Help tools in R

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This session illustrates the various help tools and documentation available in R. This information is usually provided at the end of introductory notes or books on software. However, it is important that you make yourself familiar with getting help in R right away. You may start using these tools immediately to supplement the information provided in the next chapters. The use of R is based on the application of functions, each of which is associated with a help page providing the details about its usage. Other search and documentation tools, both provided within the program or web-based, are described. In the absence of a general menu-based structure, these help tools are likely to simplify your life in learning and using R. The first section of the chapter describes the use of help pages provided with the main distribution of R. Help pages are those associated with each function or dataset available in R, while a global help page offers search tools and links to documentation. The last three sections illustrate some links for manuals and official documentation, books, and web tools, respectively.

Help pages

The simplest way to get some help in R is to refer to the help page of a given function. Such pages are included as special LaTeX-style documents (with extension .Rd, as R documentation) in each package, together with the R code of the function. They are opened in the Help window in RStudio, and you can also use menus to search within each page. As an example, the help page for the function `rnorm()` is opened with:

```
help(rnorm)
```

which can also include the quoted name as `help("rnorm")` or the shortcut `?rnorm`. Be aware that the package including the function must be loaded into the session for the help page to be shown. In the case of `rnorm()`, the page serves as a reference for multiple functions related to the normal distribution. There are various sections in the help page:

- **Description**: a brief summary of the function
- **Usage**: the syntax of the function, with optional default values for the arguments

- **Arguments**: a brief description of the arguments of the function
- **Details**: further information on the use of the function
- **Value**: a description of the value returned by the function
- **See also**: hyperlinks to other related functions
- **Examples**: some examples of applications, commonly using data stored in R.

Other sections, such as NOTE, REFERENCES, AUTHOR, or WARNINGS can be included as well. Among the sections above, the most important for new users are USAGE and EXAMPLES. The former clarifies how the function needs to be written, while the latter provides the code for performing some example, which can be copied, pasted in the console and run (try it out with the examples for `rnorm()`). Also, you can use the links to open related help or web pages. The Help window in RStudio can be of assistance, providing buttons to navigate backwards and forward and to search within help pages.

Other help tools are available in an R session. The main documentation page for a package can be opened using the argument `package` in `help()`. For instance, the command:

```
help(package="nlme")
```

opens the main help page for the package NLME, containing functions to run linear and non-linear mixed-effects models. The page lists all the functions and data, with hyperlinks.

Other help tools accessible directly in R are a global help page that can be opened with `help.start()` and a search method through `help.search()` (or the shortcut `??`). The former allows browsing help pages in different packages and accessing the HTML version of R manuals, while the latter searches among help pages of functions in the installed packages.

Manuals and official documentation

Coherently with its open-access nature, most of the documentation about R is freely available. In particular, there is a huge list of manuals and books that illustrate both the use of the software/language and specific techniques and applications. These resources are available both within the R installation and official website, as well as through other web repositories.

The official R website at www.r-project.org includes a section DOCUMENTATION in the left side menu. Here, there are links to a set of manuals in HTML or pdf formats at cran.r-project.org/manuals.html (or using the global help with `help.start()`). The main manual is *An Introduction to R* that provides an overview of the R software and programming language is provided, although with a rather technical than practical perspective. Other manuals on installation, data import/export and language definition, amongst others, are available on the same web page. Contributed documentation, written by different authors on the general use of \R{} or on more specific topics, is also available at cran.r-project.org/other-docs.html following the hyperlinks in the webpage above. The short reference card at cran.r-project.org/doc/contrib/Short-refcard.pdf also offers a compact but thorough overview of R functions for different tasks

Books

In addition to the official manuals and documentation, R users can access a huge list of books illustrating specific topics, ranging from the application of specific statistical methods to technical applications of the software. Most of these books are freely available, and sometimes downloadable in pdf format or recently more easily accessible in HTML form at specific websites. Most of the books include reproducible examples with R code and real data.

For instance, a list of books is provided on the official R website at www.r-project.org/doc/bib/R-books.html. A good repository is also available at www.bookdown.org, which includes books written using the BOOK-

DOWN package. This package provides functions and tools that facilitate writing books and long-form articles/reports with R Markdown, a typesetting software that can embed R code within text (incidentally, these notes are written with it). Many other books are freely available and can be searched on the web, in addition to printed editions.

Web tools

Help on R is also offered by web-based tools, such as search engines and mailing lists. The web pages R Site Search and Rseek, among others found at www.r-project.org/search.html include engines for searching across help files, manuals, and mailing list archives, or generally on the web, respectively. The main mailing list is R-Help, which can be subscribed to (in addition to others) at www.r-project.org/mail.html. The help support is restricted to questions on R (not on statistics), and the list is maintained by volunteers. Another excellent resource is StackOverflow (stackoverflow.com/) a public platform with a collection of software code as well as questions & answers. When using mailing lists, remember to carefully read the instructions on how their use the mailing list before submitting questions. In particular, you are expected to search among previous posts beforehand, to check if your question has been answered before (which is very likely to be). More importantly, each questions should be accompained by a simple reproducible example.

Another good source is represented by CRAN Task Views (cran.r-project.org/web/views), which offer an overview of the use of the software for specific topics, specifically listing and describing related contributed packages. The R Journal (journal.r-project.org) is also a good reference for R-related articles.