

USER GUIDE

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# GRAPE MARS:

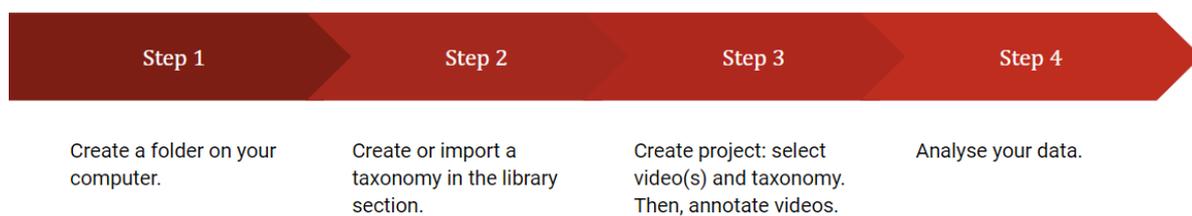
THE BASICS

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The multimodal annotation software GRAPE MARS (Multimodal Analysis Research Software), developed by the research group GRAPE (Universitat Jaume I, Spain), is designed to assist in the detailed analysis of videos and the different semiotic modes used in them. The program allows the creation of libraries defined by the user, where the modes to be analysed are collected (e.g., gestures, head movements, facial expression, visual effects, sound effects, etc.), as well as their different typologies (e.g., types of gestures, or different facial expressions). The software facilitates the annotation of these modes by organising them in different layers which are time-aligned. This helps determine the co-occurrence of modes (i.e., the instances when they occur in synchrony). Likewise, it facilitates the quantitative analysis of these data and its representation in graphs. The software consists of the following modules: video library, video player, verbal transcription, audio representation graph, annotation library, annotation layers, and data analytics.

This user guide explains the four main steps that should be followed to start using the GRAPE MARS software.



### STEP 1: Create a folder on your computer

Firstly, create a folder on your computer to allow the software to have access to the data stored during the analysis on the website.

Once you have created the folder, open [GRAPE MARS](#) on Google Chrome<sup>1</sup> and click on '**select a directory**'. Here, you will be prompted to choose the folder you have just created. Grant the software permission to edit the files in that folder.

Then, the website will change, and you will find two sections at the top: **workspace** and **analytics**. On the one hand, in the workspace section, you can create or modify the taxonomy you want to work with (i.e., step 2) and annotate the videos (i.e., step 3). On the other hand, in the analytics section, you can perform the quantitative analysis of the data obtained during the video annotation (i.e., step 4).

### STEP 2: Create or import a taxonomy

Before starting the video annotation, you need to define the taxonomy you want to work with. The software gives you **two options**: you can **create a taxonomy from scratch** or **import a taxonomy you have already used**. We are going to start by creating a new taxonomy.

<sup>1</sup> If you use a browser different from Google Chrome, the software may not work.

## Creating a new taxonomy

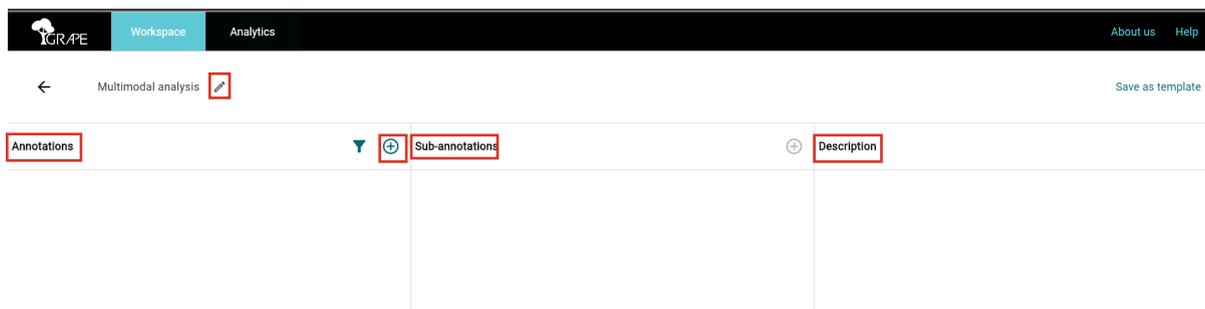
Move to the **library section** to create a new taxonomy. The software will indicate the number of taxonomies you have saved (see Picture 1). Since this is the first time you are using GRAPE MARS, you will be able to read that “0 libraries were found”. You will also see the options mentioned above in blue: “import” and “new library”. **Click on “new library”** and name it.



