Quick Start Guide

FaceReader

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Up and running quickly

This Quick Start Guide guides you through the main steps to analyze facial expressions with FaceReader. Only the most basic features are addressed. Inevitably, some features that may be vital to your application are not discussed. You can find additional information in the FaceReader Help.

GENERAL INFORMATION

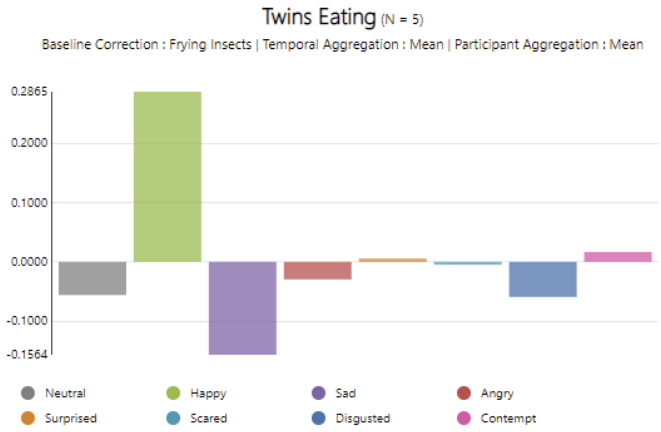
The first part of the Quick Start Guide contains general information on using FaceReader. Follow the instructions to set up your system, install FaceReader and to analyze the facial expressions.

You can extend your FaceReader license with a number of modules.

PROJECT ANALYSIS MODULE

The Project Analysis Module allows you to create groups of participants based on independent variable values like age and gender, and to analyze average expression values per group. In addition to this, you can view the stimulus video together with the video of the test participant's face and the FaceReader analysis.

The second part of this Quick Start Guide describes the Project Analysis Module.

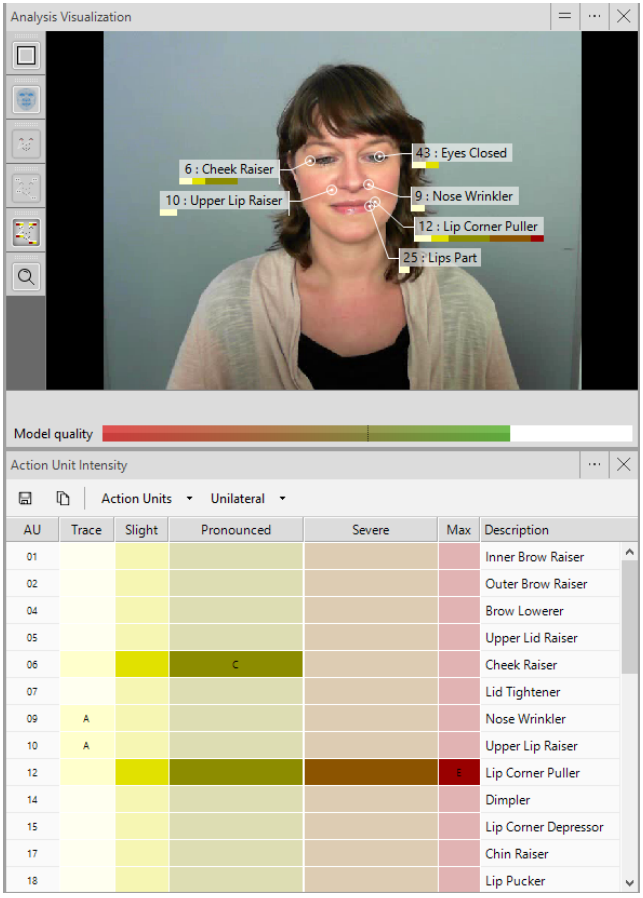


OTHER MODULES

FaceReader also has the following other modules:

