Quick Start Guide

FaceReader

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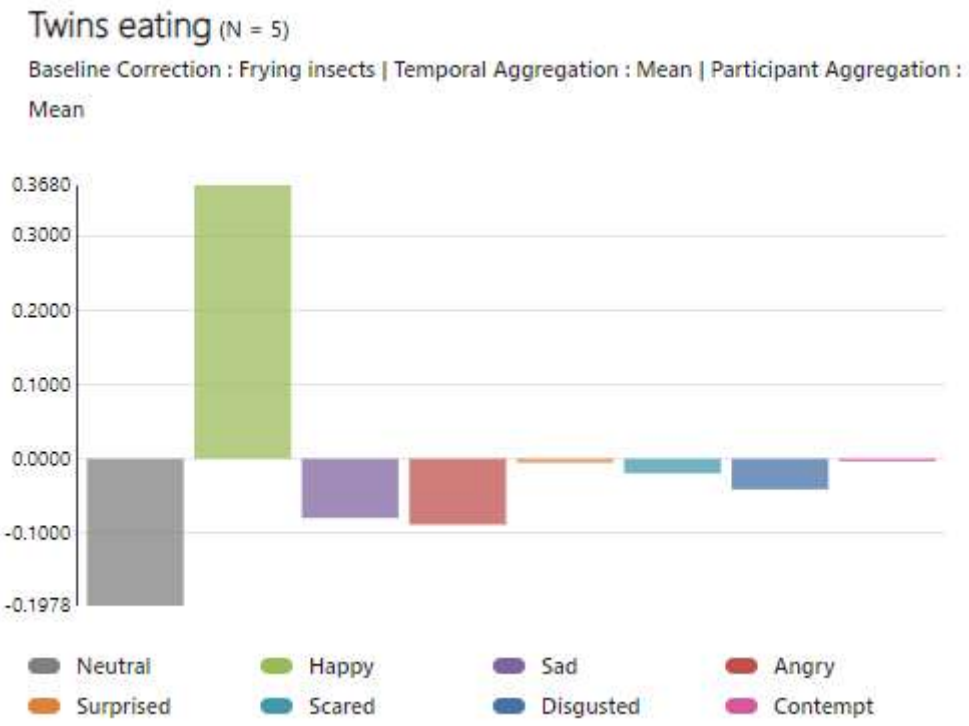
Up and running quickly

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

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

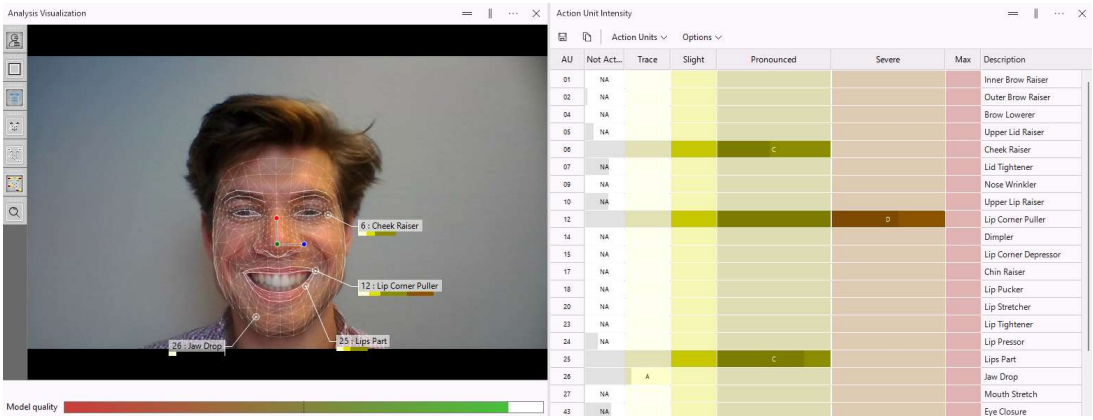


OTHER MODULES

FaceReader also has the following other modules:

