

# Customizing and extending Emacs Speaks Statistics

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January 15, 2021

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# A short tutorial for customizing ESS

## Target audience

This tutorial is for R-users beginning to use ESS. We only assume that you have mild familiarity with Emacs, and that you know how to customize Emacs by filling your `.emacs` or `init.el` file.

## Goals

- Helping newcomers and beginners to have a more friendly and efficient setup
- Helping users migrating from other IDEs to keep behaviours and habits they are used to
- Showcasing some other Emacs packages that play well with ESS and may improve your coding experience

These slides are a companion for the video tutorial available at ...

# A word about use-package

In this document, several pieces of Emacs Lisp code will be proposed so that you can use them in your init file.

It is assumed that you use use-package for your init file: the Emacs Lisp code can be adapted in a straightforward manner if you do not use it.

As a reminder, this is the minimal code to add in your init file so as to use use-package, once it has been installed:

```
;; Make sure that use-package is installed:  
(unless (package-installed-p 'use-package)  
  (package-refresh-contents)  
  (package-install 'use-package))  
;; Load use-package:  
(eval-when-compile  
  (require 'use-package))
```

# Completion I

As mentioned in the ESS manual, there are several completion frameworks for writing R code with ESS. The Emacs package `company` is an elegant solution, which also supports many other programming languages.

Here is a minimal piece of Emacs code to add in your init file to install and load `company`:

```
(use-package company
  :ensure t
  :config
  ;; Turn on company-mode globally:
  (add-hook 'after-init-hook 'global-company-mode)
  ;; Only activate company in R scripts, not in R console:
  (setq ess-use-company 'script-only))
```

# Completion II

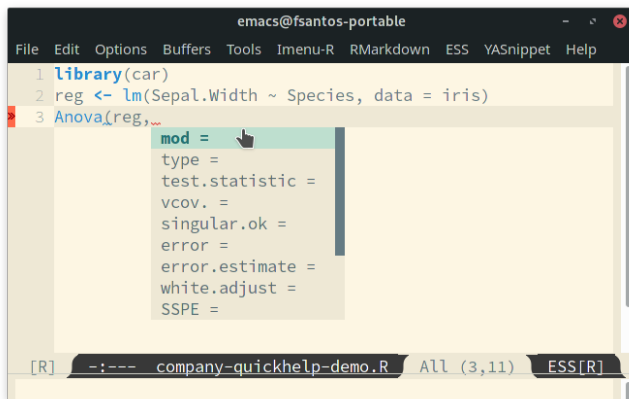


Figure 1: An example of code completion with `company`: various candidates are proposed for the arguments of the function `car::Anova()`.

## Completion III

company offers completion candidates in various contexts: function name, argument name within a function call (as in Fig. 1), object name.

It may seem preferable to adopt a non-intrusive workflow. For functions or objects names, completion starts automatically after you type a few letters. For arguments names within a function call, it is suggested that you trigger manually the completion only when you need it. This can be done with M-x `company-complete`, or more conveniently, by binding this function to a convenient shortcut. For example, to bind it to F12, add the following to your init file:

```
;; Use F12 to trigger manually completion on R function args:  
(add-hook 'ess-r-mode-hook  
  '(lambda ()  
    (local-set-key (kbd "<f12>") #'company-R-args)))
```

# Completion IV

Of course, further customization of `company` can be done in your `init` file. For instance:

```
;; More customization options for company:  
(setq company-selection-wrap-around t  
  ;; Align annotations to the right tooltip border:  
  company-tooltip-align-annotations t  
  ;; Idle delay in seconds until completion starts automatically  
  company-idle-delay 0.45  
  ;; Completion will start after typing two letters:  
  company-minimum-prefix-length 2  
  ;; Maximum number of candidates in the tooltip:  
  company-tooltip-limit 10)
```

# Documentation popups I

company-quickhelp allows for documentation popups, e.g. to further describe function arguments.

