# COFFEE, DATA, AND JAMOVI: THE PERFECT RECIPE FOR GREAT STATISTICAL ANALYSIS

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## ABSTRACT

**Objective:** This article presents Jamovi, an open-source statistical analysis software based on the R language. The main goal is to demonstrate the software's functionalities, highlighting its user-friendly interface and accessibility, making it an ideal tool for both beginners and professionals. Additionally, it aims to promote the use of free statistical software, reducing technical and financial barriers in data analysis.

**Method:** The study conducts a descriptive and applied review of Jamovi, covering its history, development, and key features compared to other statistical programs like SPSS and SAS. Moreover, a practical example is provided, guiding the reader through essential steps such as data import, statistical tests, and result interpretation using Jamovi.

**Results:** Jamovi stands out for its intuitive interface, cross-platform accessibility, and seamless integration with R. It allows users to perform statistical analyses without requiring extensive programming knowledge. Its active community and continuous development ensure ongoing improvements and adaptation to academic and professional needs.

**Conclusion:** Jamovi proves to be a powerful and accessible alternative for data analysis, widely used in fields such as psychology, public health, education, and marketing. Its increasing adoption highlights its feasibility as an academic and professional tool, promoting more democratic access to statistical analysis.

**Keywords**: Software freeware. Data analysis. Jamovi.

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# CAFÉ, DADOS E JAMOVI: A RECEITA PERFEITA PARA UMA BOA ANÁLISE ESTATÍSTICA

**RESUMO**

**Objetivo:** Este artigo apresenta o Jamovi, um software de análise estatística de código aberto baseado na linguagem R. O objetivo principal é demonstrar as funcionalidades do software, destacando sua interface amigável e acessibilidade, tornando-o uma ferramenta ideal tanto para iniciantes quanto para profissionais. Além disso, busca incentivar o uso de softwares livres para análise de dados, reduzindo barreiras técnicas e financeiras.

**Método:** O estudo realiza uma revisão descritiva e aplicada do Jamovi, abordando sua história, desenvolvimento e diferenciais em comparação com outros programas estatísticos, como SPSS e SAS. Além disso, o artigo apresenta um exemplo prático, guiando o leitor na utilização do software, desde a importação de dados até a execução de análises estatísticas fundamentais.

**Resultados:** O Jamovi se destaca por sua interface intuitiva, acessibilidade multiplataforma e integração com a linguagem R. Ele permite a execução de análises estatísticas de forma simplificada, sem necessidade de conhecimentos avançados em programação. Sua comunidade ativa e desenvolvimento contínuo garantem sua evolução e adaptação às novas demandas acadêmicas e profissionais.

**Conclusão:** O Jamovi representa uma alternativa robusta e acessível para análise de dados, sendo amplamente utilizado em diversas áreas, como psicologia, saúde pública, educação e marketing. Sua adoção crescente comprova sua viabilidade como ferramenta acadêmica e profissional, promovendo um acesso mais democrático à análise estatística.

Palavras chave: Software livre. Análise de dados. Jamovi.

## INTRODUCTION

In recent decades, statistical analysis has been marked by an increasing demand for software that combines robustness, accessibility, and ease of use. While traditional packages such as SPSS and SAS have established themselves in the market, their complex structures and high costs have become barriers for students, small businesses, and researchers, particularly in emerging countries, but also in developed ones. Responding to the need for more inclusive

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alternatives, JJamovi emerged as an open-source statistical analysis software that combines operational simplicity with advanced features (Kangiwa et al., 2024).

Jamovi was developed by a team of statisticians and programmers whose objective was to create an open and intuitive platform capable of democratizing access to analytical tools. Officially launched in 2017, the project was founded on the premise of offering an analysis environment that is easy to learn and use, particularly for individuals with no prior programming experience. The Jamovi graphical interface was inspired by traditional software packages to facilitate a smooth transition for new users without compromising productivity (Ahmed & Muhammad, 2021; Caldwell, 2022).

Since its launch, Jamovi has gained traction in psychology, marketing, and public health. Its ability to perform complex analyses without requiring extensive knowledge of programming languages has contributed to its emerging popularity (Leppink, 2022). At the same time, the high cost and lack of technical support for traditional software packages are motivating users to seek alternatives. In addition, its direct integration with the R language broadens the range of possibilities for advanced users, and facilitates the addition of customized packages and specific analyses (Navarro & Foxcroft, 2019; Bartlett & Charles, 2022).

One of Jamovi's key differentiators from other alternatives is its collaborative development model (Navarro & Foxcroft, 2019). That is, as open-source software it is continuously expanded and improved by a global community of developers and users. This ensures the program remains aligned with the latest demands of the field and that new modules and functionalities are regularly added, enhancing its applicability (Navarro & Foxcroft, 2019; Richardson & Machan, 2021).

Another standout feature of Jamovi is its intuitive graphical interface. The program's modular structure enables users to select the tools necessary for each project, making it quite versatile for fundamental descriptive analyses as well as more advanced methods such as multiple regressions and structural equation modeling. Additionally, the software facilitates real-time results visualization, a handy feature for teaching and instructional presentations.

Accessibility is another substantial advantage. Being free and available for multiple platforms (Windows, macOS, and Linux), Jamovi eliminates financial and technical barriers that have traditionally limited the use of statistical software. This makes it a viable option for universities, schools, and institutions seeking cost-effective alternatives without compromising quality (Şahin & Aybek, 2019).

