Using the siena01Gui for RSiena

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1 How to start SIENA using the siena01Gui

Next to data input in the normal way for R, described in the manual and the help pages, data input for SIENA can also be done using the graphical user interface (*GUI*) via siena01Gui(). The latter way is not favored by the SIENA maintainers, but it still is available and documented here in a minimal cookbook-style introduction.

1.1 Data formats

1. Network and covariate files should be text files with a row for each node. The numbers should be separated by spaces or tabs.

2. An exogenous events file can be given, indicating change of composition of the network in the sense that some actors are not part of the network during all the observations. This will trigger treatment of such change of composition according to **?**. This file must have one row for each node. Each row should be consist of a set of pairs of numbers which indicate the periods during which the corresponding actor was present. For example,

   ```
   1 3
   1.5 3
   1 1.4 2.3 3
   2.4 3
   ```

   would describe a network with 4 nodes, and 3 observations. Actor 1 is present all the time, actor 2 joins at time 1.5, actor 3 leaves and time 1.4 then rejoins at time 2.3, actor 4 joins at time 2.4. All intervals are treated as closed.

3. If you use software such as Excel or SPSS to create input files to use with RSiena on a Mac, try to ensure that you do not create Unicode[1] files. This is an option in SPSS, and will depend on the file type with Excel.

More about input data can be found in the manual.

1.2 Installation and running the graphical user interface under Windows

1. Install R (most recent version). Note that if this leads to any problems or questions, R has an extensive list of 'frequently asked questions' which may contain adequate help for you.
   Start R, click on Packages and then on Install packages(s).... You will be prompted to select a mirror for download. Then select the packages xtable, network and RSiena.
   If you are using some version of Windows and get an error of denied permission when trying to install the packages, you may get around this by right-clicking the R icon and selecting 'Run as administrator'.

2. If you want to get the latest beta version of RSiena, before installing the packages, select Packages/Select repositories... and select R-forge. Then install the packages in the normal way. (Sometimes the SIENA website also contains newer versions.)

3. Start up R from the start menu or by (double-)clicking a shortcut on the taskbar (or desktop).

[1] Unicode is one of the standards for encoding text, an alternative to ASCII. Unicode formats are denoted by symbols such as UTF-8 and UCS-2.

4. By right-clicking the shortcut and clicking 'Properties' you can change the startup working directory, given in the 'Start in' field. Data files will be searched for in the first instance in this directory.

5. Load the RSiena package via the menu `Packages`

6. Type
   `siena01Gui()`

7. You should see a screen like that shown in Figure 1

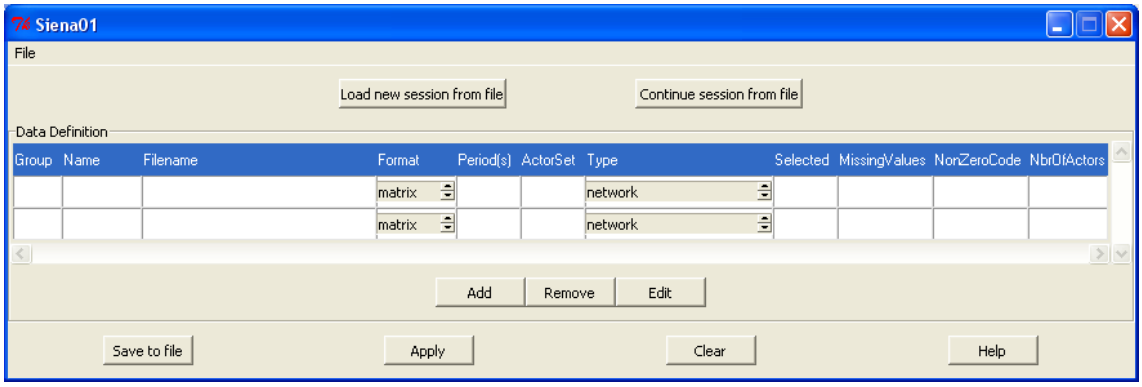

Figure 1: Siena Data Entry Screen

8. If the initial screen appears correctly, then check your working directory or folder. This is the directory that is opened immediately when clicking the Add button. Various problems can be avoided by making sure that the working directory is the directory that also contains the data files and the saved session file (see below)!
   You need to have permission to write files in the working directory, and the data files you want to use need to be in the same directory. To change the directory:

   (a) Right click on the shortcut, and select Properties. (if somehow you don't have permission to do this, try copying the shortcut and pasting to create another with fewer restrictions. (This may not work in Windows 7: you may need to copy it from the visible desktop and then paste it in Windows Explorer in your personal Desktop area.)) In the Start in: field type the name of the directory in which you wish to work, i.e., a directory in which you can both read and write files. Then click OK.

