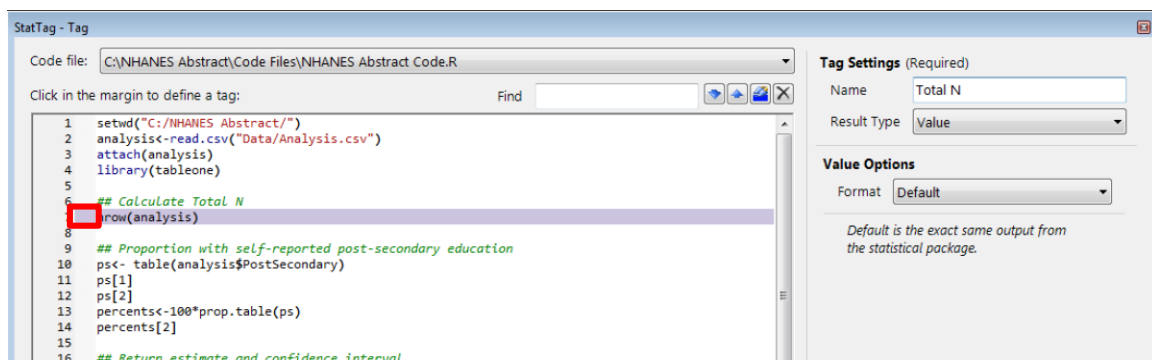
Note: StatTag recognizes different keywords in Stata, SAS, and R. Use of these commands is discussed in detail in [Section 4](#).

Type			
Numeric Values	<code>display</code>	<code>%put</code>	Any command that returns a value
Tables	<code>matrix list</code> , any command that returns a .xls or .csv file	ODS CSV	Any command that returns a data frame, matrix, vector or list, any command that returns a .xls or .csv file
Figures	<code>graph export</code>	ODS PDF	pdf, win.metafile, png, jpeg, bmp, postscript
Verbatim	Any Code	Any Code	Any Code

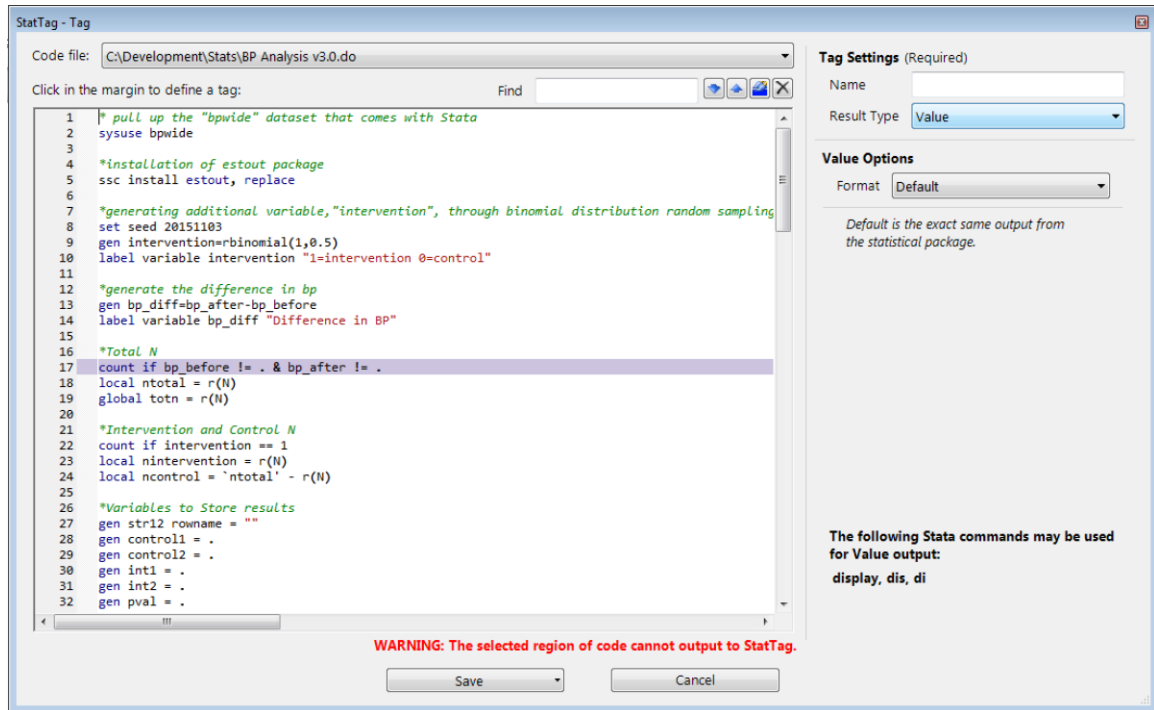
8. Highlight the line of code containing the `display`, `%put` or R command. ***To highlight, click between the line number and the start of the line of code. Clicking in this margin will highlight the line of code in purple.*** In the R example below, this location is outlined in red.



Tip: You can sometimes select multiple lines, but as best practice, select only the line(s) containing the result of interest.



9. If your selection of code does not include a recognized keyword, StatTag will print an error in the bottom right of the text editor. This applies only to SAS and Stata code files.



Tip: If you get a warning that the section of code you have highlighted cannot output to StatTag, double check the instructions in the selection pane. These will tell you what commands you should highlight.

