Package: fSRM (via r-universe)

October 22, 2024

Encoding UTF-8

Type Package

Title Social Relations Analyses with Roles (``Family SRM")

Version 0.6.5

Date 2021-01-25

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Description Social Relations Analysis with roles (``Family SRM") are
computed, using a structural equation modeling approach. Groups
ranging from three members up to an unlimited number of members
are supported and the mean structure can be computed. Means and
variances can be compared between different groups of families
and between roles.

Depends lavaan

Imports plyr, reshape2, ggplot2, scales, foreign, tcltk, tcltk2,
gridExtra, methods

License GPL (>= 2)

RoxygenNote 7.1.1

NeedsCompilation no

Date/Publication 2021-01-27 10:50:02 UTC

Repository https://nicebread.r-universe.dev

RemoteUrl https://github.com/cran/fSRM

RemoteRef HEAD

RemoteSha f11d395a3f9db01816ed694d7b221a5a33e750cd

Contents

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buildSRMSyntax   *Build lavaan syntax for a Social Relations Model with roles ("Family SRM")*

Description

Build lavaan syntax for a Social Relations Model with roles ("Family SRM"). This function is called by the fSRM function, but can be also called directly to build an appropriate lavaan syntax.

Usage

```
buildSRMSyntax(
  roles,
  var.id,
  self = FALSE,
  IGSIM = list(),
  drop = "default",
  err = "default",
  means = FALSE,
  diff = FALSE,
  pairwise = FALSE,
  groupnames = NULL,
  add.variable = c(),
  selfmode = "cor",
  noNegVar = FALSE,
  rolesEqual = FALSE,
  ...
)
```

Arguments

roles	A vector with all role labels.
var.id	A vector with the variable names of the DV indicators
self	Should self-ratings be included in the analysis (if present in the data set)?

IGSIM	Define intragenerational similarity correlations. Must be a list where the levels of actor.id and partner.id are combined, e.g.: IGSIM=list(c("m", "f"), c("c", "y")). Here "m"other and "f"ather are defined as one generation, and "y"ounger and "o"lder as the other generation.
drop	In three-member families at least one component has to be dropped. drop defines which one: "none": drop nothing; "family" - drop family effect; "GR" - drop generalized reciprocities; "actor" - drop actor factors and actor-partner covariances; "partner" - drop partner effects and actor-partner covariances; "default": drop nothing in >= 4 members and drop family effect with 3 members. Although usually not necessary, the drop parameter can also be applied to >= 4 member families.
err	Defines the type of correlations between error terms. err = "no": no error term correlations - this is the required mode for single indicators. err = "all": If multiple indicators are present, correlate same items BETWEEN raters (e.g., Dyadic Data Analysis, Kenny, Kashy, & Cook, 2000). err = "default": Set err to "no" for single indicators and to "all" for multiple indicators.
means	Should the structured means of the SRM factors be calculated?
diff	Compare groups with the delta method?
pairwise	Compute pairwise comparison of actor and partner means between all roles? Only works when means is also set to TRUE
groupnames	Vector with the names of the groups (i.e., the values of the group column in the data set)
add.variable	Not yet fully implemented: Add external variables to the model syntax.
selfmode	Defines the style how the selfratings are combined with the latent actor and partner effects. If selfmode="cor" they are correlated (as in REFERENCE), if selfmode="kq" the k and q paths are calculated (see Kenny & West, 2010)
noNegVar	Should variance estimates be constrained to be positive?
rolesEqual	Maximal constraints: Do roles matter at all? If this parameter is set to TRUE, it is a model with no mean difference, the actor variances equal, partner variances equal, relationship variances equal, and the respective reciprocities equal (Thanks to a suggestion of David Kenny). Model comparisons via anova can show whether roles matter at all.
...	Additional arguments (not documented yet)

Details

None.

References

Kenny, D. A., & West, T. V. (2010). Similarity and Agreement in Self-and Other Perception: A Meta-Analysis. Personality and Social Psychology Review, 14(2), 196-213. doi:10.1177/1088868309353414

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clinical | *Data set on negativity in problematic and nonproblematic families A simulated dataset, mimicking the study performed by Eichelsheim et al. (2011) who investigated whether there are differences in patterns of negativity between families with and without an adolescent with externalizing problem behavior. In the study of Eichelsheim et al. (2011), four members of the same family (mother, father, target adolescent and sibling) reported on the amount of negativity they experienced in relation to each other. In total, these authors studied 120 Dutch four-person families with a target adolescent scoring above the externalizing behavior clinical norm scores on either the Child Behavior Check List (N = 47; CBCL; Achenbach, 1991) or the Youth Self Report (N = 73; YSR; Achenbach, 1991). Because of confidentiality reasons, not the original data but mimicked data are used here, so results of social relations analyses will deviate from the original paper.*

Description

In sum, this dataset contains a measures of negativity for each of the 12 relationships. Four roles are present: Mothers "M", fathers "F", the asolescent with externalizing problem behavior "T", and the adolescent sibling without problem behavior "S". A wide version of the same data set is in `clinical.wide`.