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The growth of Jamovi's user community and extensive documentation also contribute to Jamovi's success. For example, the software is supported by a robust base of tutorials and active forums, where questions are promptly addressed, and new users can find practical examples of applications (Ahmed & Muhammad, 2021; Kangiwa et al., 2024). This fosters a smooth learning curve and creates a collaborative environment for knowledge exchange.

This article provides a practical introduction to using Jamovi, highlighting its main features and advantages. Moreover, through an applied example, readers are guided step-by-step in performing essential operations, from data import to results interpretation, enabling them to explore the software's potential in their academic or professional projects.

## 2. HISTORY OF THE CONCEPTION AND CREATION OF JAMOVI

Jamovi was developed based on a clear need in statistical analysis: to provide a platform that combines accessibility, efficiency, and integration with advanced features such as the R language. The conception of this software began with three experts: Jonathon Love, Damian Dropmann, and Marcus Löfgren. These statisticians and programmers had previously contributed to JASP's development, another open-source statistical software focused on Bayesian analysis. Their aim with Jamovi, however, was to create a tool that was even more flexible and collaborative, addressing the needs of a broader range of users (Bartlett & Charles, 2022; Caldwell, 2022).

One of the central motivations for creating Jamovi was the realization that most statistical packages, such as SPSS and SAS, were costly and required extensive training. Furthermore, while integration with R offered a technical advantage, many users felt intimidated by the need for coding. Jamovi's goal was to provide a platform that facilitates robust analyses through a simple and familiar graphical interface while enabling advanced users to leverage R integration to create custom modules.

The first official version of Jamovi was released in 2017 (Navarro & Foxcroft, 2019) and was immediately praised by researchers and educators. Inspired by established packages like SPSS, its user-friendly graphical interface facilitated the transition for users accustomed to traditional programs. Simultaneously, its open-source model attracted educational institutions and organizations seeking more accessible and sustainable analytical solutions (Richardson & Machan, 2021).

A key strategic decision in Jamovi's design was to ensure that it was modular and expandable. This means anyone can develop and share additional packages for the platform,

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enhancing its functionality and adapting it to different fields of knowledge (Leppink, 2022; Bartlett & Charles, 2022; Kangiwa et al., 2024). This approach quickly positioned Jamovi as a standout tool in academia, especially in psychology, marketing, health, and education, where data analysis is critical for research.

Another notable feature is Jamovi's real-time results visualization capability. While many software packages require users to execute complex commands to obtain outputs, Jamovi dynamically displays results as analyses are configured (Şahin & Aybek, 2019). This feature facilitates understanding and error correction during execution, making the software particularly valuable for teaching quantitative methods in undergraduate and graduate programs. See Figure 1 as an example of the dynamic displays available from a multiple regression model.

Global collaboration has also been decisive in Jamovi's growth and success. As an open-source project, it has benefited from contributions from developers and users worldwide. The active community has created support forums, tutorials, and educational materials, reducing the learning curve for beginners. Additionally, the creators remain committed to regular updates, ensuring the software is aligned with innovations in statistics and data science (Bartlett & Charles, 2022).

Since its launch, Jamovi has become an indispensable tool for beginners and seasoned professionals conducting complex analyses. Its integration with R enables experienced users to develop custom solutions and perform advanced statistical analyses. With this dual approach, Jamovi focuses on both simplicity and sophistication.

Today, Jamovi is widely used in universities and research centers across various countries, including Brazil. Its growing presence in marketing, consumer behavior, and public health reflects the trust it has earned as an efficient and accessible alternative. Over the years, the platform has continued to evolve and grow with the same initial mission: to democratize access to data analysis and foster a more open and collaborative research culture.

## 3. CONTRIBUTIONS AND KEY COLLABORATORS

Since its launch, Jamovi has stood out as a collaborative and open project where programmers, statisticians, and academics from diverse fields continuously contribute to its growth. In addition to its founders, Jonathon Love, Damian Dropmann, and Marcus Löfgren, the platform has benefited from a global ecosystem of developers who create new modules and functionalities to meet the specific demands of various fields of knowledge. This collaborative

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dynamic allows the software to evolve quickly and efficiently, staying relevant amidst changes in analytical methods and academic needs.

A key strength of the platform is its expandability through community-developed modules. These modules enable the Jamovi software execute options beyond traditional statistical analyses by incorporating advanced tests, specific models, and innovative data visualizations. For instance, modules developed by external contributors have added functionalities such as covariance-based structural equation modeling (CB-SEM), survival analysis, and non-linear regression models, significantly broadening the software's capabilities.

Many key contributors are researchers and programmers affiliated with the R community. These experts leverage Jamovi's natural integration with R to develop packages that can be used directly through the software's graphical interface without coding. Popular modules include GAMLj, which provides tools for linear and mixed models, and MedMod, designed for mediation and moderation analyses. These additions are particularly valuable in fields such as psychology and social sciences, where these techniques are widely used.

Another example of significant collaboration is the development of modules tailored to education and public health (Bartlett & Charles, 2022), such as *Learning Statistics with R*, which supports students in learning statistics. These modules facilitate the understanding of theoretical concepts.

Beyond technical contributions, the user community has played a vital role in documenting and promoting the software. Online forums and groups bring together researchers who share tutorials, resolve questions, and discuss best practices for using Jamovi. This collaborative network is crucial for disseminating knowledge and ensuring that beginners and experts can fully utilize the program's features.