10. Use the formatting window to make any changes to the way in which the result is displayed. By default, the result will be displayed as it is in the statistical program. For example, our selections to `display `ntotal'`, `%put &num` and `print(nrow(esoph))` will insert these numbers to the Word document using the default formatting from Stata, SAS and R respectively.
11. Click either "Save" or "Save and Define Another". If "Save" is chosen, the tag will be saved, as will any edits to the statistical code. The Tag editor window will close, and return to the Tag Manager. If "Save and Define Another" is selected, the tag will be saved, as will any edits to the statistical code. The Tag editor window will remain open and all selections will be reset for you to define your next tag.

12. Use the “*Define Tag*” icon as often as needed to create tags for all of your statistical results. (In the next section, we have also defined several additional tags following the steps above).

Insert Tag Output

Tags can be inserted from the Tag Manager. Tags can be inserted more than one time within a document. Tags are always inserted at the location of the cursor, although they can be copied and pasted elsewhere once inserted.

To insert a saved tag:

1. Within the Tag Manager, select the tag of interest by clicking once on it. Clicking twice will open the tag in the Tag Editor window.
2. With the cursor in the Word file where you want the tag inserted, click ‘*Insert 1 Selected Tag*’. This action inserts a placeholder for the tag, which consists of the tag name in brackets (e.g. “[my tag name]”) in your Word document. This allows you to insert many tags without ever running the statistical code file.

Clinical Trial Enrollment Report

To date, [Total N] participants have been identified for screening. Of [#2] screened participants, [#4] participants have been randomized.

3. Insert as many tags as you wish repeating the steps above.

Clinical Trial Enrollment Report

To date, [Total N] participants have been identified for screening. Of [N Screened] screened participants, [N Randomized] participants have been randomized.



Tip: Multiple tags can be selected at one time.

4. To fill in the values for the tags, within the Tag Manager, select all the tags you wish to fill in. Click “*Update X Selected Tags*”. This action executes the code file silently and returns the results within the placeholders in Word.

Clinical Trial Enrollment Report

To date, 10 participants have been identified for screening. Of 9 screened participants, 7 participants have been randomized.




Tip: Once a tag is inserted into a Word document, double clicking on the tag will open the tag window, from which you can modify the characteristics of the tag (name, when to run) or the associated statistical code.

Update Tag Output


Tags can be updated at any time from the Tag Manager by selecting them and clicking “*Update X Selected Tags*”.

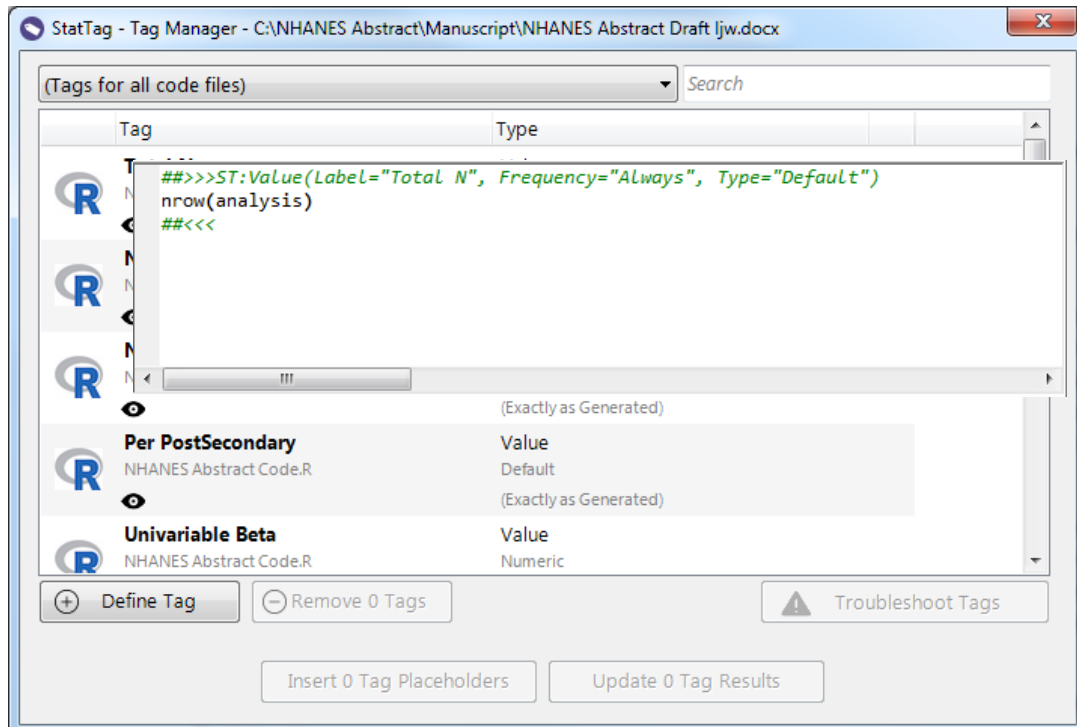
Manage Tags

Once saved, all tags will be listed in the Tag Manager. From this dialog box, the user can change how tags are formatted and updated, or can remove them entirely. To manage tags:

1. Click “Tags” 
2. All saved tags are depicted in the Tag Manager box by their tag name with information about how they have been defined. From this dialog box, new tags can be defined, and existing tags can be edited or removed.



Tip: From the Tag Manager, select the peek () to quickly view the code associated with a tag without opening the Tag Editor.



- To edit a tag, double click on the tag. This opens the statistical code window, showing the highlighted tag. The options for this tag can be edited through the dialog box.



Note: Tag properties can be edited either through the dialog box using the clickable and selectable tag properties options or by editing the tag itself through either the statistical program or a text editor.

