Package 'SDT'

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Title Self-Determination Theory Measures

Description Functions for self-determination motivation theory (SDT) to compute measures of motivation internalization, motivation simplex structure, and of the original and adjusted self-determination or relative autonomy index. SDT was introduced by Deci and Ryan (1985) <doi:10.1007/978-1-4899-2271-7>. See package?SDT for an overview.

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SDT-package *Self-Determination Theory Measures: The R Package SDT*

Description

Self-determination theory (SDT) is a theory of human motivation. The package **SDT** provides functions and an example dataset for computing measures of motivation internalization and of motivation simplex structure, and the original and adjusted self-determination or relative autonomy index in R.

Details

Package:	**SDT**
Type:	Package
Version:	1.0.0
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License:	GPL (>= 2)

SDT was proposed by *Deci and Ryan (1985, 2000, 2002)* and is a popular theory of motivation. This theory is useful for understanding the motivational basis of human behaviors. The general aim is to investigate the interplay between the extrinsic forces or factors acting on people (e.g., grades or payment) and the intrinsic motives or needs inherent in humans (e.g., interests or enjoyment).

Applications are numerous and are extensively referenced, with comprehensive additional materials on the theory and the available questionnaires, on the website http://www.selfdeterminationtheory.org.

In particular, SDT postulated different types of motivation. As to the introjected and identified regulation of extrinsic motivation, their internalizations were described as *"somewhat external"* and *"somewhat internal"* and remained undetermined in the theory. The function `internalization` implements the constrained regression analysis approach by *Uenlue and Dettweiler (2015)* that allows these vaguely expressed intermediate motivations to be estimated from questionnaire data. The approach can also be generalized and applied for simplex structure analysis in SDT, where the simplex structure of SDT means that motivation regulation types theoretically closer to one another are more strongly interrelated/correlated. Simplex structure analysis in R is provided with the function `simplex`. Finally, the third main function `sdi` of the package **SDT** implements the popular *self-determination* or *relative autonomy index* (SDI or RAI), which is a scoring protocol or summary statistic aggregating individual test or subscale scores to yield an overall informative measure. As discussed in *Uenlue (2016)*, the original SDI or RAI index is confounded (i.e., generally not accommodating biasing effects on the overall index value that may result from a mixture of internal and external motivation), therefore the function `sdi` also implements an adjusted scoring protocol variant of this measure.

The package **SDT** is implemented based on the S3 system. It comes with a namespace, and consists of three main functions: `internalization`, `sdi`, and `simplex`. It also contains five functions, which are `plot`, `print`, and `summary` methods for objects of the class `sdi`, and `plot` and `print` methods for objects of the class `share`: `plot.sdi`, `print.sdi`, and `summary.sdi`, and `plot.share`

and print.share. The features of the package **SDT** are illustrated with an accompanying dataset: learning_motivation.

Author(s)

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References

Deci, E. L. and Ryan, R. M. (1985) *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum. URL https://doi.org/10.1007/978-1-4899-2271-7.

Deci, E. L. and Ryan, R. M. (2000) The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, **11**(4), 227–268. URL https://doi.org/10.1207/S15327965PLI1104_01.

Deci, E. L. and Ryan, R. M. (Eds.) (2002) *Handbook of Self-Determination Research*. Rochester, NY: University of Rochester Press.

Uenlue, A. (2016) Adjusting potentially confounded scoring protocols for motivation aggregation in organismic integration theory: An exemplification with the relative autonomy or self-determination index. *Frontiers in Educational Psychology*, **7**(272), 1–4. URL https://doi.org/10.3389/fpsyg.2016.00272.

Uenlue, A. and Dettweiler, U. (2015) Motivation internalization and simplex structure in self-determination theory. *Psychological Reports*, **117**(3), 675–691. URL https://doi.org/10.2466/14.PR0.117c25z1.