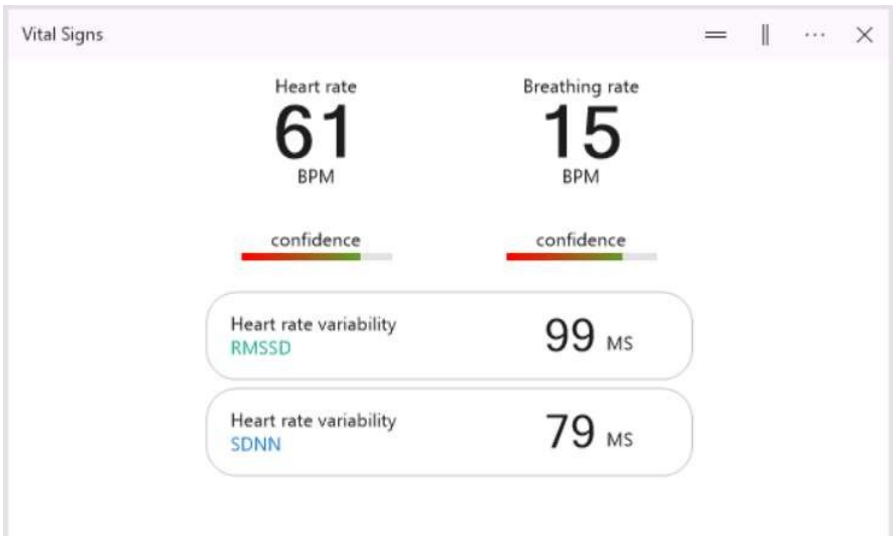
Action Unit Analysis Module

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.



Vital Signs Module

To estimate the heart rate, heart rate variability, and breathing rate of the subject in front of the camera. Heart rate and heart rate variability are measured 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. Breathing rate is measured by detecting upper-body movement associated with respiration.



Consumption Behavior Module

To analyze consumption behaviors like **Intake event** and **Chewing**.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)

Voice Analysis Module

With this module FaceReader can recognize emotions in the voice (Neutral, Happy, Sad and Angry) and Valence and Arousal in the voice.

Advanced Research Module

The Advanced Research Module allows you to analyze multiple faces in a video simultaneously. With this module you can also track the test participant's gaze when you present stimuli using the Stimulus Presentation Tool, view the gaze overlay on the stimuli when you analyze the data and make heatmaps.

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 to get a good image. Avoid direct light, reflections and shadows on the face. Diffuse frontal lighting is desirable. The light intensity or color is less relevant. If possible, place the FaceReader setup in front of a window. Make sure that any windows to the sides of the subject are blinded. Lights from the ceiling, common in most buildings, will produce shadows below the eyebrows and nose. In situations where interior lighting cannot be controlled, stronger lights (e.g., on either side of the monitor or professional photo lights) can be used to negate the effect of other, undesirable, light sources. You can purchase such lights from Noldus IT. You can also use (near) infrared light, in combination with a camera that is sensitive to this type of light.

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 5 Setup.exe**) from the Noldus website using your MyNoldus account (my.noldus.com).

2. Double-click the file to run it.

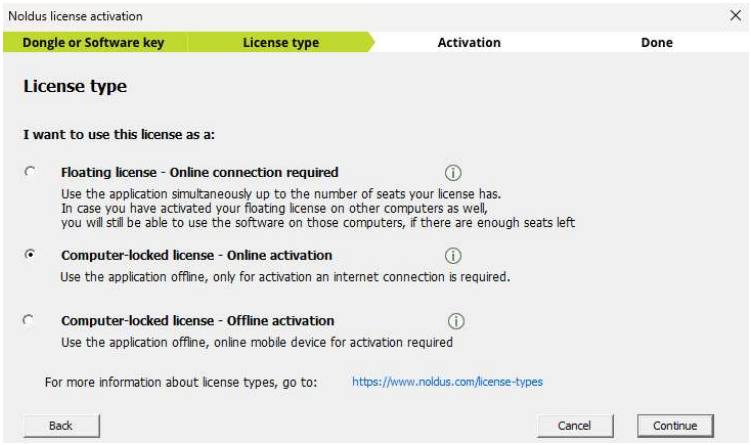
3. As **Installation type**, select **Standard.**