   (b) To run the examples, put the session file and the data files in the chosen directory before starting RSiena.

   (c) To use your own data, put that data in the chosen directory before starting RSiena.

1.2.1 Using the graphical user interface from Mac or Linux

1. Install R (most recent version) as appropriate for your computer.

2. Within R, type
   install.packages("RSiena")
   To use the latest beta version, use
   install.packages("RSiena", repos="http://R-Forge.R-project.org")

3. Navigate to the directory RSiena package, (which you can find from within R by running system.file(package="RSiena")) and find a file called sienascript. Run this to produce the Siena GUI screen.(You will probably have to change the permissions first (e.g.
   chmod u+x sienascript)).

4. If you want to use the GUI, you need tcl/tk installed. This is an (optional) part of the R installation on Mac. On Linux, you may need to install Tcl/tk and the extra Tcl/tk package tktable. On Ubuntu Linux, the following commands will do what is necessary (perhaps version numbers must be adapted):[2]

   ```
   sudo apt-get install tk8.5
   sudo apt-get install libtktable2.9
   ```

1.2.2 Running the graphical user interface: more details

Originally RSiena provided access to the GUI interface direct from Windows. This is not now possible. This section details some helpful notes about starting RSiena within R[3]. This is done by starting up R and working with the following commands. Note that R is case-sensitive, so you must use upper and lower case letters as indicated.

First, set the 'working directory' of the R session to the same directory that holds the data files; for example,
setwd('C:/SienaTest')
(Note the forward slash[4], and the quotes are necessary[5].) Windows users can use the Change dir... option on the File menu.

You can use the following commands to make sure the working directory is what you intend and see which files are included in it:
getwd()
list.files()

Assuming you see the data files, then you can proceed to load the RSiena package, with the library function:
library(RSiena)
The other packages will be loaded as required, but if you wish to examine them or use

[2] Thanks to Michael Schweinberger and Krists Boitmanis for supplying these commands.
[3] We are grateful to Paul Johnson for supplying these ideas.
[4] You can use backward ones but they must be doubled: setwd('C:\\SienaTest').
[5] Single or double, as long as they match.

other facilities from them you can load them using:
library(network)
The following command will give a review of the functions that RSiena offers:
library(help=RSiena)
After that, you can use the RSiena GUI. It will 'launch' out of the R session.
siena01Gui()
You can monitor the R window for error messages – sometimes they are informative.

When you are done, quit R in the polite way:
q()
(Windows users may quit from the File menu or by closing the window.)

1.2.3 Entering Data.

There are two ways to enter the data.

1. Enter each of your data files using Add.
   Fill in the various columns as described in Section 1.2.5.

2. If you have earlier saved the specification of data files, e.g., using Save to file, then you can use Load new session from File.
   This requires a file in the format described at the end of Section 1.2.5; such a file can be created and read in an editor or spreadsheet program, and it is created in .csv (comma separated) format by the siena01Gui() when you request Save to file.

3. If you wish to remove files, use the Remove option rather than blanking out the entries.

Once you have done this, check that the Format, Period, Type, etc., are correct, and enter any values which indicate missingness in the Missing Values column. A (minimal) complete screen is shown in Figure 2. The details of this screen are explained in Section 1.2.5.