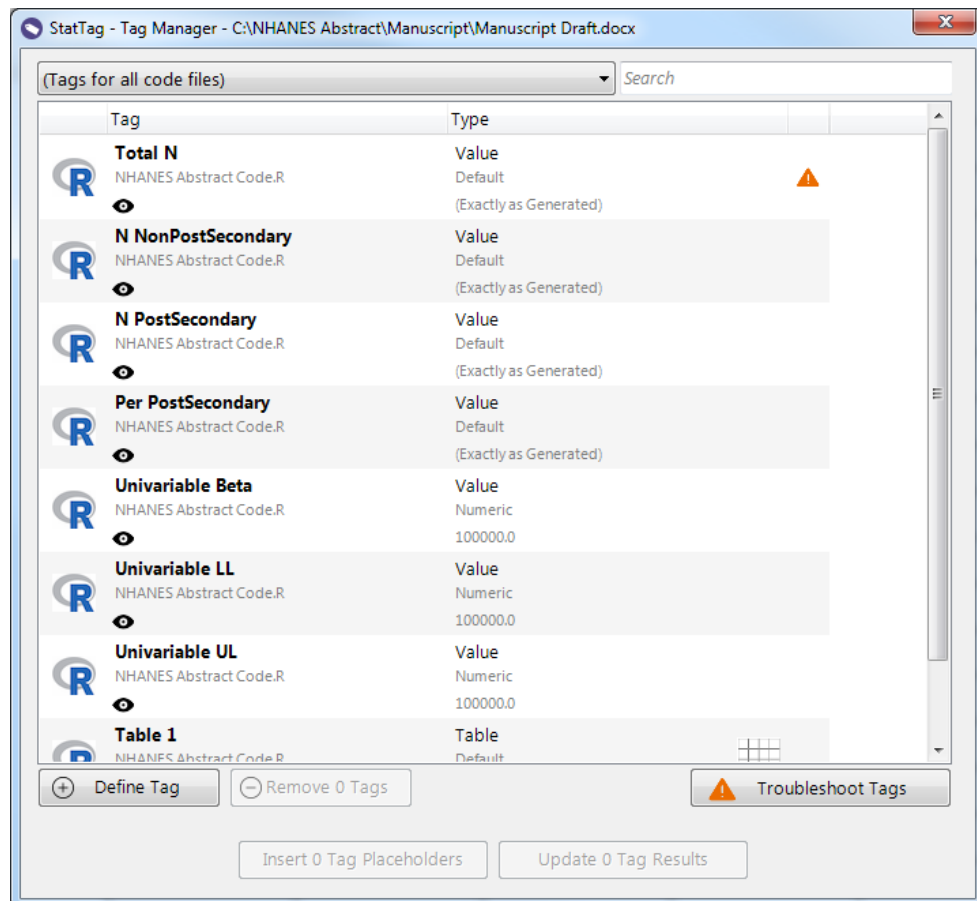
- To remove a tag, select the tag you wish to remove. Then click “*Remove 1 Tag*”.



Note: Removing tags will delete the tag notation in your statistical code. Removing tags will not delete inserted text, tables or figures from your Word document. However, those results will no longer be tagged. They will not be updated when code is rerun or the document is open.

Troubleshoot Tags

If there are any issues with your code or tags, the “*Troubleshoot Tag*” button will be enabled. The tag manager will alert you with the caution icon.



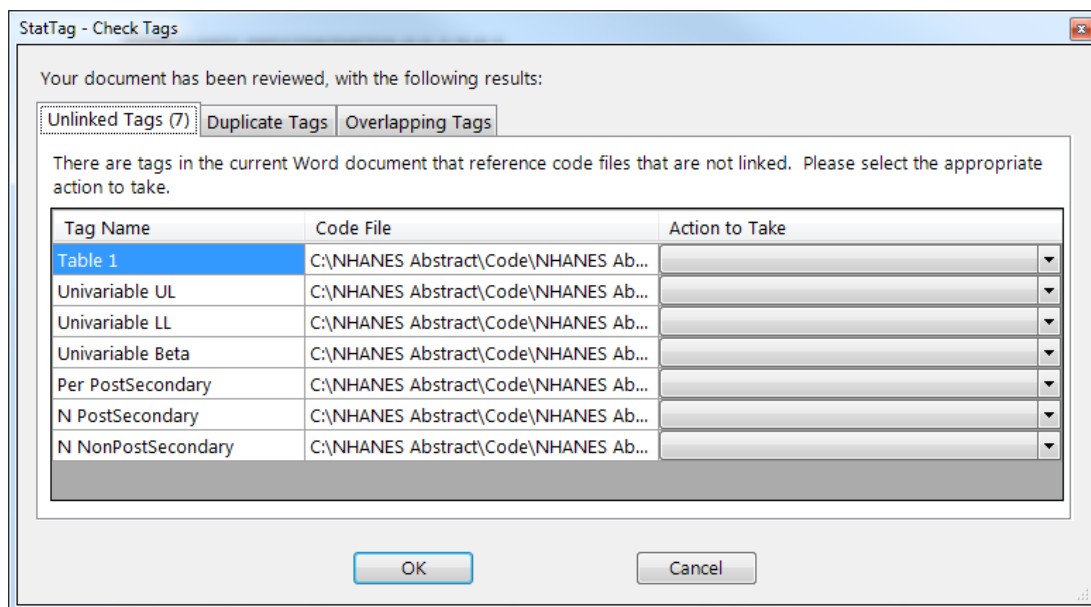
There are three troubleshoot options provided: (1) linking unlinked tags, and (2) removing duplicate tags, and (3) removing overlapping tags.

