Reference Manual

The Observer XT

Version 17

Noldus

Information Technology

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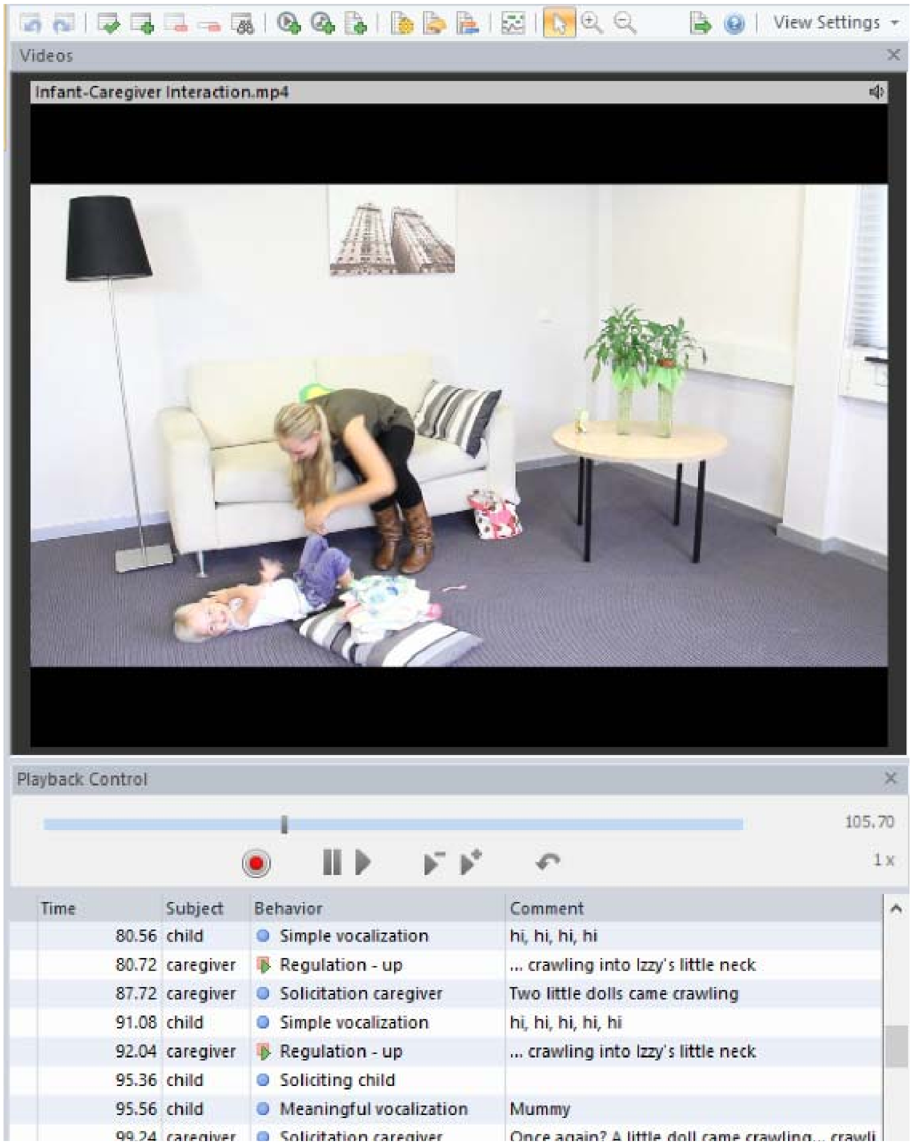
Contents

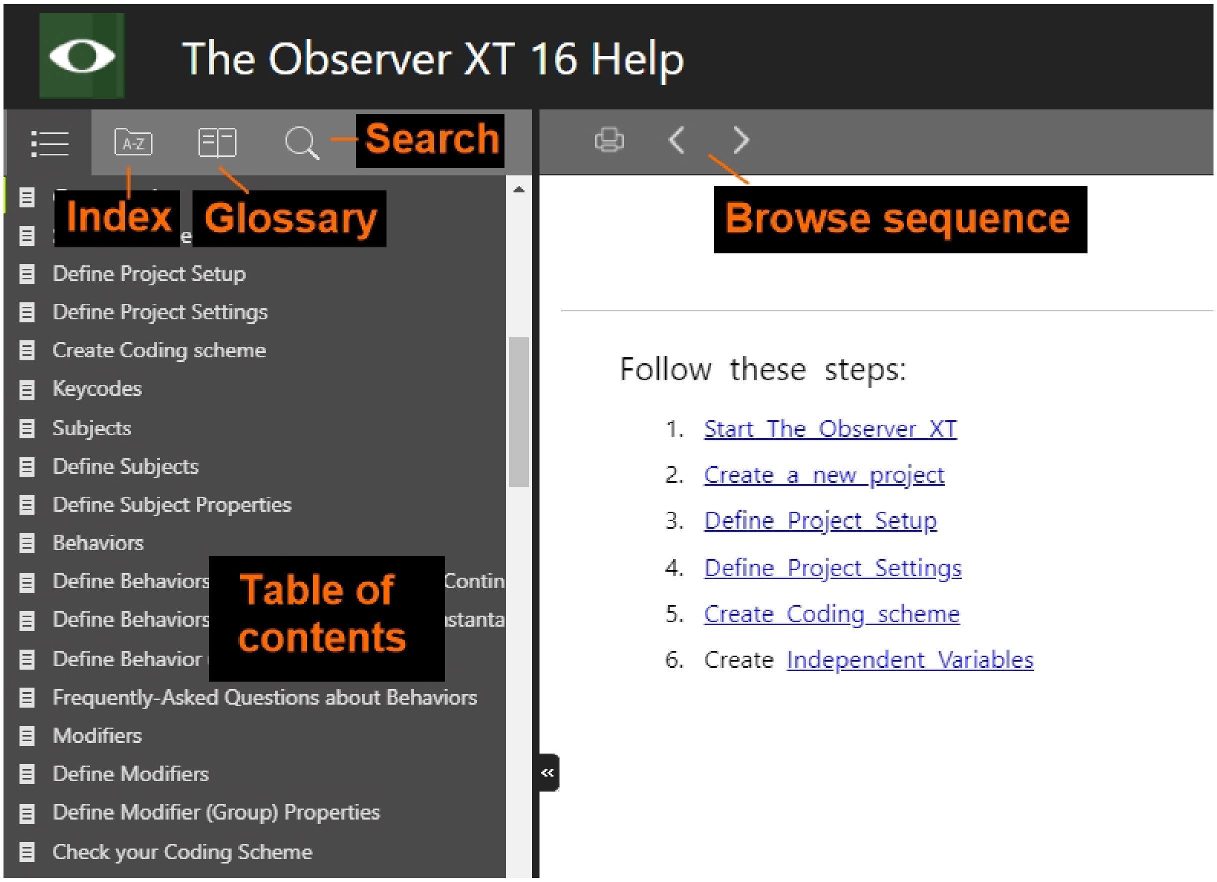
Welcome to The Observer XT!



Main topics

- Introduction to The Observer XT
- The Observer XT Licenses, Modules and Tools
- The Observer XT Interface
- What's new in The Observer XT 17

How to use this help



- If you do not see the Table of Contents on the left, enlarge the Help window or zoom out the characters (**Ctrl**+mouse wheel, or **Ctrl**+**-**).
- **TIP** To search for two or more adjacent words (e.g. numerical modifier), use quotes (“numerical modifier”).

