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1 RepSocio Multiple grids analysis

The RepSocio tool in Rep 5 extends Shaw’s (1980) SocioGrids algorithms and provides the capability to analyze data from multiple repertory grids, and to reflect back the underlying psychological processes in graphic form. It includes tools to merge grids for display and analysis as a single grid, to compare grids, to extract a Mode Grid of the most commonly used constructs, and to display Socionets of individual grids based on their commonality of construction. The analyses present multiple grids in a way that reflects the relationships between their meanings to promote discussion, understanding, decision-making, conflict mediation, and further elicitation.

1.1 RepSocio window

Clicking on the “Open” button in the “RepSocio” pane of the “Rep 5 Manager” window brings up a file directory dialog that allows a set of grids to be opened simultaneously in a RepSocio window as shown below.
If the “New” button had been used to open an empty RepSocio window then the “Open” or “Open Set” button at the bottom right could have been used to open the same set of grids. The “Open” button opens one grid at a time, and the “Open Set” button opens the set of grids in a directory. If that directory also contains non-grid files these will not be opened and no error will be reported so that notes and analyses may also be stored in the same directory as the grids.

The tab ribbon along the top of the RepSocio window lets you select any one of the the panes: “Grids,” “Socio,” and “Compare.” The RepSocio window opens with the “Grids” pane showing, and clicking on one of the other tabs brings its pane into view. The following sections describe the functions of each pane.
2 Grids pane

The rows in the table of grids in the “Grids” pane shows data on each grid: the file name; the name and note stored in the grid; the numbers of elements and constructs; the date and time when the grid was stored; and the IP address of the client if the grid was elicited through *WebGrid*. The “Title” edit panel at the top right is used to entitle the various analyses. It is initially blank for a new *RepSocio* window, or contains the name of the directory opened. It may be edited at any time to contain an appropriate title.

The data shown is that of the “Geog” example data supplied with *Rep 5*, that was elicited from three geography researchers studying spatial mapping techniques (Shaw and Gaines, 1989). The first grid is an empty one naming the purpose and the types of elements and constructs. The next three contain elements and constructs elicited from each of the researchers separately. The next six consist of ‘exchange’ grids where each of the researchers rated each of their colleagues’ elements on their colleagues’ constructs. Grid 11 contains a set of eleven elements agreed between the researchers after discussion based on their initial grids, and the next three grids contain constructs related to these elements elicited from each of researchers. The next six grids are a replication study some 2.5 months later in which the researchers repeated this elicitation and then re-rated their previous grids. The final two grids are a similar replication study with the senior researcher some 3 years later. This is a useful dataset with which to explore the facilities provided in the *RepSocio* tool.

Double-clicking on a row in the grid table opens its grid in *RepGrid* for individual analysis as shown below.
Many of the RepSocio analyses work on the subset of grids that have been selected by clicking in the row for that grid. Multiple rows may be selected by holding down the “shift” key for contiguous selections and the CMD key for non-contiguous selections, consistent with the normal conventions of the Mac and Windows operating systems. When grids are opened they are all selected automatically.

The “Count same” pane at the bottom provides a dynamic analysis of the number of grids selected and the number of elements and constructs they have in common, if any. The commonality is based on the names of elements, or names and pole names of constructs, being lexically identical in a case-insensitive comparison. If the “Note” check box is checked then the attached notes must also be the same.

Grids to be compared are usually developed based on a common set of elements or constructs which makes the lexical comparison effective. If grid data is entered for comparative analysis it is important to ensure that items that are intended to be “the same” have the same names.

“Count same” pane showing the number of common items in the selected grids
A deeper issue is to note that the interpretation of all the comparative analyses raises questions as to whether the elements and constructs that are lexically “the same” are also in some sense psychologically “the same.”

The radio buttons in the “Count same” pane control whether the Socio analyses are based on the common elements or the common constructs, and are set initially to the higher of the two counts. For the “Geog” data set with all grids selected there are no common elements or constructs. When some related grids are selected then the pane shows their overlap as shown below.

2.1 Composite grid sub-pane

The “Composite grid” pane at the bottom allows the selected grids to be merged into a single composite grid based on either their common elements or their common constructs, as selected through the radio buttons in the “Count same” pane. The check boxes in the “Composite grid” panel control what information is put into the note field of each item so that they can be distinguished in the composite grid. In this case the name field from the original grid is adequate to distinguish the source of each construct in the composite grid. The analysis tools in RepGrid allow the note field to be shown in parentheses in the various analyses. The top part of a Focus analysis of the composite grid is shown to illustrate this.
Part of Focus analysis of composite grid showing original grid names annotating constructs

The weights of items in the original grids are copied into the composite grid and hence may be used in later analysis. The weights for the common items are taken from the first of the selected grids. If these weights are used in an analysis of the composite grid, it is important to ensure in the grid elicitation process that participants understand and use weight values in a mutually consistent manner.

2.2 Grid comparison based on the analysis of composite grids

The use of the “Compare” algorithms to compare grids may be complemented in RepSocio by using the capability to form a composite grid and then analyzing those grids with the RepGrid and RepNet tools. For example, in the “geog” sample data there are two exchange grids elicited from Peter some 10 weeks (grid 16) and some 3 years (grid 22) after the original elicitation (grid 12). One can, for example, form a composite grid based on the common constructs in these grids and perform a PrinGrid analysis.

