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Manual for GridSuite Basic

Berlin February 2020

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Introduction

Legend

	Pointer that shows how to reach or activate the described functions in the program
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	Important advice
---	------------------

About GridSuite

Theoretical Background

GridSuite is software for eliciting, editing and analyzing so-called Repertory Grid-Interviews. This special interview concept stems from Personal Construct Psychology.

Personal Construct Psychology

The Personal Construct Psychology was founded by George A. Kelly in the 1950's. The personality model of this psychology stresses man's active examination of his environment ("man as a scientist"). The distinction between experiences is assumed to be the psychological base operation of this examination. This distinction ("personal construct") merges experiences according to subjective similarity/dissimilarity and gives them meaning. The body of constructs with which people organize their experiences make up their subjective world, and they act according to these constructs.

In order to understand people and their actions, it is important to gain access to their personal constructs. That is the goal of Repertory Grid Interviews. They explore the subjective world of the person interviewed by asking about his or her personal constructs and how the experiences are combined and organized according to similarity/dissimilarity. What is special is that the interview does not ask abstract questions, for example what the person interviewed thinks is important and why or what he finds fun. Rather, the interview allows the person interviewed to differentiate between 'simple' experiences and then asks what this distinction means. The substance of the interview is the concrete demonstration of how the person interviewed orients himself in the world of his experiences and the consultant's monitoring of this process and attempt to understand it.

This understanding of another person is not a correct or false diagnosis but an interpretation based on the construct system of the consultant. There are always different ways of reading something which do not differ in their closeness to reality but in their usefulness.

GridSuite: The Concept

The following aspects were in the foreground during the designing of GridSuite:

The User as Active Interpreter

In comparison to other programs, GridSuite emphasizes the active roll of the user as interpreter of the interview data. His questions about the data are in the foreground. GridSuite is designed in the spirit of "constructive alternativism" (Kelly 1955/1991a, pp. 15/11) as an aid to develop viable readings of interview data and not assumed 'true' results. GridSuite provides various editing and analyzing tools for this purpose. Statistical calculations, which GridSuite, like other programs, makes available to its users, remain in the background as resources.

Intuitive Operation

To facilitate the user's concentration on the data content of his work, GridSuite was designed with great value being placed on clear and intuitive operability. The interpretation work is supported and stimulated by numerous options and special analysis modules.

Clearness of Procedures and Results

GridSuite offers numerous options for arranging the procedures and results from interviews clearly for counseling, teaching or presentation purposes, to highlight data and their relations, to construct and to save different views of the data, etc.

Compatibility with other Software

GridSuite is programed in Java and can be used just as well under Windows and MacOS. GridSuite uses the XML-data standard, which facilitates a simpler data exchange with other programs. GridSuite also offers an export option, which makes the data exchange with other programs possible.

Functions of GridSuite

Elicitation

Interview data can be elicited in GridSuite in different ways:

- Elicitation of interviews in the client-computer-dialogue
GridSuite can be started in client mode, which only contains the views and application elements the client needs.
- Manual entry of interview results

Editing

The GridEditor allows for the retrospective editing of all interview components: deletion or replacement of elements or constructs and changes in ratings.

Analysis

Various analysis options allow different views of the data

- The module MouseSort is a specialty of GridSuite. MouseSort makes it possible to do a computer-supported analysis of Grid-Interviews by hand. Raw data is rearranged according to similarity and displayed graphically (see Cluster Analysis). It is especially suitable for educational purposes, but it is also suitable for experienced users, who want to test alternatives to computer analysis.
- Cluster Analysis arranges the raw data automatically according to similarities and illustrates the similarity clusters in dendrogram graphics (tree structures).
- Principal Component Analysis provides indications for underlying structures in an interview. It displays these graphically in coordinate systems.

Data Exchange

GridSuite offers convenient Export-Filters (GridConverter) to allow the functions of GridSuite to be combined with other programs and the results to be displayed in other programs:

- Exchange of data with IdioGrid
- Export to Microsoft Excel and Word

For RepPlus no conversion is needed.

Presentation

GridSuite offers numerous possibilities for displaying, highlighting and presenting selected data:

- Functions for individually adjusting the display colors, window sizes and views, etc.
- Filters for displaying selected data
- Screen shot functions for saving selected views and adding them to reports

Basics of Operation

GridSuite uses a so-called multiple document interface. This makes it possible to display and compare multiple documents simultaneously with each document appearing in its own window.