The screenshot shows the Emacs editor interface with the title bar 'emacs@fsantos-portable'. The menu bar includes 'File', 'Edit', 'Options', 'Buffers', 'Tools', 'Imenu-R', 'RMarkdown', 'ESS', 'YASnippet', and 'Help'. The left pane contains R code:

```
1 library(car)
2 reg <- lm(Sepal.Width ~ Species, data = iris)
3 Anova(reg,
  mod =
  type =
  test.statistic =
  vcov. =
  singular.ok =
  error =
  error.estimate =
  white.adjust =
  SSPE =
  error.df =
```

A documentation popup is displayed over the 'type' argument. The popup text reads:

```
1
2 R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
3 Copyright (C) 2020 The R Foundation for Statistical Computing
4
5 type of test, "II", "III", 2, or 3. Roman numerals are equivalent to
6 the corresponding Arabic numerals.
7 vous pouvez le redistribuer sous certaines conditions.
8 Tapez 'license()' ou 'licence()' pour plus de détails.
9
10 R est un projet collaboratif avec de nombreux contributeurs.
11 Tapez 'contributors()' pour plus d'information et
12 'citation()' pour la façon de le citer dans les publications.
13
14 Tapez 'demo()' pour des démonstrations, 'help()' pour l'aide
15 en ligne ou 'help.start()' pour obtenir l'aide au format HTML.
16 Tapez 'q()' pour quitter R.
17
18 > setwd('/home/fsantos/Documents/')
19 > library(car)
20 Le chargement a nécessité le package : carData
21 > reg <- lm(Sepal.Width ~ Species, data = iris)
22 >
```

Figure 2: Documentation popups with company-quickhelp.



# Documentation popups II

The minimal elisp code to add to your init file is straightforward:

```
(use-package company-quickhelp
  :ensure t
  :config
  ;; Load company-quickhelp globally:
  (company-quickhelp-mode)
  ;; Time before display of documentation popup:
  (setq company-quickhelp-delay 0.3))
```

By default, the documentation popup is shown automatically. You can adjust the time before the popup shows up by customizing the variable `company-quickhelp-delay`.

# Code snippets

yasnippet is an Emacs package allowing for the expansion of whole pieces of code you often use (*snippets*) from one given abbreviation.

## Key features of yasnippet

- All code snippets are stored as plain-text files in one given directory, so that they are easy to share with other people, and can be easily version controlled.
- As a corollary, it is also easy to retrieve and use large collection of snippets already available online. For instance, Andrea Crotti maintains a great collection available at <https://github.com/AndreaCrotti/yasnippet-snippets>.
- Although we only demonstrate its use within ESS and R here, note that yasnippet is not an R-specific solution, and that you can use it for any other programming language.

# Setting up yasnippet |

To set up yasnippet, proceed through the following steps:

- 1 Create a directory `snippets/` at some convenient location, and add a subfolder `ess-r-mode/` in this directory.
- 2 Add the minimal following code in your init file:

```
(use-package yasnippet
  :ensure t
  :config
  ;; Indicate the directory containing your snippets:
  (setq yas-snippet-dirs '("path/to/your/snippets"))
  ;; Load your snippets on startup:
  (yas-reload-all)
  ;; Turn on yasnippet (minor) mode when editing R files:
  (add-hook 'ess-r-mode-hook #'yas-minor-mode))
```

# Setting up yasnippet II

- ③ You can now fill your `snippets/ess-r-mode/` directory with your own snippets. For instance, create a file `function` (without any extension) in this directory, with the following contents:

```
#name : function
#key : fun
# --
${1:name} <- function(${2:args}) {
  ${3:body}
}
```

Each snippet has a unique name, and can be triggered by typing a given key (followed by TAB). As we will see later on, the present snippet allows for the expansion of a template for defining new R functions more easily. The yasnippet manual gives more details about the expected syntax to define your own code snippets:

<http://joaotavora.github.io/yasnippet/>.

# Setting up yasnippet III

- Now your snippets directory should look like:

```
| └─ snippets  
|   └─ ess-r-mode  
|       └─ function
```

Feel free to add or retrieve (a lot!) more snippets, i.e. to add more template files within the `ess-r-mode` sub-directory.

## Using yasnippet in an ESS[R] buffer

While you are editing an R source file with ESS, each snippet can be triggered by typing its key and then pressing TAB. You can then navigate through the placeholders of the expanded template by pressing TAB again.

For instance, with our previously defined snippet, typing `fun` followed by TAB will expand the full `function` template; you will then be able to specify easily a value for each of the three placeholders (the function's name, its args and body).

Note that yasnippet has a short video tutorial, available at <https://www.youtube.com/watch?v=ZCGmZK4V7Sg>.