Usage

```
data(clinical)
```

Details

The variables are as follows:

- family.id An indicator for the family.
- actor.id An indicator for the perceiver, either "M", "F", "T", or "S".
- partner.id An indicator for the target, either "M", "F", "T", or "S".
- neg Negativity measure.

---

equalMeans | *Test actor and partner means for equality*

Description

Test actor and partner means for equality, using a Wald test.

Usage

```
equalMeans(x, digits = 3)
```

Arguments

x	A fSRM object-
digits	Digits to which the printed results are rounded

---

four.person *Data set on attachment anxiety in four person families (Cook, 2000)*

Description

The classic Cook (2000) dataset consists of measurements on security of attachment within families. Only the variable measuring fear of rejection in family relationships is included in this dataset. Cook (2000) deduced this variable from the anxiety dimension of the adult attachment scale (Collins & Read, 1990). The original data consisted of four person families (i.e. two parents and two children): the mother is labeled as "m", the father as "f", the oldest child as "c" and the youngest child as "y".

Format

A data frame with 2497 rows and 4 variables (208 families with 4 members each, round-robin design)

Details

The variables are as follows:

- family.id An indicator for the family.
- actor.id An indicator for the rater in the dyad, either "m", "f", "c", or "y"
- partner.id An indicator for the person being rated in the dyad, either "m", "f", "c", or "y"
- anx: The obtained score on the attachment anxiety scale.

Source

This dataset was retrieved from http://davidakenny.net/kkc/c9/c9.htm in wide format and converted to an R dataset in long format.

References

Cook, W. L. (2000). Understanding attachment security in family context. *Journal of Personality and Social Psychology, 78*, 285-294. doi:10.1037/0022-3514.78.2.285

Collins, N. L., & Read, S. J. (1990, April). Adult attachment, working models, and relationship quality in dating couples. Journal of Personality and Social Psychology, 58, 644-663.

Examples

```
data(four.person)
head(four.person)
```

---

fSRM   *Run a Social Relations Model with roles ("Family SRM")*

Description

Run a Social Relations Model with roles ("Family SRM")

Usage

```
fSRM(
  formula = NULL,
  data,
  drop = "default",
  add = "",
  means = FALSE,
  pairwise = FALSE,
  diff = FALSE,
  IGSIM = list(),
  add.variable = c(),
  syntax = "",
  group = NULL,
  noNegVar = FALSE,
  rolesEqual = FALSE,
  missing = NA,
  ...
)
```

Arguments

formula	A formula that defines the variable names. Should be in one of following formats: (1) Single manifest dependent variable: DV ~ actor.id * partner.id	group.id, (2) Multiple indicators for dependent variable: DV1/DV2/DV3 ~ actor.id * parter.id	group.id.
data	A data frame with all variables defined by formula. Must be in long format where each row describes one directed dyadic relationship.
drop	In three-member families at least one component has to be dropped. drop defines which one: "none": drop nothing; "family" - drop family effect; "GR" - drop generalized reciprocities; "actor" - drop actor factors and actor-partner covariances; "partner" - drop partner effects and actor-partner covariances; "default": drop nothing in >= 4 members and drop family effect with 3 members. Although usually not necessary, the drop parameter can also be applied to >= 4 member families.