The program functions are all accessible in the application menu of the main window:

Frequently used functions can also be activated with icons. Each icon has a short annotation (ToolTip), which appears when the mouse is left on top of the icon for a few seconds.

All program functions for the display and editing of grids (GridEditor, all analysis modules) have a similar structure.

The tools on the horizontal toolbar directly influence the display of the data in the active window, offer additional support or manipulate the data.

The windows GridEditor, GridConverter, Raw Data, Cluster Analysis and Principle Component Analysis (PCA) are internal windows, which you can manage using the menu title Window.

The windows for the execution of interviews and MouseSort are external windows and cannot be managed with this menu title. You can find these windows in the Windows taskbar.

Functions and Icons

The menu bar of the main window of GridSuite shows the following icons:

	Create a new grid file
	Open a file
	Save
	Save as
	Save as a PNG graphic
	Print
	Elicit interview
	Triad elicitation
	GridEditor
	Raw data
	Original data
	Cluster analysis
	MouseSort
	Principle Component Analysis (PCA)

Shortcut Combinations

General

F1	Help
Ctrl + Shortcut for the menu item	Options of the Application Menu
Ctrl - C	Consultant Mode
Ctrl - G	Current Grid in the Editor

GridEditor

Ctrl - S	Save
Ctrl - Shift - S	Save under
Ctrl - N	New Grid
Ctrl - Left cursor key	Move highlighted element to the left
Ctrl - Right cursor key	Move highlighted element to the right
Ctrl - Up cursor key	Move highlighted element up
Ctrl - Down cursor key	Move highlighted element down
Ctrl - Delete	Delete highlighted element/construct

MouseSort

Ctrl - Left cursor key	Move highlighted element to the left
Ctrl - Right cursor key	Move highlighted element to the right
Ctrl - Up cursor key	Move highlighted element up
Ctrl - Down cursor key	Move highlighted element down
Ctrl - Delete	Delete highlighted element/construct

Preparation

Settings

	Extras - Settings
	Icon 

Among the different settings (e.g. **font size** in elicitation screens) that are offered here, the settings of **paths** for saving grids and plots are especially important.

Automatically dock Elements when rating with scale

With this setting elements are either arranged automatically at the rating scale (default) or can be moved freely.

Starting the Interview

Starting the Triad Elicitation

	Icon  in the menu bar at the top or in the functions list on the left
---	--

Starting the GridEditor Elicitation

An interview can also be conducted with the help of the GridEditor. The course of the interview consists of virtually filling out a form.

	File-New-Enter Interview Data
---	--------------------------------------

Entry

Entry Steps

A Grid interview typically follows these steps:

1. Elements

First, the topic of the interview is broken down into examples, so-called "elements." The topic "holidays" is broken down, for example, into a list of types of holidays, and the topic "exam" is broken down into exam-relevant situations.

2. Constructs

The elements are differentiated according to similarity and dissimilarity. These differentiations are the so-called "(personal) constructs." In the Grid interview this differentiation is denoted in a bipolar form, e.g. "intelligent-dumb" or "relaxed-tense." The first pole (the so-called "emergent pole") shows the similarity between elements, and the second pole (the so-called "implicit pole") shows the dissimilarity to other elements. For example, Michael and Laura are characterized as intelligent unlike Lucas, who is characterized as dumb.

3. Ratings

The application of the constructs to the elements can happen with varied differentiation. In the simplest (dichotomous) form, the elements are only assigned to one pole of the construct. One person, for example, will be characterized either as intelligent or dumb. This assessment can also take place with a multi-level scale, whose ends are the two poles of the construct. Depending on the number of points on the scale, the person can be appraised as more intelligent or less intelligent. A 5-point scale is commonly used.

Entry via GridEditor

Purposes of Use

Interview data can be entered completely or partially with the Grid Editor. Which data is entered depends on the purpose of use:

Eliciting a Grid Interview with the GridEditor

In this case, the GridEditor is practically used as a form, in which the interview data are entered bit by bit. The interactive and graphic possibilities offered by GridSuite in other elicitation alternatives are not used here.

Entering a Paper and Pencil Interview

Interviews in the client-computer-dialogue are not always possible or sensible. These interviews can be entered into GridSuite and further analyzed after the elicitation.