Then in RepNet one can run the script “PrinGrid Trajectories” which joins up the plots of the elements having the same names in each grid to produce the plot shown below. This may be used to discuss with the person from whom the grid was elicited the ways in which his construction of the mapping techniques appears to have changed over time, and whether this is meaningful to him.

It is obviously also appropriate to discuss meta-questions such as whether the underlying assumptions of the analysis are reasonable, that the construct dimensions are the same in each grid and the elements have changed along them.
“PrinGrid Trajectories” script plotting element trajectories in a composite grid
3 Socio pane

Clicking on the “Socio” tab in the RepSocio window brings up the pane shown below.

RepSocio window with “Socio” pane showing

When the “Socio” button is clicked, RepSocio displays a progress bar and computes a Socio analysis and displays the results as shown below. The “Power” value determines the exponent used in the Minkowski metric used to compute matching scores as discussed in the RepGrid Manual. Depending on the setting of the radio buttons at the bottom of the “Grids” pane, similarities between the constructs or the elements in the selected grids are computed using the algorithms described in (Shaw, 1980), and these are used to determine the mode constructs or elements and the socionets associated with the selected grids.
RepSocio window with “Socio” pane after a Socio analysis

3.1 Mode grid sub-pane

The “Mode Grid” sub-pane allows a composite Mode Grid to be created from the grids based on the constructs or elements most commonly used in all of them. The number of mode items which will be included depends on the value set in the “Cut off” text box, and the message at the top of the sub-pane indicates the number of items that will be included at the value entered together with the number for values either side of it. This helps the analyst determine an appropriate value for the cut off. The “Include” check box on the left allows the grid selected on the popup menu to the right of it to be fully incorporated in the Mode Grid if required. The “Grid/Item Identifier” sub-panel provides the same capability to annotate the items in the Mode Grid as already described for composite grids. Clicking on the “Mode Grid” button outputs the mode grid in RepGrid for analysis as shown below.
Generation of a mode grid

The weights of items in the original grids are copied into the mode grid as discussed for composite grids.

The generation of a mode grid is an important technique for extracting commonality in conceptual representations from a number of people, typically construing the same elements. Using PrinGrid to produce a principal components analysis of the mode grid in RepGrid provides the same type of analysis as a generalized Procrustes analysis (Gower and Dijksterhuis, 2004) of the grid data, but has the major advantage that the mode grid being analyzed is a composite of individual grids with no introduction of artificial ratings. A Focus analysis of the mode grid can clarify how the constructs from particular individuals relate to one another and contribute to the commonality, and demographic indicators can be appended to individual names so that sources of commonality and difference can be identified.

3.2 Socionets sub-pane

The “Socionets” sub-pane allows a plot to be generated in RepNet that shows the extent to which the items in one grid may be used to match the items in another grid. The value of the cut off
determines how great a similarity is needed before a link is shown initially, but the plot is dynamic and one can adjust the cut off in RepNet. The text at the top of the sub-pane shows the number of grids with links at the current cut off, and the maximum cut off for every grid to have at least one link. The “Title” check box determines whether the plot is titled. The “Scale” value determines the size of the initial plot. The “B&W” check box allows the plot to be restricted to black and white which may be helpful with certain printers.

Clicking on the “Socionet” button generates the plot shown on the left below.

![Socionet Diagram](image)

**Generation of and interaction with a socionet**

The arrows from Mary to Peter indicates that the average over all the constructs in Peter’s grid of the matches of the best-matched constructs in Mary’s grid is greater than or equal to the cut off, indicating that Mary should be capable of understanding Peter’s constructions. The cut off is shown in the text box at the bottom left and may be adjusted by typing in a different value, or by clicking on the triangular markers on either side of it to change to the next value of cut off that changes the number of links. This allows the socionets structure to be explored dynamically. The plot on the right is one where the cut off has been reduced to show all but one of the possible links.

The plot is a net in the RepNet tool (RepNet Manual) and hence it can be edited, saved in a file and opened again. In plots with large numbers of grids it is often useful to be able to drag the nodes around to make the plot more understandable.

### 3.3 ModeGrid & SocioNets Data sub-pane

The “ModeGrid & SocioNets Data” sub-pane allows the data from the Socio analyses to be output in text form. The “List” check box on the left controls listing the mode items. The “Matrix” and “Sorted” check boxes control listing the matrix of matches used in the SocioNets
analysis as matrix or sorted list, respectively. The “Cut off” text box sets the value below which matches will not be listed.

The list of mode constructs sorted by match values is useful in deciding where to set the cut off when creating a mode grid since it is possible to see the effect of various cut off values, and where natural gaps occur in the list.

Mode grid and socionets data
4 Compare pane

Clicking on the “Compare” tab in the RepSocio window brings up the pane shown below.

RepSocio window with “Compare” pane showing

This provides similar pairwise comparison capabilities to those already described for RepGrid, (RepGrid Manual), but now the two grids to be compared are selected through two popup menus listing all the grids that have been opened in RepSocio.

5 References

Some of the reports cited in the manual are available through http://repgrid.com