Contributors have also participated in developing functionalities for emerging fields such as machine learning and data science. Although Jamovi software was initially designed as a traditional statistical analysis tool, new demands are being addressed through modules incorporating techniques like predictive analytics and supervised learning. This adaptability makes the software relevant for social sciences and more data-driven and technical fields.

Jamovi's ability to grow and adapt is directly linked to its community of collaborators. Researchers from higher education institutions in various countries—such as Australia, the United States, Germany, and Brazil—have actively contributed to software maintenance. These contributors ensure that the program continues to meet contemporary scientific research needs, maintaining its status as an accessible and high-quality alternative to commercial software.

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The founders' vision of creating a collaborative and flexible platform has been widely realized. Thanks to the ongoing participation of the community, Jamovi not only offers a user-friendly and modern interface and incorporates the latest methodological innovations. This open development model strengthens the software's longevity and relevance, ensuring it remains a reference in data analysis for years.

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**Table 1** – Main Data Analysis Modules in Jamovi

| Module | Functionality | Developer(s) |
|---|---|---|
| Continuous Norming | Continuous norming for psychometric and biometric tests | Wolfgang Lenhard & Alexandra Lenhard |
| distrACTION | Probability and quartile calculations for distributions (continuous and discrete) | Boris Mayer, Michael Rihs, & Cameron Redsell-Montgomerie |
| GAMLj | General, mixed, and generalized linear models | Marcello Gallucci |
| JSQ | Bayesian statistics | Damian Dropmann, Ravi Selker, & Jonathon Love |
| Jsurvival | Survival analysis | Serdar Balci |
| Learning Statistics | Data and examples for learning statistics with Jamovi | Danielle Navarro & David Foxcroft |
| Major | Meta-analysis | W. Kyle Hamilton |
| MedMod | Mediation and moderation analysis | Ravi Selker |
| MoreTests | Additional tests for normality and variance homogeneity | Jonathon Love & Victor Moreno |
| Rasch Analysis | Rasch models, latent profile analysis, and test equation | Hyunsoo Seol |
| SEMlj - SEM | Structural equation modeling with covariance matrices | Marcelo Gallucci & Sebastian Jentschke |
| SnowCluster | Cluster analysis and decision trees | Hyunsoo Seol |
| SnowLatent | Latent class analysis | Hyunsoo Seol |

**Source:** the authors

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## 4. GETTING STARTED WITH JAMOVI

This section presents Jamovi's basic operationalization, from installation to some advanced features for quantitative data analysis.
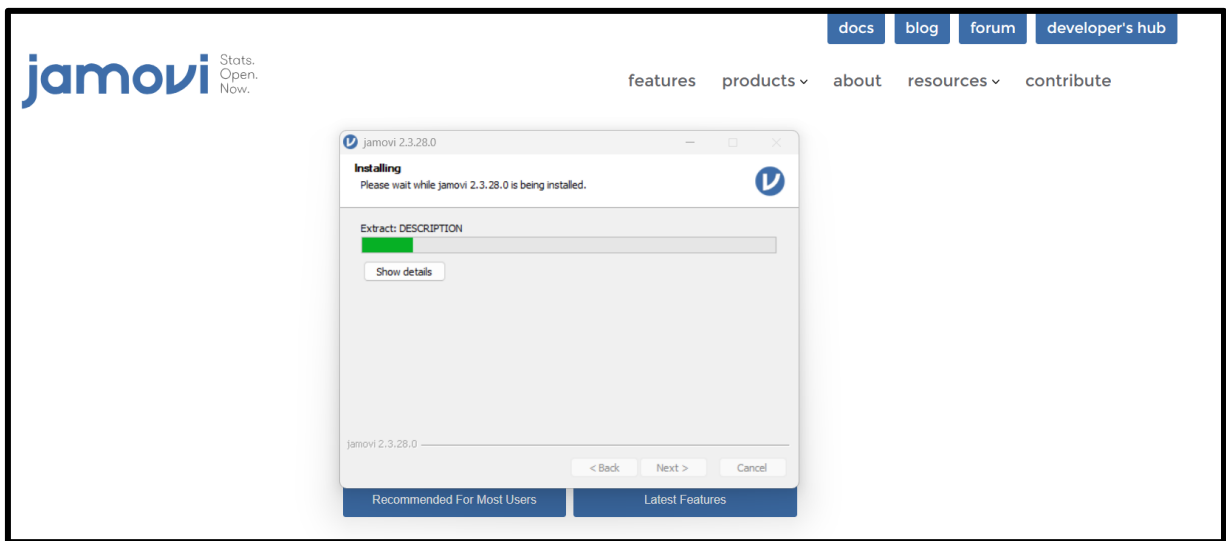
### 4.1 Installation

