

Package ‘FAfA’

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Title Factor Analysis for All

Version 1.4.1

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Description Provides a comprehensive Shiny-based graphical user interface for conducting a wide range of factor analysis procedures. 'FAfA' (Factor Analysis for All) guides users through data uploading, assumption checking (descriptive statistics, collinearity, multivariate normality, outliers), data wrangling (variable exclusion, data splitting), exploratory factor analysis (EFA) with various rotation and extraction methods, confirmatory factor analysis (CFA), reliability analysis (e.g., Cronbach's Alpha, McDonald's Omega), and measurement invariance testing across groups. Factor retention methods include parallel analysis following Horn (1965) <doi:10.1007/BF02289447>, optimized parallel analysis following Timmerman and Lorenzo-Seva (2011) <doi:10.1037/a0023353>, permutation parallel analysis for categorical variables following Lubbe (2019) <doi:10.1037/met0000171>, the Hull method following Lorenzo-Seva et al. (2011) <doi:10.1080/00273171.2011.564527>, minimum average partial criteria following Velicer (1976) <doi:10.1007/BF02293557> and O'Connor (2000) <doi:10.3758/BF03200807>, and the empirical Kaiser criterion following Braeken and van Assen (2017) <doi:10.1037/met0000074>. Exploratory graph analysis follows Golino and Epskamp (2017) <doi:10.1371/journal.pone.0174035>, with bootstrap stability assessment following Christensen and Golino (2021) <doi:10.3390/psych3030032>. Internal split-sample EFA replication follows Osborne and Fitzpatrick (2012) <doi:10.7275/h0bd-4d11>. Model-specific dynamic fit index cutoffs for CFA follow McNeish and Wolf (2023) <doi:10.1037/met0000425>. Item weighting follows Kılıç (2026) <doi:10.3758/s13428-026-03095-w>. Analyses use established R packages such as 'lavaan' and 'psych'. Results are presented in tables and plots with downloadable outputs. Analysis projects can be saved and restored, and reproducible R, HTML, and PDF workflow reports can be generated.

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Depends R (>= 4.1.0)

URL <https://github.com/AFarukKILIC/FAfA>

BugReports <https://github.com/AFarukKILIC/FAfA/issues>

Imports Amelia, EFA.MRFA, EGAnet ($\geq 2.4.1$), ItemRest, bsicons, bslib, ggplot2, golem, grDevices, graphics, haven, lavaan, mice, missForest, mvnnormalTest, naniar, psych, qgraph, readxl, semPlot, shiny, shinycssloaders, stats, tools, utils

Suggests flextable, officer, shinytest2, spelling, testthat ($\geq 3.0.0$)

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about_server	About Server Module
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Description

About Server Module

Usage

about_server(id)

Arguments

id Module namespace ID.

assumptions_server	Assumptions Server Logic
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Description

Assumptions Server Logic

Usage

assumptions_server(id, data, error_recorder = NULL, language = NULL)

Arguments

id Module namespace ID.
data Input data (reactive).
error_recorder Optional function used for anonymous diagnostics.
language Optional reactive interface language.

cfa_server

*Confirmatory Factor Analysis (CFA) Server Module***Description**

Confirmatory Factor Analysis (CFA) Server Module

Usage

```
cfa_server(
  id,
  data,
  factor_dictionary = NULL,
  error_recorder = NULL,
  language = NULL
)
```

Arguments

id	Module namespace ID.
data	Reactive containing the input dataset.
factor_dictionary	Shared reactive value containing factor-to-item mappings.
error_recorder	Optional function used for anonymous diagnostics.
language	Optional reactive interface language.

Details

The Dynamic Fit Index workflow called by this module is adapted from version 1.1.0 of the dynamic R package under the GNU Affero General Public License, version 3 (AGPL-3). The integration was rewritten for FAfA's existing lavaan analysis flow rather than copied verbatim.

References

McNeish, D., & Wolf, M. G. (2023). Dynamic fit index cutoffs for confirmatory factor analysis models. *Psychological Methods*, 28(1), 61-88. doi:[10.1037/met0000425](https://doi.org/10.1037/met0000425)

cfa_ui	<i>Confirmatory Factor Analysis (CFA) UI Module</i>
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Description

Confirmatory Factor Analysis (CFA) UI Module

Usage

cfa_ui(id)

Arguments

id Module namespace ID.

data_selection_server	<i>Data Selection Server Logic</i>
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Description

Data Selection Server Logic

Usage

data_selection_server(id, data, language = NULL)

Arguments

id Module namespace ID.
data Input data (reactive).
language Reactive or character interface language ("en" or "tr").

 efa_replication_analysis

Conduct Internal Replication Analysis in EFA

Description

Randomly splits a data set into two halves, fits the same exploratory factor model in each half, aligns factor labels and signs, and compares item-level structure and loading magnitudes.

Usage

```
efa_replication_analysis(
  data,
  nfactors = 1L,
  rotate = "oblimin",
  fm = "minres",
  cor = "poly",
  seed = 2026L,
  volatility_cutoff = 0.04
)
```

Arguments

data	A data frame containing numeric analysis variables.
nfactors	Fixed number of factors extracted in both samples.
rotate	Rotation method passed to <code>psych::fa()</code> .
fm	Extraction method passed to <code>psych::fa()</code> .
cor	Correlation type: "cor" or "poly".
seed	Non-negative integer used for the random split.
volatility_cutoff	Squared loading-difference threshold. Osborne and Fitzpatrick (2012) suggest .04, corresponding to an absolute loading difference of .20.