Procedure

	File-New-Enter Interview Data
---	--------------------------------------

Entering Basic Data, Elements and Constructs

A window appears, in which you can enter the following information for the Grid: topic, client, consultant, general comments, value range for ratings, element and construct notations.

A clear and unambiguous name for the topic and the client is especially important if multiple people will be interviewed about one topic or if one person is to be interviewed about multiple topics.

After the elements and constructs have been added using the appropriate buttons, the elements and constructs will appear in the tree view on the right side for easier orientation.

	Corrections are not possible in this step after elements and constructs have been added; however, corrections are possible in the next step with the GridEditor.
---	--

After accepting this data by clicking OK, the GridEditor will start, among other things, with the following options:

Change Elements/Constructs

Corrections of possible mistakes can now be made by clicking on the names of elements or constructs.

Enter Ratings

Ratings can be entered by clicking on the individual cells in the matrix. By clicking on the appropriate icon, the entry can occur by column  or by row . The cells can be clicked on individually at all times to be corrected.

	More information about working with GridEditor can be found under Editing .
---	--

Entry via interview

Entering Elements

Triad Elicitation

After the opening screen, in which the topic of the interview and the name (or code) of the client is asked, the screen for entering the elements will open.

The name of the element can be entered in the field at the bottom left. It will be accepted as an element field in the upper window by clicking on the field "Add Element." With a right mouse click on the element markers in the upper window, an options menu will be opened, in which the names can be changed.

Click on **Next** to move to the next step, the elicitation of constructs.

Entering Constructs

Triad Elicitation

After entering the elements and clicking on **Next**, three elements will be specified for differentiation.

The instruction is:

"Please click on the two elements which have something important in common opposed to the third."

The elements which have something in common will spring into the left frame, and the third element will spring into the right frame.

The notation of the similarity (of the first construct pole, the emergent pole) can be entered in the text field in the left frame. Hitting **Enter/Return** will confirm this entry and open a second field for the opposite pole (the implicit pole) in the right frame.

If no construct can be found the triad can be **skipped** by clicking the button down on the left.

Next leads to the next step, rating.

Assigning Ratings

Rating Scale

The constructs are applied to the elements during the rating. The element markers are relocated on a rating scale, whose ends are the poles of the respective construct. The scale is broken down into as many units as are specified in the interview profile.

In the case of the triad elicitation, the previously differentiated elements are already arranged on the ends of the scale. They can still be moved if this arrangement is too extreme. The remaining elements can be dragged to the scale and placed at a certain position on the scale. It is possible to arrange multiple elements at the same place on the scale.

Using **Ctrl**-key and mouse together all elements can be dragged to the scale.

If the construct cannot be applied to one of the elements, this element can simply be left on the left side of the desktop.

	Elements, that cannot be placed on the scale receive the median value of the other ratings to ensure that the results matrix is completely filled.
---	--

	If the button Add Element is used the ratings for the constructs elicited up to this point can be filled in at the end of the interview using the GridEditor.
---	--

Clicking on the button **Add Construct** offers the possibility to enter and rate an extra construct.

Editing: The GridEditor

Applications of the GridEditor

Saved grids can be retrospectively edited with the GridEditor, and new grids can be created. GridEditor is especially suitable for the following tasks:

- Correcting errors in grid interviews
- Changing interviews

Correcting Errors in Grid Interviews

In addition to spelling mistakes, it is possible to correct false ratings or interchanged scale poles, etc..

Elements and constructs can be erased, supplemented or rephrased.

Changing Interviews

Using GridEditor, interviews can be split up or purged of presumably disturbing elements or irrelevant constructs.

	The result of these changes can only have a hypothetical character because the interview took place with the presumably disturbing elements or irrelevant constructs.
---	---

The GridEditor Interface

Functions and Icons of the GridEditor

	Edit - GridEditor
	Icon 
	File - Open (File will open automatically in GridEditor)
	Icon  (File will open automatically in GridEditor)
	Information about the basic data of the grid
	Add/Delete element or construct
	Enter ratings by row/by column
	Set all ratings to zero/random numbers
	Move elements/constructs

	Reverse construct poles: The construct poles are reversed so that on a scale of 1 to 5 the ratings change as follows: <ul style="list-style-type: none"> • 1 becomes 5 • 2 becomes 4 • 3 becomes 3 • 4 becomes 2 • 5 becomes 1
	Display the ratings with number/color values
	Undo the last change. This function is not available for: <ul style="list-style-type: none"> • Changes in the structure dialogue • Changes in the scale • Changes in element and construct notations and ratings

The functions of the menu bar in the main window of GridSuite are also available: see **About GridSuite -Functions and Icons**.

