18 - Mixed Methods
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18 - Mixed Methods

General Information about Mixed Methods in MAXQDA

MAXQDA is one of the pioneers in the field of method integration. Functions for combining qualitative and quantitative data are already found in the very first versions of the program in the late 1980s and early 1990s. With the option to manage a data set of standardized, quantitative data parallel to the texts, the foundation was laid. Since version 10 there is a further tool in the form of code variables, which allows the definition of variables below the case level of a document and since version 12.2 there is a fully integrated statistics package "Stats" for carrying out descriptive and inferential statistical calculations, the results of which can be used directly for the integrative analysis of qualitative data.

In the Mixed Methods Tab, functions are available which either link documents and variables, e.g. the topics from qualitative interview material with the variables from standardized interviews, or which carry out quantitative evaluations based on the coding carried out. The first are so-called joint displays in which both qualitative and quantitative data, results or conclusions are presented together. Guetterman, Creswell and Kuckartz (2015) present various mixed method designs and suitable joint displays in an overview article. MAXQDA offers several joint displays suitable for common mixed method designs. These designs include in particular

- Convergent Designs (qual. and quan. study parallel)
- Explanatory Designs (qual. study after quan.)
- Exploratory Designs (qual. study before quan.)

Overview of Mixed Methods Functions

- **Activate Documents by Variables** – lets you activate documents to be included in the Coding Query based on document variable values. You could, for example, use this
function to identify what men between the ages of 40 and 50 said about migration issues.

- **Interactive Quote Matrix** – creates a Word file showing what different groups said about a theme based on certain variable values that you specify. Each group’s coded segments for the specified codes are in a different column. You could, for example, choose to see how those with various levels of education differ on their approach to combating homelessness.

- **Crosstab** – works parallel to the Code Matrix Browser, except that this function doesn’t work on the document level. Instead, you can create groups based on your variable values and compare how often each of these groups talks about each theme. You could, for example, compare how often men talk about relationships in your life satisfaction interviews in comparison to women.

- **Quantitizing** – This is the transformation of qualitative coding information into quantitative variables. Quantitizing allows you to store the code frequencies as document variables, such that for each document you have information about how often a code appears in that document. This information can then be analyzed statistically or used for the selection of cases.

- **Typology Table** – shows an overview of variable values for qualitative typologies that you have created (e.g. for people with various views on combating their own homelessness). You could see, for example, what the mean age, gender breakdown, and average time already homeless is for the “apathetic pessimists” in comparison to the “proactive optimists.”

- **Similarity Analysis for Documents** – selected documents are analyzed on the basis of existing coded segments and document variables for their similarity, and the results are presented in a similarity or distance matrix.

- **Side-by-side Display of Results** – This joint display compares the results of a qualitative study with those of a quantitative study.

- **QUAL Themes by QUAN Groups** – This joint display is used to compile coded segments or summaries in a table for groups formed on the basis of variable values.

- **Statistics by QUAL Groups** – The result of this function corresponds to the typology table and divides documents into groups according to codes assigned to them. This joint display allows you to compare average values, standard deviations and absolute and relative frequencies of selected variables for these groups.

In the “Code System” window there are functions available, that allow you to use the code frequencies for each document as document variables:

- **Transform code into document variable or categorical document variable** – Codes can be added as document variables that specify how often the code occurs in the document (“Quantitizing” as described above) or which subcode occurs most
frequently in a document. The latter is particularly useful for evaluative qualitative content analyses.

**Activation by Document Variable**

The selection of documents for the analysis, such as searches for coded segments, can be done easily by hand: You can activate all the documents of the project, the documents of a particular document group, or even a single document. But more complex selective coding searches are difficult to do by hand.

For this reason there are also automatic activation options. With the Activate by Document Variables function, you can choose to activate documents based on the variable values that have been assigned to them. If you have defined variables for gender, age, and education level, for example, you could choose to select only those documents that represent women over the age of 40 that have at least a high school education. These activations can be made by entering the appropriate formulas. The formula syntax in MAXQDA is similar to that of statistics programs like SPSS.

The Activate by Document Variables function always processes the entire project. You can access the function by

- selecting **Activate Documents by Variables** in the **Mixed Methods** tab or,
- by right-clicking on the **Documents** icon in the “Document System” and choosing **Activate Documents by Variables** from the context menu that appears, or
- clicking the icon with the same name in the “Document System”

After clicking on the appropriate button, a dialog window will appear where you can enter the formulas for activation. In the example mentioned above, we would want to activate only document with women over the age of 40 with a high school education. The dialog window is made up of the following sections:

- A section for the logical formulas and the buttons to create a new formula, delete
the currently selected formula, or delete all formulas.

- Checkboxes for selecting operators.
- Icons for opening or saving formulas.

All logical conditions must have the following components:

```
variable name / operator / value
```

If you have created a variable called “Education” and defined the education levels as “low”, “intermediate” and “high”, we would use the following formula in order to activate those documents that are interviews with participants with a rather low educational level:

```
Education = low
```

To create such an condition in MAXQDA, proceed as follows:

1. Double-click on the variable “Education” from the list of variables on the left side of the window. You will see the following text in the condition window:
   
   \[ \text{Education} = \text{<empty>} \]

2. The only thing that is missing at this point is the variable value. On the right side of the screen you will see a field where you can enter the value. Here you could enter “low,” or simply click on the arrow to open the drop-down menu and select a value from the list of all the values that have been entered for a document up to that point. In our example above, “low”, “intermediate” and “high” would be in the menu. Using this menu helps you to avoid any typos.
For numeric variables, MAXQDA inserts the value 0 in each newly inserted condition. For Boolean variables, you can use "0" for "false" and "1" for "true".