The software can be downloaded from the Jamovi project webpage, available at www.Jamovi.org. Users can access web downloads for the "solid" and "current" versions. The solid version, recommended for most users, is stable and pre-tested by the development team. The current version includes the latest updates but is still in the testing phase, potentially containing some instabilities. Both versions are available for major operating systems (Windows, macOS, Linux, and ChromeOS).
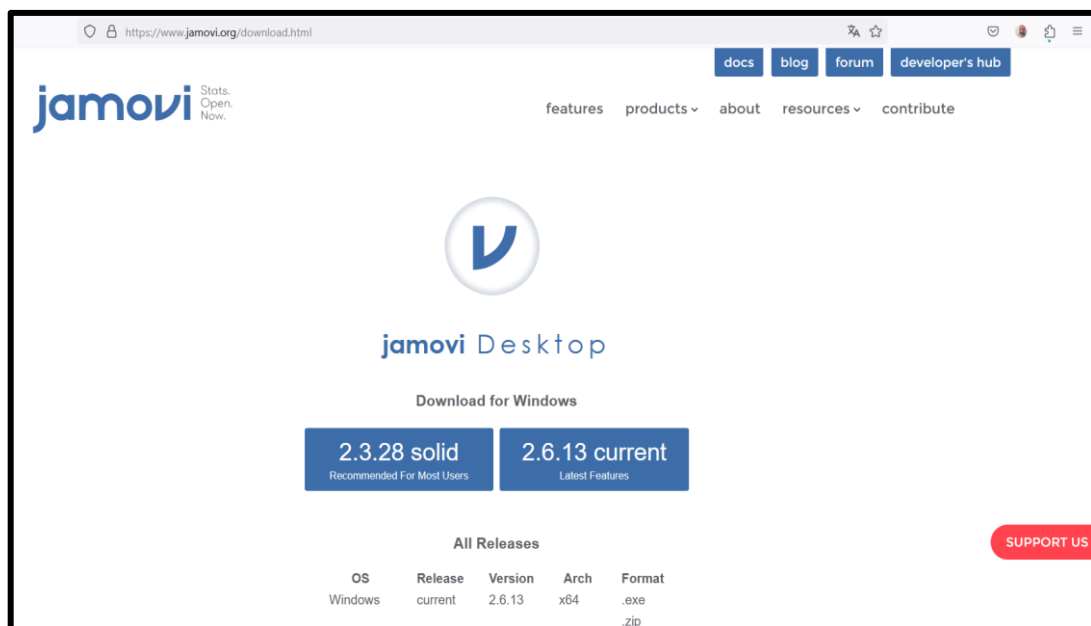


**Figure 1** – Jamovi Installation Screen

Additionally, the "Products" tab provides access to a "Cloud" version that does not require installation on a computer. The webpage also offers access to the developer community and some related documentation.

Users should choose a version and download the software based on their system's operating system. Once the download is complete, they can install the software in the desired directory.

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**Figure 2 –** Installing Jamovi on the User's Device

Once the installation is complete, Jamovi can be launched immediately. The software's initial screen is shown in Figure 3.
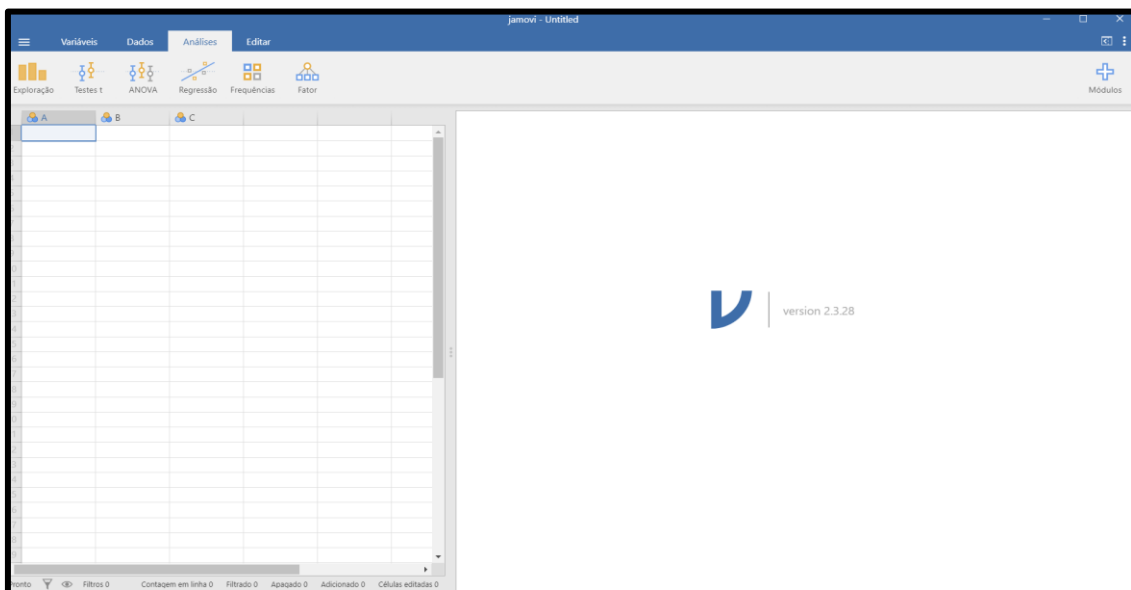


**Figure 3** – Jamovi Main Screen

The basic installation of Jamovi includes options for statistical test packages (Data Exploration, t-tests, ANOVAs, Regressions, Frequencies, and Factor Analysis).

Additional modules can be incorporated via the **+Modules -> Jamovi Library** option. This command gives users access to a menu of available packages for installation and the management of already installed packages.