- To go back to the search results after visiting one of the result pages, click again on the magnifying glass icon in the Search field.

Introduction to The Observer XT

Main topics

- What is The Observer XT?
- Sample Projects
- Workflow
- How Data are Logged in The Observer XT

What is The Observer XT?

Professional tool for behavioral research

The Observer XT is a professional manual event recorder for the collection, management, analysis and presentation of observational data. It is an important tool for the study of behavioral processes when you need to record a level of detail that you cannot obtain when you observe and write down your annotations. You use The Observer XT whenever you need to record activities, postures, movements, positions, social interactions or any other aspect of the behavior of humans and animals.

The flexibility and powerful analysis functions of The Observer XT makes it suitable for almost any study involving observational data for studies on animals as well as on humans. In human psychology, The Observer XT aids in collecting data on behavioral development, parent-child as well as any social interaction, communication, education, language acquisition, cognition, psychological assessment, etc.

Recording interactions between children at play.

How difficult is working with a machine? How easy-to-use are cash dispensers for customers? The Observer XT is also useful whenever one needs to collect observational data that is essential, for instance, to assess a physical workload, usability of products, or to study human-machine interactions.

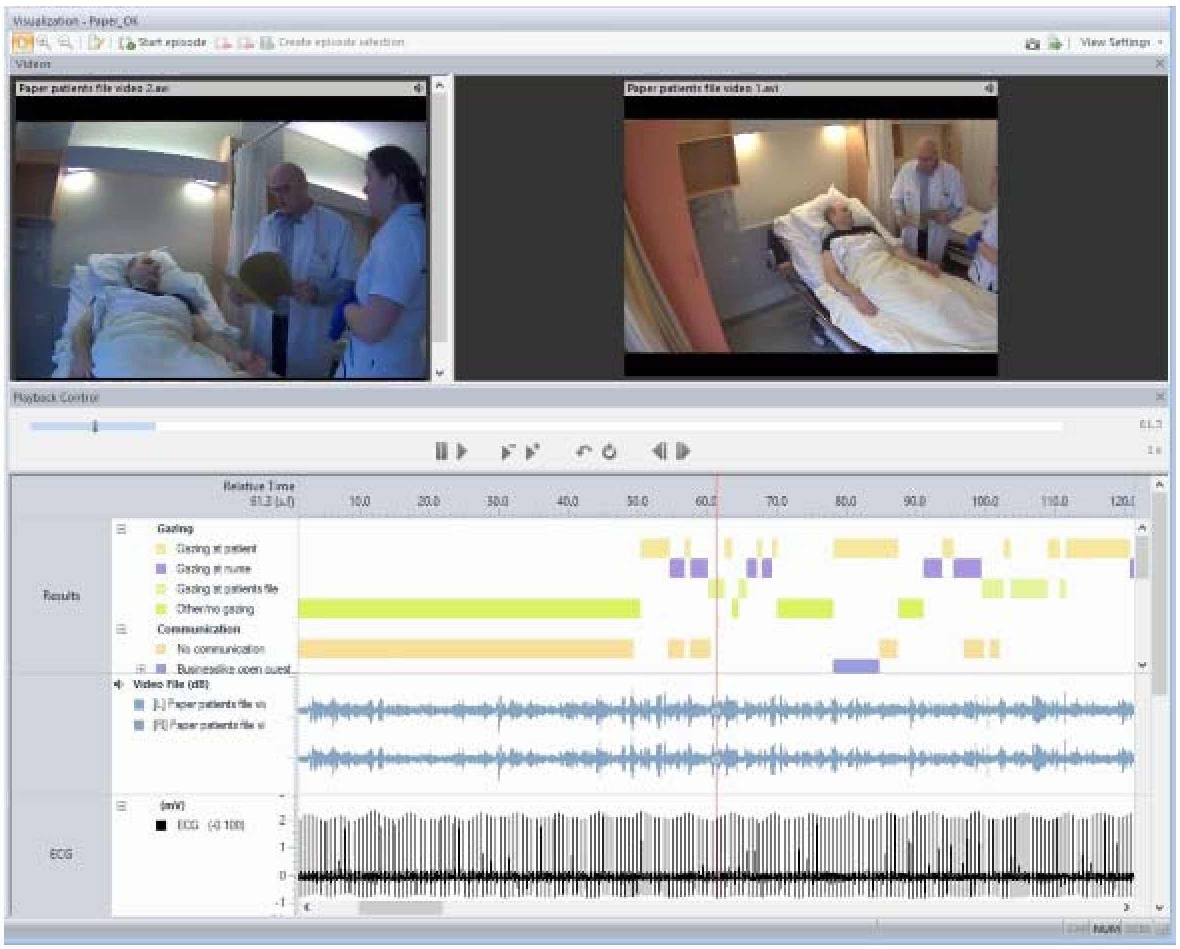
Recording the behavior at a cash dispenser.

Sample Projects

Research examples

On the MyNoldus portal (https://my.noldus.com) you can find a number of sample projects of The Observer XT in various research areas, from entomology to human-machine interactions. Download one of these projects together with their videos and the PDF file 'Description of The Observer XT sample projects', to get an idea on how to implement a research project in The Observer XT.

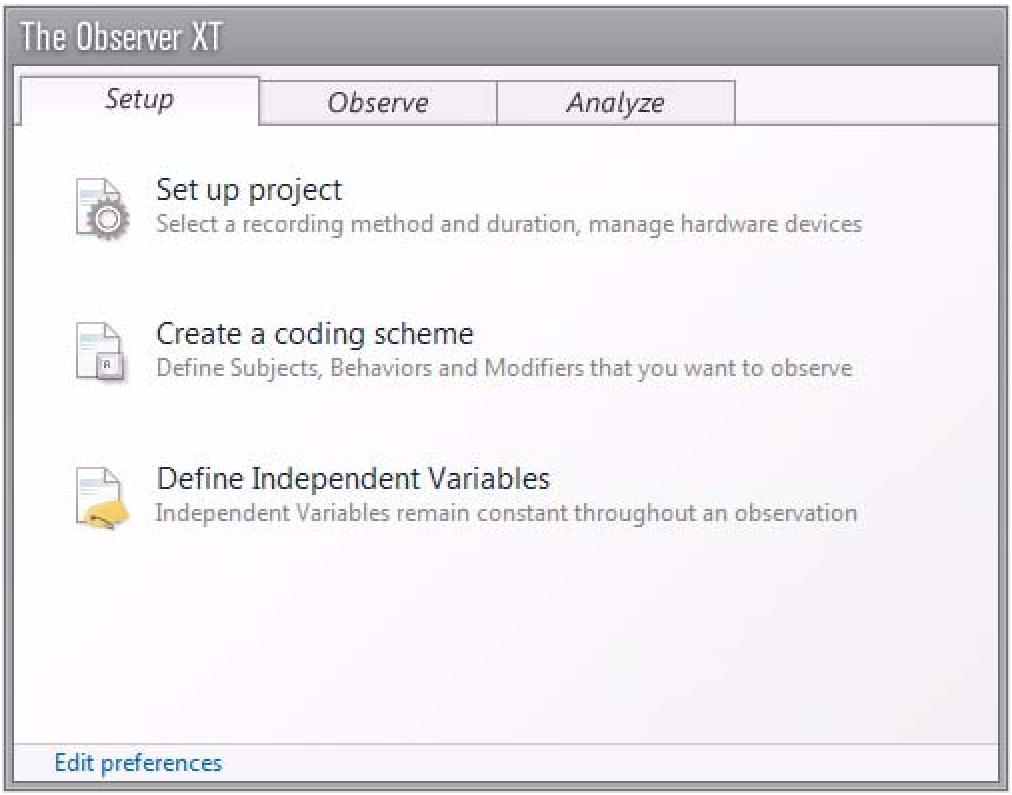
See Restore a backup of a project how to open a sample project.