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

Work with FaceReader

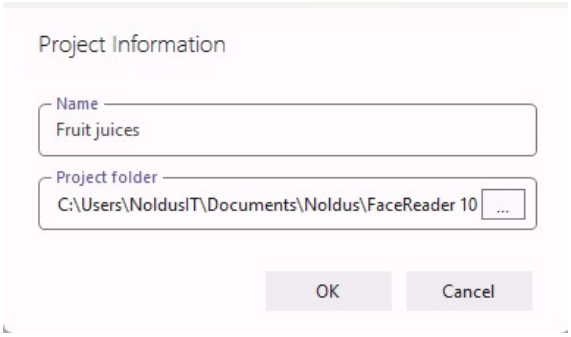
SETUP

1. Dependent on your license, do one of the following:
   - If you have a software license key, start FaceReader and activate your license. You can choose between a Floating or a Computer-locked activation.
     - **Floating license - Online connection required**: Choose Floating if you want to be flexible on which computer you use FaceReader. Your computer needs to be connected to the Internet every time when starting up the software.
     - **Computer-locked license - Online activation:** 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 an Internet connection.
     - **Computer-locked license - Offline activation: Use this option if your computer does not have an Internet connection. You need to use a smartphone with Internet instead.**

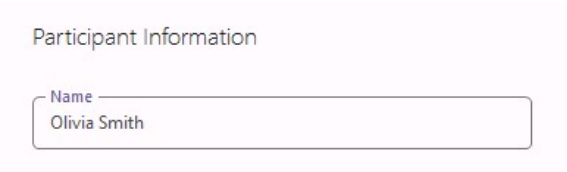


   - If you have a hardware key, insert it into the computer and open FaceReader.

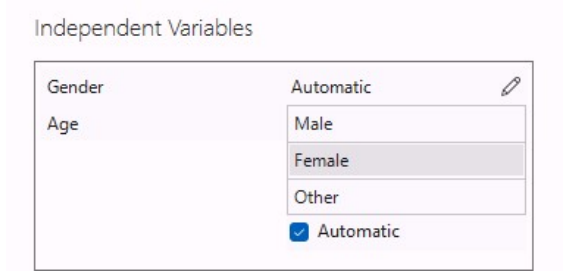
2. Create a new Project (**File** > **New** > **Project**). Give the project a name and select a location to store it, or accept the default location.



3. Choose **Participant** > **Add Participant**. Enter a name or identification code for the participant. You can also automatically add participants by selecting a video with multiple faces on the **Multi-Subject Sources** tab.

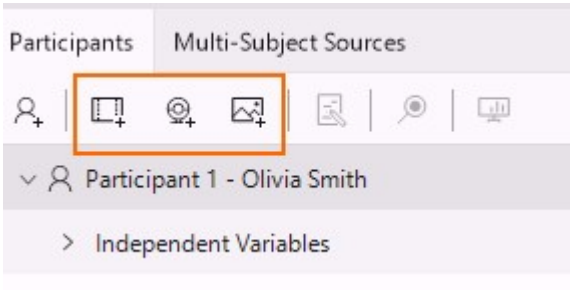


4. The gender and age of your participants are added as independent variables and are automatically estimated by FaceReader. To select the age and gender manually, double-click the participant name. Click on the pencil button next to the independent variable to enter the values.



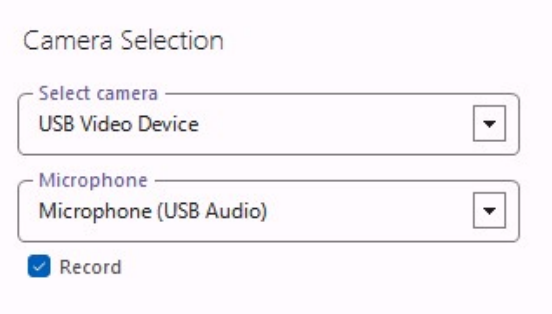
5. Add one or more analyses for each participant and choose to analyze from video, live from your camera or from images. To do so, select the participant for which you want to add an

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.