add	Additional lavaan syntax pasted at the end of the generated model. Can contain, for example, user specified error correlations.
means	Should the structured means of the SRM factors be calculated?
pairwise	Compute pairwise comparison of actor and partner means between all roles? Only works when means is also set to TRUE.
diff	Compare groups with the delta method? You need to specify a group identifier in parameter group. If diff = TRUE and means = FALSE, only variances are compared between groups. If diff = TRUE and means = TRUE, variances and means are compared between groups.
IGSIM	Define intragenerational similarity correlations. Must be a list where the levels of actor.id and partner.id are combined, e.g.: IGSIM=list(c("m", "f"), c("c", "y")). Here "m"other and "f"ather are defined as one generation, and "y"ounger and "o"lder as the other generation.
add.variable	Not yet fully implemented: Add external variables to the model syntax.
syntax	In that variable the user can directly provide a lavaan model syntax. Then no automatical model syntax is generated.
group	Variable name indicating group membership. This can be used two compare two classes of families (e.g., clinical families vs. control families). If this variable is provided, it must contain exactly two levels.
noNegVar	Should variance estimates be constrained to be positive?
rolesEqual	Maximal constraints: Do roles matter at all? If this parameter is set to TRUE, it is a model with no mean difference, the actor variances equal, partner variances equal, relationship variances equal, and the respective reciprocities equal (Thanks to a suggestion of David Kenny). Model comparisons via anova can show whether roles matter at all.
missing	Handling of missing values. By default (NA), Full Information Maximum Likelihood (FIML) is employed in case of missing values. If families with missing values should be excluded, use missing = "listwise"
...	Additional arguments passed to the sem function of lavaan

Details

A model can be rerun with additional syntax using the add function: s1 <- fSRM(dep1/dep2 ~ actor*partner | fam, dat2) s2 <- add(s1, "Ac ~~ Pm") A model can be run with new parameters using the update function: s1 <- fSRM(dep1/dep2 ~ actor*partner | fam, dat2) s2 <- update(s1, diff=TRUE)

The fSRM function relies on the lavaan package for computation: A syntax for the SRM with roles is generated and then passed to the lavaan function. Hence, many options of the lavaan function can be used out-of-the-box (additional parameters are passed to the lavaan function through the ... operator). For example, one can deal with missing values. The default behavior is to exclude families with missing values (listwise deletion). Set fSRM(..., missing="fiml") for ML / FIML estimation. Or, you can request bootstrapped standard errors with fSRM(..., se="boot"). You can test for a very restricted model by constraining the roles to be equal ("Do roles matter at all?"). Therefore, compare a model with free roles (m1 <- fSRM(..., means=TRUE, rolesEqual = FALSE)) with a model with equal roles (m2 <- fSRM(..., means=TRUE, rolesEqual=TRUE)) using anova(m1$fit, m2$fit) (Thanks to David Kenny for the suggestion). For plotting relative variances and mean structure, see plot.fSRM.

References

Kenny, D. A., & West, T. V. (2010). Similarity and Agreement in Self-and Other Perception: A Meta-Analysis. Personality and Social Psychology Review, 14(2), 196-213. doi:10.1177/1088868309353414

See Also

plot.fSRM, equalMeans, mod

Examples

```
# Example from Dyadic Data Analysis
data(two.indicators)
# 4 persons, 1 indicator
f4.1 <- fSRM(dep1 ~ actor.id*partner.id | family.id, two.indicators)
f4.1  # by default, one-sided p-values and CIs are printed for variances
print(f4.1, var.onesided=FALSE) # Show two-sided p-values and CIs for variances
plot(f4.1) # plot relative variances
plot(f4.1, bw=TRUE)

## Not run:
# 4 persons, 2 indicators
f4.2 <- fSRM(dep1/dep2 ~ actor.id*partner.id | family.id, two.indicators)
f4.2
plot(f4.2, bw=TRUE)
plot(f4.2, bw=TRUE, onlyStable=TRUE)

# 4 persons, 1 indicator, mean structure
f4.1.m <- fSRM(dep1 ~ actor.id*partner.id | family.id, two.indicators, means=TRUE)
f4.1.m
plot(f4.1.m, means=TRUE)  # plot mean structure

# 4 persons, 2 indicators, mean structure
f4.2.m <- fSRM(dep1/dep2 ~ actor.id*partner.id | family.id, two.indicators, means=TRUE)
f4.2.m

# ... add intragenerational similarity (now results are identical to Cook, 2000)
f4.ig <- fSRM(dep1/dep2 ~ actor.id*partner.id | family.id, two.indicators,
              IGSIM=list(c("m", "f"), c("c", "y")))
f4.ig

## =====================================================================
## Wald-test for equality of means
## =====================================================================

f4.1.m <- fSRM(dep1 ~ actor.id*partner.id | family.id, two.indicators, means=TRUE)
f4.1.m
equalMeans(f4.1.m)

# construct a 3-person data set
two.indicators3 <-
two.indicators[two.indicators$actor.id != "y" & two.indicators$partner.id != "y", ]
f3.2.m <- fSRM(dep1/dep2 ~ actor.id*partner.id | family.id, two.indicators3, means=TRUE)
```

```
f3.2.m
equalMeans(f3.2.m)



# --------------------------------------------------------------------
# Run analyses based on Eichelsheim, V. I., Buist, K. L., Dekovic, M.,
  Cook, W. L., Manders, W., Branje, S. J. T., Frijns, T., et al. (2011).
  Negativity in problematic and nonproblematic families:
  A multigroup social relations model analysis with structured means.
  Journal of Family Psychology, 25, 152-156. doi:10.1037/a0022450

# The data set is a simulated data set which has
# comparable properties as the original data set

data(two.groups)
str(two.groups)

E1 <- fSRM(neg ~ actor.id*partner.id | family.id, data=two.groups)
E1

# make group comparison:
# group = 1: non-problematic families, group = 2: problematic families
# The data set must contain exactly two groups, otherwise an error is printed
E2 <- fSRM(neg ~ actor.id*partner.id | family.id, data=two.groups, group="group")
E2

# Compare means and differences between groups. Beware: This model takes *really* long ...
E3 <- fSRM(neg ~ actor.id*partner.id | family.id,
           data=two.groups, group="group", means=TRUE, diff=TRUE)
E3


## End(Not run)
```