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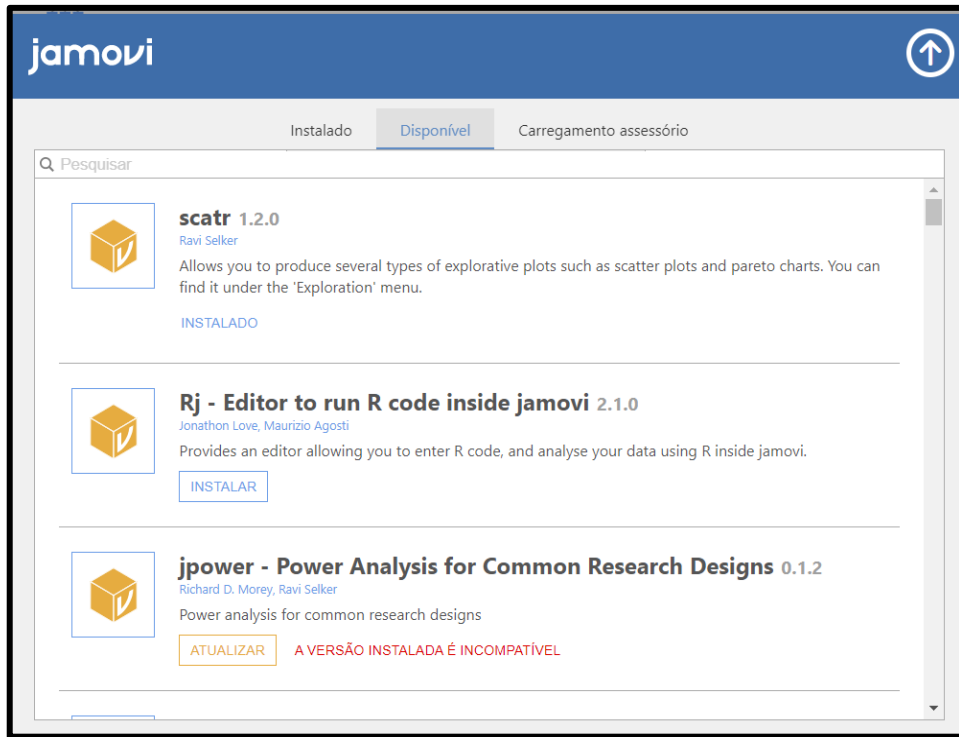
**Figure 4** – Managing Additional Data Analysis Packages

Users select the desired module, click "Install," and wait for the download and automatic installation to be completed. Once finished, a new test package icon will appear on the main screen (the moderation and mediation module are shown as an example).
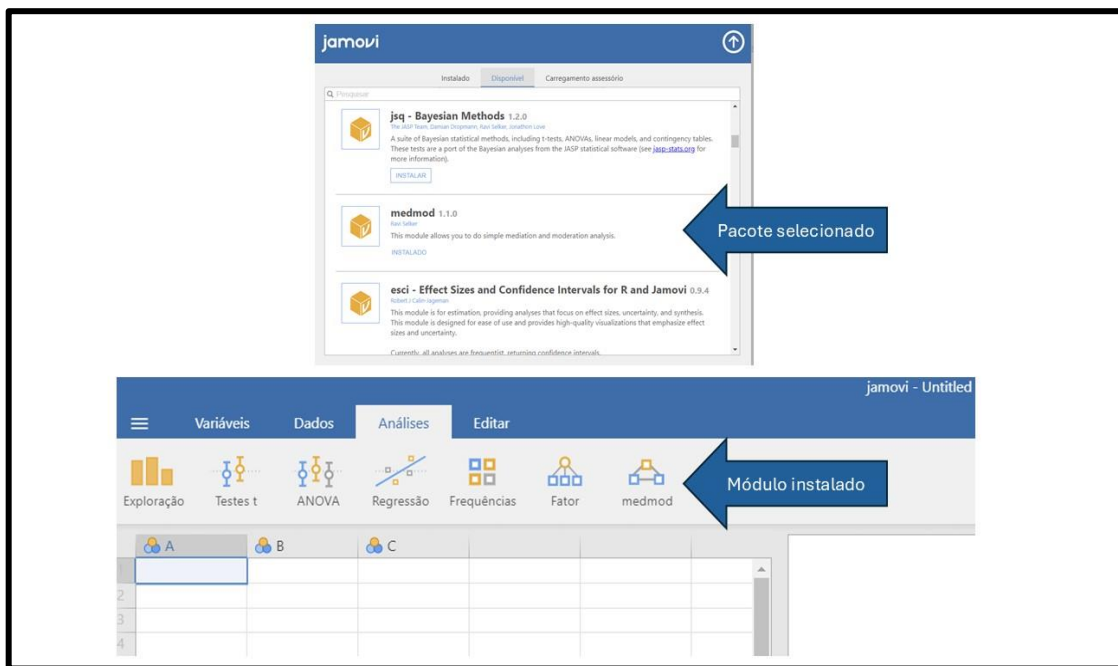


**Figure 5** – Installing Packages

## 4.2 Data Import

On the left side of the screen, users can view a structured data spreadsheet (one variable per column and one observation per row), while on the right side, statistical test results are displayed. A bar in the middle separates these two areas, and users can drag it to adjust the size of each visualization.

Like other software, users can input values directly into the Jamovi spreadsheet. It is also possible to open datasets in various formats (such as CSV, SPSS, Stata, and SAS). To open a file, select the file command menu (three lines in the upper left corner of the screen) and choose "Open" for Jamovi-format files (.omv) or "Special Import" for files in other formats. It is essential to ensure the file is not used by another software during this process.