**Picture 1.** Library section used to create new taxonomies.

Once you have written its name, this new library will become a folder. If you click that folder with the mouse’s right button, you will find a menu with four options: view, rename, duplicate and delete. To start working on this taxonomy, **double-click on the folder** or select **view** in the abovementioned menu. As you can see in Picture 2, the website has changed. At the top, you will have the name of the taxonomy, which you can modify anytime by clicking on the pencil icon. Below, you will see three options in bold:

- In **annotations**, you can add the **semantic modes** you want to analyse (e.g., hand gestures, facial expressions...).
- In **sub-annotations**, you can specify the **different types** that are included in the semantic modes you have chosen in the annotations section (e.g., in hand gestures, you can include iconic gestures, metaphoric gestures, deictic gestures and beats).
- In **description**, you can add a **definition**<sup>2</sup> or a written text describing the sub-annotation.



**Picture 2.** Sections when creating a new taxonomy.

Firstly, create the annotations with the modes you want to include in your taxonomy. To add a new mode, **click on the + icon** that is placed on the right side in the annotations column. You will find a window with the option **Create Annotation** (see Picture 3). There, write the name of one of the modes you want to analyse (we have used “hand gestures”). You can also classify those modes using the **Categories** option. For example, this guide has classified modes into two categories: embodied and disembodied modes. If you want to classify the modes in the annotation section, **click on the + icon** appearing next to Categories, write the name for that category, choose a colour and save the changes. Then, if you want to classify the other

<sup>2</sup> This description will appear every time you add an annotation and classify it in the video annotation section.

annotations you create, select the category in the drop-down menu and save the changes. You will see that the categories section is hashtag-shaped.

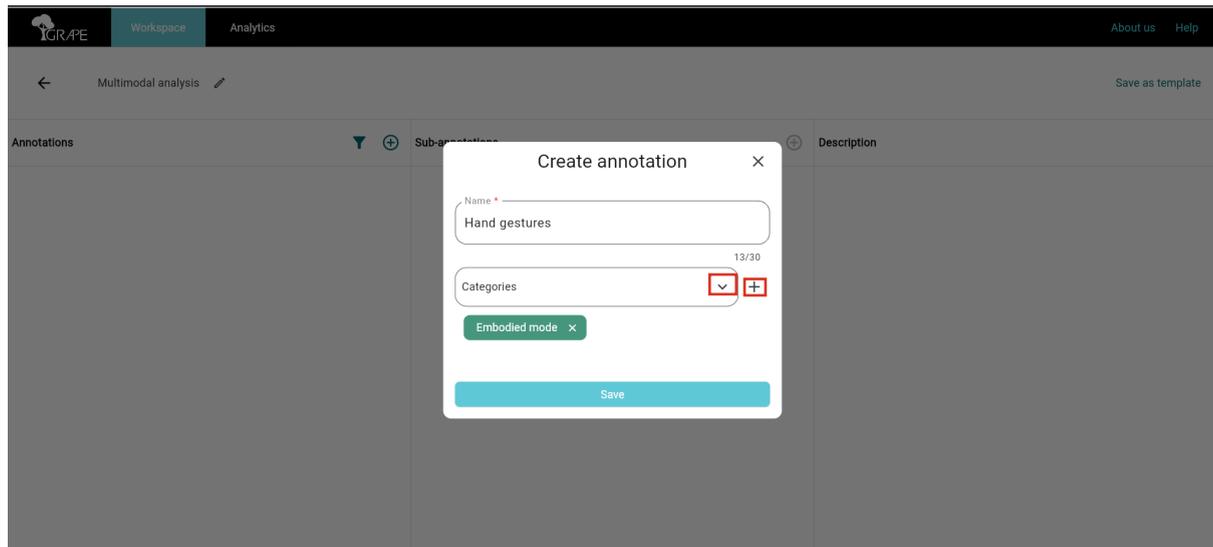


Figure 3. Window appearing when creating annotations.

You can always edit or delete annotations. To do that, click on the three points placed on the right side of the annotation you created, and it will show you the menu with the **Edit** and **Delete** options.

