R (Software)

Breuer, Johannes

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JOHANNES BREUER
University of Cologne & Knowledge Media Research Center Tübingen, Germany

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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Johannes Breuer works as a postdoctoral researcher at the Department of Psychology at the University of Cologne, Germany, and at the Knowledge Media Research Center (IWM) in Tübingen, Germany. He did his master's degree (German Diploma) in media studies and received his PhD in psychology from the University of Cologne in 2013. His main research interests include learning with digital media, the uses and effects of video games, and the methods of media effects research.