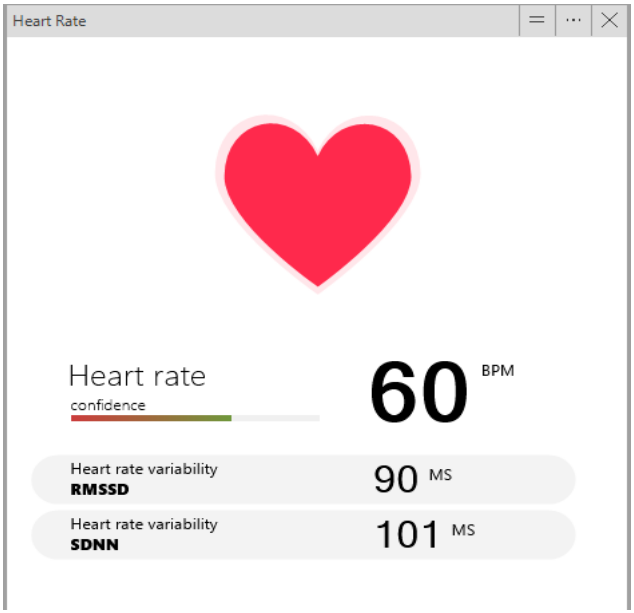
Action Unit Analysis Module

To analyze a set of 20 action units of the Facial Action Coding System (FACS). These are the action units that are most commonly used.



Remote PPG Module

To estimate the heart rate and heart rate variability of the subject in front of the camera by means of remote photoplethysmography (RPPG). This is a method based on the fact that changes in blood volume due to pressure pulses cause small changes in the reflectance of the skin.



Consumption Behavior Module

To analyze consumption behaviors like **Intake event** and **Chewing**. Please note that the Consumption Behavior Module is experimental. If you have the Consumption Behavior Module and want to use this in the analysis, you have to enable this analysis (File - Settings - Analysis Options - Optional Classifications)

MORE INFORMATION?

See the FaceReader Help that opens when you press **F1** in the program. It can also be accessed in the Windows apps screen, and can be downloaded from the MyNoldus portal. From the **Help** menu select **Noldus Online** and then **Customer Support Center** to access the MyNoldus portal.

Support

If you encounter problems, see the Support section on the MyNoldus portal or a help desk in your area. From the **Help** menu select **Noldus Online** and then **Contact Help Desk** to access the MyNoldus portal.

Note that if you send us videos showing people's faces, you should have permission from those people that you can use the video for that purpose and you may need to sign a form granting consent for us to use those videos.

Physical setup

The physical setup of your experiment is crucial for an accurate analysis with FaceReader. We give the following general guidelines:

- Place the camera in front of the test participant and slightly below eye level. Make sure your camera provides images with good contrast and brightness.
- Good lighting is crucial. Avoid direct light, reflections and shadows on the face. Make sure the lighting on the face comes directly from the front, for example by placing the setup in front of a window. If necessary, use lights on either side of the monitor, or a professional photo light to increase light intensity, or to compensate for unwanted light sources.

Install FaceReader

To install FaceReader

1. Download the installation file (FaceReader [version number] Setup.exe) from the MyNoldus portal of the Noldus website (my.noldus.com).

   If you do not have a MyNoldus account yet, you can create one.

2. Double-click the file.

3. As **Installation type**, select **Standard.**

4. Follow the rest of the instructions on your screen to install FaceReader.

To install the Stimulus Presentation Tool (Project Analysis Module only)

If you have the Project Analysis Module, you need the Stimulus Presentation Tool to present stimuli automatically. To install it:

1. Download the installation file (**Stimulus Presentation Tool 4 Setup.exe**) from the Noldus website using your MyNoldus account (my.noldus.com).

2. Double-click the file to run it.

3. As **Installation type**, select **Standard.**

4. Follow the rest of the instructions on your screen to install the Stimulus Presentation Tool.

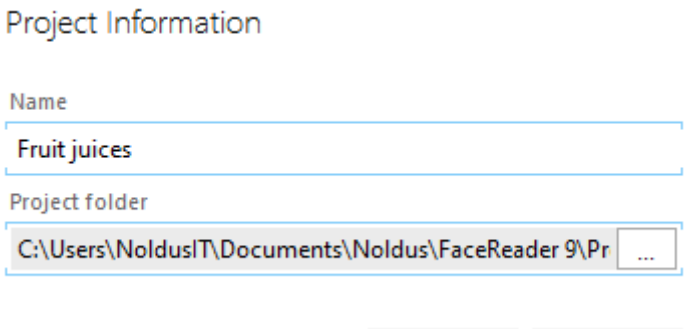
Work with FaceReader

SETUP

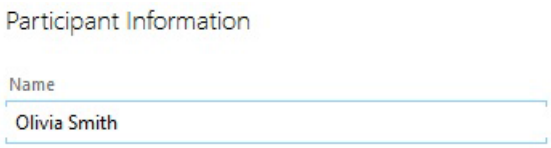
1. Dependent on your license, do one of the following:
   - If you have a hardware key, insert it into the computer and open FaceReader.