1. Tags can become unlinked if the statistical code is unlinked from the Word document, or if the statistical code is edited outside of StatTag and the notations are modified. For example, code could become unlinked if the code file (.do, .sas or .R) is moved to new location without changing the code file path in StatTag.
2. Tag names can be duplicated within statistical code if the code is edited outside of StatTag and a tag name is inadvertently duplicated.
3. Tags can overlap if the code is edited outside of StatTag and a tag becomes embedded within another tag.

To troubleshoot any issue, click “*Troubleshoot Tags*”

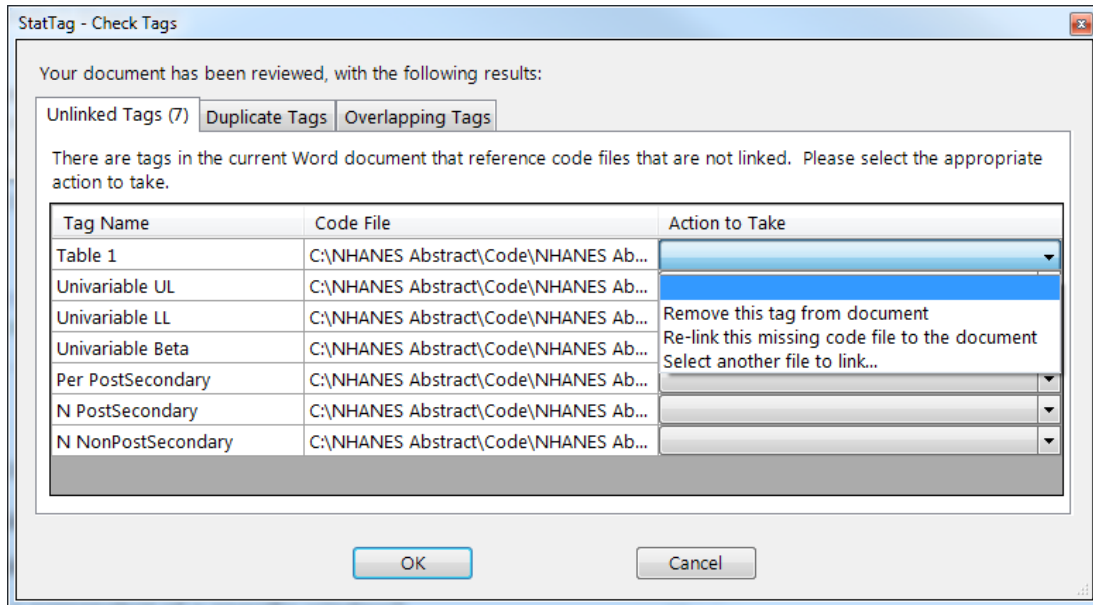
Unlinked Tags

1. If there are unlinked tags, they will be shown in the first tab.



2. The drop down menu “Action to Take” shows three options for each tag:
 - (1) Remove this tag from document
 - (2) Re-link this missing code file to the document
 - (3) Select another file to link

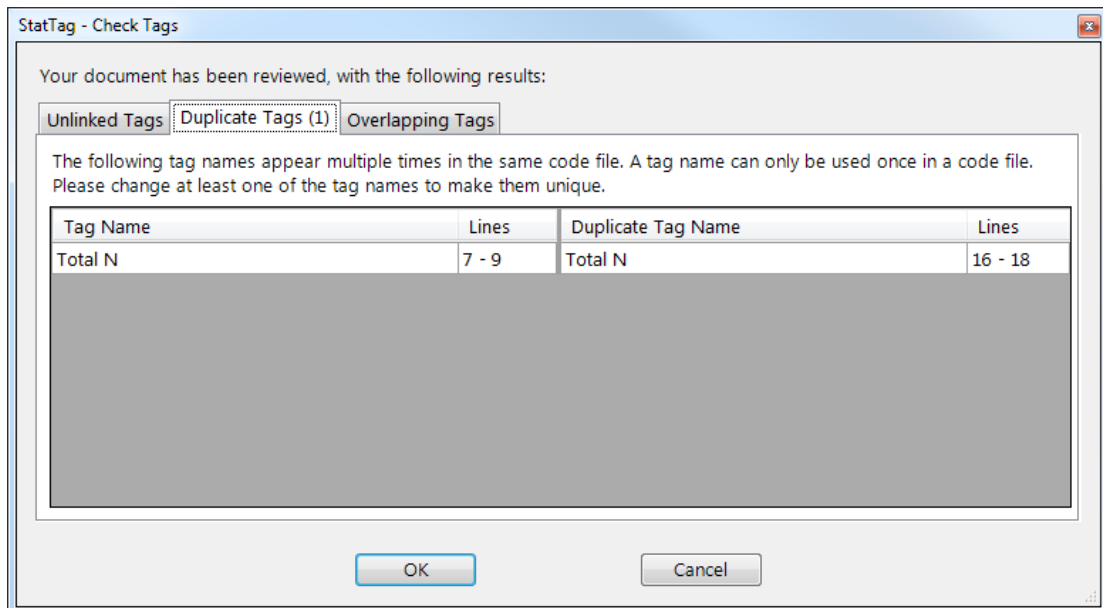
StatTag Windows Version 4.0 User's Guide