Workflow

Setup, Observe, Analyze

Before the researcher starts working with The Observer XT, he or she formulates a hypothesis and decides which individuals and behaviors to observe. The entire process carried out with The Observer XT can be divided into the three main steps Setup, Observe and Analyze. Once a project is made in The Observer XT, these steps are visible in the overview window, in the Project Explorer on the left side of your screen and in the menu at the top of your screen.



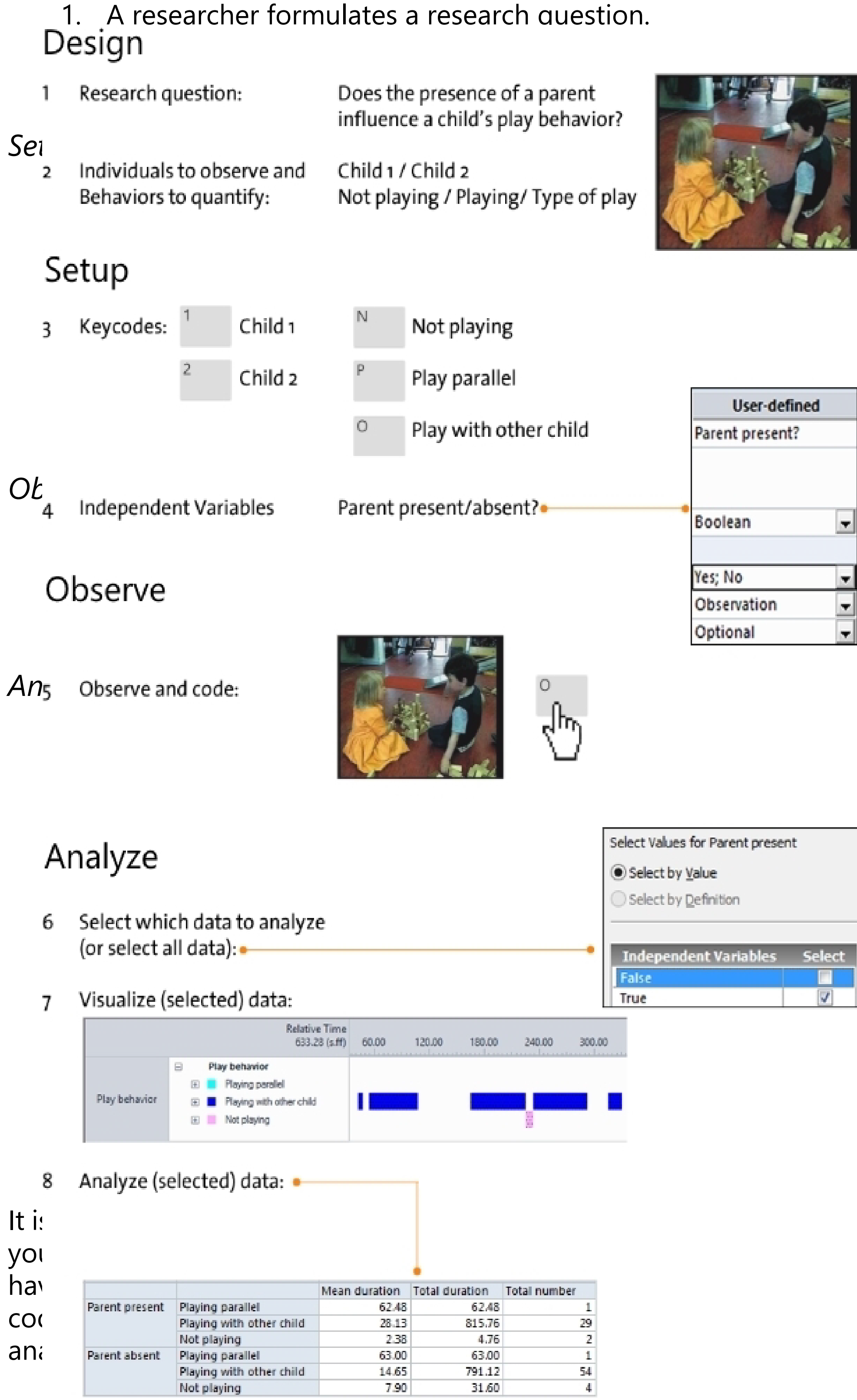
The overview window of The Observer XT in which you can navigate to the different main components: Setup, Observe, Analyze.

Workflow

The entire workflow is summarized in the figure below and explained in the text thereafter. The numbers in the text correspond to the numbers in the figure.

Hypothesis

1. A researcher formulates a research question.



		Mean duration	Total duration	Total number
Parent present	Playing parallel	62.48	62.48	1
	Playing with other child	28.13	815.76	29
	Not playing	2.38	4.76	2
Parent absent	Playing parallel	63.00	63.00	1
	Playing with other child	14.65	791.12	54
	Not playing	7.90	31.60	4

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How Data are Logged in The Observer XT

The Event log

Events in The Observer XT are stored in an Event log.

When you observe that “Child 1 is Gazing at a toy” at time 0:00:01, The Observer XT logs this in the following way.

Time — Subject — Behavior

0:00:01 — Child 1 — Gaze at toy

When something else happens (for example, “Child 1 Plays” at time 0:00:03, The Observer XT logs it by creating another event consisting of those elements:

Time — Subject — Behavior

0:00:01 — Child 1 — Gaze at toy

0:00:03 — Child 1 — Play

Each event is attached to a time stamp, so that The Observer XT can calculate the duration of any action being recorded. In this case, The Observer XT interprets your events as Child 1 has been gazing at the toy for two seconds.

Observations are certainly more complex than the examples above. To add more detail to the records, The Observer XT has a feature called Modifier. Suppose that you want to log how the child is playing:

‘Child 1 is Playing Imaginary’

This can be logged in The Observer XT in this way:

Time — Subject — Behavior — Modifier

0:00:03 — Child 1 — Play — Imaginary

In this case, the Modifier specifies type of play behavior. Modifiers can be numerical as well, for example to score sound level, or aggression classes.

You can define which behavior to log for which subject. For example, for a teacher you may be interested in other behaviors than for pupils. And similarly you can log modifiers for some behaviors and not for others. Logging the modifier *Sound level* does not make sense for the behavior *Walk*, while it does for the behavior *Sing*.

While you are scoring, the events are visualized in the Data and Audio Visualization window. This gives you an overview of what you scored and allows you to easily detect errors.

The Observer XT Licenses, Modules and Tools

What information are you looking for?

- Modules
- Other Licenses
- Tools
- How do I know which Licenses and Tools I have?
- Software license key or hardware key

Modules

Options

The Observer XT has the following modules:

- Base Module
- Single Media Module
- Media Module
- External Data Module

Your license determines which modules you have.

