Introducing R

What you will learn in R:

➤➤ Discovering what R is

➤➤ How to get the R program

R is more than just a program that does statistics. It is a sophisticated computer language and environment for statistical computing and graphics. R is available from the R-Project for Statistical Computing website (www.r-project.org), and following is some of its introductory material:

R is an open-source (GPL) statistical environment modeled after S and S-Plus. The S language was developed in the late 1980s at AT&T labs. The R project was started by Robert Gentleman and Ross Ihaka (hence the name, R) of the Statistics Department of the University of Auckland in 1995. It has quickly gained a widespread audience. It is currently maintained by the R core-development team, a hard-working, international team of volunteer developers. The R project webpage is the main site for information on R. At this site are directions for obtaining the software, accompanying packages, and other sources of documentation.

Introducing R: What it is and how to get It

R is a powerful statistical program but it is first and foremost a programming language. Many routines have been written for R by people all over the world and made freely available from the R project website as "packages." However, the basic installation (for Linux, Windows or Mac) contains a powerful set of tools for most purposes.

Because R is a computer language, it functions slightly differently from most of the programs that users are familiar with. You have to type in commands, which are evaluated by the program and then executed. This sounds a bit daunting to many users, but the R language is easy to pick up and a lot of help is available. It is possible to copy and paste in commands from other applications (for example: word processors, spreadsheets, or web browsers) and this facility is very useful, especially if you keep notes as you learn. Additionally, the Windows and Macintosh versions of R have a graphical user interface (GUI) that can help with some of the basic tasks.

[**WARNING:** Beware when copying and pasting commands into R from other applications; R can't handle certain auto formatting characters such as en-dashes or smart quotes.]

R can deal with a huge variety of mathematical and statistical tasks, and many users find that the basic installation of the program does everything they need. However, many specialized routines have been written by other users and these libraries of additional tools are available from the R website. If you need to undertake a particular type of analysis, there is a very good chance that someone before you also wanted to do that very thing and has written a package that you can download to allow you to do it.

R is open source, which means that it is continually being reviewed and improved. R runs on most computers—installations are available for Windows, Macintosh, and Linux. It also has good interoperability, so if you work on one computer and switch to another you can take your work with you.

R handles complex statistical approaches as easily as more simple ones. Therefore once you know the basics of the R language, you can tackle complex analyses as easily as simple ones (as usual it is the interpretation of results that can be the really hard bit).

Getting the hang of R:

R is unlike most current computer programs in that you must type commands into the console window to carry out most tasks you require. Throughout the text, the use of these commands is illustrated, which is indeed the point of the book.

Where a command is illustrated in its basic form, you will see a fixed width font to mimic the R display like so:

help.start()

When the use of a particular command is illustrated, you will see the user-typed input illustrated by beginning the lines with the > character, which mimics the cursor line in the R console window like so:

> data1 = c(3, 5, 7, 5, 3, 2, 6, 8, 5, 6, 9)

Lines of text resulting from your actions are shown without the cursor character, once again mimicking the output that you would see from R itself:

> data1

[1] 3 5 7 5 3 2 6 8 5 6 9

So, in the preceding example the first line was typed by the user and resulted in the output shown in the second line. Keep these conventions in mind as you are reading this chapter and they will come into play as soon as you have R installed and are ready to begin using it!

The R website:

The R website at **www.r-project.org** is a good place to visit to obtain the R program. It is also a good place to look for help items and general documentation as well as additional libraries of routines. If you use Windows or a Mac, you will need to visit the site to download the R program and install it. You can also find installation files for many Linux versions on the R website.

The R website is split into several parts; links to each section are on the main page of the site. The two most useful for beginners are the **Documentation** and **Download sections**. In the Documentation section a Manuals link takes you to many documents contributed to the site by various users. Most of these are in HTML and PDF format. You can access these and a variety of help guides under Manuals Contributed Documentation. These are especially useful for helping the new user to get started. Additionally, a large FAQ section takes you to a list that can help you find answers to many question you might have. There is also a Wiki, and although this is still a work in progress, it is a good place to look for information on installing R on Linux systems. In the Downloads section you will find the links from which you can download R.

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