   - If you have a software license key, start FaceReader and activate your license. You can choose between a Floating or a Fixed activation.
     - **Floating** — Choose Floating if you want to be flexible on which computer you use FaceReader and your computer is connected to the internet.
     - **Fixed** — A Fixed activation is linked to one computer. Your computer must have an internet connection to activate/deactivate a fixed license. After you have activated the license you can use FaceReader without internet.

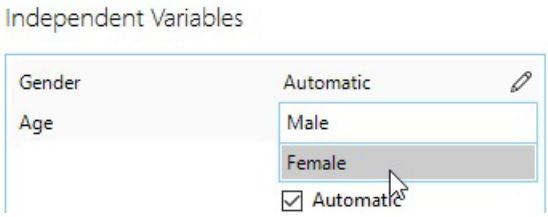
2. Create a new Project (**File** > **New** > **Project**). Give the project a name and select a location to store it, or accept the default location.



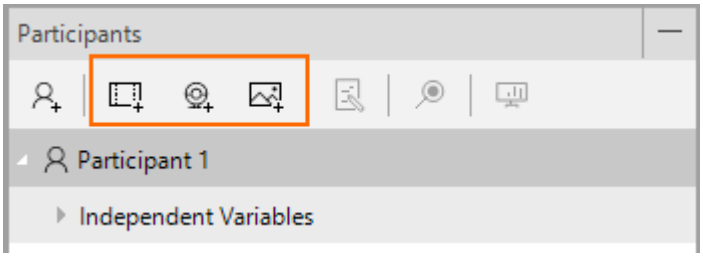
3. Choose **Participant** > **Add Participant**. Enter a name or identification code for the participant.



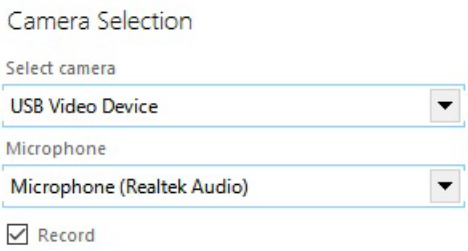
4. The gender and age of your participants are added as independent variables and are automatically estimated by FaceReader. To select the age and gender manually, double-click the participant name. Click on the pencil button next to the independent variable to enter the values.



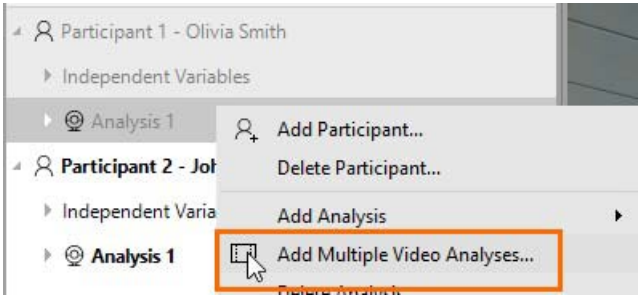
5. Add one or more analyses for each participant and choose to analyze from video, live from your camera or from images. To do so, select the participant for which you want to add an analysis in the Project Explorer. Click on the **Video**, **Camera** or **Image** button on the toolbar to add the appropriate analysis. It is not possible to mix image analyses with camera or video analyses.



6. To carry out a camera analysis, select the option **Use as default camera** if you always use this camera. To record audio, select your microphone. Optionally, select **Record** to create a video file of the test participant's face. The video will always be saved at a frame rate of 15 frames per second.

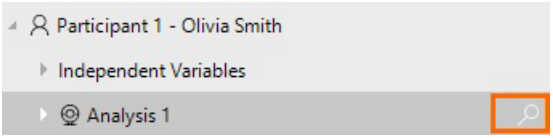


To add multiple video analyses to a participant, right-click the participant's name, select **Add Multiple Video Analyses**, and select your videos.

