EFAshiny: An User-Friendly Shiny Application for Exploratory Factor Analysis

Summary

`EFAshiny` is a user-friendly web application for exploratory factor analysis (EFA) (David J. Bartholomew 2011). The motivation to create `EFAshiny` is to streamline the routine work flow of EFA so that users unfamiliar with R can perform the analysis interactively in a web brower.

Employing the graphical user interface (GUI) of `shiny` (Winston Chang 2017) framework (Figure 1), `EFAshiny` provides an intergrated platform to perform EFA with a drop-down menu, offering a number of choices to manage, explore, analyze and visualize data. `EFAshiny` automates these processes by wrappings together several `R` (Team 2000) packages, such as `ggplot2` (Wickham 2016), `psych` (Revelle 2017), `corrplot` (Wei 2017), and `EGA` (Hudson Golino 2017), etc. For example, users can point-and-click to obtain graphical display of confidence intervals for factor loadings, which is not available in many commericial software. Moreover, results of analysis are presented on-line as tables and graphs and they can be saved and exported by the user.

Key features of `EFAshiny` include:

- An easy-to-use GUI to free users from scripting in R
- A step by step analysis flow to perform EFA
- Quick ways to summarize data by tables or graphs
- Several ways to explore factor retention numerically or graphically
- Several ways to explore factor extraction and rotation numerically or graphically
- A display of confidence intervals for factor loadings
- Several ways to link visualization of correlation matrix with factor structure
- Default options are chosen according to recommendations in the literature (Robin K Henson 2006)
- A demonstration using a real psychological scale dataset

Although the `EFAshiny` application is primarily aimed at behavioral researchers who want to perform EFA on a set of associated variables (e.g., item-level scale dataset), it can also be used to explore FA-based connectivity analyses (McLaughlin et al. 1992) in instrument data, such as event related potentials (ERPs) and functional near-infrared spectroscopy (fNIRS).

In conclusion, `EFAshiny` allows researchers to harness the combined power of many R packages together for performing interactive EFA and obtaining numerical and graphical results in a user-friendly menu-driven GUI. Documentation, tutorials and usages can be found on **our page**.

References

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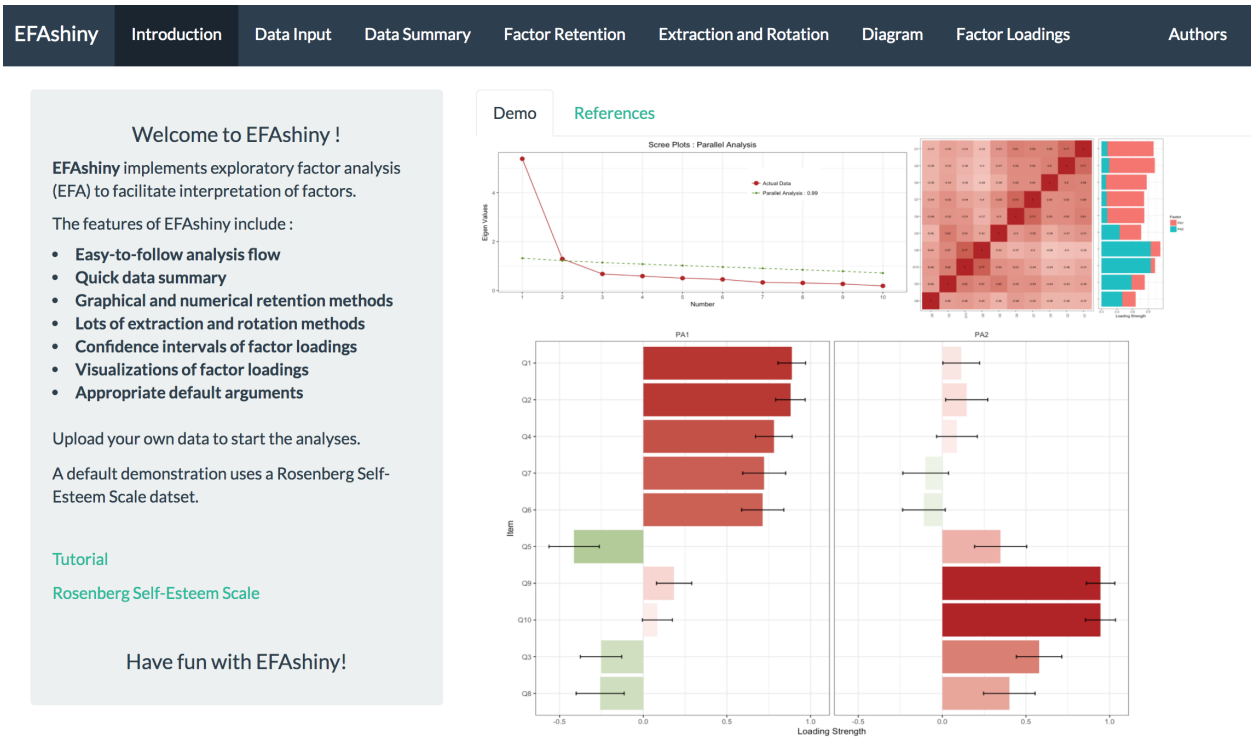

Figure 1: The GUI of `EFAshiny`

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