Title

> **mds postestimation plots** — Postestimation plots for mds, mdsmat, and mdslong

Description

The following postestimation commands are of special interest after `mds`, `mdslong`, and `mdsmat`:

Command	Description
mdsconfig	plot of approximating configuration
mdsshepard	Shepard diagram

For more information on these commands, see below. Also see [MV] **mds postestimation**.

mdsconfig

Syntax for mdsconfig

mdsconfig [, *options*]

options	Description
Main	
dimensions(*# #*)	two dimensions to be displayed; default is dimensions(2 1)
xnegate	negate data relative to the x axis
ynegate	negate data relative to the y axis
autoaspect	adjust aspect ratio on the basis of the data; default aspect ratio is 1
maxlength(*#*)	maximum number of characters used in marker labels
cline_options	affect rendition of the lines connecting points
marker_options	change look of markers (color, size, etc.)
marker_label_options	change look or position of marker labels
Y axis, X axis, Titles, Legend, Overall	
twoway_options	any options other than by() documented in [G-3] *twoway_options*

Menu for mdsconfig

Statistics > Multivariate analysis > Multidimensional scaling (MDS) > Postestimation > Approximating configuration
plot

Description for mdsconfig

mdsconfig produces a plot of the approximating Euclidean configuration. By default, dimensions 1 and 2 are plotted.

Options for mdsconfig

   Main

dimensions(*# #*) identifies the dimensions to be displayed. For instance, dimensions(3 2) plots the third dimension (vertically) versus the second dimension (horizontally). The dimension number cannot exceed the number of extracted dimensions. The default is dimensions(2 1).

xnegate specifies that the data be negated relative to the x axis.

ynegate specifies that the data be negated relative to the y axis.

autoaspect specifies that the aspect ratio be automatically adjusted based on the range of the data to be plotted. This option can make some plots more readable. By default, mdsconfig uses an aspect ratio of one, producing a square plot. Some plots will have little variation in the y-axis direction, and use of the autoaspect option will better fill the available graph space while preserving the equivalence of distance in the x and y axes.

As an alternative to autoaspect, the *twoway_option* aspectratio() can be used to override the default aspect ratio. mdsconfig accepts the aspectratio() option as a suggestion only and will override it when necessary to produce plots with balanced axes; that is, distance on the x axis equals distance on the y axis.

twoway_options, such as xlabel(), xscale(), ylabel(), and yscale(), should be used with caution. These *axis_options* are accepted but may have unintended side effects on the aspect ratio. See [G-3] *twoway_options*.

maxlength(*#*) specifies the maximum number of characters for object names used to mark the points; the default is maxlength(12).

cline_options affect the rendition of the lines connecting the plotted points; see [G-3] *cline_options*. If you are drawing connected lines, the appearance of the plot depends on the sort order of the data.

marker_options affect the rendition of the markers drawn at the plotted points, including their shape, size, color, and outline; see [G-3] *marker_options*.

marker_label_options specify if and how the markers are to be labeled; see [G-3] *marker_label_options*.

   Y axis, X axis, Titles, Legend, Overall

twoway_options are any of the options documented in [G-3] *twoway_options*, excluding by(). These include options for titling the graph (see [G-3] *title_options*) and for saving the graph to disk (see [G-3] *saving_option*). See autoaspect above for a warning against using options such as xlabel(), xscale(), ylabel(), and yscale().

mdsshepard

Syntax for mdsshepard

> mdsshepard [, *options*]

options	Description
Main	
<u>notr</u>ansform	use dissimilarities instead of disparities
<u>autoa</u>spect	adjust aspect ratio on the basis of the data; default aspect ratio is 1
<u>sep</u>arate	draw separate Shepard diagrams for each object
marker_options	change look of markers (color, size, etc.)
Y axis, X axis, Titles, Legend, Overall	
twoway_options	any options other than by() documented in [G-3] *twoway_options*
byopts(*by_option*)	affect the rendition of combined graphs; separate only

Menu for mdsshepard

Statistics > Multivariate analysis > Multidimensional scaling (MDS) > Postestimation > Shepard diagram

Description for mdsshepard

mdsshepard produces a Shepard diagram of the disparities against the Euclidean distances. Ideally, the points in the plot should be close to the $y = x$ line. Optionally, separate plots are generated for each "row" (value of id()).

Options for mdsshepard

> ┌─── Main ───

notransform uses dissimilarities instead of disparities, that is, suppresses the transformation of the dissimilarities.

autoaspect specifies that the aspect ratio be automatically adjusted based on the range of the data to be plotted. By default, mdsshepard uses an aspect ratio of one, producing a square plot.

> See the description of the autoaspect option of mdsconfig for more details.

separate displays separate plots of each value of the ID variable. This may be time consuming if the number of distinct ID values is not small.

marker_options affect the rendition of the markers drawn at the plotted points, including their shape, size, color, and outline; see [G-3] *marker_options*.

> ┌─── Y axis, X axis, Titles, Legend, Overall ───

twoway_options are any of the options documented in [G-3] *twoway_options*, excluding by(). These include options for titling the graph (see [G-3] *title_options*) and for saving the graph to disk (see [G-3] *saving_option*). See the autoaspect option of mdsconfig for a warning against using options such as xlabel(), xscale(), ylabel(), and yscale().

byopts(*by_option*) is documented in [G-3] ***by_option***. This option affects the appearance of the combined graph and is allowed only with the `separate` option.

Remarks and examples   stata.com

The matching configuration plot and Shepard diagram are easily obtained after an MDS analysis.

▷ Example 1: configuration plot

By default, `mds`, `mdsmat`, and `mdslong` display the MDS matching configuration plot. If you want to exercise control over the graph, you can specify the `noplot` option of `mds`, `mdsmat`, or `mdslong` and then use the `mdsconfig` postestimation graph command.