Value

A list containing both fitted models, aligned loading comparisons, factor alignment information, and replication decisions.

References

Osborne, J. W., & Fitzpatrick, D. C. (2012). Replication analysis in exploratory factor analysis: What it is and why it makes your analysis better. *Practical Assessment, Research, and Evaluation*, 17, Article 15. doi:10.7275/h0bd4d11

efa_replication_server*EFA Replication Analysis Server Module*

Description

Runs the internal split-sample replication procedure described by Osborne and Fitzpatrick (2012) and reports item-level structural and loading-magnitude comparisons.

Usage

```
efa_replication_server(id, data, error_recorder = NULL, language = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive).
error_recorder	Optional function used for anonymous diagnostics.
language	Optional reactive interface language.

References

Osborne, J. W., & Fitzpatrick, D. C. (2012). Replication analysis in exploratory factor analysis: What it is and why it makes your analysis better. *Practical Assessment, Research, and Evaluation*, 17, Article 15. doi:10.7275/h0bd4d11

efa_server_analysis *EFA Analysis Server Module*

Description

EFA Analysis Server Module

Usage

```
efa_server_analysis(id, data, error_recorder = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive).
error_recorder	Optional function used for anonymous diagnostics.

efa_server_fac_ret	<i>EFA Factor Retention Server Module</i>
--------------------	---

Description

EFA Factor Retention Server Module

Usage

```
efa_server_fac_ret(id, data, error_recorder = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive).
error_recorder	Optional function used for anonymous diagnostics.

efa_server_report	<i>EFA Reporting Server Module</i>
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Description

EFA Reporting Server Module

Usage

```
efa_server_report(
  id,
  data,
  efa_output_reactive,
  efa_settings_reactive,
  language = NULL
)
```

Arguments

id	Module namespace ID.
data	Input data (reactive).
efa_output_reactive	Reactive containing the EFA results.
efa_settings_reactive	Reactive containing the EFA settings.
language	Optional reactive interface language.

inv_server	<i>Measurement Invariance Server Module</i>
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Description

Measurement Invariance Server Module

Usage

```
inv_server(id, data, error_recorder = NULL, language = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive)
error_recorder	Optional function used for anonymous diagnostics.
language	Optional reactive interface language.

item_weighting_server	<i>Item Weighting Server Module</i>
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Description

Item Weighting Server Module

Usage

```
item_weighting_server(id, data, error_recorder = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive)
error_recorder	Optional function used for anonymous diagnostics.

mod_itemrest_server	<i>ItemRest Analysis Server Module</i>
---------------------	--

Description

ItemRest Analysis Server Module

Usage

mod_itemrest_server(id, data, error_recorder = NULL, language = NULL)

Arguments

- id Module namespace ID.
- data Reactive containing the input dataset.
- error_recorder Optional function used for anonymous diagnostics.
- language Optional reactive interface language.

mod_itemrest_ui	<i>ItemRest Analysis UI Module</i>
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Description

ItemRest Analysis UI Module

Usage

mod_itemrest_ui(id)

Arguments

- id Module namespace ID.

mod_missing_server	<i>Missing Value Handling Server Module</i>
--------------------	---

Description

Missing Value Handling Server Module

Usage

```
mod_missing_server(  
  id,  
  data,  
  project_state = NULL,  
  restore_state = NULL,  
  error_recorder = NULL,  
  language = NULL  
)
```

Arguments

id	Module namespace ID.
data	Reactive containing the input dataset.
project_state	Optional shared project-state object.
restore_state	Optional reactive used while loading a project.
error_recorder	Optional function used for anonymous diagnostics.
language	Optional reactive interface language.

Value

Reactive containing the processed (imputed) dataset.

mod_missing_ui	<i>Missing Value Handling UI Module</i>
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Description

Missing Value Handling UI Module

Usage

```
mod_missing_ui(id)
```

Arguments

id	Module namespace ID.
----	----------------------

op_null_or	<i>Default Value Operator</i>
------------	-------------------------------

Description

Helper for default NULL values (coalesce)

Usage

```
x %||% y
```

Arguments

x	Left hand side
y	Right hand side

reliability_server	<i>Reliability Analysis Server Module</i>
--------------------	---

Description

Reliability Analysis Server Module

Usage

```
reliability_server(id, data, factor_dictionary = NULL, error_recorder = NULL)
```

Arguments

id	Module namespace ID.
data	Input data (reactive)
factor_dictionary	Shared reactive value containing factor-to-item mappings.
error_recorder	Optional function used for anonymous diagnostics.

run_app	<i>Run the Shiny Application</i>
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Description

This function launches the Shiny application. It uses default options for shinyApp and golem.

Usage

```
run_app()
```

`wrangling_server_ex_var`*Wrangling Server Modules*

Description

Wrangling Server Modules

Usage

```
wrangling_server_ex_var(  
  id,  
  data,  
  project_state = NULL,  
  restore_state = NULL,  
  error_recorder = NULL  
)
```

Arguments

<code>id</code>	Module namespace ID.
<code>data</code>	Input data (reactive)
<code>project_state</code>	Optional shared project-state object.
<code>restore_state</code>	Optional reactive used while loading a project.
<code>error_recorder</code>	Optional function used for anonymous diagnostics.

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