3. Use the drop down menu to take the appropriate action.

Duplicate Tags

1. If there are duplicated tags, they will be shown in the second tab.

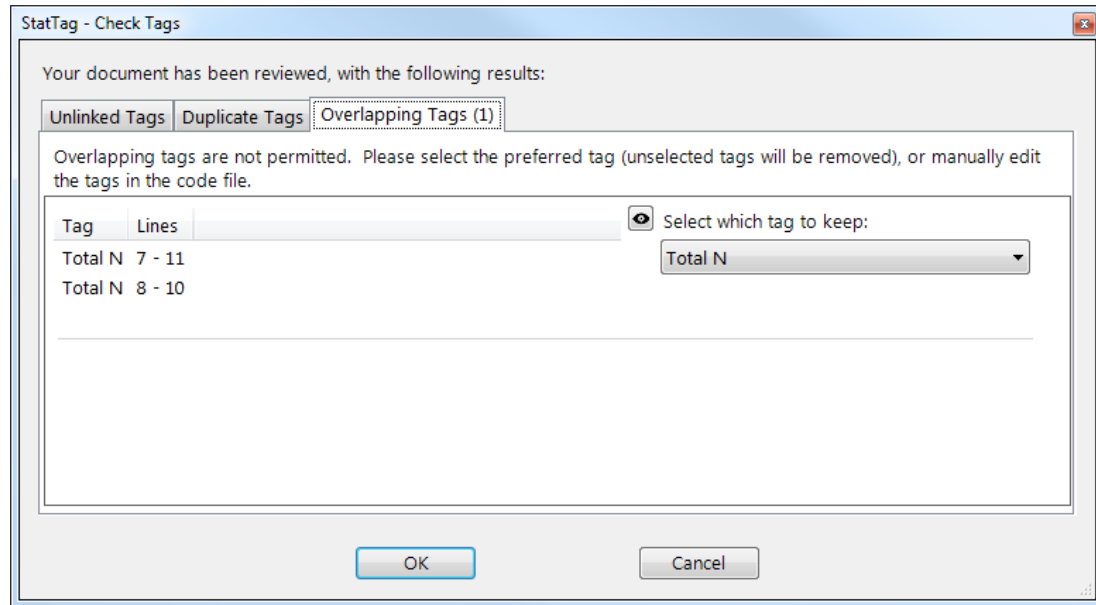


2. The dialog box shows the duplicated tags and the lines in the statistical code in which they occur.
3. Change the name of one of the tags by directly typing within this window. You may also rename or remove tags through the Tag Manager. If duplicates are not resolved, the tag

output in the Word document will reflect output corresponding to the latest occurrence of the tag in the statistical code.

Overlapping Tags

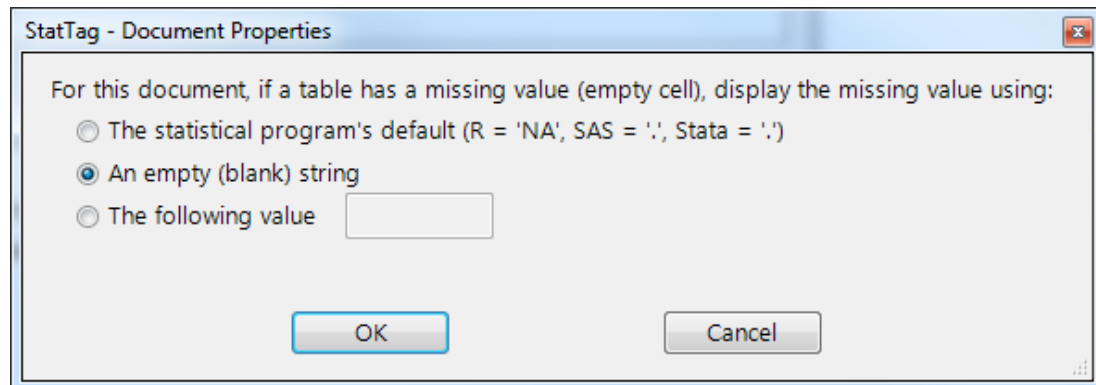
1. If there are overlapping tags, they will be shown in the third tab.



2. Use the drop down menu to select which tag to keep. The lines that correspond to each tag are shown within the window on the left. The peek function can be used to see the associated code.

Document Properties

The Document Properties window controls default formatting behavior applied to the active document. This includes how missing values or empty table cells should be depicted within word.