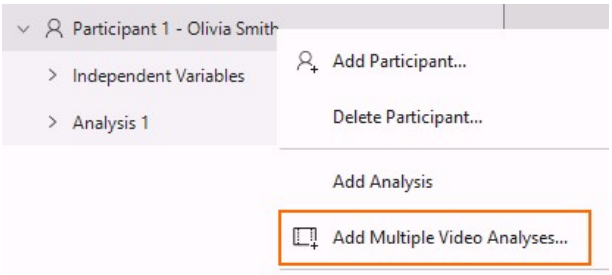


The **Multi-Subject Sources** tab is only available if you have the Advanced Research Module. On this tab click the **Add multi-subject** icon and select the video that you want to analyze.

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.



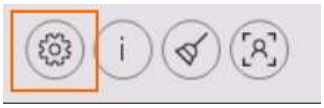
To add multiple video analyses to a participant, right-click the participant's name, select **Add Multiple Video Analyses**, and select your videos.



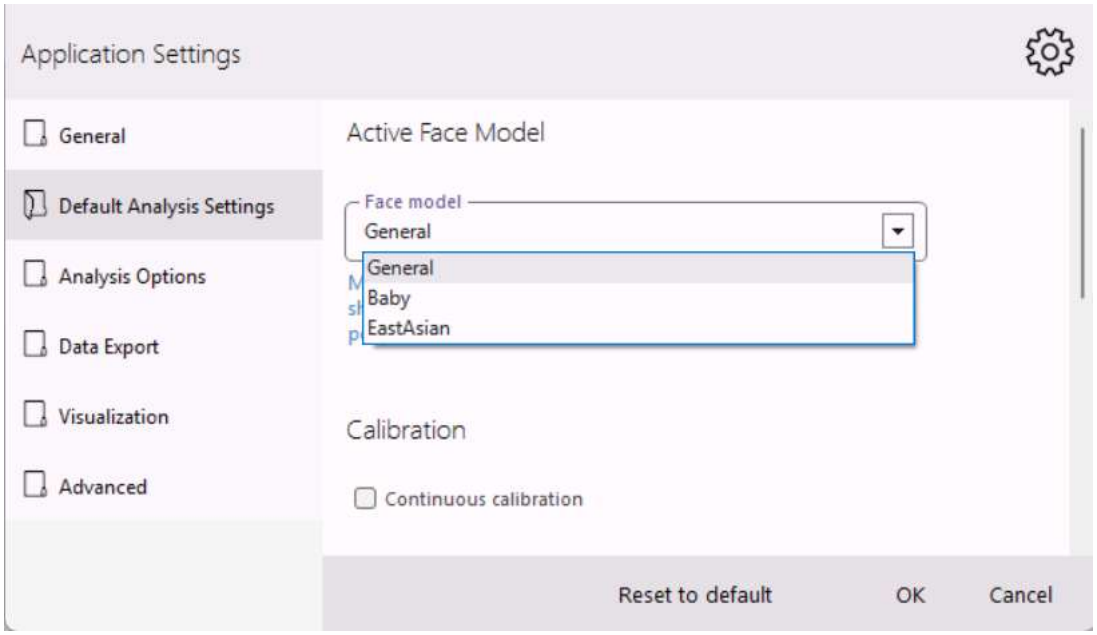
ANALYZE

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

2. Check the options for this analysis by clicking the **Analysis Settings** button at the bottom of your screen.



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



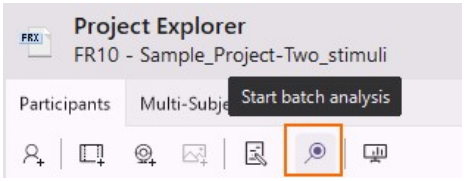
See the FaceReader Help for an explanation of the options. Press **F1** in the program to open it.

Choose **File** > **Settings** > **Analysis Options** and select **Action units**, **Consumption behavior, Vital signs and/or Voice analysis** to activate the Consumption Behavior Module, the Vital Signs Module and/or the Voice Analysis 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.

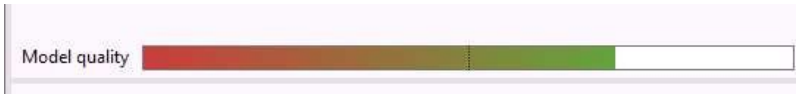
3. Click on the **Start analysis** button at the bottom of your screen to carry out the analysis.