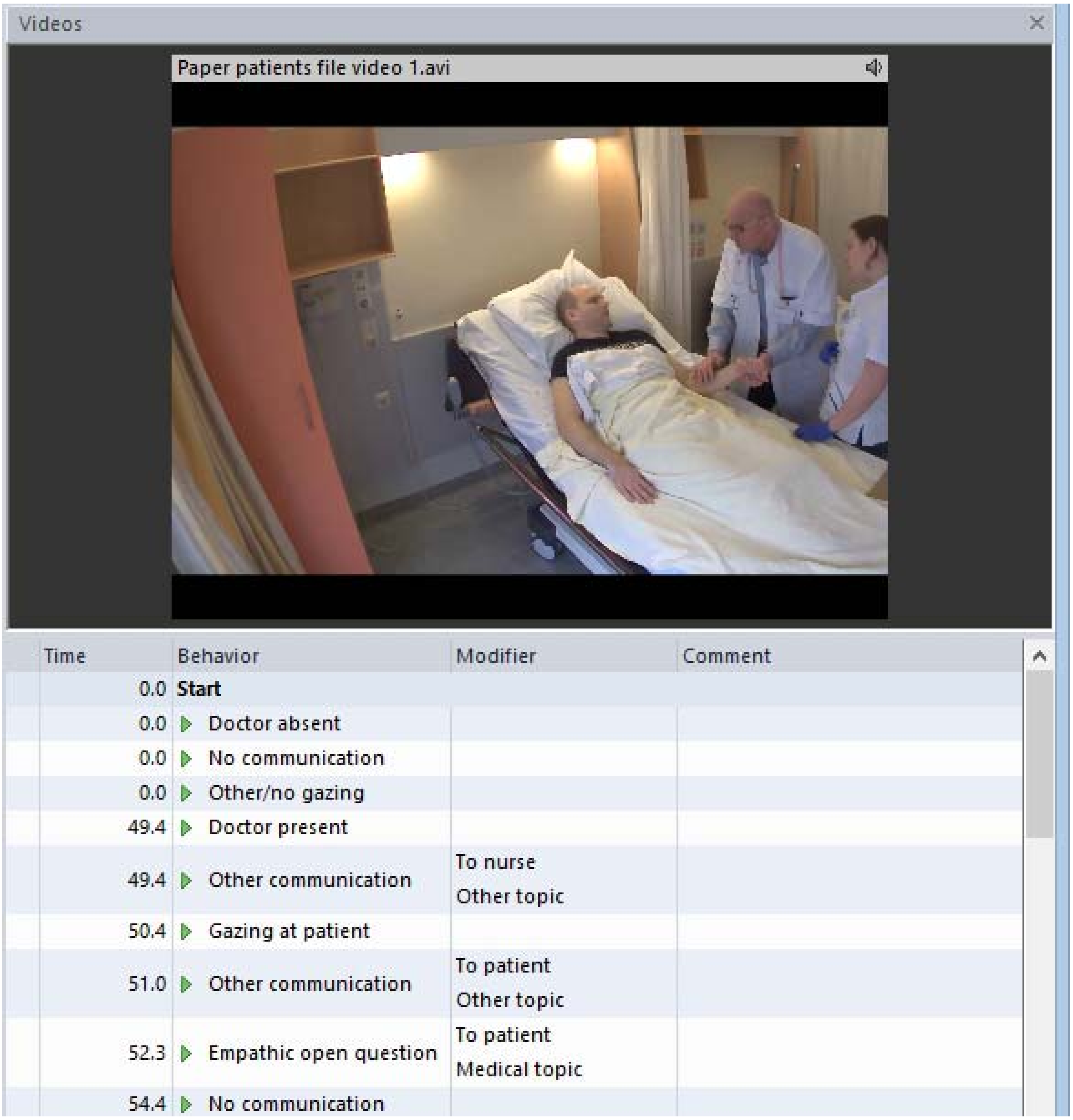
Base Module

With the Base Module of The Observer XT you can score events in a live situation, without using video files. Every license for The Observer XT includes the Base Module, which can be extended with other modules.

Time	Behavior	Modifier
0.000	Start	
0.000	No	
0.000	No communication	
0.000	Other/no gazing	
49.380	Yes	
49.380	Other communication	Medical personnel Other topic
50.406	At patient	
50.988	Other communication	Patient Other topic
52.346	Empathic open question	Patient Medical
54.378	No communication	

Single Media Module

You need this module if you want to score data from a video or audio file. It allows you to play back one video or audio file in The Observer XT.



Media Module

This module allows you to play back a maximum of twenty media files simultaneously.

IMPORTANT To play back twenty videos simultaneously, your computer must be suitable for that purpose. Please contact your Noldus IT sales representative for more information.

External Data Module

With this module, you can import any external data stored in ASCII or EDF format. External data may include physiological data (e.g., heart rate in BPM, ECG, EEG, blood pressure), environmental data (e.g., temperature, humidity) or eye-tracking data. It is possible to synchronize logged events and associated external data. Then you can, for example, calculate the average value of these external data during an event, or, the other way around, what behavior occurred when the external data had a certain value.

Other Licenses

Options

You can extend The Observer XT with the following licenses:

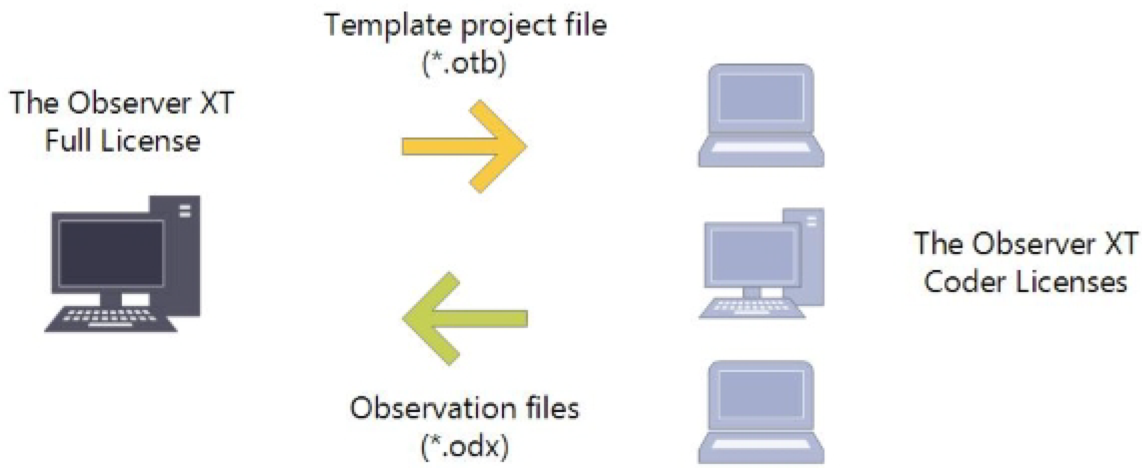
- Pocket Observer license
- Coder license

Pocket Observer license

If you need to be mobile during observations, you can use this module and score events with Pocket Observer installed on a handheld device (for example a smartphone).

Coder license

When several observers work on the same project. A coder license is a low cost coding tool. It allows for coding and visualization only. The observations from the coding stations are imported in the main project on the computer with The Observer XT.