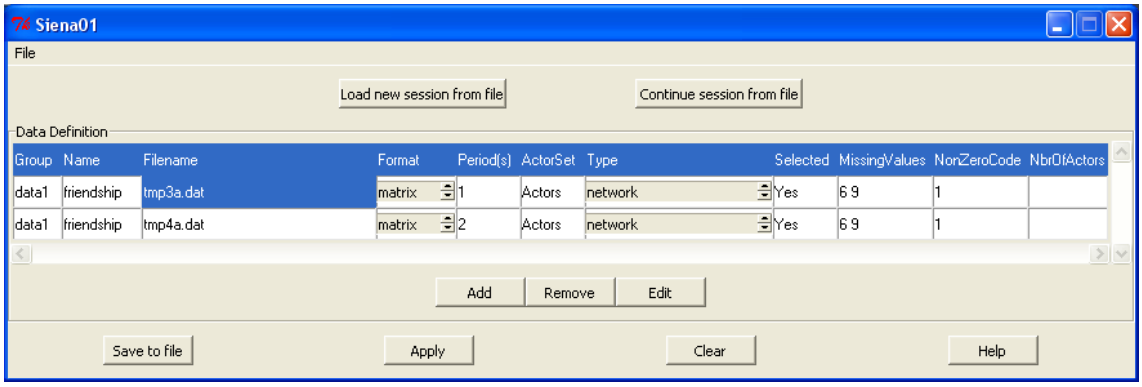

Figure 2: Example of a Completed Data Entry Screen

1.2.4 Running the Estimation Program

1. Click Apply: you will be prompted to save your work. Then you should see the Model Options screen shown in Figure 3. If this does not happen, then one possible

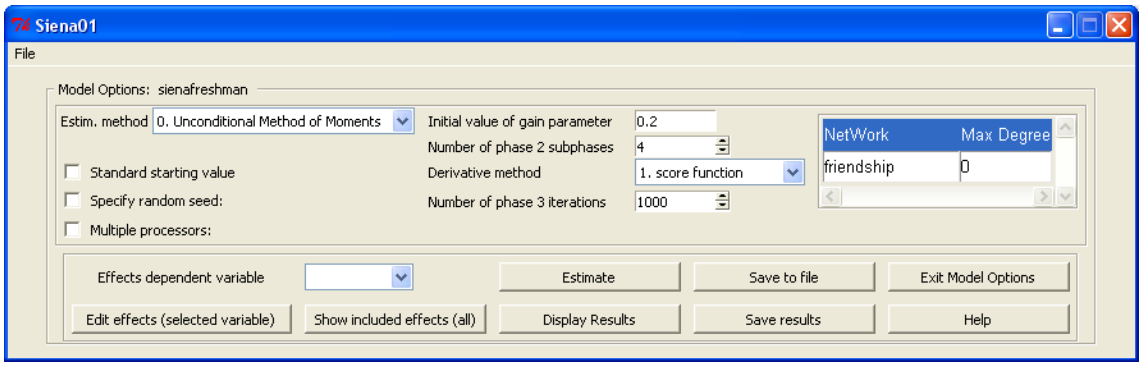

Figure 3: Model options screen

source of error is that the program cannot find your files; e.g., the files are not in the working directory (see above) but in a different directory.
If errors occur at this moment and the options screen does not appear, then you can obtain diagnostic error messages working not through the siena01Gui, but directly within R as described in Section **??**. This will hopefully help you solving this problem; later on you can then work through the siena01Gui again.

2. Select the options you require.

3. Use Edit Effects to choose the effects you wish to include. Note you can edit the effects for just one dependent variable at a time if you wish by selecting one dependent variable in 'Effects dependent variable'.

4. Click Estimate.

5. You should see the SIENA screen of the estimation program.

6. When the program has finished, you should see the results. If not, click Display Results to see the results. The output file which you will see is stored, with extension `.out` in the directory in which you start siena.exe.

7. You may restart your estimation session at a later date using the Continue session from file on the Data Entry Screen.
The restart needs a saved version of the data, effects and model as R objects. This will be created automatically when you first enter the Model Options Screen, using the default effects and model. You may save the current version at any time using the Save to file button, and will be prompted to do so when you leave this screen.

1.2.5 Details of The Data Entry Screen

Group May be left blank unless you wish to use the multi-group option described in the manual. Should not contain embedded blanks.

Name Network files or dyadic covariates should use the same name for each file of the set. Other files should have unique names, a list of space separated ones for constant covariates.