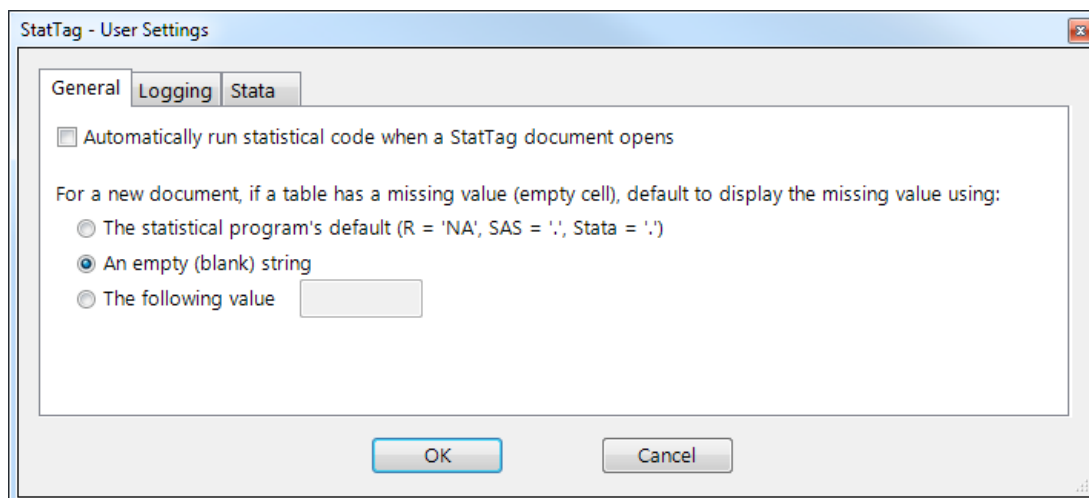
3.2 Support

User Settings

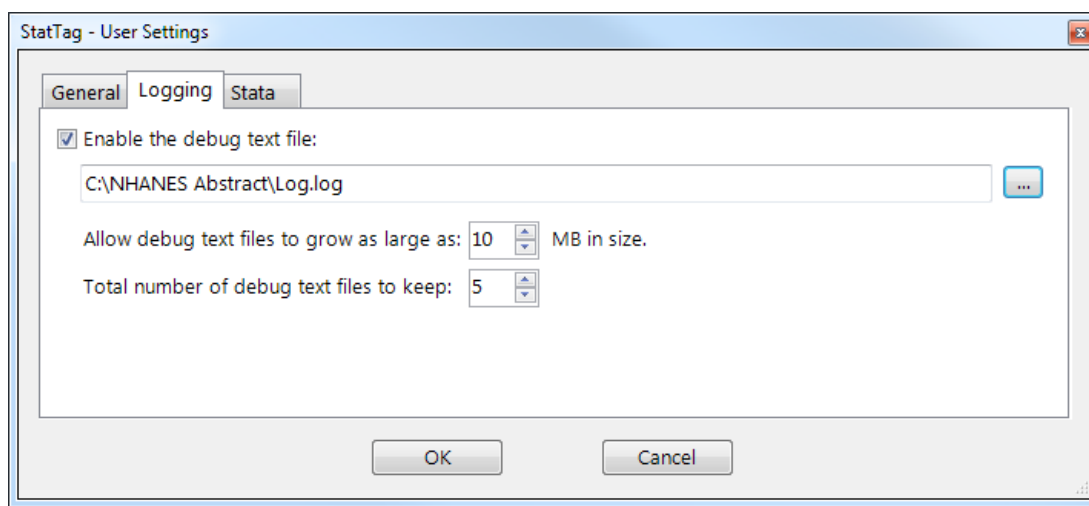


The Settings window controls aspects of StatTag's operation.

The General tab 1) controls execution of the statistical code when a Word document associated with a code file through StatTag is opened, 2) the default method for how missing values or empty table cells should be depicted for all Word documents.

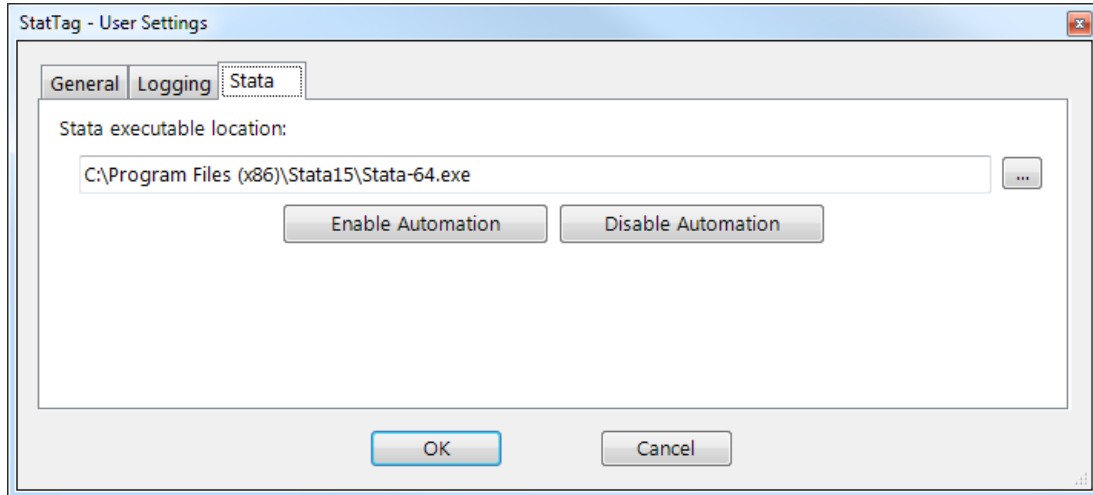


The Logging tab controls generation of a log file that can be used for troubleshooting. This is disabled by default, but if you encounter errors and would like to request assistance please do the following: (1) enable the debug file, by checking the box, which will write a plain text file to your computer; (2) run your program to generate the errors, and; (3) send the debug file to StatTag@northwestern.edu.



StatTag Windows Version 4.0 User's Guide

The Stata tab allows connection of the Stata API. This tab was used during StatTag setup to allow StatTag to interface with Stata. These settings can be changed or updated at any time. If you are using Stata, and have not configured this, see page 4 for more information about configuring Stata.



About ⓘ




The About icon will open a window containing the version number of StatTag that you are using, and information regarding citation, usage, and licenses related to StatTag.

Help ?