Template project file
(*.otb)
The Observer XT
Full License
The Observer XT
Coder Licenses
Observation files
(*.odx)

Tools

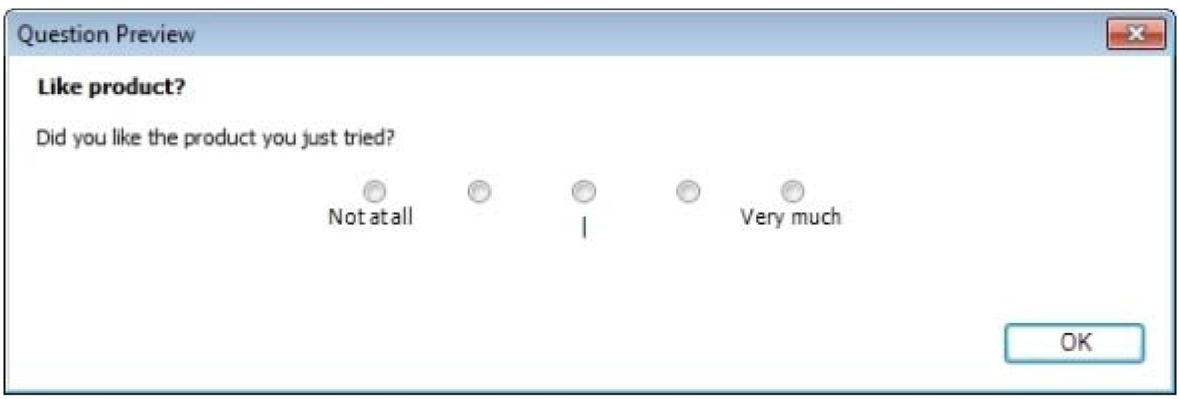
Options

In addition to the modules and licenses, you can purchase the following tools that can be used in combination with The Observer XT:

- uASQ
- uLog
- E-prime
- Software Development Kits

uASQ

With uASQ you can set up questionnaires and collect subjective information from your test participants. Answers can be nominal, numerical, Likert scale etc. Typical questions could be: "Did you like the product you just tried (from Not at all to Very much)?" or "How do you rate the attractiveness of this web page (scale 1-5)?".



For details, please refer to the uASQ Reference Manual which can be found in the documentation folder on the MyNoldus portal of the Noldus website (my.noldus.com).

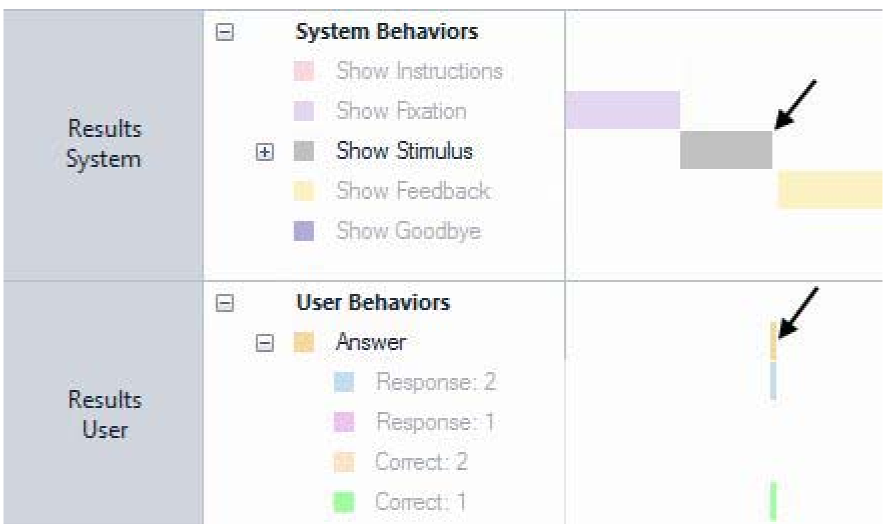
uLog

With uLog you can log the key and mouse activity of a test participant. uLog data can be imported into The Observer XT for data selection and analysis. This way you can, for example analyze the behavior of a test participant when it was browsing a web page.

Time	Behavior	Modifier	Comment
0.00	**Start**		
1.62	Mouse click	141 1190 pane Left	pane : NotificationOverflow :
2.11	Application started	iexplore	
2.15	Application started	iexplore	
2.15	Window activated		http://intranet/ - Internet Explorer

E-prime

Combine The Observer XT with the stimulus presentation program E-prime. Annotate events in The Observer XT based on the presented stimuli and start and stop E-prime with commands from The Observer XT. When done, visualize E-prime data together with the manually scored events in The Observer XT.



Software Development Kits

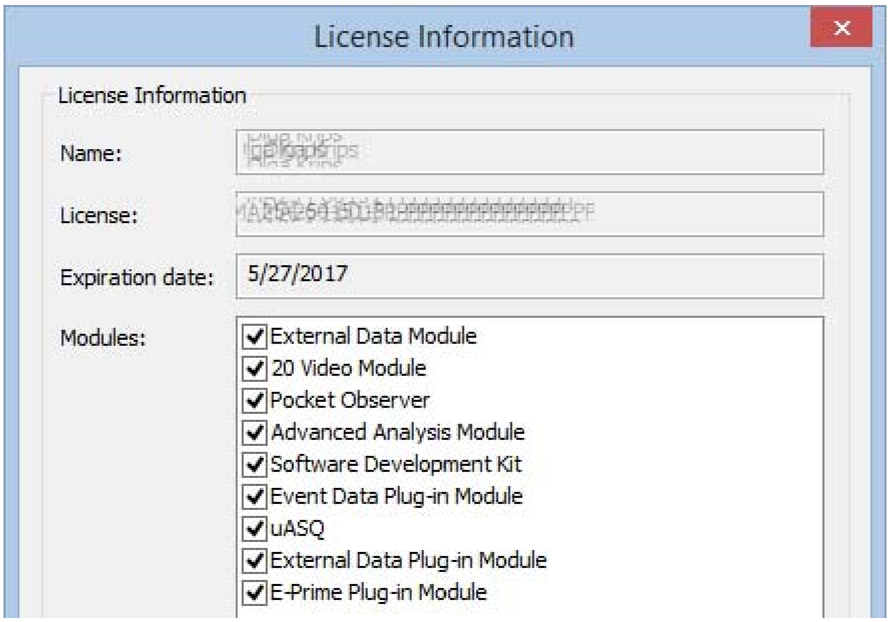
A Software Development Kit (SDK) is a set of development tools that allows software engineers to create or use applications in combination with The Observer XT.

See Software Development Kits for more information.

How do I know which Licenses and Tools I have?

View the license info

In The Observer XT, choose **Help** > **About The Observer XT** > **License info**. Under **Modules** you find which options are enabled with your license.



Software license key or hardware key

License types

There are two license types for The Observer XT. A license comes with either a software license key or a hardware key.

Software license key

Your software license key makes either one or multiple activations of the software possible, depending on the number of activations that you purchased and the type of activation that you choose. For information on how to activate your license see Activate The Observer XT with a software license key.