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internalization *Motivation Internalization or Externalization Shares*

Description

internalization computes the internalization or externalization shares of an intermediate motivation regulation type with respect to the poles of intrinsic regulation and external regulation as the reference system.

Usage

```
internalization(intermediate_regulation, intrinsic_regulation,
  external_regulation)
```

Arguments

intermediate_regulation	A required numeric vector of intermediate, either identified or introjected, regulation subscale motivation scores. No NA, NaN, Inf, or -Inf values are allowed.
intrinsic_regulation, external_regulation	Required numeric vectors of intrinsic regulation and external regulation subscale motivation scores, respectively. No NA, NaN, Inf, or -Inf values are allowed.

Details

This function computes the shares of motivation internalization or externalization pertaining to the notion of *"somewhat internal"* and *"somewhat external"* on the self-determination theory subscales of identified regulation and introjected regulation, as the intermediate motivation regulation types—with respect to intrinsic regulation and external regulation, the completely internal and completely external motivation poles of the theory, respectively, as the reference system spanned by these two base elements.

The argument `intermediate_regulation`, the target variable of the constrained regression analysis, can be either identified regulation or introjected regulation aggregate subscale motivation scores, and the arguments `intrinsic_regulation` and `external_regulation`, the predictor variables of the constrained regression analysis, do represent aggregate motivation scores for the intrinsic regulation and external regulation subscales, respectively. The function `solve.QP` of the package **quadprog** is applied in `internalization` to solve the self-determination theory related (convex) quadratic program. For details, see *Uenlue and Dettweiler (2015)*.

Value

If the arguments `intermediate_regulation`, `intrinsic_regulation`, and `external_regulation` are of required types, `internalization` returns a numeric vector containing the 2 named components `internal share` and `external share` of the `intermediate_regulation` type with respect to the extreme poles `intrinsic_regulation` and `external_regulation` of the theory. The returned object is of the class `share` and has the attribute `analysis` set to have the value `internalization`.

Author(s)

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References

Uenlue, A. and Dettweiler, U. (2015) Motivation internalization and simplex structure in self-determination theory. *Psychological Reports*, **117**(3), 675–691. URL https://doi.org/10.2466/14.PR0.117c25z1.

See Also

The two other main functions of the package: `simplex` for motivation simplex structure analysis; `sdi` for the original and adjusted SDI or RAI index. See the methods associated with `internalization` as the constructor function: `plot.share`, the S3 method for plotting objects of the class `share`; `print.share`, the S3 method for printing objects of the class `share`. See also `SDT-package` for general information about this package.

Examples

```
## attach dataset to search path (to use variable names)
attach(learning_motivation)

## internal share and external share of identified regulation
(idr <- internalization(identified, intrinsic, external))
```

```
## attribute value and class
attr(idr, "analysis")
class(idr)

## internal share and external share of introjected regulation
(ijr <- internalization(introjected, intrinsic, external))
## all attributes
attributes(ijr)
```

`learning_motivation` *Learning Motivation Data*

Description

A dataset containing the aggregate learning motivation scores for the subscales of intrinsic regulation, identified regulation, introjected regulation, and external regulation of a total number of $1,150$ students.

Usage

```
learning_motivation
```

Format

A data frame with $1,150$ rows and 6 variables:

`sex` integer vector, female ($= 1$) and male ($= 2$)

`age` integer vector, years

`intrinsic` numeric vector, aggregate intrinsic regulation subscale motivation scores

`identified` numeric vector, aggregate identified regulation subscale motivation scores

`introjected` numeric vector, aggregate introjected regulation subscale motivation scores

`external` numeric vector, aggregate external regulation subscale motivation scores

Details

The variables `intrinsic`, `identified`, `introjected`, and `external` of the data frame `learning_motivation` contain aggregate subscale scores in the sense that the scores are the means taken over all raw-data test items that make up a respective subscale.