Working with the GridEditor

With the GridEditor it is possible to change all constituents of a grid interview. In doing so, the following is true:

- Change element and construct names by double clicking on the respective field.
- Change ratings with a single click on the respective cell.

	If different versions of a grid are to be kept, the changed versions have to be saved under new names.
---	--

Analysis

MouseSort

Applications of MouseSort

MouseSort makes it possible to do a computer-supported analysis of the grid interview by hand. The goal is to make the data clearer. The data of the interview matrix are arranged so that similar constructs and elements are near each other and far away from dissimilar ones.

The advantage of an analysis done by hand over a computer analysis is that various alternative perspectives of the interview data can be played with in addition to the mathematically based analysis of the computer. This is especially helpful:

- when you first start working with grid interviews, so that you can get a feel for the complexity of the information provided by such an interview, rather than simply relying on the computer and
- for experienced users, who want to contrast the purely mathematical computer analysis with an analysis enhanced with alternative views of the data.

The MouseSort Interface

	Analysis - MouseSort
	Icon 

The MouseSort-Interface has three windows:

- the **raw matrix window** (above left),
- the **matrix window** (above right), in which similarity and difference values for constructs and elements are displayed, and
- the **dendrogram window** (below), in which the similarities and differences of constructs and elements are displayed graphically in a tree structure.

	Use the dividing line to change the size of the three fields in MouseSort and the arrows on the dividing line to close and reopen these fields.
---	---

The Raw Matrix Window

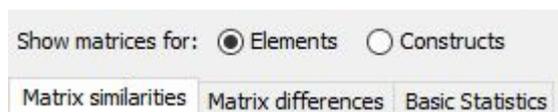
The raw matrix window is the workspace, in which the raw data can be rearranged. These changes are immediately displayed graphically in the dendrogram window.

Functions and Icons in the Raw Matrix Window

	Open file
	Save as
	Save as a PNG-graphic
	Print
	Show ratings with number values/colors
	Undo
	Move elements/constructs
	Reverse construct poles: the construct poles are reversed and the scale values are changed accordingly. On a 5-point scale: <ul style="list-style-type: none"> • 1 becomes 5 • 2 becomes 4 • 3 becomes 3 • 4 becomes 2 • 5 becomes 1
	Delete elements/constructs
	Show dendrogram window horizontally below/vertically on the right
	Help

The Matrix Window

The matrix window shows similarities and differences of constructs and elements. Switch between the displays using the following tabs:



The **Similarities Matrix** shows the percentage of agreement between the ratings of the individual elements/constructs in the upper right portion.

To begin with, the differences of all elements/constructs are added among themselves and normalized under consideration of the number of elements/constructs and the gage of the rating scale. The similarity is calculated as 1-difference. Finally, the range is standardized so that it runs from 0 to 100 for the elements and from -100 to +100 for the constructs. The range for the similarity of constructs is, thus, similar to the range of correlation coefficients.

The value **centrality** under the matrix shows the average similarity of a construct/element to all others. It can be seen as an indicator for how 'typical' or unusual an element is, or how 'central' or marginal a construct is.

The value **average centrality** (in Tschudi: total connectedness) as the average of the central values can be seen as a measure for the cognitive complexity of the construct system. Values >60 indicate a less differentiated system - similar in meaning to the eigenvalue of the first component in the PCA.

The matrix data are repeated in a simple format under **basic statistics** with cumulative values for the number of extreme ratings per construct/element and details about the utilization of the scale values.

	Reloads the display after changes in the raw matrix window
---	--

The Dendrogram Window

The dendrogram window graphically shows the similarities/differences of elements/constructs corresponding to the configuration in the raw matrix window. The percentage of agreement between elements or constructs can be read on the vertical number bar on the left (for the elements) and on the horizontal bar on the right (for the constructs).

Shallow bends in the dendrogram show a high percentage of similarity between elements or constructs, and higher bends show a low percentage of similarity.