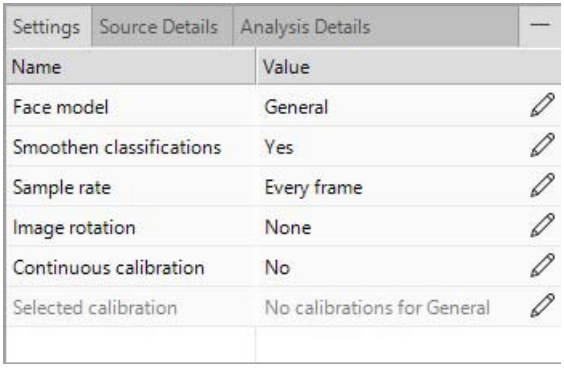


ANALYZE

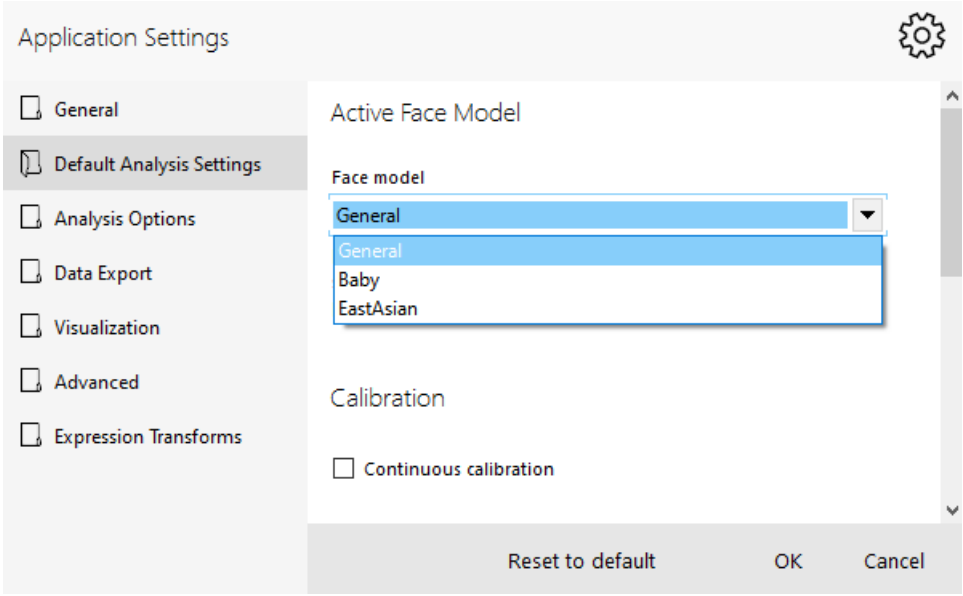
1. Click on the magnifying glass button next to an analysis to open it.



2. Check the options for this analysis in the **Settings** window in the bottom-left corner of the analysis window.



To create default settings for each new analysis, choose **File** > **Settings**. Open the tab **Default Analysis Settings** and make your selection.

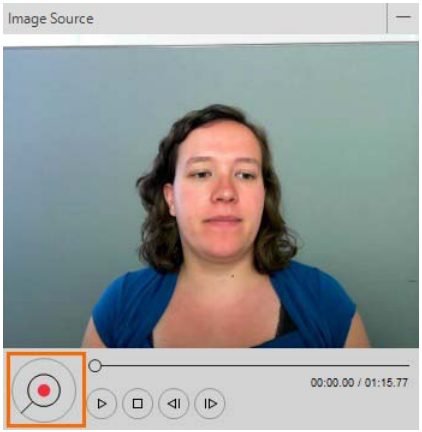


See the FaceReader Help for an explanation of the options. Press **F1** in the program to open it.

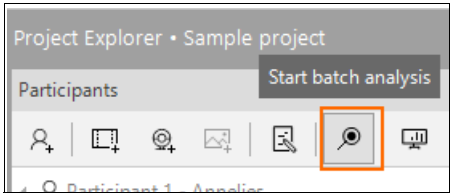
Choose **File** > **Settings** > **Analysis Options** and select **Action units**, **Estimate heart rate and heart rate variability** and/or **Consumption behavior** to activate the Action Unit module, the Remote PPG module and/or the Consumption Behavior module.