Source

Mueller, F. H. and Hanfstingl, B. and Andreitz, I. (2007) Skalen zur motivationalen Regulation beim Lernen von Schuelerinnen und Schuelern: adaptierte und ergaenzte Version des Academic Self-Regulation Questionnaire (SRQ-A) nach Ryan & Connell [Scales of motivational regulation for student learning: adapted and supplemented version of the Academic Self-Regulation Questionnaire (SRQ-A) by Ryan & Connell] (Transl. A. Uenlue). In Institut fuer Unterrichts- und Schulentwicklung (Ed.), *Wissenschaftliche Beitraege* [*Scientific Contributions*] (Transl. A. Uenlue) (pp. 1–17). Klagenfurt, Austria: Alpen-Adria-Universitaet.

See Also

The three main functions of the package: `internalization` for motivation internalization analysis of the data; `sdi` for the orginal and adjusted SDI or RAI index of the data; and `simplex` for motivation simplex structure analysis of the data. See also `SDT-package` for general information about this package.

`plot.sdi` *Plot Method for Objects of Class sdi*

Description

S3 method to plot objects of the class `sdi`.

Usage

```
## S3 method for class 'sdi'
plot(x, minscore = 1, maxscore = 5, ...)
```

Arguments

`x`	A required object of the class `sdi`, obtained from a call to the function `sdi`.
`minscore, maxscore`	Optional numerics, integer-valued, giving the minimum score (typically 1) or maximum score (typically 4, 5, or 7) used in the scale procedure, respectively. See also 'Details'.
`...`	Further arguments to be passed are ignored in this function.

Details

This `plot` method graphs the results obtained from calculating the original or adjusted SDI or RAI index. It produces a scatterplot of the confounded or adjusted external locus component values (y-axis) versus the confounded or adjusted internal locus component values (x-axis), respectively. In addition, for comparison, the reference line $y = x$ (red full line) for visual inspection of the deviation of the two types of values and the admissible range (gray dashed lines) for the original or adjusted SDI or RAI index component values are plotted. Points with higher original or adjusted SDI or RAI overall index values are shown in darker gray tone.

To define and plot the admissible range, we do need the `minscore` and `maxscore` arguments, where `minscore` is the minimum score used in the scale procedure (typically 1), and `maxscore` is the maximum score used in the scale procedure (typically 4, 5, or 7). Note that translation with '$-$ `minscore`' and averaging are applied in the definitions of the components of the adjusted SDI or RAI index. The admissible range in the adjusted measure case is given by $[0, maxscore - minscore]$, which yields $[0, 4]$ for the default values. The admissible range in the original index case is the interval $[(2 * minscore) + minscore, (2 * maxscore) + maxscore]$, that is, $[3, 15]$ for the default values.

The function `gray` of the package **grDevices** is used to plot the points in the scatterplot at different gray levels determined by their respective original or adjusted SDI or RAI overall index values.

Value

If the arguments `x`, `minscore`, and `maxscore` are of required types, `plot.sdi` produces the plot and invisibly returns `NULL`.

Author(s)

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References

Uenlue, A. (2016) Adjusting potentially confounded scoring protocols for motivation aggregation in organismic integration theory: An exemplification with the relative autonomy or self-determination index. *Frontiers in Educational Psychology*, **7**(272), 1–4. URL https://doi.org/10.3389/fpsyg.2016.00272.

See Also

The main function of the package, which creates objects of the class `sdi`: `sdi` for the original and adjusted SDI or RAI index. `print.sdi`, the S3 method for printing objects of the class `sdi`; `summary.sdi`, the S3 method for summarizing objects of the class `sdi`. See also `SDT-package` for general information about this package.

Examples

```
## attach dataset to search path (so a variable can be accessed by name)
attach(learning_motivation)

## adjusted index plot
plot(sdi(intrinsic, identified, introjected, external))

## original index plot
plot(sdi(intrinsic, identified, introjected, external, compute.adjusted = FALSE))
```

---

plot.share *Plot Method for Objects of Class share*

Description

S3 method to plot objects of the class `share`.