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



IMPORTANT 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.

5. 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** buttons 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

You can choose between:

- **Face Analysis**
  - **Action Unit Intensity** – Available with the Action Unit Module.
  - **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.
  - **Expression Intensity** – A chart that displays which of the facial expressions show up in the face.
  - **Expression Line Chart** – A line chart with the facial expression intensities over time.
  - **Expression Summary** – A pie chart with the distribution of the facial expressions.
  - **Facial States** – Whether, for example, mouth or eyes are open or closed.
  - **Gaze Angles Line Chart** —Horizontal and Vertical gaze angle on a time line.
  - **Head Orientation Line Chart** – The head orientation on a time line (Pitch, Yaw and Roll).
  - **Head Position Line Chart** —Horizontal, Vertical and Depth position on a time line.
  - **Subject Characteristics** – With, for example, the estimated age and gender.
  - **Valence and Arousal Line Chart** – Valence indicates whether the emotional status of the test participant is positive or negative. Arousal is based on the activation of the 20 Actions Units in FaceReader.
- Consumption Behavior (available with the Consumption Behavior Module)
- Vital Signs (available with the Vital Signs Module)
- **Voice Analysis** (available with the Voice Analysis Module)
- **Analysis Visualization** – Click on a button on the left to view how FaceReader analyzes the face.
- **Custom Expression Table** – Available with the Action Unit Module.
- **Custom Expression Line Chart** – Available with the Action Unit Module.
- **Stimulus View**
- **Timeline** – An overview of the facial expressions, and facial states on a timeline.

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

EXPORT

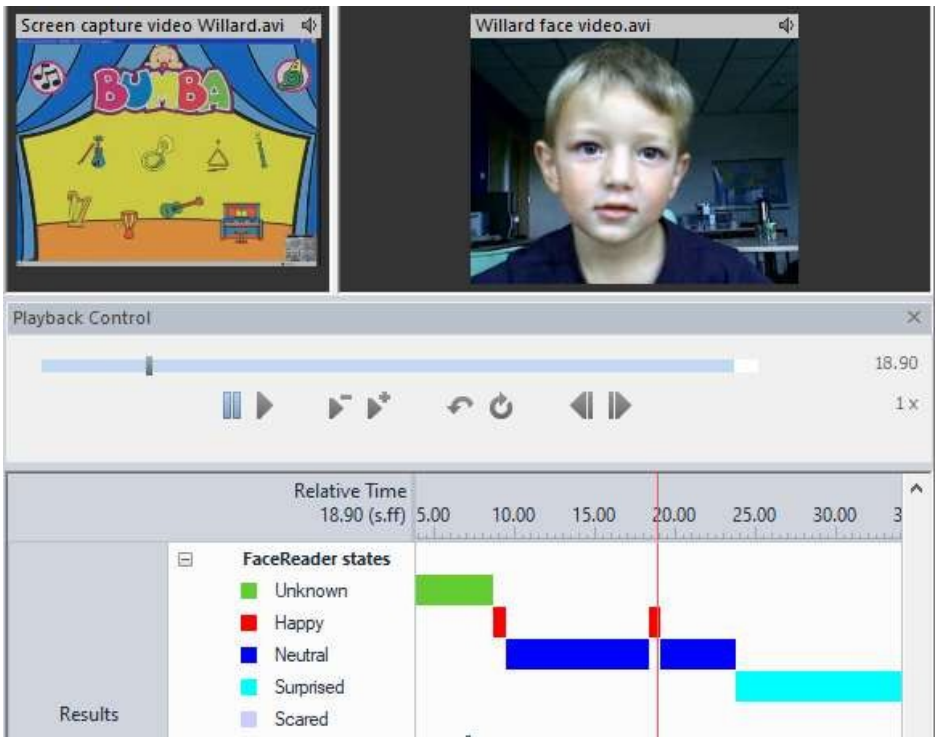
To export your data, choose **File** > **Export**. Choose to export the results of the analysis, participant, or entire project. You have the following options:

- **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 playing 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.