3. Since the “=” operator is used most often, it is automatically selected when you start a new formula. If you want to use a different logical operator, simply choose it from the right side of the window and MAXQDA automatically replaces the “=” operator.

The operators have the following meanings:

= (equal to) Selects variable values that are the same as the formula value.

< (smaller than) Selects variables values that are smaller than the formula value.

≤ (smaller or equal to) Selects variables values that are smaller or equal to the formula value.

> (larger than) Selects variable values that are larger than the formula value.

≥ (larger or equal to) Selects variable values that are larger or equal to the formula value.

≠ (unequal) Selects variable values that are not the same as the formula value.

⊃ (contains) This operator is only offered for text variables. Selects variable values that contain the formula value within their text.

Tip: It is possible to specify the condition that a non-numerical variable value should be <empty>. Then all documents to which no variable value was assigned will be selected.

Results of activations by document variables

Once you have entered the correct logical formulas, you can start the automatic activation. Click on the Activate button.

MAXQDA then checks the variable values assigned to each document to check whether it matches the formulated criteria. The documents that matched the criteria are now activated (marked red) in the “Document System.”

Tip: The status bar at the bottom of the MAXQDA window shows you how many documents have been activated.

If you want to activate documents frequently based on the same criteria, it is recommended that you save the activation model as a document set. To do so, select
the option **New set** from the dialog window. MAXQDA will then create a document set containing the activated documents. This new document set can be activated at any time in the Document System, without having to call up the function for automatic activation via document variables.

**Complex Logical Formulas**

It is also possible to combine various logical formulas. The basic units of these combinations are still the formulas in their basic form:

```
variable name / operator / value
```

Combining formulas just means that you are connecting two of these basic formulas with an operator.

In the above example, we used the condition "Education=low" to activate all documents of participants with a rather low level of education.

If you want to further limit the results, so that you only see what participants over 30 years with a low level of education had to say, you need to define a second condition, namely "Age > 30". In addition, you need to combine these conditions by a logical **AND**. The second condition, would be created just like the first condition:

4. Double-click on the variable **Age** from the list of variables. The new condition will look like this: [Age] = <empty>
5. Type in "30" for the value and choose the operator >(larger than).
6. MAXQDA automatically inserts the **OR** operator. To use the **AND** operator instead, select the appropriate option in the right-hand pane. According to the schema, any number of other logical combinations can be added. Click the **Activate** button to begin.

In this way, you can add as many combinations of logical formulas as you want. You can then click **Activate** to start the activations.

The combination operators **OR** and **AND** have the following affect on the results of your activation process: If you choose the OR option, MAXQDA looks for documents that meet at least one of the various formulas’ criteria. If you entered the formulas “Education = low” OR “Age > 30,” you will get all the documents of participants with a low level od education as well as participants older than 30 years. For our example, then, the OR option would not be appropriate. We want both formulas to be met, so we would need to use the **AND** operator, so that it looks as follows:
Deleting formulas

It is possible to go back and delete a formula at any time:

- Click on the row you wish to delete.
- Click on the **Delete** button.

Changing and saving formulas

After starting the automatic activation process, the dialog window is no longer seen. The formulas, however, will still be in that window the next time you open it.

You can change the logical formulas (operators and values) at any time:

- Click on the **Formula** in the dialog window, and select another operator.
- If you want to change the value, simply enter the new value or select it from the drop-down menu.

After you have changed the formula, click on the **Activate** button to restart the activation.

You can also save a formula, so that you can have quick access to it at a later time. Just click on the **Save** symbol at the bottom of the dialog window. You can then give it a name and choose where you want to save it.

Files for saved logical formulas are saved by MAXQDA as .LOA (logical activation) files. To open a saved formula, choose **Open** and navigate to the place you saved the .LOA file. It makes sense to set up a folder for all of your LOA files, so they are easy to find.

Using code variables for Activation by code variables

It is not only possible to activate documents based on their document variables; you can also activate codes based on their assigned code variables. The **Activate by Code Variable** function can be accessed by right-clicking on the top level entry (Code System) in the “Code System” and choosing the **Activate Codes via Variables** option in the context menu.
Crosstab

The Crosstab function has some similarities to the Code Matrix Browser, except that documents are analyzed grouped by document variable. Social groups, such as men and women, or people with different personal background, etc. can be compared based on variable values. All of the variables that are in your project can be used to set up a group.

Crosstab is a visualization of the relationship between document variables and codes. The following example displays the number of times each code occurred in interviews in rural and interviews in urban areas.

Creating a Crosstab

1. Choosing your codes

As usual in MAXQDA, the selection of codes is done via activation. The selection
should be completed before using the Crosstabs function, otherwise all codes will be displayed in the Crosstab.

**Tip:** You can open the crosstab function by right-clicking on a code from the context menu. In this case, only that specific code is shown in the cross table.

2. Define columns

The definition of the columns is done by defining appropriate variable conditions (formulas) in the dialog window, which is similar to the Activate by Document Variables dialog window.

To do this, open the **Crosstab** function in the **Mixed Methods** tab.

After activating codes and selecting Crosstab, you will have the option to create logical conditions that will be used to assign documents to each column. The window is broken up into the following sections:

- A list of all the document variables in the project.
- A section for the definition of logical conditions (formulas).
- Buttons for selecting operators and values.
- Buttons for opening and saving logical conditions (formulas).