IMPORTANT If you select the Baby Face model, Facial expressions are not available as analysis output. You will obtain Action Unit intensities. See **Action Unit Module** in the FaceReader Help for more information.

3. Click on the **Start analysis** button to carry out the analysis.



TIP To analyze all analyses at once, click on the **Start batch analysis** button on the toolbar.



IMPORTANT We recommend to close all visualization windows before you start batch analysis. Bear in mind that carrying out batch analysis on a high number of long videos with a high resolution and frame rate may cause problems.

4. The **Model quality** bar should cross the dashed line. If this is not the case, improve lighting or reposition your camera.

OUTPUT

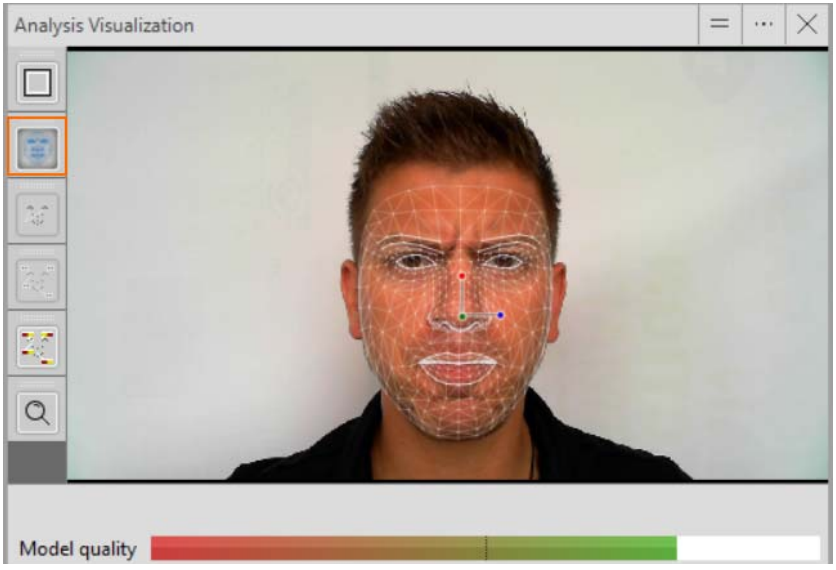
FaceReader displays a number of windows with graphical and tabular output.

Important notes

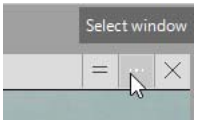
- Not all visualization options may be available by default. If you do not see some of the options described in this Quick Start Guide, choose **File** > **Settings** > **Analysis Options** and select all options.
- If you selected the Baby Face model, not all output is available. See the FaceReader Help for more information.

Procedure

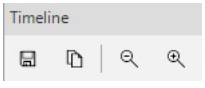
1. Click on one of the buttons in the **Analysis Visualization** window to show, for example, the key points in the face or the Facial States.



2. To switch windows, click on the **Select** window button in the upper-right corner of one of the windows and make your selection. See **Analysis windows** on page 16 for a short description of the options.



3. To zoom, or to copy or save graphs, click on one of the icons on the window toolbar.



4. To show more windows, click on the **Split/Unsplit** button in the upper-right corner of one of the windows.

TIP If you notice the test participant shows a bias towards some facial expressions, use one of the calibration methods to correct for that. See **Analyze Facial Expressions/ Calibrate FaceReader** in the FaceReader Help for details.

Analysis windows

For the upper windows you can choose between:

- **Analysis Visualization** – Click on a button on the left to view how FaceReader analyzes the face.
- **Subject Characteristics** – With, for example, the estimated age and gender.
- **Facial States** – Whether, for example, mouth or eyes are open or closed.
- **Expression Intensity** – A chart that displays which of the facial expressions show up in the face.
- **Expression Summary** – A pie chart with the distribution of the facial expressions.
- **Circumplex Model of Affect** – A chart in which emotions are described in a two-dimensional circular space, containing arousal on the vertical axis and valence on the horizontal axis.
- **Action Unit Intensity** – Available with the Action Unit Module.
- **Heart rate** – Available with the Remote PPG Module.
- **Consumption Behavior Statistics** – Available with the Consumption Behavior Module.
- **Custom Expression Table** – Available with the Action Unit Module.