When the annotation is too broad, you can add different types in the sub-annotation section. **Click on the + icon** on the right side of the sub-annotation section, and a window will appear. Then, name that sub-annotation, choose a colour, write a description, if necessary, and save the changes. By default, a sub-annotation with the same name as the main annotation is created, but it can be removed if you do not need it. You can edit or delete sub-annotations using the menu, as in the annotations section.

Repeat this process until you have included all the modes you want to analyse. When the taxonomy is finished, save that taxonomy on your computer by **clicking on save as template**, which appears in the upper right corner (see Picture 4).

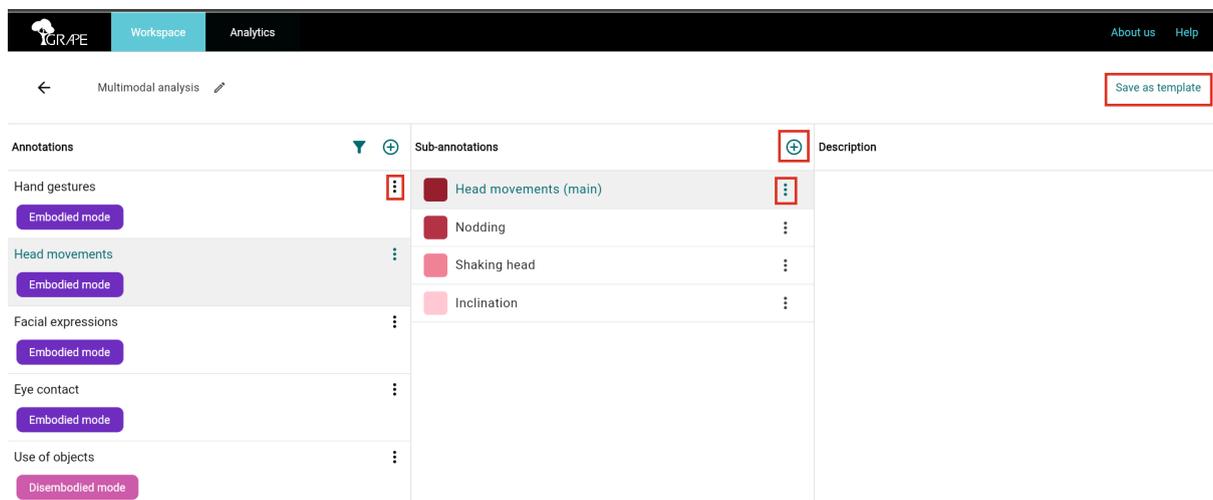


Figure 4. Taxonomy including annotations and sub-annotations.

## Import a taxonomy

If you have already used this software, you can select a taxonomy you created before and modify it to adjust it to the new analysis. As a result, **click on Import**, which appears in the library section. Then, edit, delete or create new annotations and sub-annotations following the same steps of the previous section.

### STEP 3: Video annotation

When you finish the taxonomy, **click on** ← , which is placed in the upper left corner (see Picture 4), to return to the main library section. Then, **click on Projects**, which appears in light grey next to Library (see Picture 5).