The Help icon will open the User Guide from within Word. If you need additional help or support, email StatTag@northwestern.edu or visit the StatTag website at <http://sites.northwestern.edu/stattag/> to interact with the user community.

4.0 Tag Structure and Syntax

Four types of results can be tagged.

Type			
Numeric Values	<code>display</code>	<code>%put</code>	Any command that returns a value
Tables	<code>matrix list</code>	<code>ODS CSV</code>	Any command that returns a data frame, matrix, vector or list
Figures	<code>graph export</code>	<code>ODS PDF</code>	pdf, win.metafile, png, jpeg, bmp, postscript
Verbatim	Any Code	Any Code	Any Code

In order to return results from your statistical analysis to Word, your results must be created and either printed to the results window of your statistical program or to file through one of the above commands, and encapsulated in a tag. Other lines in your statistical code should not be encapsulated by tags, as they may cause errors. Examples of all commands referenced below can be found in the accompanying sample files for each statistical program.

4.1 Values

Values are returned to StatTag and then inserted into Word with the `display` (Stata) or `%put` (SAS) commands, or R commands that return a number. The `display` and `%put` commands are used in Stata and SAS code respectively to print strings or scalar values to the results window. They will not return data in any other format, such as a matrix or table.



The `display` command is typically used in Stata code with the return command to retrieve stored results, or with local or global macro variables.



The `%put` command is typically used in SAS code to store values or strings as local macro variables.



R commands that return a single value (e.g., `print`) may be used. If the value returned has more than one element (such as a vector), only the first element will be used.

4.2 Tables

Tables are returned to Word with the `matrix list` (Stata) or `ODS CSV` (SAS) commands, or R commands that return a collection of values.



The `matrix list` command is used in Stata code to print a matrix to the results window. The `matrix list` command is typically used after creation of a matrix with the `mkmat`, `matrix define`, `estout`, or `estimates table` commands.



The `ODS CSV` command is used in SAS code to redirect output to a location on file, instead of the results window. The file location is used by StatTag to pull in the results of interest.



R commands that return a collection of values (data frame, matrix, vector, or list) can be used as table results by StatTag.

4.3 Figures

Figures are returned to Word with the `graph export` (Stata), `ODS PDF` (SAS), `pdf`, `win.metafile`, `png`, `jpeg`, `bmp`, or `postscript` (R) commands.



The `graph export` command is used in Stata code to save a graph or figure to file outside of Stata, the location of which is specified by the user. StatTag will retrieve the file to insert into Word. The `graph export` command expects a pathway and file name to be specified along with the file format, and the `replace` option to overwrite an existing file as required. The command will export the last graph rendered in Stata.



The `ODS PDF` command is used in SAS code to save results of other commands to a pdf file outside of SAS, the location of which is specified by the user. StatTag will retrieve the file to insert into Word. The `ODS PDF` command expects a pathway and file name to be specified. The command will export any contained output that would be otherwise printed in the results window.



The `pdf`, `win.metafile`, `png`, `jpeg`, `bmp` and `postscript` commands are used by R to save a graph or figure to a file outside of R, the location of which is specified by the user. StatTag will retrieve the file to insert into Word.

4.4 Verbatim

Verbatim results echo any printed output within the statistical program. Inserted output will be formatted text in a text box. The inserted text may be further formatted in Word.



Tagging code as verbatim in Stata will result in the insertion of any output printed to the Stata results screen.



Tagging code as verbatim in SAS will result in the insertion of any information printed to the SAS log screen.



Tagging code as verbatim in R will result in the insertion of any output printed to the R console.

4.5 Syntax

A tag always starts with `**>>>ST:Value(Label=" ", Type="")` and may contain additional information based on the type of tag (number, table, or figure) it identifies. The tag always ends with `**<<<`. Examples of tags for a numeric value, a table, a figure and verbatim output are listed below.

```
**>>>ST:Value(Label=" ", Type="")
```

```
code
```

```
**<<<
```

```
**>>>ST:Table(Label="", Type="", AllowInvalid=True, Decimals=0, Thousands=False)
```

```
code
```

```
**<<<
```

```
**>>>ST:Figure(Label="",)
```

```
code
```

```
**<<<
```

```
**>>>ST:Verbatim(Label="")
```

```
code
```

```
**<<<
```

If tags are made through StatTag, the text (`"**>>> ... **<<<"`) will be written into your statistical code by the plug-in. The Label, Type and Table parameters are defined in the Tag editor window ([Section 3.1](#)). The more advanced user may also directly write tags into statistical code. If written directly in the statistical code tags must include both the opening (`"**>>>"`) and closing (`"**<<<"`) comments, and have a name ("Label").



Note: Tags cannot be nested within each other. A tag should encapsulate exactly one keyword command (i.e. `display`, `matrix list`, `%put`, etc.)

5.0 Formatting tags

When a tag is created, its format should be specified accordingly. Options may be selected for either Values or Tables. There are no formatting options for Figures or Verbatim.

5.1 Values

Values can be formatted by default (per the exact statistical output), as a number with a specific number of decimal places, as a date/time combination, or as a percentage with a specific number of decimal places. Formatting is selected from the drop-down list.

The screenshot shows the 'Tag Settings (Required)' dialog box. The 'Name' field contains 'Total N'. The 'Result Type' dropdown is set to 'Value'. Under 'Value Options', the 'Format' dropdown is set to 'Default'. A note at the bottom states: 'Default is the exact same output from the statistical package.'