Usage

```
## S3 method for class 'share'
plot(x, target = NULL, reference = NULL, ...)
```

Arguments

x	A required object of the class share, obtained from calls to the functions internalization and simplex.
target	An optional character string giving the label of the target regulation that is used. The default value NULL corresponds to generic labeling. See 'Details'.
reference	An optional character vector giving the labels of the reference system base regulations that are used. The default value NULL corresponds to generic labeling. See 'Details'.
...	Further arguments to be passed are ignored in this function.

Details

This plot method produces stacked bar plots of the internalization, externalization, or simplex structure shares of a target regulation with respect to a reference system. Generic or user-specified convenient labeling of the plot axes are provided.

The default value target = NULL corresponds to generic labeling, which is "intermediate regulation" in the case of the attribute value analysis = internalization, or "target regulation" in the case of analysis = simplex. If a character string is explicitly specified instead, this is used to label the x-axis of the bar plot. See also 'Examples'.

The default value reference = NULL corresponds to generic labeling, which is "internalization share (dark)" and "externalization share (bright)" in the case of the attribute value analysis = internalization, or "base regulation 1 share (dark)", "base regulation 2 share (medium)", and "base regulation 3 share (bright)" in the case of analysis = simplex. If a character vector is explicitly specified instead, which must be of length 2 for analysis = internalization or of length 3 for analysis = simplex, this is used to label the y-axis of the bar plot. See also 'Examples'.

Value

If the arguments x, target, and reference are of required types, plot.share produces the plot and invisibly returns NULL.

Author(s)

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References

Uenlue, A. and Dettweiler, U. (2015) Motivation internalization and simplex structure in self-determination theory. *Psychological Reports*, **117**(3), 675–691. URL https://doi.org/10.2466/14.PR0.117c25z1.

See Also

The two main functions of the package, which create objects of the class share: internalization for motivation internalization analysis; simplex for motivation simplex structure analysis. print.share, the S3 method for printing objects of the class share. See also SDT-package for general information about this package.

Examples

```
## attach dataset to search path (to use variable names)
attach(learning_motivation)

## internalization plot
(ijr <- internalization(introjected, intrinsic, external))
## with generic labels
plot(ijr)
## with user-specified convenient labels
plot(ijr, target = "introjected regulation",
     reference = c("intrinsic regulation", "external regulation"))

## simplex structure plot 1
(simstr2 <- simplex(target_regulation = external, base_regulation_1 = intrinsic,
                    base_regulation_2 = identified, base_regulation_3 = introjected))
## with generic labels
plot(simstr2)
## with user-specified convenient labels
plot(simstr2, target = "external regulation",
    reference = c("intrinsic regulation", "identified regulation", "introjected regulation"))

## simplex structure plot 2
## different target variable and reference system, conveniently labeled
plot(simplex(identified, intrinsic, introjected, external), target = "identified regulation",
    reference = c("intrinsic regulation", "introjected regulation", "external regulation"))
```

`print.sdi` *Print Method for Objects of Class sdi*

Description

S3 method to print objects of the class `sdi`.

Usage

```
## S3 method for class 'sdi'
print(x, ...)
```

Arguments

`x`	A required object of the class `sdi`, obtained from a call to the function `sdi`.
`...`	Further arguments to be passed are ignored in this function.

Details

This `print` method prints the main results obtained from calculating the original or adjusted SDI or RAI index, which are the overall index values or SDI or RAI scores. The output can be long, and thus, entries may be omitted.

Value

If the argument x is of required type, print.sdi prints the original or adjusted SDI or RAI overall index values and returns an invisible copy of these scores.

Author(s)

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References

Uenlue, A. (2016) Adjusting potentially confounded scoring protocols for motivation aggregation in organismic integration theory: An exemplification with the relative autonomy or self-determination index. *Frontiers in Educational Psychology*, **7**(272), 1–4. URL https://doi.org/10.3389/fpsyg.2016.00272.