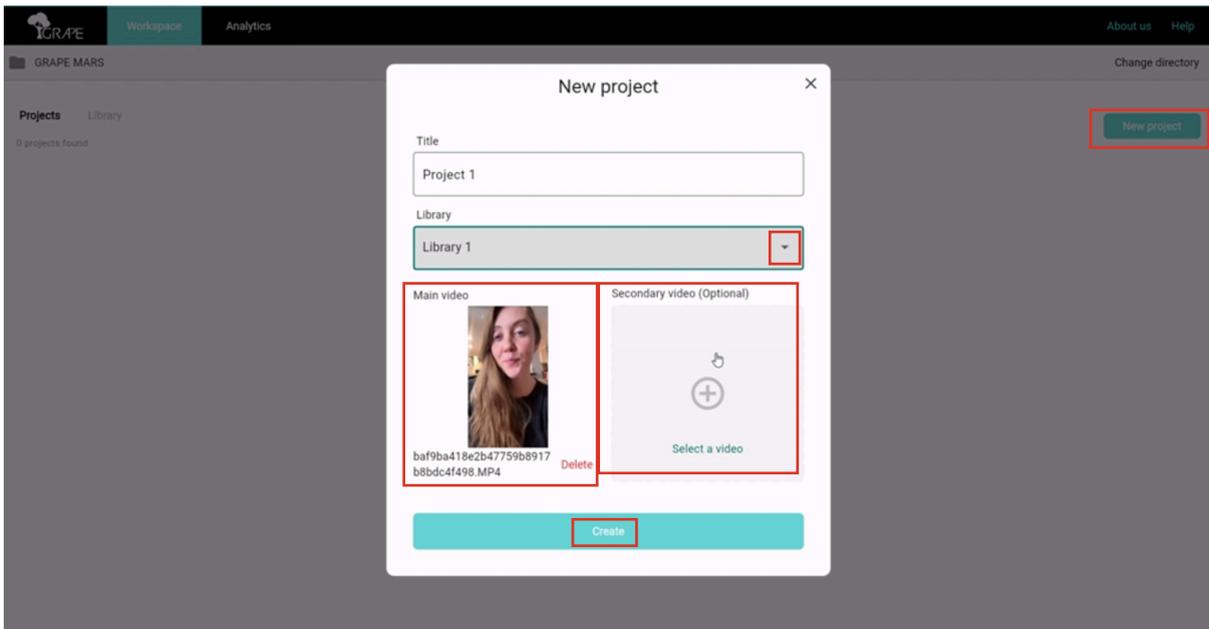


**Picture 5.** Coming back to the Projects section.

**Click on “New Project”** to create a project<sup>3</sup> and start annotating videos. Then, a window will appear where you will add a title, select a taxonomy in the drop-down menu and upload the video(s) you want to analyse (see Picture 6). Here, you will see the first difference between GRAPE MARS and other multimodal annotation software because GRAPE MARS allows you to add a secondary video so that you can analyse the same situation from different points of view. For example, if you want to analyse a lecture, you can add a video that includes the lecturer’s explanations in the main video and students’ reactions in the secondary video option. If you add two videos, remember that they should be synchronised. After selecting the video(s), **click on Create** and wait until the software finishes generating the project (this step may last some minutes, depending on the length of the video and the number of users processing videos simultaneously). We recommend selecting shorter videos (1-3 minutes) or splitting longer videos into shorter segments.

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<sup>3</sup> You can include more than one project in the same folder.



Picture 6. Window to add a new project.

When the software generates your project, you can annotate the semantic modes you want to analyse. To do that, click on the project with the mouse's right button (you will see a menu with four options: view, rename, duplicate and delete) and **select view**, or you can **double-click on the video**. The screen will change to the video annotation section. There, you will find the video, audio waveform, and the transcription made by AI. It is advisable to review the transcription, as errors may occur during the process.

### Layout and functionality of the video annotation

To explain the layout and functionality of the video annotation section, we have divided the screen into four parts (see Picture 7): the left-hand menu, the video player, the tiers and the annotation section.