File Name Usually entered by using a file selection box, after clicking Add.

Format Only relevant for networks or dyadic covariates. Can be a matrix; a single Pajek network (.net) (not for two-mode networks); or a Siena network file (an edgelist, containing three or four columns: (from, to, value, wave (optional)), not yet tested for dyadic covariates!). By specifying the waves in the fourth column in the Siena format, one file can be used to contain data for all the waves.

Period(s) Only relevant for networks and dyadic covariates. All other files cover all the relevant periods. Indicates the order of the network and dyadic covariate files. Should range from 1 to M within each group, where M is the number of time points (waves). Use multiple numbers separated by spaces for multi-wave Siena network files.

ActorSet If you have more than one set of nodes, use this column to indicate which is relevant to each file. Should not contain embedded blanks.

Type Indicate here what type of data the file contains. Options are:

network (i.e., a one-mode network, which is the usual type)

bipartite (i.e., a two-mode network, which is a network with two node sets, and all ties are between the first and the second node set)

behavior

constant covariate

changing covariate

constant dyadic covariate

changing dyadic covariate

exogenous event (for changing composition of the actor set)

Selected Yes or No. Files with Yes *or blank* will be included in the model. Use this field to remove any networks or behavior variables that are not required in the model.

Missing Values Enter any values which indicate missingness, with spaces between different entries.

Nonzero Codes Enter any values which indicate ties, with spaces between different entries.

NbrOfActors For Siena network files, enter the number of actors. For Siena net bipartite files, enter the two dimensions (number of rows, number of columns) of the network, separated by a blank space.

The details of the screen can be saved to a *session* file, from which they can be reloaded. But you can create a session file directly: it should have columns with exactly the same names and in exactly the same order as those of the Data Entry screen, and be of any of the following types:

Extension	Type
`.csv`	Comma separated
`.dat` or `.prn`	Space delimited
`.txt`	Tab delimited

The root name of this input file will also be the root name of the output file.

1.2.6 Continuing the estimation

1. Below you will see some points about how to evaluate the reliability of the results. If the convergence of the algorithm is not quite satisfactory but not extremely poor, then you can continue just by Applying the estimation algorithm again.

2. If the parameter estimates obtained are very poor (not in a reasonable range), then it usually is best to start again, with a simpler model, and from a standardized starting value. The latter option must be selected in the Model Options screen.

Section 1.2.7 explains how to make the step from the use of the GUI to the use of R commands in the regular R way.

1.2.7 The transition from using the graphical user interface to commands

At some moment, for users who started learning the use of RSiena through the GUI, it can be desirable to make the transition to using commands in the regular R way. This will make available more options and integration with other R features. The transition can easily be made as follows.

After having made at least one estimation run in the GUI (which could be with the default model specification, without having made any further additions to the model; but it could also be with a more complicated model), click the button Save to file. You will be prompted for a file name with extension .RData. Make sure that you do give a non-empty name before the dot in .RData; for the moment, let us choose the name trans.RData.

Then later in an R session you can load the trans.RData. This can be done in Windows by selecting File – Load Workspace from the drop down menu, and entering this file name. It can also be done by entering the command

```
load("trans.RData")
```

This will make available three objects, for data, algorithm, and effects. What is currently in your workspace is shown by the command

```
ls()
```

This will probably show that the loaded objects have the names mydata, mymodel, and myeff. These are the type of objects created by the functions sienaDataCreate, sienaAlgorithmCreate, and getEffects, and discussed in the SIENA script Rscript02SienaVariableFormat.R on the SIENA website.

Now attach the package RSiena and subsequently ask for the descriptions of these three objects:

```
library(RSiena)
mydata
mymodel
myeff
```

This will give short descriptions and thereby a confirmation of what has been imported from the GUI session to the regular R session. From here on you can continue and work with R commands, as in the script, to further specify the model by working on the effects object, and then estimate the parameters by the siena07 function.

The precise point to continue from here, using the scripts in the next section and also on the RSiena website, is to use script Rscript02SienaVariableFormat.R, starting with section D (*Defining Effects*), part 3 (*Adding/removing effects using includeEffects*). After this, you are advised to continue with script Rscript03SienaRunModel.R.