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R (Software)

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R is both a programming language and a free and open-source software environment for statistical analyses and graphics. Information about R and its development can be found on the website of the R Project for Statistical Computing (<http://www.r-project.org/>). Unlike commercial statistical software like *SPSS* or *Stata*, R is not developed by a company, but by its user base. R is available for all major operating systems, including Windows, Mac OS X, and Linux. The functions needed to perform statistical analysis and produce graphical output are provided through so-called packages. Both the basic R software environment and most of the user-generated packages can be downloaded via the Comprehensive R Archive Network (CRAN) at <http://cran.r-project.org/>. Additional packages are available at <http://www.bioconductor.org/>. While an analysis by Muenchen (2012) indicated that *SPSS* is still by far the most widely used software for statistical analyses in scholarly articles, the interest in and use of R has seen a substantial and steady increase in recent years. Besides being open-source and freely available, the graphical capabilities of R for the production of publication-ready tables and figures are one reason for its surge in popularity. One of the most commonly used package for generating graphical output in R is *ggplot2* (Wickham, 2010). R also offers packages for advanced multivariate analyses, such as *sem* (Fox, 2006), *lavaan* (Rosseel, 2012), and *lavaan.survey* (Oberski, 2014) for structural equation modeling, and *lme4* (Bates, Maechler, Bolker, & Walker, 2015) or *nlme* (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2015) for multilevel models. While the basic graphical user interface (GUI) of R is sparse, several alternative GUIs have been developed. Among those, *RStudio* (<http://www.rstudio.com/>) is one of the most extensive user interfaces that also facilitates the use of R for users more familiar with statistical packages like *SPSS*, *SAS*, or *Stata*.

SEE ALSO: Multilevel Modeling; SAS (Software); SPSS (Software); Stata (Software); Structural Equation Modeling

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