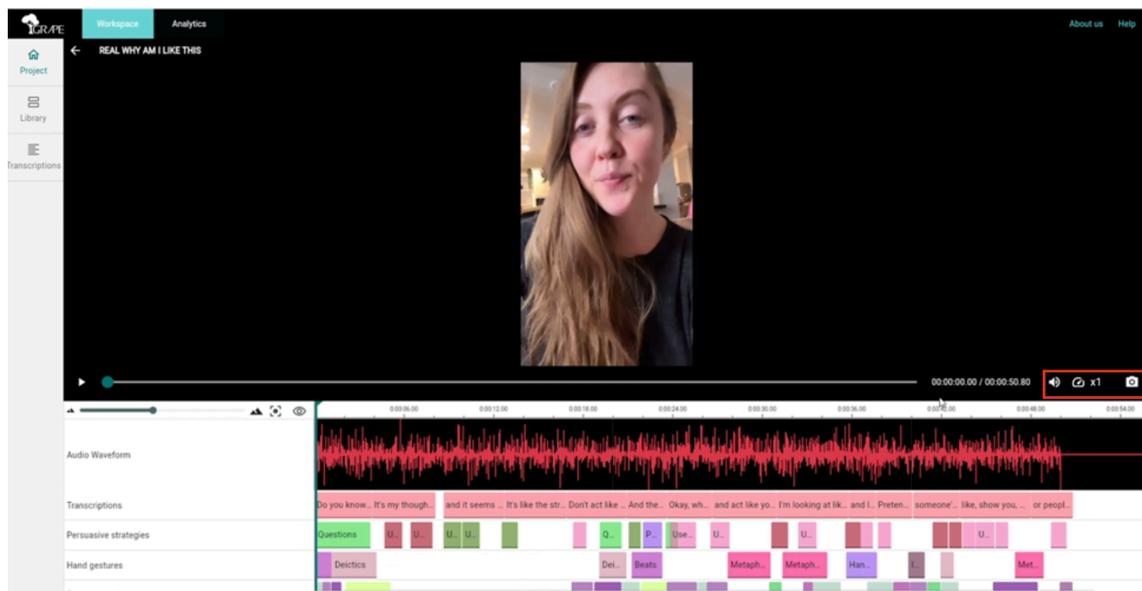


Picture 7. Sections when opening a project.

The left-hand menu includes three options: project, library, and transcriptions.

- In **Project**, you can carry out the video annotation.
- In **Library**, you can modify the taxonomy you selected. However, those changes will just be applied to the current project.<sup>4</sup>
- In **Transcriptions**, a new window will open with the verbal transcription (you cannot make changes there).

In the video player, you can watch the video, pause it, change the volume and speed, and even take captures of the video images (see Picture 8). If you want to make the video image bigger, place the mouse cursor on the edge of the bottom area of the video player. When the cursor changes from a hand/arrow to two vertical arrows, click there and drag the arrows downwards. If you want to make the video image smaller, follow the same procedure, but drag the arrows upwards.



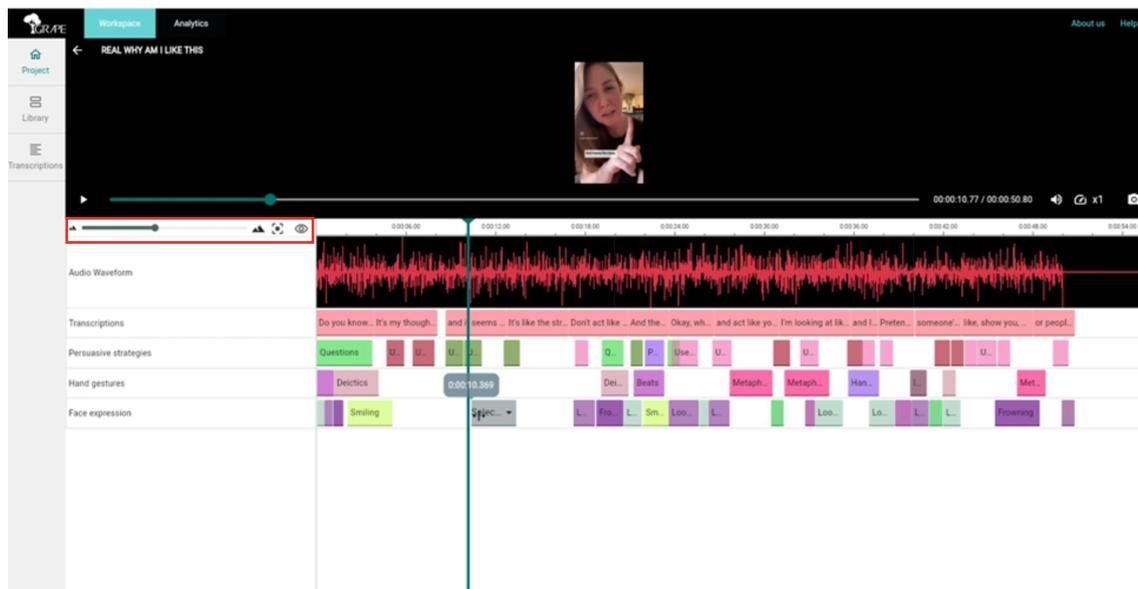
**Picture 8.** Changing some aspects of the video.

Finally, the last sections (i.e., the tiers and the annotation section) appear below the video player (see Picture 9):

- On the left side, you will find the tiers, including the semantic modes you added to your taxonomy. You can change the order of the tiers by dragging them downwards or upwards.
- Next to the tiers, you will have the audio waveform and the section where you will perform the annotation.<sup>5</sup>
- Above the tiers, there are four icons and a bar:
  - The bar between the mountain icons is used to make the annotation section longer or shorter.
  - The icon formed by a square with a circle in the middle is useful when you pause the video and review the annotations you made before. Then, click on this icon to come back to the part of the video you paused.
  - The eye-shaped icon is used to hide or show the audio waveform.