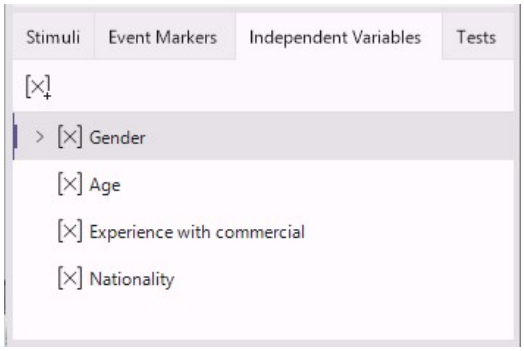
TIP It is also possible to send the analysis results directly during the FaceReader analysis to The Observer XT, using the Noldus network communication program N-Linx. See **FaceReader with The Observer XT** in the FaceReader Help for details.

Project Analysis

SETUP

The Project Analysis section 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 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

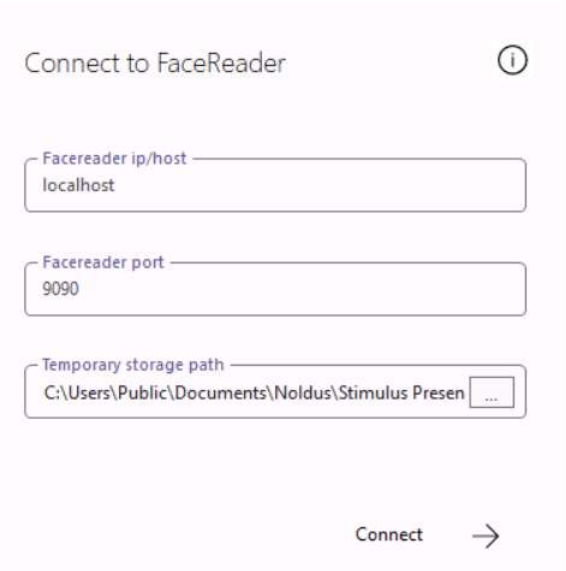
1. Choose **File** > **Settings** > **Data Export** and under **External Communication (API and Stimulus Presentation Tool)** select the **Enable External Control** checkbox**.**
2. To add tests, open the **Tests** tab in the bottom pane of the Project Explorer. Then click on the **Add test** button.

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

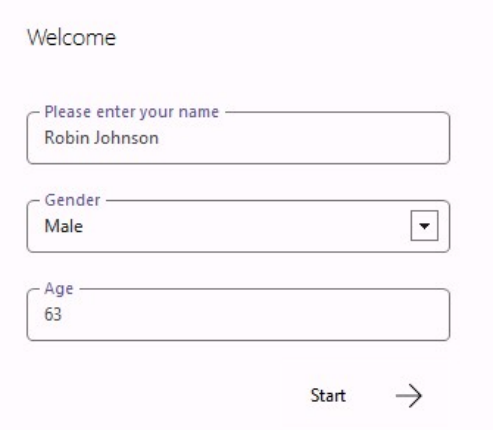
   Optionally, choose to let participants enter their own name, age and gender, perform gaze calibration, randomize the presented stimuli, set the stimulus display size and the length of the pause between the stimuli.

On the test participant computer

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

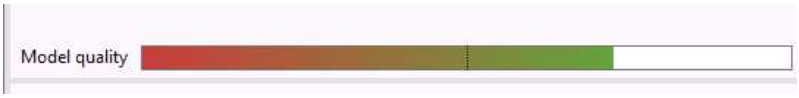


2. Select a test and click **Start**.
3. Fill in the participant details and click **Start** again, or let the participant do this. The test and analysis start.



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.