	<p>Red lines in the constructs in the dendrogram show that the construct has primarily negative relationships to the other constructs and that the poles of this construct probably should be reversed.</p> <p>The length of the red lines is not to scale, but is shortened for lack of space.</p>
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The button **Cluster Analysis** allows for the comparison of one's own analysis with that of the computer.

Working with MouseSort

All changes in the arrangement of the grid raw data occur in the raw data window at the above left. The matrix window provides information about which changes should be carried out. The dendrogram window displays the result of changes graphically.

The potentially necessary **reversing of the construct poles** is possible with the button . The pole notations are interchanged and the ratings are changed accordingly. To reverse the poles, click on the relevant construct in the raw grid (workspace) to highlight this construct and then click on the button . The construct will be marked with the icon  in both the above left window and the dendrogram window. The values in the matrix window will be calculated again. The pole reversal can be repeated for all relevant constructs, and it can be undone again.

All **values of a construct can be highlighted** for better orientation. Clicking on a construct pole in the raw data window highlights all associated values in the matrix window (yellow). Cancel the highlighting of these values by clicking on one of the light blue fields at the top of the raw matrix window, which show the ends of the rating scale.

You can also **highlight individual cells** in the matrix window for better orientation. Clicking on a cell will highlight this cell (blue). Clicking on the cell again will cancel the highlight.

To **move** constructs in the raw matrix window, highlight the construct by clicking on it, and then click on the following buttons to move the construct/element by one position:    . The display in the dendrogram window will change accordingly.

For the realignment, you can choose between the numerical display of the ratings and the display with different shades of color:  .

	In the dendrogram window, the ratings always appear as various shades of color.
---	---

MouseSort in Comparison to Cluster Analysis

The rearrangement of the data matrix as applied in MouseSort is known in the literature as focusing. This work can also be transferred to the computer. As a matter of fact, similarity calculations are taking place the entire time in the background of MouseSort and lead to the similarity and difference values in the matrix and the dendrogram illustrations.

The option **Cluster Analysis** shows where your reading of the data differs from results reached purely mathematically.

	The order of elements and constructs is not important for a comparison. What is important is that comparable clusters develop.
---	--

Cluster Analysis

Applications of Cluster Analysis

The cluster analysis aims to identify clusters/groups among the elements and constructs, which display great similarity to each other and simultaneously clear distinction from other clusters.

The grouping of clusters is based on the similarities between the elements/constructs.

Starting with the element/construct pair with the highest similarity, the clusters are built hierarchically with a gradual increase in size. The element/construct with the greatest similarity to the existing cluster is added until all elements/constructs are integrated in the hierarchy. The results are made particularly clear in the dendrogram illustration.

There are numerous methods of cluster analysis which vary in the way they build clusters.

The problem: When the first data pair has been established as a cluster and the computer is searching for the next value, the question of how to determine the similarity to the cluster arises because the values of the cluster are not the same. Similar to what? The most common methods are known as: single, complete and

average linkage. The single linkage method, which is used by GridSuite, uses the distance from the new value to the nearest value in the cluster, the so-called nearest neighbor. The complete linkage method uses the furthest neighbor in the cluster, and the average linkage method uses the average value of the values in the cluster.

	<p>There are numerous methods of cluster analysis which vary in the way they build clusters. GridSuite uses the single linkage method, which uses the distance from the new value to the nearest value in the cluster (nearest neighbor) as the measure of similarity. The complete linkage method uses the furthest neighbor in the cluster, and the average linkage method uses the average value of the values in the cluster.</p>
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If the internal similarity of elements *or* constructs is being examined, Cluster Analysis and PCA provide similar information in most cases. Cluster Analysis is clearer for clients.

If the relations of elements *to* constructs are being examined, PCA is much more informative.

The Cluster Analysis Interface

	Analysis - Cluster Analysis
	Icon 

Functions und Icons

	Numerical/color display of the ratings
	Hide/show z-values
	Display tree structure with straight/slanted lines

The tab **Cluster Statistics** opens the window with the raw data and the order of the cluster formation.

The **Similarity** and **Difference Matrices** of the Grid can be shown by clicking on the icon  in the main menu of GridSuite.

Working with the Cluster Analysis

In addition to the graphic dendrogram display, the similarity and difference matrices are also available for the analysis of data with the icon .