Similarly, the "Save" and "Save As" commands enable users to save files in Jamovi, respectively, another desirable format.
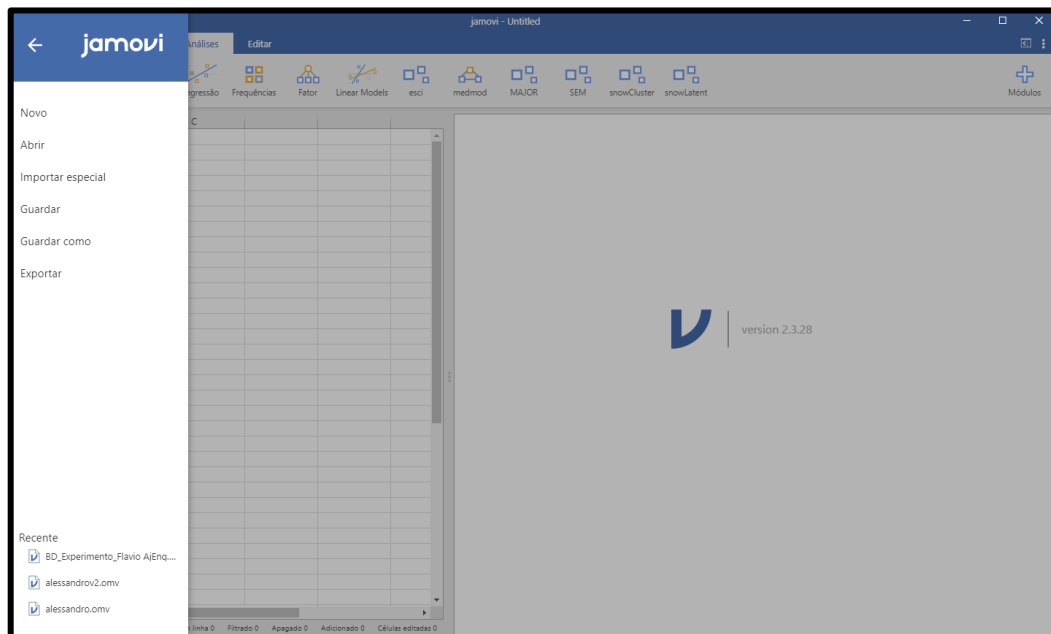


**Figure 6 –** Data Import and Export Menu

## 4.3 Variable types and measurement level

One of the most neglected aspects of data analysis is the proper definition of the variable type, whether qualitative/categorical or quantitative/numerical. In addition, when the variable is quantitative/numerical it can also be identified as either discrete or continuous.

This is a critical step before data analysis, even for seasoned researchers and professionals. Poorly defining the variable type can lead to impossible analyses, like ANOVA for categorical variables or a Chi-square test for numerical variables.

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Since Stevens's seminal work (1946) on the theory of measurement scales, researchers have been advised to be extra careful in assigning the variable type to each variable to be analyzed. In Jamovi, this is an easy step under the menu "Dados", as shown in Figure 7.



**Figure 7** – Data screen

In the example depicted in Figure 8, each variable is assigned to a proper Jamovi variable type. The first column is each respondent's ID (identification), and the variable was identified as the "ID". The following variable is the respondent's age, which was classified as "Contínua," as well as gender, educational level, and região; all of the categorical variables were classified as "Nominal." The variables starting with "Q" are part of the measurement scale. Data was collected using a Likert-type scale of 7 points. Given the nature of the measurement, the variables were classified as "Ordinal".

To classify a variable according to its measurement level, click on the row corresponding to that variable, and the options will be presented for selection, as shown in Figure 8.



**Figure 8** – Indicating the data category

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As shown in Figure 8, Jamovi presents four options to be selected: "Nominal" for categorical variables like marital status, "Ordinal" for ordinal-type variables (e.g., Likert-type scales), "Contínua" for numerical variables, and "ID"—an identification of each respondent. Assigning a variable as "ID" implies that the variable will not be used in any data analysis.

A specific case of "Contínua" is a choice between "Inteiro," or an integer number (those belonging to the set of integers numbers, or $\mathbb{Z}$), or "Decimal" for a number belonging to the set of real numbers, or $\mathbb{R}$), as shown in Figure 9.
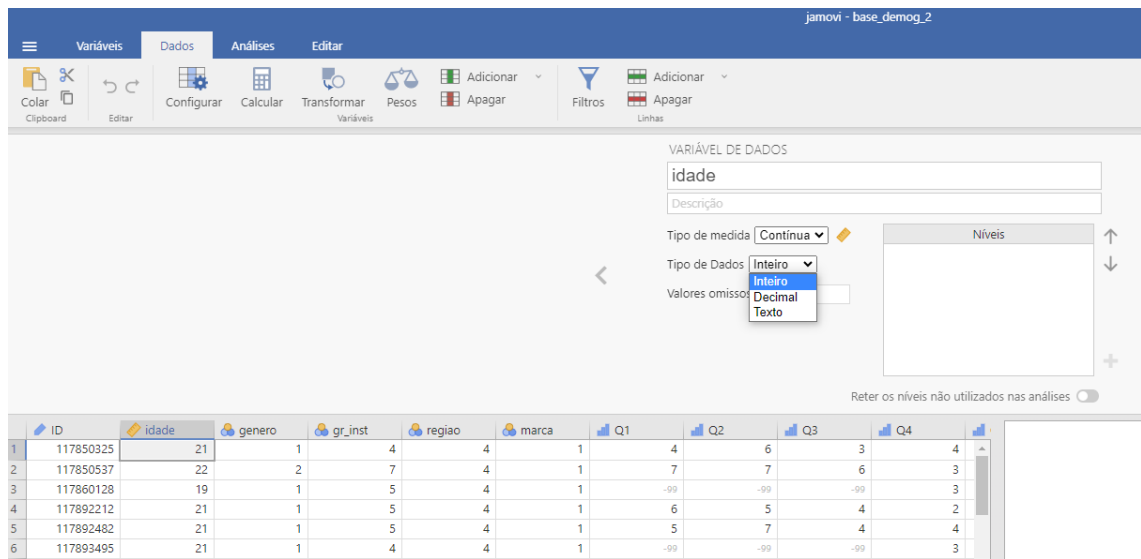