See Also

The main function of the package, which creates objects of the class sdi: sdi for the original and adjusted SDI or RAI index. plot.sdi, the S3 method for plotting objects of the class sdi; summary.sdi, the S3 method for summarizing objects of the class sdi. See also SDT-package for general information about this package.

Examples

```
## attach dataset to search path (to use variable names)
attach(learning_motivation)

## adjusted index print
padj <- print(sdi(intrinsic, identified, introjected, external))
## compactly displayed structure of the object padj
str(padj)

## original index print
sdi(intrinsic, identified, introjected, external, compute.adjusted = FALSE)
```

---

print.share *Print Method for Objects of Class share*

Description

S3 method to print objects of the class share.

Usage

```
## S3 method for class 'share'
print(x, ...)
```

Arguments

x	A required object of the class share, obtained from calls to the functions internalization and simplex.
...	Further arguments to be passed are ignored in this function.

Details

This print method prints the internalization, externalization, and simplex structure shares of a target regulation with respect to a reference system.

Value

If the argument x is of required type, print.share prints the internalization, externalization, or simplex structure shares, and invisibly returns x, stripped off the analysis (= internalization or simplex) and class (= share) attributes.

Author(s)

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References

Uenlue, A. and Dettweiler, U. (2015) Motivation internalization and simplex structure in self-determination theory. *Psychological Reports*, **117**(3), 675–691. URL https://doi.org/10.2466/14.PR0.117c25z1.

See Also

The two main functions of the package, which create objects of the class share: internalization for motivation internalization analysis; simplex for motivation simplex structure analysis. plot.share, the S3 method for plotting objects of the class share. See also SDT-package for general information about this package.

Examples

```
## attach dataset to search path (to use variable names)
attach(learning_motivation)

## internalization print
pidr <- print(internalization(identified, intrinsic, external))
## compactly displayed structure of the object pidr
str(pidr)

## simplex structure print
psimstr <- print(simplex(intrinsic, identified, introjected, external))
## compactly displayed structure of the object psimstr
str(psimstr)
```

sdi *Original and Adjusted SDI or RAI Index*

Description

sdi computes the original SDI or RAI scoring protocol and an adjusted variant of it.

Usage

```
sdi(intrinsic_regulation, identified_regulation, introjected_regulation,
  external_regulation, compute.adjusted = TRUE, minscore = 1)
```

Arguments

intrinsic_regulation, identified_regulation, introjected_regulation, external_regulation	Required numeric vectors of intrinsic regulation, identified regulation, introjected regulation, and external regulation subscale motivation scores, respectively. No NA, NaN, Inf, or -Inf values are allowed.
compute.adjusted	An optional logical. The default value TRUE corresponds to computing the adjusted variant of the SDI or RAI index, and also allows for setting the argument minscore. If set to FALSE, the original index value is computed, and the argument minscore is irrelevant and ignored in this case.
minscore	An optional numeric, integer-valued, giving the minimum score used in the scale procedure (typically 1). See also 'Details'.

Details

This function provides the popular and original scoring protocol called the *self-determination index* (SDI), also known as the *relative autonomy index* (RAI). The version of the used index is for instruments assessing extrinsic motivation (excluding integrated regulation) and intrinsic motivation. With the SDI or RAI, the inventory scores are weighted and combined to give a descriptive overall measure of the behavioral self-regulatory style. The formula is, in respective regulation types:

$$SDI = RAI = (2 * intrinsic + identified) - (2 * external + introjected).$$

The original SDI or RAI index does not allow one to account for the extent to which the identified and introjected regulation types are internal and external motivation. In particular, in the process of weighting the subscale scores, the same weights are used (1 or -1, respectively).

Correcting adaptations are proposed to accommodate for mixed or confounded internal and external motivation, implemented in the function sdi. This function also computes an adjusted variant of the original SDI or RAI index, which is weighted according to the extent to which the intermediate identified and introjected regulation types are internal and external motivation. For details, including the mathematical formula for the adjusted measure, see *Uenlue (2016)*.