The **matrix window** shows the similarities and differences of constructs and elements. Clicking on the tabs switches between the displays:



The **Similarities Matrix** shows the percentage of agreement between the ratings of the individual elements/constructs in the upper right portion.

The differences of all elements/constructs are added among themselves and normalized under consideration of the number of elements/constructs and the range of the rating scale. The similarity is calculated as 1-difference. Finally, the range is standardized so that it runs from 0 to 100 for the elements and from -100 to +100 for the constructs. The range for the similarity of constructs is, thus, similar to the range of correlation coefficients.

The value **centrality** under the matrix shows the average similarity of a construct/element to all others. It can be seen as an indicator for how 'typical' or unusual an element is, or how 'central' or marginal a construct is.

The value **average centrality** (Tschudi: total connectedness) as the average of the central values can be seen as a measure for the cognitive complexity of the construct system. Values >60 indicate a less differentiated system - similar in meaning to the eigenvalue of the first component in the PCA.

Analyses with modified interview data and alternative analyses of the original data can be tested in the combination with the **GridEditor** and **MouseSort**.

	Since all elements/constructs are integrated into the calculation, it is possible that not only "real" clusters are generated but also artifacts. The z-value (cf. Johnson) compares the density within the clusters with the purely random expected density. The z-value (cf. Tschudi) should lie above 2.0 and increase upward along the hierarchy.
---	---

Principle Component Analysis (PCA)

Applications of the PCA

The Principle Component Analysis calculates the similarities and differences of the targeted elements and constructs.

It goes beyond the Cluster Analysis by further reducing the amount of information about the (correlative) relationships of the elements and constructs and expressing this more economically through the principle components:

- The goal in the calculation is to express the correlation matrix through a smaller matrix.
- The question is to what extent the observed correlations can be traced back to a common underlying variable.
- For geometric visualization the elements and constructs of a person can be entered into a coordinate system that represents the psychological space (Kelly) in which a person moves subjectively. The relationships of individual constructs and elements to one another can be depicted as relationships in this space and to the axes of the coordinate system.

One feature of the PCA calculation and presentation in GridSuite is that elements and constructs are generally mapped in one coordinate system (thus the name biplot for this twofold display). In addition to the (correlative) relationships between the elements and constructs among one another, the relationships to these coordinate axes are also calculated. These axes are only a mathematical orientation aid, which can be compared to reference points used for orientation in the measurement of different locations on a site. The axes have no actual meaningful content; rather, they relate the variables (in this case: elements and constructs) to each other.

Due to the higher abstraction from the raw data, the affiliation of the results to the raw data is no longer possible, as in the Cluster Analysis.

The PCA is clearly more informative than the Cluster Analysis with respect to the relations of elements and constructs, when searching for elements that are characterized by certain constructs, or when searching for constructs that primarily characterize one or more elements.

The PCA Interface

	Advanced - Principle Component Analysis
	Icon 

The PCA interface contains the following icons:

	Open plot
	Save plot
	View settings

	Fix tabs: This can prevent that important windows are closed by accident while changing between multiple windows.
---	---

The tabs at the top of the PCA interface lead to three areas:

- Settings
- Biplot
- Graphics

Very comprehensive settings and analysis possibilities are hidden behind these options, which are explained under **Working with the PCA**. The following only offers a few short tips:

Settings

Here you can set which analyses should be conducted and shown in the PCA.

Biplot Graphics

The above settings determine which graphics should be shown (e.g., whether only rotated plots or all plots). The available indices are then chosen with the straight plates with the type: `PC 1 - PC 2 (Varimax)`.

Tables

The above settings also determine which tables should be shown. The straight plates then choose between the displayable tables.

	Various display and selection options are hidden behind the icon  on the left side of the window.
---	--

Biplot (The Coordinate System of the PCA)

The coordinate system shows two components respectively. In addition to the number of the components, the percentage value of the variance, explained by these components (see **Scree Plot**) is shown on the end of the axis at the top and to the right.

In the biplot, the constructs (rhombuses) and the elements (points) are mapped out together. The element notations are directly beside the points, and the notations of the construct poles are in the margins of the graph.

If constructs/elements have to be placed in the same location or very close to one another, it is possible that they will overlap in the graph. Using the mouse, you can move the labels to a suitable location.

	All labels for constructs, elements and memos can be moved or enlarged in the biplot.
---	---

Working with the PCA

There are at least two different ways to work with the PCA: either you see the axes only as a guide or you try to describe them with regards to content.