---

import	*Import and transform a dataset into long format*

Description

This graphical users interface (GUI) can be used for inserting .csv, .txt and .sav-files in R by means of a pop-up window. It also allows to transform a dataset from wide into the requiered long format for the fSRM-function. The output format for the SRM components can be confirmed or modified.

Usage

```
import()
```

Details

This GUI allows the user three different things: (i) Import a datafile in R. The upper section of the main window allows to insert .csv, .txt and .sav-files in R. It is required that the first row of this datafile contains the variable names. (ii) Transform a dataset that is in wide format into the desired long format, in order to use the `fSRM`-function. A new pop-up window appears after clicking on 'transform my data' in the middle section. This new window allows to transform a dataset from wide format (i.e. each column represents one measured relationship, each row one family) to the necessary long format. Specify - if present - first the variable names which identifies the different families and groups, respectively. Next, specify the columns in the original dataset which contain the dyadic measurements. Enumerated columns need to be separated with a comma, consecutive columns need to be defined by means of colon (e.g. 1 : 9 defines the first until the second column in the original dataset). Finally, define the position of the characters of the rater, the person being rated and the indicator (if present) in the previously selected dyadic measurements. (iii) Define the desired output-format for the different SRM-components. At the bottom section of the main window the user can agree with the default labels of the SRM components by clicking on 'Confirm output format' or specify alternative labels.

Importing a data set is a two-step process. First, you have to call the `import` function. When you click on OK, the transformed data set is saved in a hidden variable. To access the variable, you have to call `getImport`.

Examples

```
## Not run:
import()
# --> now click throught the menu
dat <- getImport()

## End(Not run)
```

---

mod   *Get modification indices for a fSRM object*

Description

Get modification indices for a fSRM object.

Usage

```
mod(x, minMI = 10)
```

Arguments

x	A fSRM object.
minMI	Minimum size of modification indices to be printed.

---

plot.fSRM   *Plot an fSRM-object, two types*

Description

This function provides two types of plots: 1) Plot the relative variances of an fSRM-object (default)
2) Plot the mean decomposition for each dyad (set means=TRUE)

Usage

```
## S3 method for class 'fSRM'
plot(x, ..., means = FALSE, bw = FALSE, onlyStable = FALSE)
```

Arguments

x	A fSRM object.
...	Other parameters (currently not used)
means	If FALSE, the relative variances are plotted. If TRUE, the mean structure is plotted.
bw	Black/white plotting?
onlyStable	In case of variance plots: Should only the partitioning of the *stable* variance (without error) be plotted?

Examples

```
## Not run:
data(two.indicators)
# 4 persons, 1 indicator
f4.1 <- fSRM(dep1 ~ actor.id*partner.id | family.id, two.indicators, means=TRUE)
f4.1
plot(f4.1)
plot(f4.1, bw=TRUE)
plot(f4.1, means=TRUE)

# 4 persons, 2 indicators
f4.2 <- fSRM(dep1/dep2 ~ actor.id*partner.id | family.id, two.indicators, means=TRUE)
f4.2
plot(f4.2)
plot(f4.2, bw=TRUE)
plot(f4.2, means=TRUE)

## End(Not run)
```

---

predict.fSRM   *Predict new cases based on a fitted fSRM model*

Description

Predict new cases based on a fitted fSRM model

Usage

```
## S3 method for class 'fSRM'
predict(object, newdata, ...)
```

Arguments

object   A fSRM object.

newdata   A data frame with exactly the same structure as the data frame on which the
                original fSRM object is based on.