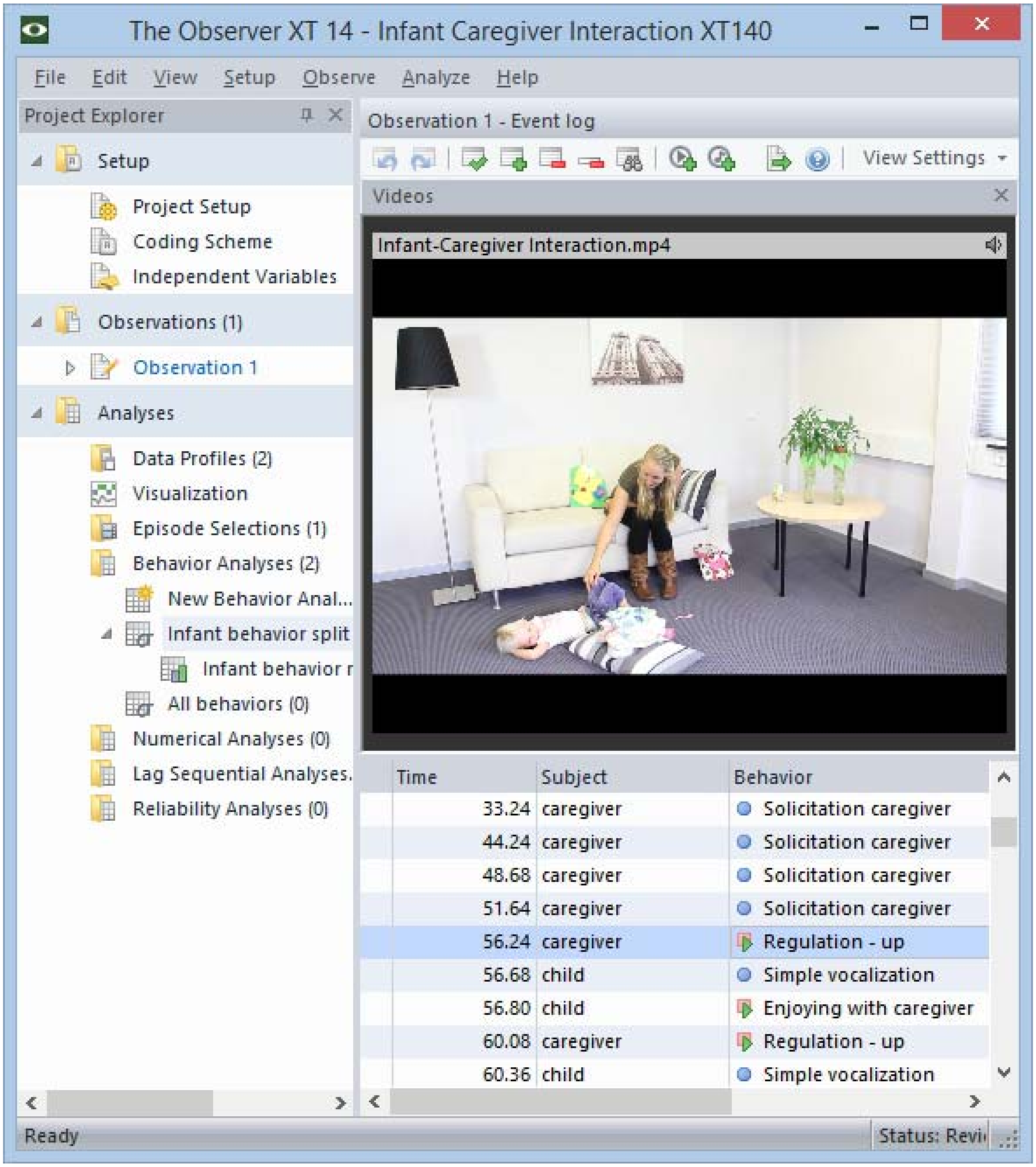
Hardware key

The hardware key determines which license options are available to you (see The Observer XT Licenses, Modules and Tools). This is a very important piece of equipment, as it represents the full value of your license and cannot be replaced if lost. If The Observer XT comes with a hardware key, use of The Observer XT is only possible when the hardware key is connected to your computer. When it is installed and connected properly, a red light glows inside it.

IMPORTANT Please make sure that you do not lose the key! You will need to pay for a new license if so. Also be careful with the hardware key. It is sensitive and can be easily damaged.

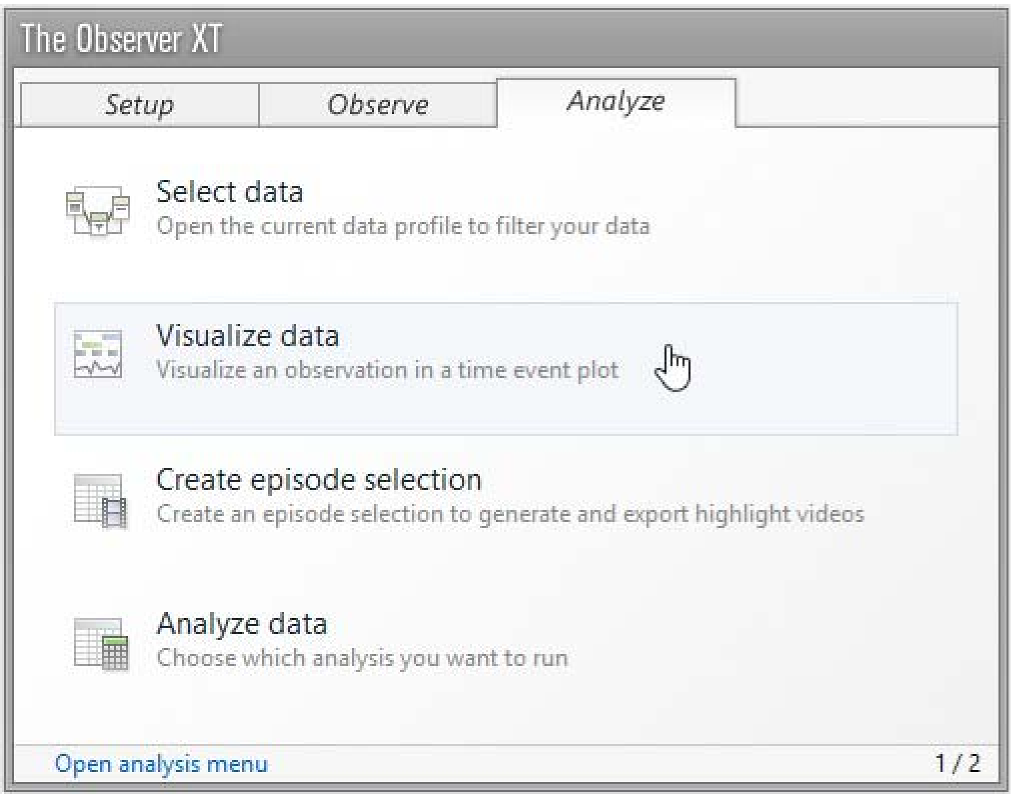
IMPORTANT You must connect the hardware key <u>after</u> you install the software.

The Observer XT Interface

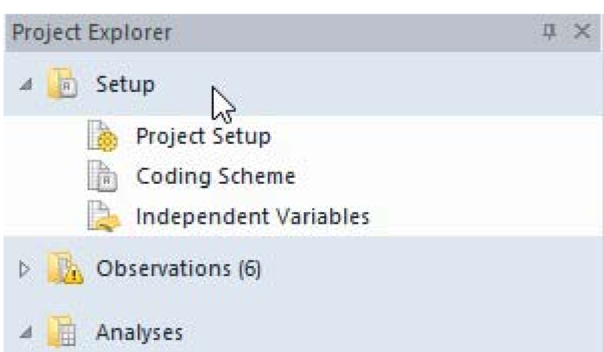


Overview window

When you create or open a Project, the overview window of The Observer XT appears on your screen. This window can guide you through the three main steps *Setup*, *Observe* and *Analyze* to complete your work. Click one of the three tabs and then a button to the function you want to activate.