If you have created a variable called “Region” and used the value “urban” for urban regions and “rural” for rural regions, we would use the following formula in order to create a crosstab that compares the code frequencies for the two types of regions:
1. Select the option **Insert all variable values as conditions**.
2. Double-click the desired variable "Region" in the left pane of the window.

MAXQDA then lists the formulas for all variable values in the middle pane of the window. In the example, it would look as follows:

[Region] = urban

[Region] = rural

The Crosstabs created in this way would look as follows:

![Crosstabs comparing the number of coded segments for each code by region](image)

**Tips for defining columns**

If there are many different possible values for a certain variable, you can choose to delete those that you don’t want to include in the visualization. If, for example, you had a variable “level of organization” with possible values “very high,” “high,” “medium,” “low,” and “very low,” you might only want to compare the two extremes. To do so, click on the element you wish to remove from the list in the Formula row and click the **Delete** symbol.

You can also compare groupings based only on specific variable values by not checking the box to **Insert all variable values as conditions**. Instead, you would simply create a formula and add single values by following these steps:

1. Double-click on the desired variable in the list of variables to set it as a condition (formula).

2. Insert the appropriate variable value in the field on the right side of the window or choose it from the drop-down list. The drop-down list will have all the values that
were assigned to the chosen variable. Choosing the value from the list helps you avoid any typos that would cause you to get false results.

3. Repeat the first three steps to set up each column of the Crosstabs.

When you click OK, the table will be displayed.

You can also save formulas, so that you can have quick access to them at a later time and don’t have to reenter them one by one. Just click on the Save button at the bottom of the dialog window. You can then give it a name and choose where you want to save it.

Files for saved formulas are saved by MAXQDA as .LOA files. To open a saved set of formulas, choose Open and navigate to the place you saved the .LOA file.

Functions in the toolbar

The Crosstab function can be accessed from the Mixed methods tab or from the context menu of a code.

The Crosstab toolbar at the top of the window offers the following in addition to the usual export functions:

- Interactive Quote Matrix – Displays the coded segments from the table in an interactive window.

- Code Hierarchy – Displays code system with or without code hierarchy.

- Number of segments – Displays absolute frequencies, meaning the number of segments of the respective codes for the variable form of the respective column.

- Row percentage – The percentage share of the cell calculated across the row (horizontal percentage calculation).

- Column percentage based on the sum of coded segments (row “SUM”) – The percentage share of the cell calculated across the column (vertical percentage calculation).

- Column percentages based on the number of documents “N (documents)” – The column percentage in terms of the number of documents in the column (the option Count hits per document only once will be selected automatically).

- Count hits per document only once – The unit of analysis is set to Document. Each document is analyzed based only on whether the code has been assigned or not; the
frequency with which a code occurs within a document is not taken into account.

\[ \sum \text{ Sum} \] – displays the sum of rows and columns.

\[ \sum \text{ Highlight highest values} \] – for better interpretation of the results higher values are highlightes in green.

\[ \sum \text{ Refresh} \] – recalculates the values in the table.

Interactive connection to source files

The cells in the crosstab are interactively linked to the data material in your project.

- Double-click on a cell to list its segments in the “Retrieved Segments” window. This action automatically activates both the documents and codes connected with the cell.
- Right-click on a cell and choose Activate Documents from the context menu. This activates the connected documents without changing your current code activation selection.

Crosstab suitability

Crosstabs are well suited for the analysis of sub-categories and their distribution in sub-groups of the sample. Imagine you have asked how students prepare for examinations, and the different options (e.g. reading books, working together with colleagues, etc.) are defined as codes. With the Crosstab function, you can compare various groups with each other. Are female students participating more in training groups? Do male students read more text? The options to view the values as row or column percentages make the interpretation of the data even easier.

Quote Matrix

The “Quote Matrix” is based on the same idea as the Crosstabs function, i.e. to create a joint display of themes and quantitative variables. The Quote Matrix does this on a more detailed, non-aggregated level. Here the coded segments themselves are listed in the cells of the matrix, not only the number of coded segments for that particular cell. In the example below, we can see a comparison about what married and single people said about certain themes.

| Code | Family status = married | Family status = single |
| emotions | Happiness does not remind me of one event. It makes me think of my life. Even though there are bad times, overall I am very happy with the way I turned out as a human being and I like were my life is headed.  
*New York/Joanna: 34 - 35 (100)* | I feel as if I am very healthy and I know that I have a firm background on what being healthy means because of my interest in Nutrition and Exercise. I always try to eat better and make the right choices and exercise on a regular basis.  
*New York/Milly: 11 - 11 (100)* |
| --- | --- | --- |
| Sadness reminds me of the death of my grandmother (Dec. 90') and my grandfather (June 96'). Their deaths effected my life greatly. They were like my second parents.  
*New York/GINA: 12 - 12 (100)* |  |
| education | My career now is college. I am graduating this weekend from my Community Health Undergraduate program at Hofstra University. I am continuing my undergraduate studies at CW Post in the fall to get a BS in nutrition. Getting my RD is my major career choice.  
*New York/GINA: 17 - 17 (100)* | My major is Dietetics and I am planning on working with children at either a center or a Children's Hospital and do meal plan counseling for children that need special diets because of sickness, or whatever the case may be. I know that will not be happy in my occupation unless I work with children.  
*New York/Vincent: 12 - 12 (100)* |
| I would like to improve my dedication to working out. I am the type of person who will work out 5 times a week for a month straight and then is slowly turns into less days a week until it is none. I get distracted by school work, my job or just being tired.  
*New York/Silvia: 42 - 42 (100)* |  |

MAXQDA creates a table that shows the same coded segments that would be numerically listed in the Crosstab, but here they are displayed as text. In theory, it would be possible for you to create a Quote Matrix on your own by doing retrievals in MAXQDA for each group and copying them from the “Retrieved Segments” window into a table in Word, but the resulting table would contain only the segments themselves and no source data. To create a Quote Matrix, proceed as follows:

1. First, activate the codes you wish to include in the Quote Matrix.
2. From the **Mixed Methods** menu tab select **Quote Matrix**. The following dialog
window will open, in which you can define the columns of the matrix:

You can find a detailed description on how to select variables for matrix columns in the **Crosstabs** chapter.