**Figure 9** - Continuous variables configuration option

Finally, the researcher should declare the code for missing data. Otherwise, this unique code will be employed as variables, and the results of any analysis will be compromised. In Figure 10, the representation of a missing data code, in this case, "-99", is shown under the variable Type definition. To change or include the missing data code, a double-click in the box "Valores omissos" will present a menu for this inclusion.



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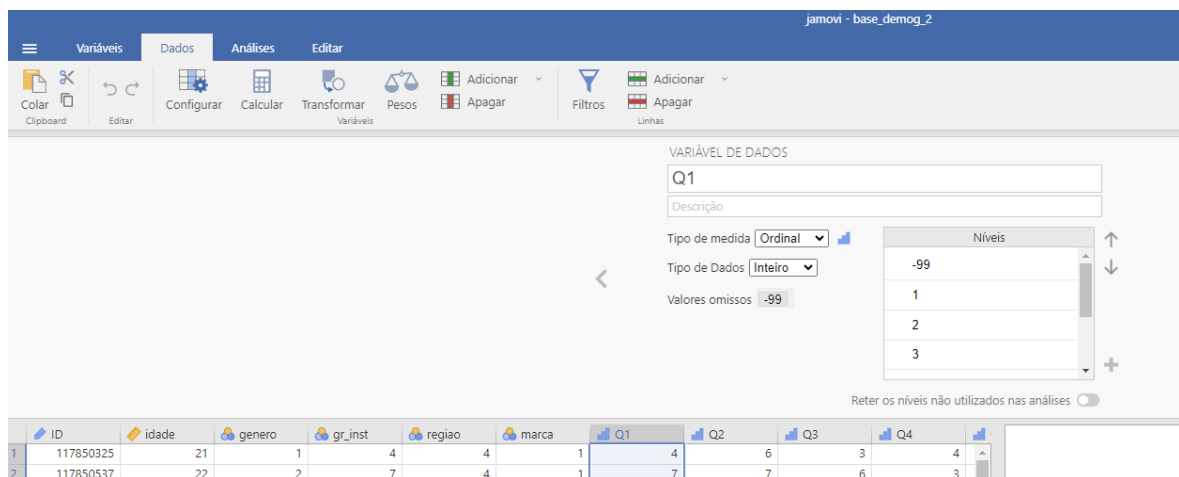
**Figure 10** - Specification of missing data

Although this article does not discuss in depth the analysis of missing data and potential ways to mitigate its impact, we recommend researchers invest some time in studying the causes and remedies for missing data before proceeding with data analysis. As one example, however, = explain how to deal with one type of missing data.  For a full explanation of dealing with missing data, we recommend reviewing Hair et al. (2019), especially Chapter 2, titled "Examining Your Data."

## 4.4 Screen for Data Analysis

Data analysis in Jamovi is accessed via the top toolbar, where each selection opens a specific options panel. This panel enables users to assign variables to different analysis parts and adjust parameters. Results are displayed simultaneously in the results panel on the right and are automatically updated as options are modified.
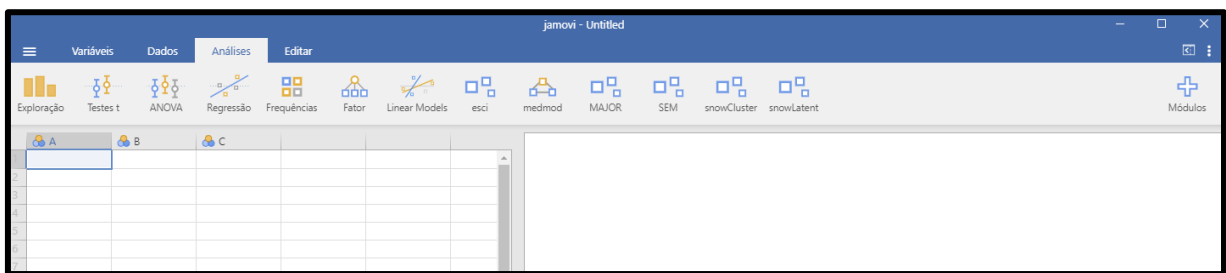


**Figure 11** – Data Analysis Options

Once the analysis is configured, the options panel can be hidden to facilitate viewing the results and reopened at any time. If necessary, analyses can be removed by right-clicking on the result, selecting "Analysis," and then choosing "Remove."

In Jamovi, data is organized in a spreadsheet where each column represents a variable. These variables can be imported in various formats (CSV, SPSS, Stata, and SAS) or entered manually. As mentioned previously, variables can have three data types (integer, decimal, and text) and four measurement types (nominal, ordinal, continuous, and identifier).