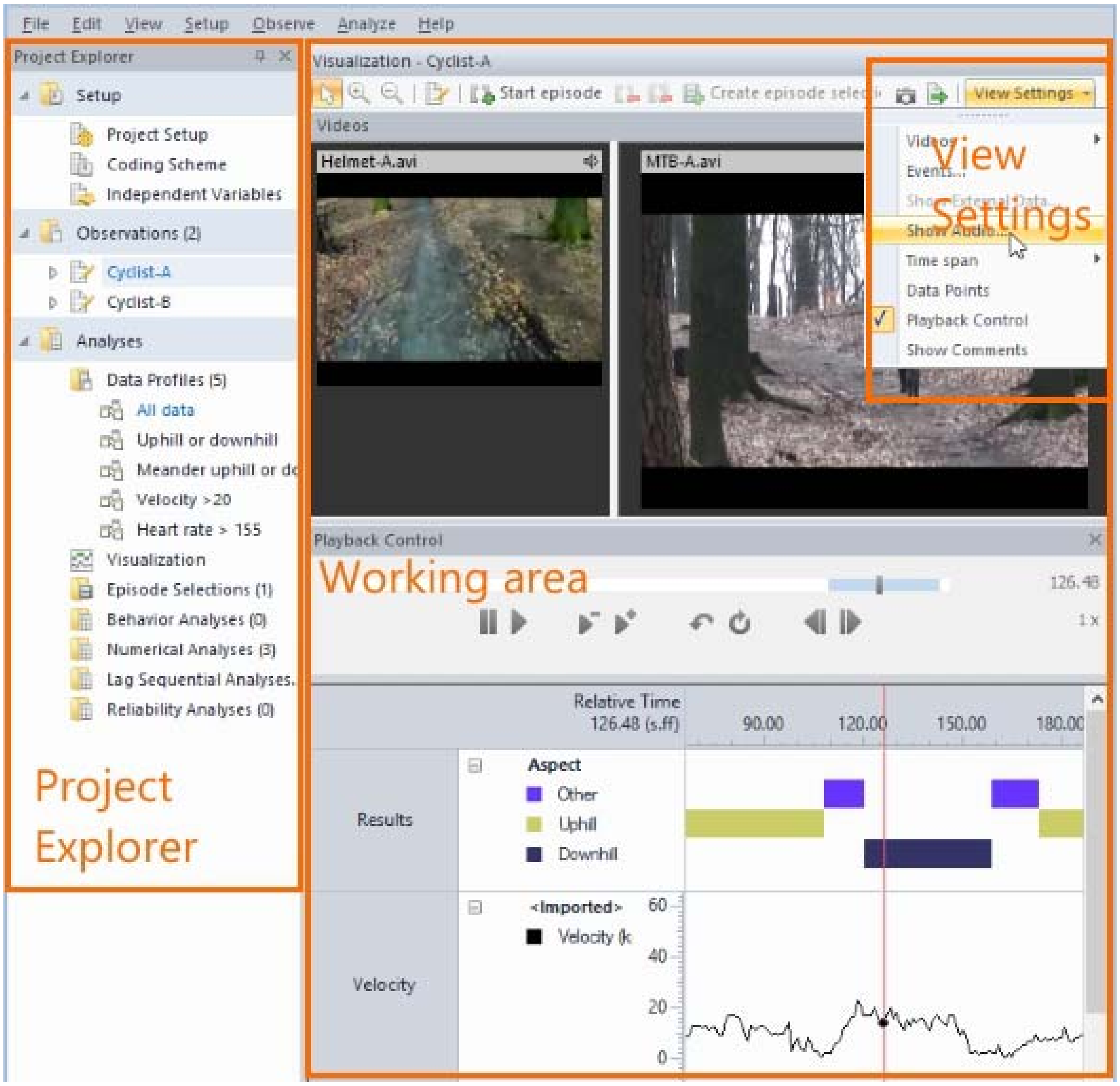


You can go back to the overview window at any time by clicking **Setup**, **Observations** or **Analyses** in the left part of your screen (the Project Explorer, see below).



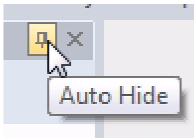
Interface

By default, the interface of The Observer XT consists of two views: the Project Explorer, and the working area.



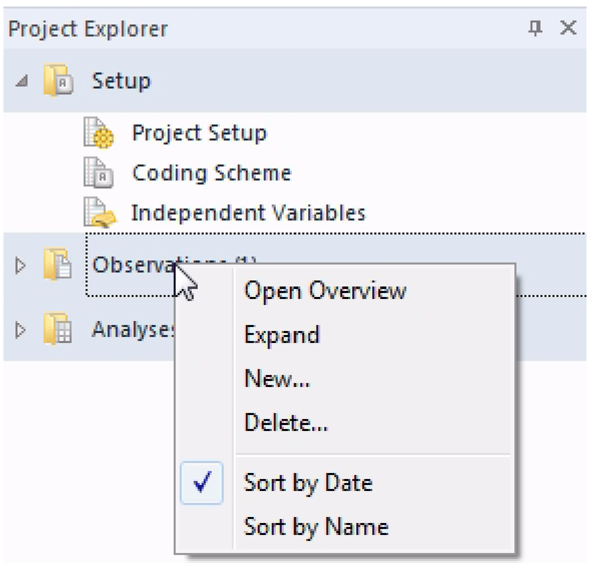
The Project Explorer gives an overview of the observations and analysis results of your project. Use the Project Explorer to manage your project data.

The working area is different in different parts of the program, for example Project setup, Visualization or Analysis. The working area is customizable. The toolbar contains View Settings, which you can use to define what windows to display.



Right-click menus

Most items in the Project Explorer have right-click menus. This way you can, for example, sort your observations by name. All key functionality can be conveniently accessed through right-click menus.



What's new in The Observer XT 17

Compared to The Observer XT 16

Visualize event data during coding

In The Observer 17 you can view a Time-Event plot during scoring similar to the plot in the Visualization part of the software. The plot “grows” while you are scoring, giving you a good overview of the scored data.

Controlling eye tracker glasses software

It is now possible to start and stop data acquisition of Tobii Glasses. For this solution you need our MediaRecorder software. The solution allows you to view a real-time gaze overlay video which is automatically imported into The Observer XT. You can also collect pupil diameter data which can give important insight in mental workload and excitement. For more details please see the Technical Note ‘The Observer XT - Eye tracker glasses’ which you can download from your MyNoldus account (my.noldus.com).

Integration with Bitbrain EEG systems

The Observer XT can now control data acquisition of a Bitbrain Diadem EEG system. The BitBrain Diadem is a 12-channel wearable and portable, dry EEG device designed for real-world applications. The Diadem system is designed to address the pre-frontal, frontal, parietal and occipital brain areas to measure emotional and cognitive states such as cognitive workload. For more details please see the Technical Note ‘The Observer XT - Bitbrain Diadem EEG’ which you can download from your MyNoldus account (my.noldus.com).

Compared to The Observer XT 15

Charts removed

The possibility to visualize your analysis results in charts was removed.

Software activation code instead of hardware key

The Observer XT comes with a software activation code as the license which makes it easier to work with the software. For existing customers it is still possible to upgrade their hardware key.

Compared to The Observer XT 14.2

Episode Video removed

The video generation option from the episode selection was removed.

5 digits precision

Earlier versions used a maximum of 3 digits precision when working with numbers and timestamps. in this version this was increased to 5 digits to work with high precision data.

Compared to The Observer XT 14.0

N-Linx improvements

Communication between different programs with the Noldus network communication protocol N-Linx has become more uniform. N-Linx Server, that previously was installed with The Observer XT, is now installed separately. It can be installed on any computer in the network. All programs that need to communicate with each other connect to N-Linx Server. N-Linx Server takes care of data transfer between applications.

See also the Reference Manual - N-Linx on the MyNoldus portal of the Noldus website (my.noldus.com).