Continuing with example 1 of [MV] **mds postestimation**, we produce a configuration plot with an added title and subtitle.

```
. use http://www.stata-press.com/data/r13/morse_long
(Morse data (Rothkopf 1957))
. gen sim = freqsame/100
. mdslong sim, id(digit1 digit2) s2d(standard) noplot
(output omitted)
. mdsconfig, title(Morse code digit dissimilarity) subtitle(data: Rothkopf 1957)
```
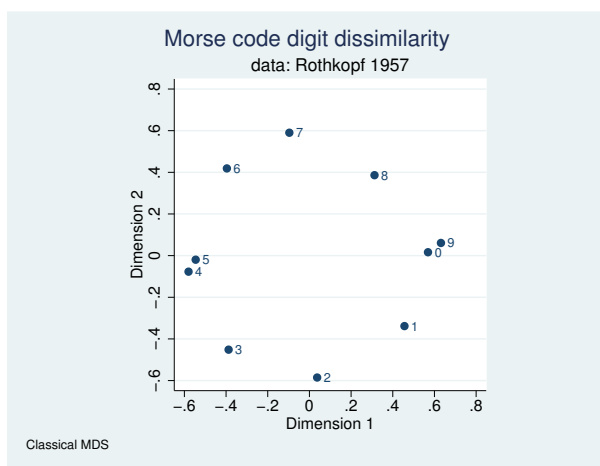

The plot has an aspect ratio of one so that 1 unit on the horizontal dimension equals 1 unit on the vertical dimension. Thus the "straight-line" distance in the plot is really (proportional to) the Euclidean distance between the points in the configuration and hence approximates the dissimilarities between the objects—here the Morse codes for digits.

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▷ Example 2: Shepard diagram

A second popular plot for MDS is the Shepard diagram. This is a plot of the Euclidean distances in the matching configuration against the "observed" dissimilarities. As we explained before, in classical MDS a linear transformation is applied to the dissimilarities to fit the Euclidean distances as close

as possible (in the least-squares sense). In modern MDS the transformation may be the identity (no transformation), a power function, or a monotonic function. A Shepard diagram is a plot of the $n(n-1)/2$ transformed dissimilarities, called disparities, against the Euclidean distances.

```
. mdsshepard
```

Shepard diagram

Classical MDS
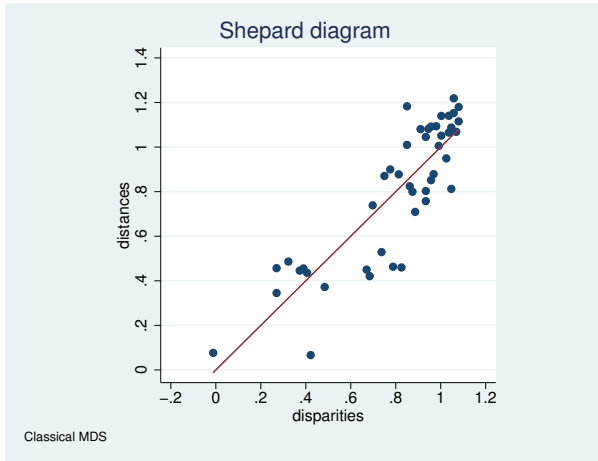
If the Euclidean configuration is close to the disparities between the objects, all points would be close to the $y = x$ line. Deviations indicate lack of fit. To simplify the diagnosis of whether there are specific objects that are poorly represented, Shepard diagrams can be produced for each object separately. Such plots consist of n small plots with $n-1$ points each, namely, the disparities and Euclidean distances to all other objects.

```
. mdsshepard, separate
(mdsshepard is producing a separate plot for each obs; this may take a while)
```

Shepard diagrams

Classical MDS
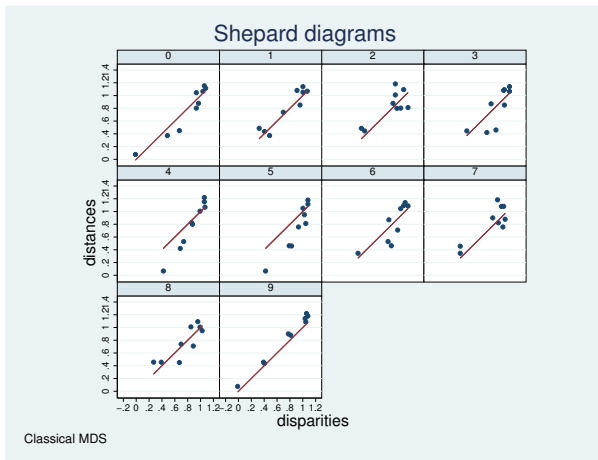
Other examples of `mdsconfig` are found in [MV] **mds**, [MV] **mdslong**, and [MV] **mdsmat**.

Roger Newland Shepard (1929–) was born in Palo Alto, California, earned degrees at Stanford and Yale, and worked at Bell Labs and Harvard before returning to Stanford in 1968. One of the world's leading psychologists and cognitive scientists, he has worked on perception, mental imagery, representation, learning, and generalization. Shepard is noted within statistical science primarily for his work on nonmetric multidimensional scaling. He is a member of the U.S. National Academy of Sciences and a recipient of the National Medal of Science.

References

See *References* in [MV] **mds**.

Also see

[MV] **mds** — Multidimensional scaling for two-way data

[MV] **mdslong** — Multidimensional scaling of proximity data in long format

[MV] **mdsmat** — Multidimensional scaling of proximity data in a matrix

[MV] **mds postestimation** — Postestimation tools for mds, mdsmat, and mdslong

[MV] **screeplot** — Scree plot