5.2 Tables

Matrices and tables are inserted to Word through StatTag using different mechanisms depending on the statistical software used. In all cases, data are formatted using OpenXML prior to being inserted. By default, where data are blank or missing, a "." is returned in the particular cell. This behavior can be changed for either the document (document properties) or the user (user settings) so that the returned value is a missing character or another default character. Tables use field formatting, and text cannot currently be wrapped within a cell.

Currently, if any formatting is specified, the formatting is applied to the entire table. Formatting options include specification of the number of decimal places and inclusion of a comma separator for thousands places, which will be applied to all numerical data in the table.

The screenshot shows the 'Tag Settings (Required)' dialog box. The 'Name' field contains 'Table 1 R'. The 'Result Type' dropdown is set to 'Table'. Under 'Table Options', there are checkboxes for 'Exclude row(s):' and 'Exclude column(s):', each followed by a text input field. A note below these fields states: 'Enter the values or ranges to exclude, separated by commas (e.g. 1, 3, 8-10)'. Under 'Value Options', the 'Format' dropdown is set to 'Default'. A note at the bottom states: 'Default is the exact same output from the statistical package.'

Once inserted to Word, the dimensions (rows and columns) of a table should not be modified in the statistical program (e.g. removing rows or columns), as this can cause errors when updating the results. If you change the dimensions of a table in the statistical program, you should delete the table from Word and insert the table again. However, once a table is inserted, you may manually add rows/columns in Word – they StatTag allows flexibility in importing tables to exclude rows and columns by number. Using these options, the headers, row names, or specific variables and data can be excluded. However, once you've inserted a table in Word, you may add rows or columns in Word (e.g. a table title, a row of footnotes, or a spacing column) as long as these rows or columns do not need to contain tagged results.



Tip: Data from individual cells in an inserted table can be copied elsewhere within the Word document text, and will retain their linkage to the original data. For example, if you wished to include a p-value in the text, copy the result from the table and paste into the text. When the table is updated, the value in the text will be updated as well.

5.3 Formatting after insertion

Once inserted, values and tables can be formatted using Word text formatting options, such as changing fonts, bolding, or italicizing. Updating the tags will not affect the applied formatting in Word.

Tags can also be copy and pasted, or cut and pasted to other parts of the text, and will retain their linkage to the statistical code. If your tag is copied or inserted in multiple locations, updates within your statistical code will update every instance of the tag within your text.



Tip: Tags can be deleted from the text. Deleting the tag from the text will not delete the tag syntax within your statistical code. To delete the syntax, use the “Remove tags” option in the Manage Tags dialog box.

6.0 Troubleshooting

Error	Solution
[NO RESULT]	<p>StatTag returns this value when the plug-in does not capture any information from the statistical program. If your tag returns this result, complete these steps:</p> <ol style="list-style-type: none"> 1. Close the statistical program if it is open. 2. Check to ensure the tag encapsulates a keyword command. 3. Check to ensure the statistical code is running correctly. Run the code in the native software and check for any errors or warnings. 4. Review any files created on disk to ensure they contain the expected output, and they are created each time the code is run.
My document takes a long time to update	<p>Inserting and updating tables can take a long time due to the number of fields.</p>
Could not communicate with Stata	<p>The Stata API must be enabled to insert and update tags. Check the Settings icon to ensure that (1) the correct pathway has been specified to your Stata.exe file, and (2) that the API has been enabled.</p>
Warning is displayed when a tag is defined	<p>If a red warning notice is given, you have not highlighted a keyword command in your code. Check to ensure you have selected the right option of Value, Table, or Figure, and you have highlighted a section of code containing the corresponding command.</p>

Looping	Tags must be standalone, and should not be embedded within a loop.
Embedded Tags	Tags should not encapsulate other tags.
I don't see StatTag in the Toolbar	Check in your program files to ensure StatTag is installed. If installed, check the COM Add-ins after Word is launched. To do so, from the File menu in Word, open the Options menu, then the Add-ins menu. On the bottom of the menu, under Manage, ensure COM Add-ins is selected and click 'Go'. Ensure the box for StatTag is checked and click 'OK'.
My tag from R inserts but is blank	Try encapsulating your R command with the "print" function. For example, summary output from a regression model may not show up as verbatim output with "summary(myModel)" as the tagged code, but "print(summary(myModel))" should work.

7.0 Acknowledgements

Development of StatTag and this user's guide was supported, in part, by the National Institutes of Health's [National Center for Advancing Translational Sciences](#), Grant Number UL1TR001422. The content is solely the responsibility of the developers and does not necessarily represent the official views of the National Institutes of Health.

StatTag was inspired in part by the Stata Automation Report project:

Lo Magno, G.L. (2013). Sar: Automatic generation of statistical reports using Stata and Microsoft Word for Windows. The Stata Journal, 13(1); 39-64.

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- Scintilla - <http://www.scintilla.org/>
- ScintillaNET - <https://github.com/jacobslusser/ScintillaNET>
- Json.NET - <http://www.newtonsoft.com/json>
- SASHarness - <https://github.com/cjdinger/SasHarness>
 - Hemedinger, C. (2013). Create Your Own Client Apps Using SAS® Integration Technologies. SAS Global Forum 2013. Paper 003-2013.
- R.NET - <https://github.com/jmp75/rdotnet>
- ScintillaNET Find&Replace - <https://github.com/Stumpii/ScintillaNET-FindReplaceDialog>
- log4net - <https://logging.apache.org/log4net/>
- EPPlus - <https://github.com/JanKallman/EPPlus>

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