To compute the adjusted variant measure, sdi calls the function internalization. The latter, in turn, uses the function solve.QP of the package **quadprog** to solve the corresponding constrained regression optimization problem.

The arguments intrinsic_regulation, identified_regulation, introjected_regulation, and external_regulation do represent aggregate subscale scores calculated by averaging the raw-data test items associated with each of the four subscales (i.e., mean over the items that make up a respective subscale). The four subscales are intrinsic regulation, identified regulation, introjected regulation, and external regulation.

The argument minscore only needs to be specified for the adjusted index variant. Translation with '− minscore' and averaging are applied in the adjusted variant to ensure that the instrument variables and the component and index values all range in the same interval (from 0 to, e.g., 4).

Value

If the arguments intrinsic_regulation, identified_regulation, introjected_regulation, external_regulation, compute.adjusted, and minscore are of required types, sdi returns a named list, of the class sdi and with the attribute variant, which consists of 3 components, independent of whether the original index computation (variant is then set to original) or the adjusted index computation (variant is then set to adjusted) was performed.

The original index computation list contains the following first 3 components, the adjusted index computation list the subsequent 3 components:

confounded_internal_locus
: A numeric vector of the confounded internal locus original SDI or RAI component values.

confounded_external_locus
: A numeric vector of the confounded external locus original SDI or RAI component values.

sdi_original
: A numeric vector of the original SDI or RAI overall index values.

adjusted_internal_locus
: A numeric vector of the adjusted internal locus adjusted SDI or RAI component values.

adjusted_external_locus
: A numeric vector of the adjusted external locus adjusted SDI or RAI component values.

sdi_adjusted
: A numeric vector of the adjusted SDI or RAI overall index values.

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References

Uenlue, A. (2016) Adjusting potentially confounded scoring protocols for motivation aggregation in organismic integration theory: An exemplification with the relative autonomy or self-determination index. *Frontiers in Educational Psychology*, **7**(272), 1–4. URL https://doi.org/10.3389/fpsyg.2016.00272.

See Also

The two other main functions of the package: `internalization` for motivation internalization analysis; `simplex` for motivation simplex structure analysis. See the methods associated with `sdi` as the constructor function: `plot.sdi`, the S3 method for plotting objects of the class `sdi`; `print.sdi`, the S3 method for printing objects of the class `sdi`; `summary.sdi`, the S3 method for summarizing objects of the class `sdi`. See also `SDT-package` for general information about this package.

Examples

```
## attach dataset to search path (so a variable can be accessed by name)
attach(learning_motivation)

## adjusted index computation
adj <- sdi(intrinsic, identified, introjected, external)
## first six elements of each list component vector and attributes
lapply(adj, head)
attributes(adj)

## original index computation
orig <- sdi(intrinsic, identified, introjected, external, compute.adjusted = FALSE)
lapply(orig, head)
attributes(orig)
```

---

simplex *Motivation Simplex Structure Shares*

Description

`simplex` computes the shares of a target regulation type in a reference system consisting of three base regulation types to illustrate the self-determination theory postulated simplex structure of motivation.

Usage

```
simplex(target_regulation, base_regulation_1, base_regulation_2,
  base_regulation_3)
```

Arguments

`target_regulation`
: A required numeric vector of either intrinsic, identified, introjected, or external regulation subscale motivation scores. No `NA`, `NaN`, `Inf`, or `-Inf` values are allowed.

`base_regulation_1, base_regulation_2, base_regulation_3`
: Required numeric vectors of, depending on the regulation type specified in `target_regulation`, the remaining three regulation subscale motivation scores. No `NA`, `NaN`, `Inf`, or `-Inf` values are allowed. For an example, see 'Details'.