<sup>4</sup> You can save your modified library to reuse it in future projects by clicking on “Save as template.”

<sup>5</sup> At the beginning, you will see the verbatim transcription.



**Picture 9.** Annotation section when opening a project.

## Adding annotations

To add annotations, **double-click** on the tier of the semantic mode you want to annotate. If that semantic mode includes sub-annotations, **select the correct type**. Finally, **adjust the size**<sup>6</sup> of the bar to match it with the video. To adjust the timing, place the mouse cursor on the left edge to modify when the semantic mode starts being used and place the cursor on the right edge to indicate when that mode stops.

## Editing annotations

If you want to modify part of the verbal transcription or edit an annotation, double-click on the annotation containing the mistake so that you can write, change the sub-annotation or adjust the timing. You can also click on an annotation with the right button of your mouse to find a menu with eight options. If you click on **New**, you will add another annotation to that tier. Clicking on **Edit** will allow you to change the type as well as the start and end times. In addition, you will be able to **Cut**, **Copy** and **Paste** that annotation or **Delete** it. Finally, clicking on **Expand right** will change the annotation end time to coincide with the end of the video, whereas its start time will change to the beginning of the video if you click on **Expand left**.

To add more annotations, double-click on the right part of the annotation section. Do the same until you finish with the video annotation.

## Saving and loading data

At this point, you will observe another difference between GRAPE MARS and other multimodal annotation software: you do not need to save your work because it is saved automatically. However, if you close the webpage to postpone the analysis, your projects and libraries will not automatically appear when reopening the GRAPE MARS software. To access your saved data, always select the folder you created in Step 1 by clicking on "Select Directory." This step ensures

<sup>6</sup> To adjust the annotation timing, use the bar above the tiers to make the annotation section longer.

that the software retrieves your previously saved data, allowing you to continue with the annotation process.

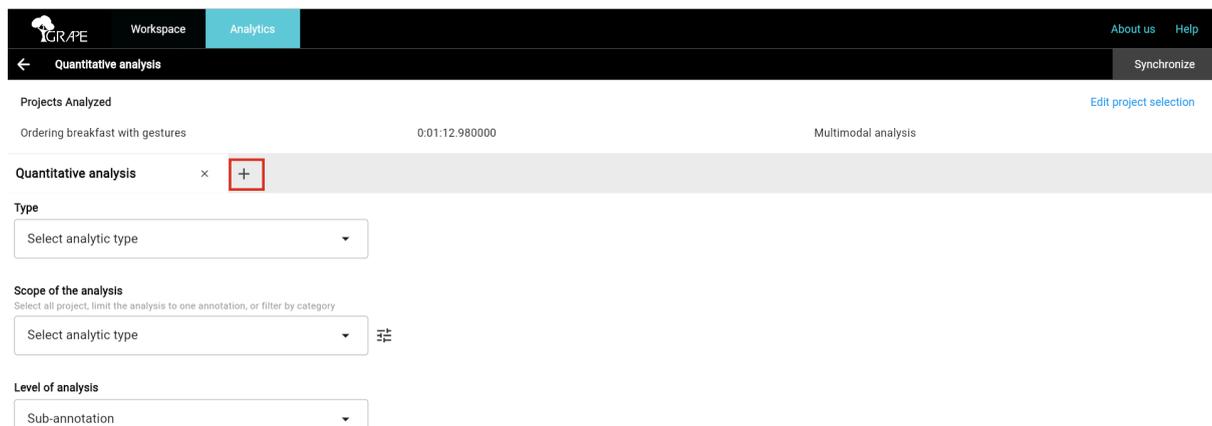
## STEP 4: Data analysis

One of the main functionalities of GRAPE MARS is that it allows you to conduct a quantitative analysis. To start an analysis, **click on Analytics** and then on **New Analysis** (see Picture 10). You need to name that analysis and add the project(s) you want to analyse.



Picture 10. Analytics section.

To start the analysis, **double-click** on the grey and blue pie chart, and the screen will change. There, you will see the list of the projects you have included for the analysis. **Click on the + icon** to begin a sub-analysis<sup>7</sup> and add a name to it. Picture 11 depicts the screen you will see once you have added that sub-analysis.