When you click **OK**, a dialog window will open in which you can create a file name and select the location where the Quote Matrix will be saved. The matrix can be saved as an Excel, HTML or RTF file. For a matrix with many columns, Excel format is recommended, for a matrix with few columns, RTF format is recommended. The file will open automatically upon export.

**Tip:** You can also generate a Quote Matrix directly from the Code Matrix Browser or Code Relations Browser or Crosstab by clicking the **Quote Matrix** symbol.

**Quote Matrix with Comments**

You may have added a **comment to one or multiple coded segments**. These comments can be displayed in the Quote Matrix in addition to or as an alternative to the coded segments. This is especially interesting if the comments contain a short summary of the coded segments or important notes about them.

To display the comments instead of the coded segments, go to the Mixed Methods menu tab and click on the word **Quote Matrix** below the Quote Matrix symbol to open up a drop down menu. Here you can click on **Quote Matrix with Comments** or **Quote Matrix with Coded Segments and Comments**.
Interactive Quote Matrix

The Interactive Quote Matrix can be used to interactively compare the coded segments for different cases and groups. The Interactive Quote Matrix displays the same content as the regular Quote Matrix, except that the data is not exported but displayed directly in MAXQDA in an interactive window. The Interactive Quote Matrix is therefore usually preferable to the regular Quote Matrix.

Follow these steps to open an Interactive Quote Matrix:

1. Activate the documents and codes you wish to include in the matrix. If none are activated, all documents and codes will be included.
2. Open the function via Mixed Methods > Interactive Quote Matrix.
3. Use variable conditions to determine which documents are to be displayed in the columns (a separate column is created for each variable condition). You can find a detailed introduction to defining columns in the section on Crosstabs.
4. If necessary selected the options Only for activated documents and/or Only for activated codes.
5. Click OK – MAXQDA will open a new window with the interactive display:
The first column displays a list with the codes you selected. MAXQDA automatically adds the parent codes of the activated codes in order to retain the code system’s hierarchical structure.

**Tip:** If you selected the option **Only for activated codes**, you can change this later in your “Code System” to adjust the selection of displayed codes in the interactive quote matrix.

The other columns are the results of your selected variable conditions: for each defined condition, a column is displayed. These columns contain the coded segments of the documents which meet the respective variable condition. The number of documents per column is indicated in the column headings.

Click on a code in the code tree to list its coded segments in the columns. The column headers indicates how many coded segments are displayed in the column.

**Tip:** The Interactive Quote Matrix function can also be opened directly from the Code Matrix Browser or from a Crosstab. When working with the Code Matrix Browser or a Crosstab, click the first icon on the very left. The Interactive Quote Matrix can also be opened by selecting: **Analysis > Compare groups > Qualitative.**

**Toolbar**

Along the top edge you will see a symbol toolbar with the following functions:

- **Display codes with hierarchy** – if this option is activated, the codes are displayed in a hierarchical tree structure. The non-activated parent codes may be displayed to retain its hierarchical structure. When the option is deactivated, the codes are displayed in a linear list. Should you have selected the option "Only activated codes" when creating the matrix, only the activated codes will be displayed.

- **Display origin** – shows the source documents, locations within documents and the code weights in brackets below the coded segments. Clicking on the displayed source document imports the corresponding document into the document browser and highlights the coded segment.

- **Display comments for coded segments** – displays all the comments on coded segments (if any).

- **Display memos** – displays below the coded segments the titles of memos that are present at the level of the coded segments. Clicking on the displayed memo title opens that memo.
Standardize font – with this setting, you can standardize the text font, size, and line spacing to create a consistent display of your text segments. Font styles such as bold and italics are not affected by this setting.

Zoom out – minimizes the display of the segments in the columns.

Zoom in – magnifies the display of the segments in the columns.

x of y columns – adjusts how many columns (x) of the total columns (y) are visible.

Display search toolbar - allows you to search within the Interactive Quote Matrix.

Refresh – reopens the options window for the Interactive Quote Matrix, which lets you customize the columns and included documents and codes.

Exporting the Interactive Quote Matrix

The Quote Matrix can be exported using the usual icons at the top right of the window. The segments of all displayed codes are always exported. If you limited the quote matrix to activated codes, only these activated codes are exported.

Open as Word document – Creates a Word document and opens it.

Open as Excel table – Creates an Excel spreadsheet and opens it.

Export – Creates a table as a Word file (DOCX format), an Excel file (XLS/X format), or a web page (HTML format).

Typology Table

This function offers yet another way to combine quantitative data and your codes or categorical variables. It is called a Typology Table, because it is able to calculate various variables and their percentages (means, standard deviations, etc.) for qualitative typologies.