In the first case, the plot can be seen as a graphic display of clusters that appear as clouds/groups of neighboring constructs and elements. The interpretation comes from the formation of these clouds and from their position in the coordinate system, i.e. their distribution. In the second case, you would normally try to find the similarity of the constructs, which correlate highly with an axis, after a rotation.

Which of the following options for the analysis is useful, depends on the individual case: the purpose of the analysis, the data, and the preferences of the user. The options are available are explained below.

Settings

There are two types of settings:

1. Settings that determine how the PCA is **calculated**: how many components are extracted and whether a rotation of the axes is implemented. These settings influence the results.
2. Settings that determine how the results of the PCA are **displayed**. These settings have no influence on the results; rather, they influence which of the results are seen and in what form. The calculations are conducted regardless of these settings.

Extraction

You can indicate the number of principle components to be calculated.

Correlation Matrix

The correlation matrix provides similar information to the similarity matrix in the Clusteranalyse and MouseSort.

The correlation matrix is the basis for the calculation of the principle components.

Eigenvalues/Scree-Plot

How many components it is sensible to calculate can be tested with the so-called "Scree-Plot." The first column 'PC' indicates the number of components, and the second indicates the sum of the squared charges ("eigenvalues") for each component. Similar to the third column (% variance), the information consists of which portion of the total variance is explained by the respective components. The components are arranged in descending order of explained variance percentage so that each contribution to the explanation of the variance (cumulative %) becomes less and less with each further component.

In addition to the explained total variance, another criterium can be used to make a decision about the number of calculated components. Typically (cf. Kaiser), an eigenvalue of 1.0 is attached as the limit for the components, which still need to be calculated (cf. i.e. Tschudi 1993, p.57). The factors below this limit are colored gray in the graphic.



The results of the Principle Component Analysis vary with the number of components calculated.

Commonalities

The value in the column "final" shows what percent of the variance of the respective construct is explained by the calculated components.

Structure Coefficients

The coefficients (also called factor loadings) indicate the correlation of each construct with the components. The value ranges accordingly between -1 and +1. The question here is how well the original grid values can be predicted from the component values.

Component Score Coefficients

Are regression values that are dimensioned similarly to the correlation values (ranging from -1 and +1 except for special cases) and can be interpreted accordingly. Compared to the Structure Coefficients, the question here is the opposite: how well the component values can be predicted from the construct values.

Standardized Component Scores

The values of this table show the relationship of the elements to the calculated components.

Rotations Options

With the (Varimax) rotation, the rotation of the coordinate axes around the origin, the attempt is made to obtain the purest possible components. In calculations, these are high correlations of a group of variables with a reference axis. Viewed graphically, these are axes as close as possible to clouds/groups of variables.

This rotation does not change the data and the relationships among the data; what is changed is the relation of the variables to the principle components.

Selection and Presentation

Further selection and display options are available for displaying the information of the biplots. Their purpose is to emphasize selected contents of the plot (e.g. for a counseling interview or for a presentation).



On the left side of the biplot window, there is a small vertical bar with an arrow icon. Clicking on the icon opens a toolbox.

Selection Lists for Elements and Constructs

<input checked="" type="checkbox"/> <input type="checkbox"/>	Show/Hide all elements/constructs
	Make element symbols smaller/larger
	Make construct symbols smaller/larger

In the selection lists, elements/constructs can be hidden or shown all together or individually with a mouse click. Hidden elements/constructs appear light gray in the list.

	Showing and hiding constructs/elements only affects the view, not the calculations. All data is always calculated. If constructs/elements should be excluded from the calculation, the grid can be edited accordingly with the editor.
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Elements or constructs can also be hidden directly in the biplot. The command to show these again is only possible with the selection lists in the toolbox.

Extras

Construct Lines

In addition to constructs and elements, you can also show or hide the connecting lines of the construct poles (The size and color of the lines can be changed in ).

Anchor Lines

The anchor lines and their labels can also be shown and hidden. These anchors are only shown automatically when an element/construct is moved from its original position.

Only Left Pole

Only the so-called emergent poles, which indicate the similarity of the two constructs in the elicitation, are displayed.

Element Context

This option serves the purpose of selectively showing the elements that are similar to an element or to which a construct is primarily applied.