For the lower windows you can choose between the line charts:

- **Timeline** – An overview of the facial expressions, and facial states on a timeline.
- **Valence Line Chart** – The valence indicates whether the emotional status of the test participant is positive or negative.
- **Arousal Line Chart** – Arousal indicates whether the test participant is active or not active.
- **Expression Line Chart** – A line chart with the facial expression intensities over time.
- **Head Orientation Line Chart** – The head orientation on a time line (Pitch, Yaw and Roll).
- **Heart Rate and Variability Line Chart** – Available with the Remote PPG Module.

- **Custom Expression Line Chart** – Available with the Action Unit Module.
- **Heart Beat Chart** – Available with the Remote PPG Module.
- **Head Position Line Chart** —Horizontal, Vertical and Depth position on a time line.
- **Gaze Angles Line Chart** —Horizontal and Vertical gaze angle on a time line.

See **FaceReader's Output** in the FaceReader Help for a full description of the analysis windows.

EXPORT

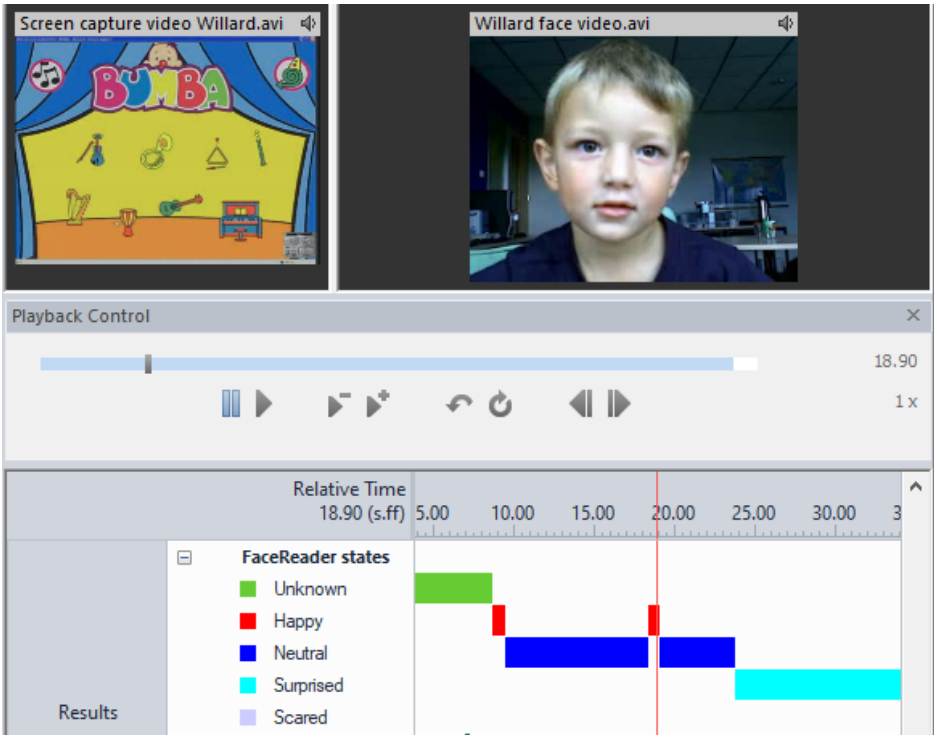
To export your data, choose **File** > **Export**. Choose to export the results of the analysis, participant, or entire project. You have the following options:

- **State log** – A text file or Excel file with the dominant facial expressions as states over time.
- **Detailed log** – A text file or Excel file with the intensities of all facial expressions over time.

  To save extra options, like facial states, global gaze direction, valence and arousal values to the log file, select these options in the **Data Export** tab of the **Settings** window (**File** > **Settings**).

  Optionally, adjust the sample rate of the export file and select whether to include headers.
- **Heart beat log** — A text file or Excel file with the inter-beat interval data (the time intervals between individual heart beats).
- **The Observer XT log** – Choose this option if you want to import the analysis results in the annotation software The Observer® XT for further analysis.

  The screenshot below comes from The Observer sample project 'Child FaceReader'. In this project a 3-year old boy is observed during play with an online game. His face is filmed with a webcam, while the screen is captured with the Noldus screen capture device. The video of the boy's face was analyzed in FaceReader. The Observer log was exported from FaceReader and imported into The Observer XT. The screenshot shows the facial expressions on the time line.