...   Other parameters (currently not used)

---

three.person   *Data set on attachment anxiety in 3-person families (based on Cook,
                             2000)*

Description

The classic Cook (2000) dataset consists of measurements on security of attachment within families.
Only the variable measuring fear of rejection in family relationships is included in this dataset. Cook
(2000) deduced this variable from the anxiety dimension of the adult attachment scale (Collins &
Read, 1990). The orignial data consisted of four person families (i.e. two parents and two children),
but in order to obtain a three person family the oldest sibling is systematically deleted in accordance
with Kenny, Kashy & Cook (2006). The following labels are used for the three roles: the mother is
labelled "m", the father "f" and the youngest child "y". The data are presented in the long format.
Three roles are present: Mothers "m", fathers "f", and the younger child "y".

Format

A data frame with 1249 rows and 5 variables (208 families with 3 members each, round-robin
design)

Details

The variables are as follows:

- family.id An indicator for the family.
- actor.id An indicator of the rater in the dyad, either "m", "f", or "y"
- partner.id An indicator for the person being rated in the dyad, either "m", "f", or "y"
- anx1: First indicator of relationship specific anxiety (i.e. average of first halve of the scale).
- anx2: Second indicator of relationship specific anxiety (i.e. average of second halve of the scale).

Source

This dataset was retrieved from <http://davidakenny.net/kkc/c9/c9.htm> in wide format and converted to an R dataset in long format.

References

Cook, W. L. (2000). Understanding attachment security in family context. *Journal of Personality and Social Psychology, 78*, 285-294. doi:10.1037/0022-3514.78.2.285

Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58, 644-663.

Examples

```
data(three.person)
head(three.person)
```

---

two.groups	*Data set on negative interactions A simulated dataset, mimicking the study performed by Eichelsheim et al. (2011) who investigated whether there are differences in patterns of negativity between families with and without an adolescent with externalizing problem behavior. The problematic and nonproblematic group consist of 120 and 153 four-person families, respectively. This dataset contains a measures of negativity for each of the 12 relationships. Four roles are present: Mothers "M", fathers "F", the asolescent with externalizing problem behavior "T", and the adolescent sibling without problem behavior "S". A wide version of the same data set is in* two.groups.wide.

Description

The variables are as follows:

Usage

```
data(two.groups)
```

Format

A data frame with 3276 rows and 6 variables (273 families with 4 members each, round-robin design)

Details

- family.id An indicator for the family.
- actor.id An indicator for the perceiver, either "M", "F", "T", or "S".
- partner.id An indicator for the target, either "M", "F", "T", or "S".
- group An indicator for the group, 1 represents the problematic families and 2 the nonproblematic families.
- neg Negativity measure.

References

Eichelsheim, V. I., Buist, K. L., Dekovic, M., Cook, W. L., Manders, W., Branje, S. J. T., et al. (2011). Negativity in problematic and nonproblematic families: A multigroup social relations model analysis with structured means. *Journal of Family Psychology*, 25, 152-6. DOI: 10.1037/a0022450.

---

two.indicators   *Data set on attachment dependency (Cook, 2000) The classic Cook (2000) dataset consists of measurements on security of attachment within families. Only the variable measuring attachment dependency in family relationships is included in this dataset. Four roles are present (i.e. two parents and two children): mothers "m", fathers "f", the older child as "c", and the younger child "y".*

Description

The variables are as follows:

Format

A data frame with 2496 rows and 4 variables (208 families with 4 members each, round-robin design)

Details

- family.id An indicator for the family.
- actor.id An indicator for the perceiver, either "m", "f", "c", or "y".
- partner.id An indicator for the target, either "m", "f", "c", or "y".
- dep1 first measurement of attachment dependency.
- dep2 second measurement of attachment dependency.

References

Cook, W. L. (2000). Understanding attachment security in family context. *Journal of Personality and Social Psychology, 78*, 285-294. doi:10.1037/0022-3514.78.2.285

Examples

```
data(two.indicators)
head(two.indicators)
```

---

update.fSRM	*Rerun a fSRM model with new parameters*

Description

Rerun a fSRM model with new parameters

Usage

```
## S3 method for class 'fSRM'
update(object, evaluate = TRUE, ...)
```

Arguments

object	A fSRM object.
evaluate	Set to TRUE.
...	Other parameters (currently not used)

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