Details

This function computes the simplex structure shares of a target motivation (e.g., intrinsic regulation) in a reference system consisting of three base regulation types (e.g., identified regulation, introjected regulation, and external regulation). With the function `simplex`, the self-determination theory postulated simplex structure can be illustrated, where the simplex structure of the theory means that motivation regulation types theoretically closer to one another are more strongly interrelated/correlated. From a theoretical viewpoint, the simplex structure analysis can be viewed as a generalization of the problem of `internalization`.

The argument `target_regulation`, the dependent variable of the constrained regression analysis, can be any regulation type, and the arguments `base_regulation_1`, `base_regulation_2`, and `base_regulation_3`, the independent variables of the constrained regression analysis, do represent the remaining regulation types, with respect to which the optimal shares of the target regulation are computed. The function `solve.QP` of the package **quadprog** is applied in `simplex` to solve the self-determination theory related (convex) quadratic program. For details, see *Uenlue and Dettweiler (2015)*.

Value

If the arguments `target_regulation`, `base_regulation_1`, `base_regulation_2`, and `base_regulation_3` are of required types, `simplex` returns a numeric vector containing the following 3 named components `base_regulation_1 share`, `base_regulation_2 share`, and `base_regulation_3 share` of the `target_regulation` with respect to the remaining `base_regulation_1`, `base_regulation_2`, and `base_regulation_3` of the theory. The returned object is of the class `share` and has the attribute `analysis` set to have the value `simplex`.

Author(s)

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References

Uenlue, A. and Dettweiler, U. (2015) Motivation internalization and simplex structure in self-determination theory. *Psychological Reports*, **117**(3), 675–691. URL https://doi.org/10.2466/14.PR0.117c25z1.

See Also

The two other main functions of the package: `internalization` for motivation internalization analysis; `sdi` for the original and adjusted SDI or RAI index. See the methods associated with `simplex` as the constructor function: `plot.share`, the S3 method for plotting objects of the class `share`; `print.share`, the S3 method for printing objects of the class `share`. See also `SDT-package` for general information about this package.

Examples

```
## attach dataset to search path (to use variable names)
attach(learning_motivation)

## simplex structure analysis with intrinsic regulation as target variable
```

```
## and identified, introjected, and external regulation as reference system
(simstr <- simplex(intrinsic, identified, introjected, external))

## numeric vector, attribute value, and class
mode(simstr)
attr(simstr, "analysis")
class(simstr)
```

`summary.sdi` *Summary Method for Objects of Class sdi*

Description

S3 method to summarize objects of the class `sdi`.

Usage

```
## S3 method for class 'sdi'
summary(object, ...)
```

Arguments

`object`	A required object of the class `sdi`, obtained from a call to the function `sdi`.
`...`	Further arguments to be passed are ignored in this function.

Details

This `summary` method outlines the results obtained from the original or adjusted SDI or RAI index computation by printing simple summary statistics of the values obtained for the confounded or adjusted internal locus, confounded or adjusted external locus, and for the original or adjusted SDI or RAI overall index.

Value

If the argument `object` is of required type, `summary.sdi` prints simple summary statistics of the list components values, and invisibly returns `object`.

Author(s)

Ali Uenlue <ali.uenlue@icloud.com>

References

Uenlue, A. (2016) Adjusting potentially confounded scoring protocols for motivation aggregation in organismic integration theory: An exemplification with the relative autonomy or self-determination index. *Frontiers in Educational Psychology*, **7**(272), 1–4. URL https://doi.org/10.3389/fpsyg.2016.00272.

See Also

The main function of the package, which creates objects of the class `sdi`: `sdi` for the original and adjusted SDI or RAI index. `plot.sdi`, the S3 method for plotting objects of the class `sdi`; `print.sdi`, the S3 method for printing objects of the class `sdi`. See also `SDT-package` for general information about this package.

Examples

```
## attach dataset to search path (for using variable names)
attach(learning_motivation)

## original and adjusted index summary
summary(sdi(intrinsic, identified, introjected, external, compute.adjusted = FALSE))
summary(sdi(intrinsic, identified, introjected, external))
```

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