Calculated and recoded variables can be added through the "Data" tab, enabling operations such as logarithmic transformations, z-scores, and means. Jamovi also facilitates importing multiple files and creating templates that act as scripts for automatically applying analyses to new datasets.

Filters can be applied to exclude rows that do not meet specific criteria. Additionally, Jamovi generates tables and graphs formatted in APA style, which can be copied directly into

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other programs, including spreadsheets and text editors. To do this, right-click, choose the desired table or graph, and select the "Copy" function.

## 4.5 Syntax Mode in Jamovi

Jamovi offers an R Syntax Mode, which generates the equivalent R code for each process analysis performed. To activate this mode, select the Application Menu (three dots in the upper right corner) and enable the Syntax Mode option. Repeating the process can deactivate this mode.

When using this mode, analyses continue to function normally but produce ASCII output and R syntax, which can be copied and pasted into an R session. However, data import must be done manually. Additionally, the Rj module allows users to execute R code directly within Jamovi for more advanced analyses.
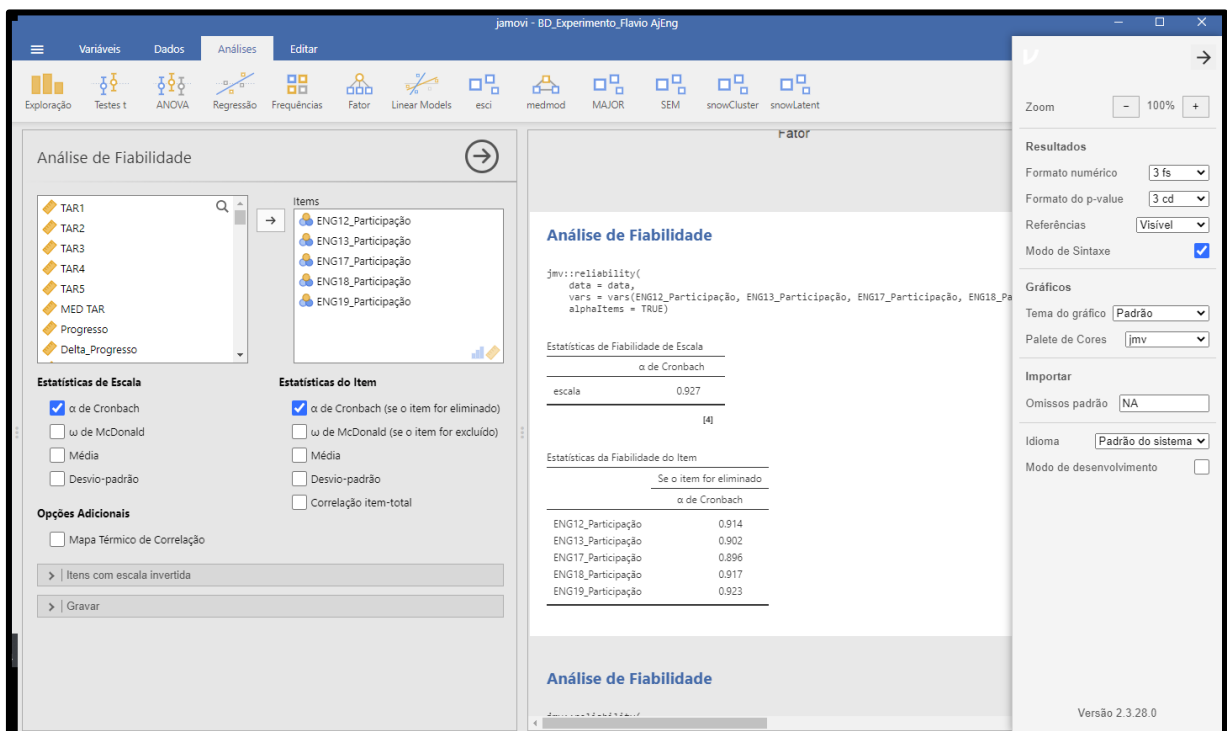


**Figure 12** – Syntax Mode in Jamovi

## 5. FINAL CONSIDERATIONS AND FUTURE POSSIBILITIES

Jamovi represents a significant innovation in data analysis, combining accessibility and robust functionalities in free and open-source software. Its intuitive approach allows students, researchers, and professionals from various fields to perform statistical analyses without requiring in-depth programming knowledge. Furthermore, its integration with R expands

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analytical possibilities for advanced users, making Jamovi a versatile and scalable tool. Perhaps most important is the software is "free" to potential users and will open up opportunities for many more individuals to execute advanced analyses and, therefore, to publish their research.

The future possibilities for Jamovi are promising. A collaborative community's continuous expansion of modules reinforces its role as a platform adaptable to emerging psychology, health, education, and marketing needs. As data analysis becomes increasingly essential for decision-making, Jamovi has the potential to establish itself as an indispensable option, particularly in educational institutions and organizations seeking accessible and efficient alternatives for quantitative analysis.

Based on their practical experience with the software, the authors of this article recommend Jamovi for data analysts at all proficiency levels. Beginners will find a user-friendly and straightforward interface. At the same time, more experienced professionals can explore its advanced integrations with R. In a nutshell, Jamovi is a powerful software tool for teaching, research, and professional practice.

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