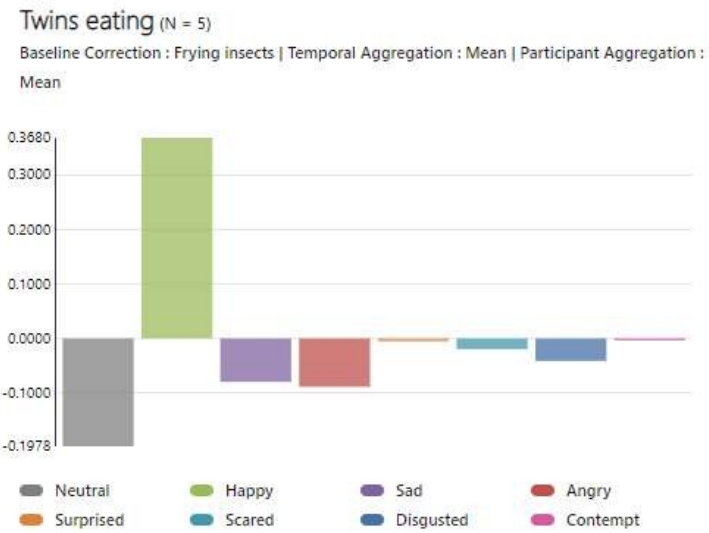


Optionally, score event markers during the analysis.

OUTPUT

Apart from the general FaceReader output options (page 15), the Project Analysis section has the following output:

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



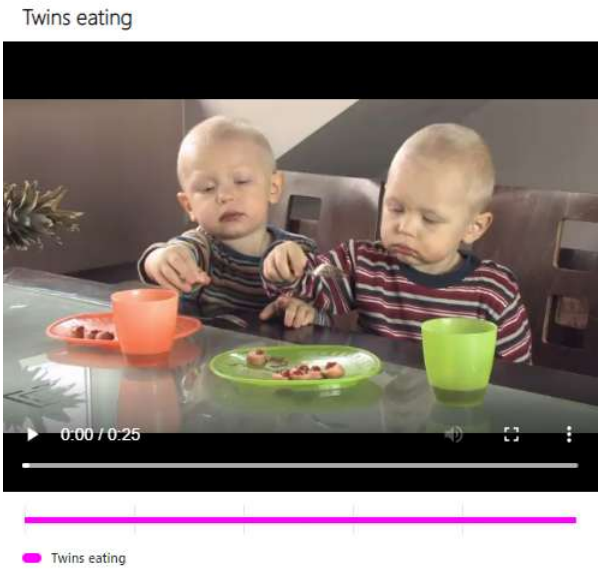
- **Heatmap** —Only available if you used the Stimulus Presentation Tool and tracked the test participant's gaze. The latter is possible with the Advanced Research Module.
- **Table** —To calculate statistics on the analyzed facial expressions and other parameters of all participants, participant groups or single participants.

Twins eating (N = 5)

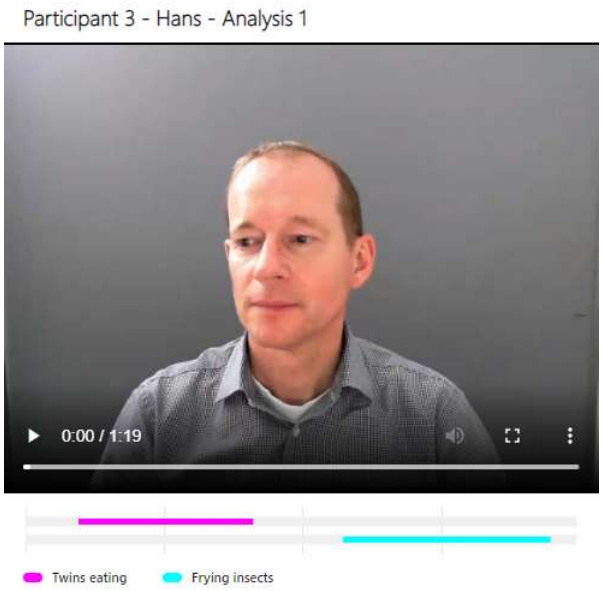
Baseline Correction : None | Temporal Aggregation : Mean | Participant Aggregation : Mean

Participant	Neutral	Happy	Sad	Angry	Surprised	Scared	Disgusted
	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Mean	0.3521	0.5033	0.0387	0.0320	0.0261	0.0051	0.0055

- **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		Surprised		Scared	
Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
0.0177	0.0148	0.0112	0.0153	0.0152	0.0085	0.0019	0.0019
0.0702	0.0065	0.0632	0.0580	0.0423	0.0086	0.0099	0.0006

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 do a baseline correction and 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.