The table is set up similarly to the following example from Creswell and Plano’s book “Designing and Conducting Mixed Methods Research” (2011: 292):
Example of a Typology Table

This table shows a comparison between two types of patients, “Depressed” patients (27 persons) and “Not Depressed” patients (21 persons). The last column p-Value shows the statistic significance of the mathematical means. The first row “Age” shows the average age of both groups and the standard deviation in brackets.

The row “Women” contains the number of women and their percentage. This means that of the 27 depressed persons 21 are women, which is exactly 79%.

As we can see, the rows consist of variables, metric variables to be exact, and specific values of categorical variables – either text or numerical variables. The columns follow the pattern of Crosstabs, meaning the values of any categorical variables can be selected.

To create a Typology Table, proceed as follows:

1. Select **Typology table** from the **Mixed Methods** menu tab.
2. For categorical variables, all respective variable values are listed in the dialog window. For non-categorical (metric) variables, the variables themselves are listed. For easy differentiation, non-categorical variables appear in red. Check the variable values and variables you would like to include in the Typology table and to compare between groups.

3. Select the **Exclude missing values** option when the missing values of non-categorical variables should be ignored. This will usually be the case.

4. When you click **Continue** a second dialog window will appear in which you can define the columns of the Typology table, and where you can specify the elements that should be compared with one another.

5. Create a variable condition (formula) for each desired column, for example “Depressive = Yes” and “Depressive = No”. The quickest way to do so is by double-clicking the variable in the variable column. When you click **OK**, MAXQDA will display the Typology table.

### The Typology Table toolbar

At the top of the Typology Table you will find a toolbar that – besides the usual export options – offers the following functions:

- **Highlight lowest value per row** – for better interpretation of the results the value highest in row is highlighted in red.

- **Highlight highest value per row** – for better interpretation of the results the value lowest in row is highlighted in green.

- **Refresh** – updates display via recalling the function.

### Interactive connection to source data

The typology table is linked to the data in your MAXQDA project interactively:

- Double click on a cell, that shows the number of documents (and no mean value), to activate these documents in the “Document System”.
- Double click on a cell of the first column, where the cell shows a variable value, to activate all documents that fit the clicked variable criteria.

### Side-by-side Display of Results

**Definition:** The purpose of the side-by-side display is to array quantitative and qualitative data of a Mixed Methods project together.
Side-by-side displays are used to display the results of a qualitative and a quantitative study together by sorted themes. The display is structured like this:

<table>
<thead>
<tr>
<th>Qualitative Results (Document A)</th>
<th>Quantitative Results (Document B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1 (Code 1)</td>
<td>Coded segments / Summaries</td>
</tr>
<tr>
<td>Theme 2 (Code 2)</td>
<td>Coded segments / Summaries</td>
</tr>
<tr>
<td>Theme 3 (Code 3)</td>
<td>Coded segments / Summaries</td>
</tr>
</tbody>
</table>

The side-by-side display has two columns. Each column displays coded segments or summaries for each of the two studies. The rows of the table are made up of themes, in this case your codes.

This joint display is especially suitable for convergent designs, where a qualitative and a quantitative study are conducted independently or for the final integration of an explanatory or exploratory design.

Creating a new side-by-side display

Navigate to the Mixed Methods menu tab and click the Side-by-Side Display entry. From the dropdown select to create a new display for either Coded segments or Summaries. MAXQDA will open the following dialog:
1. Drag and drop a document from the “Document System” into each of the fields for “Qualitative study” and “Quantitative study” with your mouse. Drag another document into a field to replace a document you already selected.

2. Drag and drop any number of codes from the “Code System” into the “Themes” box on the left. Codes can be rearranged with the mouse. Codes can be removed from the “Themes” box by dragging the code out of the box or selecting the code and pressing Del key (Windows) or cmd-Backspace (Mac).

3. Check the box next to Include comments of coded segments to include comments. If a comment exists, it will be displayed below the coded segment in the final display. This option is not available for side-by-side displays created for summaries.

4. After clicking OK, a dialog window will appear where you enter a file name and select the location on your computer to save the display to.

MAXQDA generates an Interactive Quote Matrix with two columns for a side-by-side display, so that you can explore this display interactively. You can find further information on how to work with this results window in the following section of the manual: Interactive Quote Matrix.

**Similarity Analysis for Documents**

The Similarity Analysis for documents can be used to check the similarity or dissimilarity of various documents in terms of code frequency. The values of document variables can also be included.

**Starting the Similarity Analysis**

1. Activate all documents you would like to include in the Similarity Analysis.
2. It is also helpful to activate all codes you wish to use for determining similarity.
3. From the Mixed Methods menu tab, click Similarity Analysis for Documents. A window will appear that contains all previously created similarity and distance matrices.
4. Click on the New Similarity/Distance matrix symbol to begin the similarity analysis.

**Setting the parameters for the analysis**

A dialog window will appear in which you can select the codes and variables and specify the type of analysis.
Setting options for the analysis

In the upper section, you can add the codes you wish to include in the analysis. You can add all activated codes directly via the Paste activated codes button.

Next, select the type of analysis:

**Existence of code** – Generates a similarity matrix that considers only whether the selected codes occur in the document or not.

**Code frequency** – Generates a distance matrix that takes the distance of individual codes into consideration.

**Similarity measures with the option “Existence of Code”**

To calculate similarity, various options are available. All of the calculations are based on a four-field table of the following type that is generated for each paired combination of documents (in the background):

<table>
<thead>
<tr>
<th>Document A</th>
<th>Document B</th>
<th>Document C</th>
<th>Document D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New similarity/distance matrix

Codes

People
Friends
Grandparents
Parents
Siblings
Partner

Existence of code -- similarity measure:

- Simple matching
- Jaccard
- Kuckartz & Rädiker zeta
- Russel & Rao

Code frequency -- distance measure:

- Set missing values to 0
- Ignore documents with missing values

Chosen codes: 6
Chosen variables: 0

Only for activated documents

OK Cancel

Setting options for the analysis
<table>
<thead>
<tr>
<th>Document</th>
<th>Code/Variable value exists</th>
<th>Code/Variable value does not exist</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

A = Number of codes or variable values that are identical in both documents.