Picture 11. Options included when creating a sub-analysis.

In this screen, you will have to make some choices:

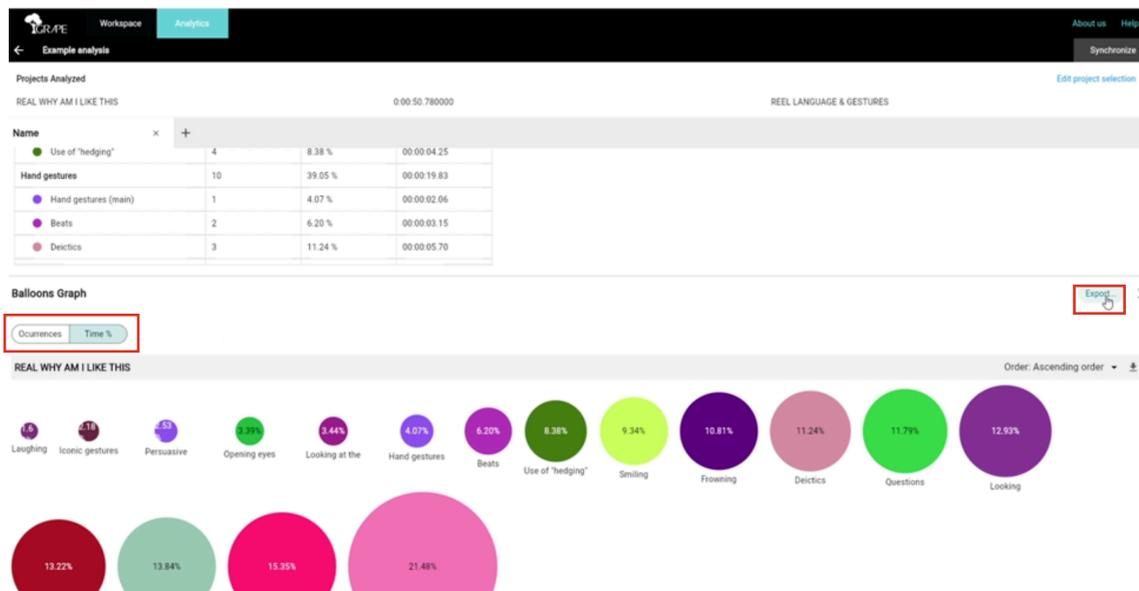
- Regarding the **Type**, you will have two options. On the one hand, if you click on **General**, the time percentage and the total number of occurrences for each annotation/category in the selected project(s) will be analysed. On the other hand, if you choose **Co-Occurrences**, the time percentage and the total number of occurrences of only the annotations/categories that occur simultaneously among the selected project(s) will be analysed.

<sup>7</sup> You can create different sub-analysis.

- Regarding the **Scope of the Analysis**, you can select the data you want to include in the analysis. The options given are analysing all the project (including all the annotations and sub-annotations), analysing only one annotation (or sub-annotation), or analysing one or more categories.
- Regarding the **Level of Analysis**, you can choose the data you want to analyse from the scope chosen in the previous option. This software allows you to analyse annotations, sub-annotations, or categories.

After selecting the options you want for your analysis, you will find the results. Firstly, you will obtain a quantitative analysis of all the projects selected, including the total number of occurrences, time percentage of appearance, and the duration of the videos. Then, if you scroll down the page, you will find the **Comparative Analysis**<sup>8</sup>. The software will show you different tables and graphs indicating how many times the same annotation was found in the selected videos, how long it was used, the percentage of its usage, etc. You can download those tables and graphs if you **click on Export** (see Picture 12), which is found on the upper right side of every table and graph:

- **Tables** will be exported in **CSV format** to help you import that data into a spreadsheet.
- **Graphs** will be downloaded in **PNG format**.



Picture 12. Exporting tables and graphs on GRAPE MARS.

All files will be saved in the local folder created in Step 1. These files are editable and can be modified at any time. To share the analysis, it is recommended to compress the entire folder into a ZIP file and send it so that the recipient can edit the files and save them to their own computer.

<sup>8</sup> Next to the title Comparative Analysis, you will see the option "Add". If you click on it, you can select the specific annotations and sub-annotations for the comparative analysis.