The Procedure:

1. **Click on Option:** Hides all elements/constructs (They appear light gray in the list.)
2. **Click on elements/constructs:** The elements/constructs appear in the plot.
3. Click on the element/construct symbol and **draw out the circle** without letting go of the pressed left mouse key: the elements searched for will appear in the circle successively.

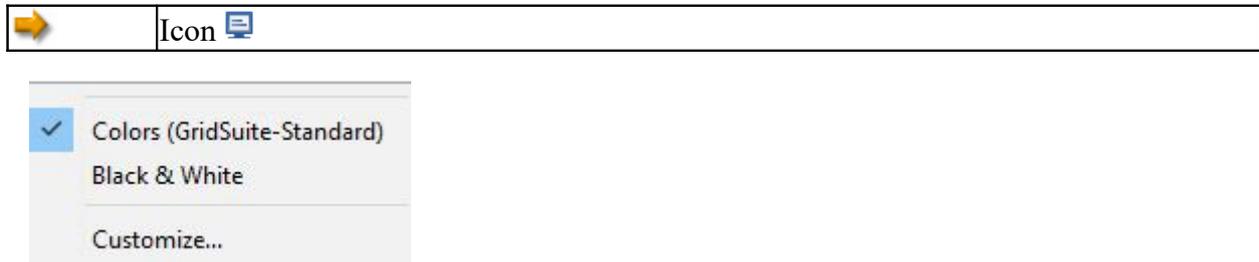
	Only one circle can be drawn out at a time.
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Construct Context

This option serves the purpose of selectively showing the constructs that are similar to a selected construct or which is applied primarily to an element.

The Procedure: see the above procedure for element context.

Further Display Settings

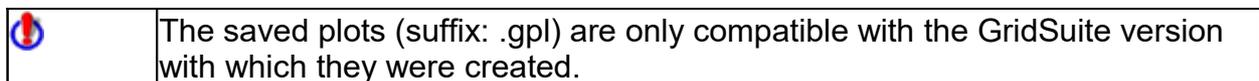


The (quick) choice between color and black & white display can be useful when presentation media (e.g. LCD projectors) do not provide a suitable display.

Colors, fonts and line thickness (e.g. for certain purposes or clients) can be set under **Customize...** and saved as a profile.

Saving Biplots

Save the various (selective) views of the biplot individually with the icon: . Load them into the active PCA interface with the icon: . When a new biplot file is opened, a new tab will appear in the PCA interface. You can load an indefinite number into the active PCA interface and, thereby, easily compare various diagrams.



When you open saved biplots in the PCA, you can still continue to use all of the toolbox options.

However, the colors and other settings cannot be changed!

To save biplots long-term or to be able to use the files in word processing, use the function: Save as PNG Graphic (Icon: ).

Data Exchange

GridSuite and other Software

- For individual files, there is the **Import/Export Function**.
- For the batch processing of larger sets of grids, there is the **GridConverter**.

Export of Individual Files

	File - Import
	Icon 

Program	
RepPlus	X
IdioGrid	X
Microsoft Excel	X
Microsoft Word	X

Batch Processing with the GridConverter

	File - GridConverter
	Icon 

Select

The button ADD FILES opens a window, in which files appear that should be converted. When you have selected files that cannot be imported, you will receive an indication of this in the status window at the bottom. The data that cannot be imported will simply be skipped in this case.

The selected files will appear in the conversion window. If necessary, you can select entries from the list and remove these entries with the button **Remove file(s)**.

	The files can be from different directories and in various formats.
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Converting

After selecting the output format with the buttons on the right, the desired destination directory for saving the converted files has to be specified.

Possible problems during the progress of the conversion (red entries) are shown in the status window. The conversion is usually finished in a very short time, even for larger data sets.



During longer conversion processes, you should never close GridConverter or GridSuite as this can lead to incomplete outputs.

Right-click on the status window to open a small menu entry, with which you can empty the output in the status window.

Technical Information

System Requirements

- PC with Windows from version to WIN 10
- Macintosh-System with MacOS X and Java
- At least 60 MB free on the harddrive for installation

Standard Directory

GridSuite saves the program settings and standard directories under Windows under:

C:\Documents and Settings\\GridSuite

This makes it possible to use separate settings and profiles on systems with multiple users. This directory will be created automatically when GridSuite is started if it does not already exist. It will not overwrite any files.

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