D = Number of codes or variable values that do not exist in both documents.

B and C = Number of codes or variable values that exist in only one document.

The calculation options differ in, among other things, the extent to which field "d", or non-existence in both documents, is considered a match.

**Simple match** = \(\frac{a + d}{a + b + c + d}\) – Both existence and non-existence are counted as a match. The result is the percentage match.

**Jaccard** = \(\frac{a}{a + b + c}\) – Non-existence is completely ignored.

**Kuckartz & Rädikers zeta** = \(\frac{2a + d}{2a + b + c + d}\) – Existence is counted twice, non-existence once.

**Russel & Rao** = \(\frac{a}{a + b + c + d}\) – Only existence is considered a match, but non-existence reduces the similarity.

**Please note**: If you include more than one code into the analysis that does not exist in multiple documents, it may be better to use a coefficient who ignores non-existing codes (Jaccard) or values them less (Kuckartz & Rädiker zeta, Russel & Rao). Otherwise you may receive a high similarity score, even if the codes are not assigned very differently. The non-existing codes will dominate the existing codes in this case.

**Distance measures with the option “Code Frequency”**

To calculate the distance between two documents based on “Code frequency”, the following options are available in which the code frequencies of two documents will be compared:

**Squared euclidean distance** = The sum of squared deviations (higher deviations will be rated higher as lower ones because of squaring the deviations).

**Block distance** = The sum of absolute deviations.
Please note: Since it is also possible to include variable values in the analysis, all code frequencies and variable values are z-standardized previously beforehand.

Including variables

If you want to include variables in addition to codes in the similarity analysis, click the Integrate variables button. If you selected “Existence of code” as the type of analysis, you can then select which variable values MAXQDA should evaluate in the dialog window. If the selected variable value exists in both documents, this is evaluated as a match (type “a”). In the dialog window, only variables of type “text”, “true/false”, "Date" as well as categorical integers or floating-point numbers are listed.

Selecting variable values in the “Existence of Code” analysis

If you selected "Code frequency" as the type of analysis, another dialog window will appear that contains only integer or floating-point variables, that are not marked as "categorical".
Dealing with missing variable values

You can choose how missing values are handled:

**Set missing values to 0** – If a variable value does not exist, it is set to 0 due to the z-standardization of the average. In this option, the document with the missing value is taken into account in the analysis.

**Ignore documents with missing values** – If in a document one of the variable values is missing, the entire document will be ignored in the analysis.

The final similarity or distance matrix

The following figure shows a similarity matrix for five interviews. The selected documents are listed both in the rows and in the columns:
Similarity matrix for five interviews

The default shadowed color helps to interpret the cells, which in a similarity matrix can have a value of 0 (no similarity) to 1 (identical): The darker the green, the more similar the two documents are in terms of the selected code and variable values. In the figure, for example, you can see that "Sam" completely coincides with "Jamie" both in their codes and their variable values.

The matrix is sortable: Click on a column header to sort the documents in the rows according to their similarity to the clicked document.

The Similarity Analysis toolbar

In addition to the usual export options, the following functions can be accessed from the toolbar:

- **New similarity/distance matrix** – Calls up the dialog window where you can create a new matrix.
- **Delete** – Deletes the selected matrix.
- **Names, columns: none, short, full** – Controls column width.
- **No color highlight** – Turns off green highlighting.
- **Color highlight refers to whole matrix** – The highlight color takes into account the value of the cell. The same values will have the same highlight color in the table.
- **Color highlight refers to columns** – In each column, the colors are graduated from white to green. In this way, you can see at a glance which documents are particularly similar to the document in the column. The same values in the matrix may be different colors.
- **Color highlight refers to rows** – In each row, the colors are graduated from white to green. In this way, you can see at a glance which documents are particularly similar to the document in the row. The same values in the matrix may be different colors.

Distance matrices look identical to similarity matrices, however their interpretation is the reverse: The lower the value in a cell, the more similar the two documents are.

The list of existing similarity and distance matrices

In the left pane of the window you can see the similarity and distance matrices created
earlier in the project. They can be renamed with a double-click, or deleted by clicking the **Delete** icon in the toolbar.

**Tip:** In order to ensure the transparency of the analysis process, the matrix name and selected settings will be displayed in the tooltip if you hover over a matrix name.

### Qualitative Themes by Quantitative Groups

**Definition:** This joint display integrates data by arraying the qualitative data (segments or summaries) as one dimension and the groups formed by the quantitative data as another dimension.

This joint display is used to compare coded segments or summaries for groups of documents. Documents are grouped based on variable values. The following table is a schematic representation of a joint display for the document variable “Occupation”. Document groups are created based on their occupational status:

<table>
<thead>
<tr>
<th>Document variable: Occupation</th>
<th>unemployed (N = x documents)</th>
<th>employed (N = y documents)</th>
<th>self-employed (N = z documents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
</tr>
<tr>
<td>(Code 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 2</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
</tr>
<tr>
<td>(Code 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme 3</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
<td>Coded segments / Summaries</td>
</tr>
<tr>
<td>(Code 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each column displays coded segments or summaries from those documents with the corresponding variable value, separated into rows by themes (= codes).