TIP It is also possible to send the analysis results directly during the FaceReader analysis to The Observer XT, using the Noldus network communication program N-Linx. See **FaceReader with The Observer XT** in the FaceReader Help for details.

Project Analysis Module

SETUP

The general procedure to set up an experiment with FaceReader also applies to the Project Analysis Module. The Project Analysis Module contains the following extra options:

1. **Independent Variables** - The independent variables *Age* and *Gender* are present by default. Choose **Project** > **Independent Variable** > **Add Independent Variable** to add more independent variables, like whether the participants saw the commercial before, or their native language.

Double-click **Independent Variables** under a participant name to score them. *Age* and *Gender* can be estimated by FaceReader, or entered manually.

2. **Stimuli and Event Markers** – Define stimuli or event markers (**Project** menu) to mark episodes of interest. Stimuli have a fixed duration and can be linked to a video or image to show to the test participants.

STIMULUS PRESENTATION TOOL

Use the stimulus presentation tool to automatically show the stimuli to the test participants and synchronize them with the analyses.

IMPORTANT In a two computer setup, synchronize the computer clock times with a time server. See **Synchronize computers with a network time protocol** in the FaceReader Help how to do so.

On the computer with FaceReader

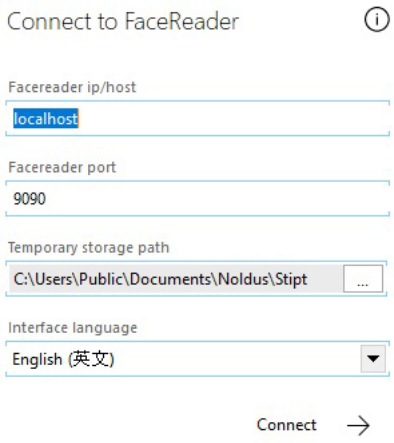
1. Choose **File** > **Settings** > **Data Export** and under **External Communication (API and Stimulus Presentation Tool)** select the checkbox **Enable External Control.**
2. To add tests, open the **Tests** tab in the bottom pane of the Project Explorer. Then click on the **Add test** button.

3. Select the camera and the stimuli to show to the test participants.

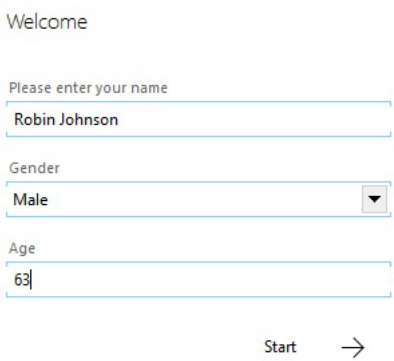
   Optionally, choose to let participants enter their own name, age and gender, randomize the presented stimuli, set the stimulus display size and the length of the pause between the stimuli.

On the test participant computer

1. Start the Stimulus Presentation Tool and follow the instructions to connect with the FaceReader computer.



2. Select a test and click **Start**.
3. Fill in the participant details and click **Start** again, or let the participant do this. The test and analysis start.



ANALYZE

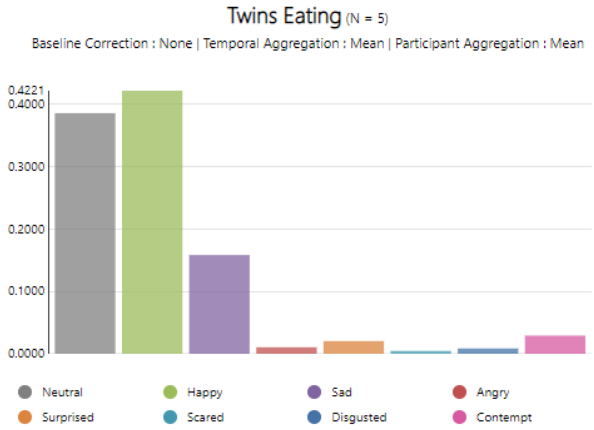
Participants are automatically added when you use the stimulus presentation tool. Also, analyses are automatically carried out. Watch the **Model quality** bar when the test runs. The bar should cross the dashed line. If this is not the case, improve lighting or reposition your camera.

Optionally, score event markers during the analysis.