This joint display is especially suitable for explanatory designs, but could also be useful for convergent (parallel) designs.

### Creating a new display

Navigate to the **Mixed Methods** menu tab and click on the **QUAL Themes for QUAN Groups** entry either for Coded segments or Summaries. MAXQDA will open the following dialog:
Creating a joint display “Qualitative themes by quantitative groups”

1. Select which groups to compare by selecting a document variable and up to four variable values from the drop down menus. MAXQDA will include all documents with the corresponding variable value in the final columns of the display.
2. You can limit the display to only include currently activated documents by checking the box next to Only for activated documents.
3. Drag and drop any number of codes from the “Code System” into the “Themes” box on the left. Codes can be rearranged with the mouse. Codes can be removed from the “Themes” box by dragging the code out of the box or selecting the code and pressing Del key (Windows) or cmd-Backspace (Mac).
4. Check the box next to Include comments of coded segments to include comments. If a comment exists, it will be displayed below the coded segment in the final display. This option is not available for displays created for summaries.
5. After clicking OK, a dialog window will appear where you enter a file name and select the location on your computer to save the display to.

MAXQDA then exports the side-by-side display in a RTF document which can be read by Word and opens the document. The result of this display is similar to the result of a Quote Matrix.

Statistics by Qualitative Groups

Definition: This joint display integrates a qualitative typology as one dimension with the quantitative data as another dimension.
This joint display is used to compare types that have been constructed from the qualitative data by statistical values such as mean, standard deviation, etc. The types are created based on the existence of codes in each document. The following table is a schematic representation of this kind of joint display:

<table>
<thead>
<tr>
<th></th>
<th>subcode A</th>
<th></th>
<th>subcode B</th>
<th></th>
<th>subcode C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable 1</td>
<td>Mean (Standard deviation)</td>
<td>Mean (Standard deviation)</td>
<td>Mean (Standard deviation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable 2</td>
<td>Total (%)</td>
<td></td>
<td>Total (%)</td>
<td></td>
<td>Total (%)</td>
</tr>
<tr>
<td>Documents</td>
<td>N (%)</td>
<td></td>
<td>N (%)</td>
<td></td>
<td>N (%)</td>
</tr>
</tbody>
</table>

Each column holds all documents, in which the selected subcode occurs. It is therefore important that only one of the subcodes is assigned to each document. An example could be an evaluative qualitative text analysis where the code “self assurance” has the subcodes “low,” “medium,” and “high”. If one of the subcodes is assigned to each document, they can now be used to create this joint display.

This joint display is suitable for convergent (parallel), as well as explanatory and exploratory designs.

Creating a new display

Navigate to the **Mixed Methods** menu tab and click the **Statistics for QUAL Groups** entry. MAXQDA will open the following window:
1. Create groups by dragging a code that has subcodes (but no sub-subcodes) from the “Code System” window to the “Groups” field at the top of this window. Select up to 4 subcodes from the drop down menus below.

2. You can limit the display to only include currently activated documents by checking the box next to **Only for activated documents**.

3. Click the “**Choose document variables...**” button to call up the variable selection window. Select which variable values to include for categorical variables.

4. Click **OK** to include your selection and click **OK** again to create the joint display.

The result of this display is equal to that of a typology table.

**Transform a Code into a Document Variable (Quantitizing)**

A code in the “Code System” can be transformed into a document variable, indicating how often the selected code appears in each document. The document variable is dynamic. MAXQDA will automatically update the document variable, i.e. increasing the variable value if a new segment is coded with the code. This feature is particularly useful as it allows the user to export code frequencies along with variables, or activate
documents based on certain code frequencies for analysis.

To transform a code into a document variable, right-click the code and select **Transform into a Document Variable.**

MAXQDA will generate a document variable, with the same name as the code, as a numeric variable. The program will automatically insert the code frequency of each document into the appropriate cell of the column. It opens along with the “Data editor” of the document variable and positions it in the appropriate column. The content of this variable can't be edited manually. MAXQDA updates the variable dynamically: If you add or delete an encoding for the transformed code, the variable value is automatically updated.
Hint: To transform multiple codes into document variables at once, activate all of the codes first, then click the Quantitizing entry in the Mixed Methods menu tab.

You can recognize variables transformed from codes in the "List of Document Variables" by the green square icon in the first column and the "Code" entry in the "Source" column.

The transformed code can be binarized by clicking the Convert to boolean variable icon in the "List of Document Variables". The variable then no longer indicates how often the corresponding code occurs in the respective document, but whether it occurs (1) at all in the document or not (0).
Transform a Code into a Categorical Document Variable

Evaluative categories in (qualitative) content analyses

In many research projects, forms of evaluative qualitative content analysis are used. The standard steps are to: (1) define evaluative categories, usually with ordinal variables, (2) code text segments, and (3) analyze the data descriptively and statistically. A good example of this form of analysis process is found in Philipp Mayring’s chapter on qualitative content analysis found in “A Companion to Qualitative Research” (Flick, et al., 2004), which describes scaled variations of structure content analysis.

In one of Mayring’s detailed examples from a study on student teachers, a category called “self confidence” is created with three options: “high,” “medium” and “low” (see below). These categories were developed from the material – one can see from the following figure that the categories are not only precisely defined, but also empirically supported with the help of the anchor examples in the material.
The coding process, which is standard procedure for content analysis, has the researcher working through the entire data set and assigning evaluative codes to appropriate text segments that have to do with “self-esteem.” This means that every single text segment that connects to self-esteem will be assigned the code “high,” “medium” or “low” on the basis of the coding guidelines established.