OUTPUT

Apart from the general FaceReader output options (page 14), the Project Analysis Module has the following output:

- **Quick Layouts**— This will open a number of charts to give you a first impression of the data.
- **Pie chart, Box plot, Bar chart, Circumplex model** or **Line chart** — Circumplex Model and Line Chart are only available if you scored stimuli in your project.



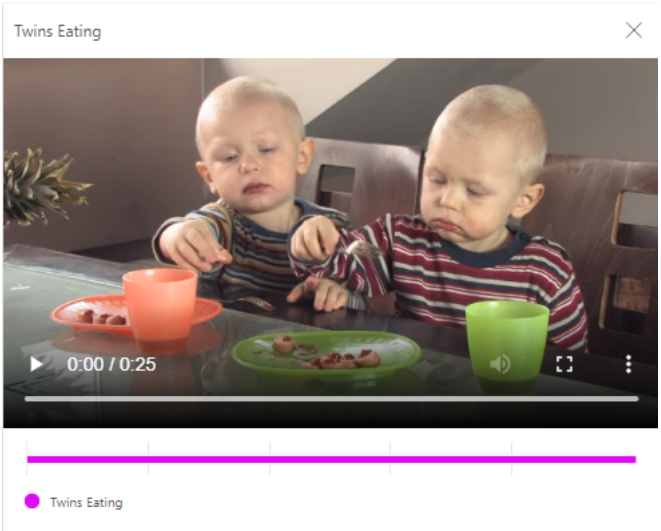
- **Table** —To calculate statistics on the analyzed facial expressions and other parameters of all participants, participant groups or single participants.

Twins Eating (N = 5)

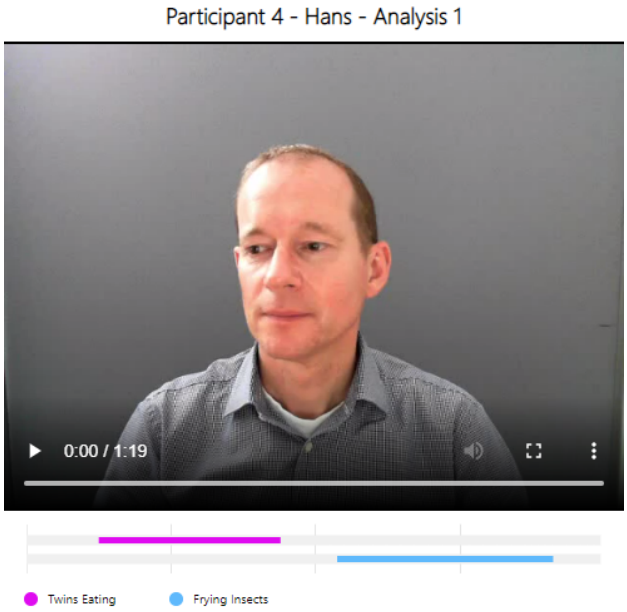
Baseline Correction : None | Temporal Aggregation : Mean | Participant Aggregation : Mean

Participant	Neutral	Happy	Sad	Angry	Surprised	Scared	Disgusted
	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Mean	0.3861	0.4221	0.1584	0.0105	0.0205	0.0046	0.0085

- **Stimulus** — To add your stimulus videos to the visualization. You can play back your stimulus videos together (synchronized) with a Line chart with the facial expressions and other parameters.



- **Participant** — To add your participant face video to the visualization. You can play back your participant videos together (synchronized) with the stimulus video and a Line chart with the facial expressions and other parameters.



- **Compare** —To compare two or more data sets in a chart or table and carry out a t-test to test for significant differences.

Sad		Angry		Scared		Disgusted	
Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
0.0485	0.0098	0.0369	0.0244	0.0363	0.0176	0.0301	0.0101
0.1690	0.0688	0.0477	0.0286	0.0253	0.0238	0.0743	0.0305

You can select what data to include in the analysis:

- Select what parameters to visualize/tabulate.
- Select a stimulus or event marker to visualize/tabulate the data during this stimulus/event marker.
- Select whether you want to visualize/tabulate absolute or relative values of your parameters.

- Select how to aggregate data over time.
- Select how to aggregate data over test participants.
- Select which test participants to include in your analysis.