At the end, each case (in the case of interviews, a case would be an interviewed person) can be analyzed as a whole and given a summary characterization as having “high,” “medium” or “low” self-esteem. Cases characterized as having high self-esteem can then be compared with those with low self-esteem. Code frequencies can also be compared and used in combination with other categories in crosstabs.

**Principles of application in MAXQDA**

The method for evaluative content analysis can be done in MAXQDA in the following way. First, the category “self-esteem” is created as a code with the subcodes “high,” “medium” and “low.” The definitions of these codes along with anchor examples can be created as code memos.
Now the material will be analyzed, meaning that each document is read line by line. The text segments that have to do with self-esteem are identified and then coded with the appropriate code (e.g. “high” self-esteem). After an entire text has been worked through in this way, the researcher will have one of the following situations:

- Text segments about self-esteem in this document were all coded with the same subcode (e.g. “medium” self-esteem). In this situation, the entire case can be said to have a medium level of self-esteem.
- Text segments about self-esteem in this document were coded with various subcodes, but one of those subcodes obviously occurs more often (e.g. three with “high” self-esteem and one with “medium” self-esteem). In this situation it makes sense to give the whole case that level of self-esteem that is coded most often.
- Text segments about self-esteem in this document were coded with various subcodes, and none of them clearly occur more often than the others (e.g. two with “medium” self-esteem and two with “high” self-esteem). In this situation, a quick categorization cannot be made, so the coded segments should be compared to one another by the coders, who then make a decision about which categorization is more appropriate.
- No text segments were coded with self-esteem subcodes, meaning the document does not contain any information about this theme. None of the subcodes can be used to categorize this document, and will need to be treated as a “missing” value.

The “Transform into a Categorical Variable” function

After coding the appropriate text segments, the “Self-esteem” code can be transformed into a categorical variable by right-clicking on the code and selecting the appropriate option in the menu that appears.
Calling up the “Transform into a categorical doc-variable” function in a code’s context menu

After this option is selected, MAXQDA performs the following actions:

1. A new categorical variable is created in the List of document variables with the name of the code that it was created from (in this case, “Self-esteem”).
2. All cases (documents) in the “Document System” are evaluated according to the rules explained above.
   a) Each case is assigned the value of the subcode that occurs the most often.
   b) If there are two or more subcodes used the same numbers of time, it is labeled “undefined.”
   c) If none of the subcodes are used at all, no value is assigned. If the table is exported to a statistical software, empty values are usually treated as “missing.”
3. Immediately afterwards MAXQDA opens the “Data Editor for Document Variables”.

<table>
<thead>
<tr>
<th>Interviews group</th>
<th>Document name</th>
<th>Self-esteem</th>
<th>Age</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews New York</td>
<td>Riley</td>
<td>high</td>
<td>18</td>
<td>New York</td>
</tr>
<tr>
<td>Interviews New York</td>
<td>Julies</td>
<td>low</td>
<td>19</td>
<td>New York</td>
</tr>
<tr>
<td>Interviews New York</td>
<td>Luca</td>
<td>medium</td>
<td>21</td>
<td>New York</td>
</tr>
</tbody>
</table>
Note: If a subcode has further subcodes, then these subcodes and their codings are not included in the evaluation for the categorical variable. Only the direct subcodes are taken into account.

Dynamic properties of categorical variables

In MAXQDA’s List of document variables, the categorical variables have a special status. One recognizes them in the list, because they have a green square in the first column and are created from a “Code” as seen in the “Source” column; categorical variables are defined as text variables, and the texts are taken from the “Code System” (in this case “high,” “mid” or “low”).

Categorical variables are dynamic, which means they are updated automatically when new segments are coded in the documents. This is also the case for documents that are imported after the categorical variable has already been created; when one codes this new document, the variable label changes accordingly.

Tip: If a subcode has further subcodes, they will not be included for the evaluation of categorical variable values. Only direct subcodes of the codes that were transformed into a categorical variable are evaluated.

Categorical variables in the context of MAXQDA’s mixed methods functions

Categorical variables lend themselves very well to use with MAXQDA’s mixed methods functions. With the Activate documents via variables function, for example, one can choose to activate only those documents with a certain variable value. This is helpful for answering research questions such as “How do student teachers with low self-esteem experience their situation in the school system? How do they approach disciplinary issues?”
The **Crosstabs** function offers an aggregated overview of the number of coded segments in certain categories in the “Code System” for each of the three self-esteem variables. The self-esteem characterizations are shown in the columns on the x-axis, and the selected codes are shown in the rows on the y-axis. Using the self-esteem example, the Crosstabs function could count the number of times that student teachers with low self-esteem talk about disciplinary issues in comparison to the number of times student teachers with high self-esteem talk about the issue. One can then easily call up the document segments counted in each cell in the “Retrieved Segments” window.

One can also use the **Quote Matrix** to see a detailed table of the document segments, each column holding those segments that occur in documents with a specific categorical value. In our self-esteem example, one column could hold those statements about a certain topic that come from student teachers with high self-esteem, and the other column could display those statements from teachers with low self-esteem.

The **Typology Table** uses categorical variables similar to the way the Crosstabs function does; a table is created with the categorical variable values in the columns. In this case, however, the variables are analyzed rather than the categories. One could look, for example, what percentage of people with high self-esteem are older than 30 years and what percentage are younger, or whether good grades in teacher certification exams seem to connect in any way to self-esteem, etc.