BIOPAC AcqKnowledge integration

Control of physiological data acquisition with a BIOPAC system has improved. Communication between BIOPAC AcqKnowledge and The Observer XT now makes use of the Noldus network communication protocol N-Linx. This simplifies start and stop of physiological data acquisition and synchronization with the Event Log in The Observer XT.

See also the Technical Note - BIOPAC MP system - The Observer XT on the MyNoldus portal of the Noldus website (my.noldus.com).

Tobii Pro Lab and Tobii Pro Studio integration

Control of Tobii eye-tracking systems has improved. Communication between Tobii Pro Lab/Tobii Pro Studio and The Observer XT now makes use of the Noldus communication protocol N-Linx. This simplifies start and stop of the eye tracking recording and synchronization with the Event Log in The Observer XT.

See also the Technical Note - Tobii Pro Eye trackers - The Observer XT on the MyNoldus portal of the Noldus website (my.noldus.com).

Improved FaceReader integration

Communication between The Observer XT and FaceReader has improved. FaceReader videos can now automatically be linked to a live observation in The Observer XT and synchronized with the events. Also, multiple FaceReader instances can be controlled with one instance of The Observer XT.

See Observe Live and Analyze with FaceReader in Set up your Project for a summary of the procedure and see FaceReader with The Observer XT in the FaceReader Help for details.

E-Prime Studio 3.0 support

A new version of the E-Prime client and server are released, so that it supports E-Prime Studio 3.0.

See also the Technical Note - E-Prime - The Observer XT on the MyNoldus portal of the Noldus website (my.noldus.com).

For more Information

Other manuals

On the MyNoldus section of the Noldus web site (my.noldus.com) you can also find:

- Quick Start Guide - The Observer XT. A small document with a summary on how to use The Observer XT. It also comes with the software, printed on paper. The Quick Start Guide is also available as PDF file in Chinese, Japanese, French, German, Spanish, and Italian.
- Application Manual - The Observer XT. A manual with instructions how to use The Observer XT XT in several research areas like Parent-child interaction, Doctor-patient interaction, Usability research, Human factors research, Consumer behavior.
- Reference Manual - Pocket Observer. An extensive manual about using a mobile scoring device for live observations.
- Reference Manual - uASQ. A manual for the questionnaire tool uASQ.
- Technical notes on how to use The Observer XT coder licenses, control the video with a jog-shuttle device, use The Observer XT with the stimulus presentation tool E-prime etc.

See also

https://my.noldus.com and log in with your MyNoldus username and password.

Quick help

In some parts of the program, the program you find short explanations about the functionality. Click the **Quick Help** button for these explanations. You find the button at the top right of your screen.

Help menu

The Observer XT's **Help** menu contains the following options:

- **Help Topics** – Opens the The Observer XT Help
- **Video Tutorial** – Take a few minutes to learn about how to set up an observational study in The Observer XT.
- **Noldus Online** –

- **The Observer XT Home Page** — Links to The Observer XT section on the Noldus website.

- **MyNoldus Portal** — Brings you to the MyNoldus section on the Noldus website. Create a new account or log into your existing account. On you MyNoldus page you can find the licenses and NoldusCare contracts associated with your account, you can download the latest version of the software, manuals and sample projects, contact Support or request a Sales visit.

- **Report an Issue** — You are forwarded to an online form where you can report your issue. Noldus Support will contact you after they received the form.

- **Get Support** — Brings you to the MyNoldus section on the Noldus website. Create a new account or log into your existing account. Under **Get Support** you will find the contact details of the help desk in your region, you can view the status of your current support cases or submit a new support case.

- **Check for Updates** — Brings you to the MyNoldus section on the Noldus website. Create a new account or log into your existing account. Under **Downloads** click on **Software and documentation** and check whether there are updates available.

- **License** - **Deactivate** — This option is available if you have activated The Observer XT with a software license key. See Deactivate your Observer XT license for the procedure to follow.
- **Upgrade** – This option is available if you have a hardware key. Clicking this option opens the Upgrade Key dialog box. The dialog box opens automatically when you start The Observer XT and the software detects that you have a license for an earlier version of the software. If you have purchased a new module for The Observer XT, choose this option to type the new Upgrade Key number that you have received from Noldus.

  See Upgrade to The Observer XT 17 16
- **About The Observer XT** – Choose this option to see details of exactly which version of The Observer XT you are using. Click **License info** to see the registered user, license number of your software and what licenses you have.

Support center

If you have any problems, questions, remarks or comments, please let us know. From the **Help** menu select **Noldus Online** and then **Get Support** or browse to https://my.noldus.com. This brings you to the MyNoldus section on the Noldus website. Create a new account or log into your existing account.

Before you contact Technical Support, please have the following information available. To find this information, go to the **Help** menu and select **About The Observer XT**:

- The version number of your copy of The Observer XT.
- The name of the registered user of The Observer XT (click **License Info**).
- The license number of your copy of The Observer XT (click **License Info**).

Our Technical Support department may request a log file and/or a dump file when answering your support question.

See File Locations in File Management

For other contact information, please refer to the **Contact** section on our website.

www.noldus.com

NoldusCare

Your license of The Observer XT comes with a standard service package of one year. This includes a one-year period of free technical support. With NoldusCare you make sure that you work with the latest version of your software, based on input from our worldwide customer base. Updates, upgrades and new releases are available for free. As well as update meetings, where you can discuss new features with a Noldus consultant.

For more information, see our web page

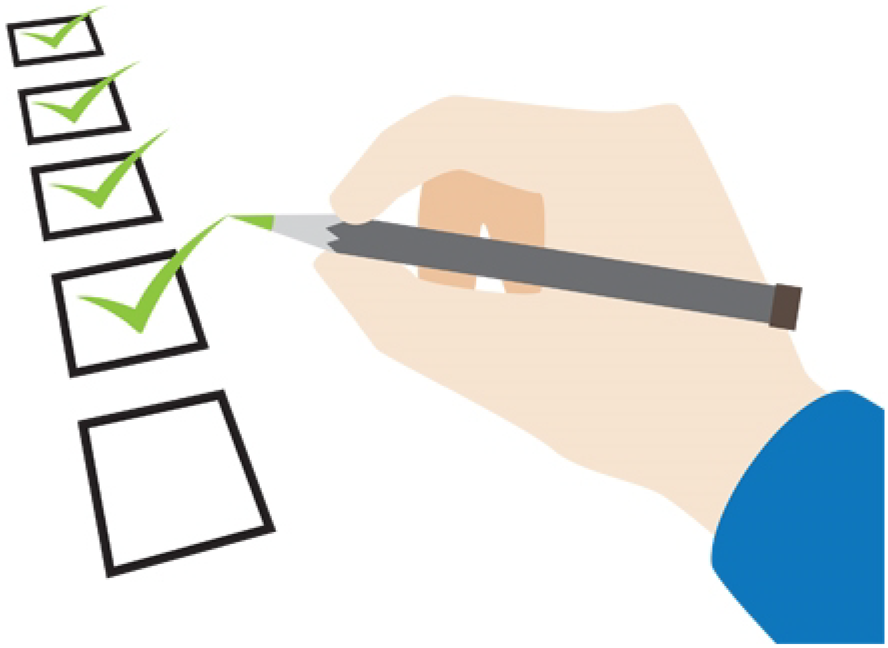
www.noldus.com/nolduscare

Installation

Main topics

- System Requirements
- Supported Hardware
- Before you install The Observer XT
- Install The Observer XT
- Upgrade to The Observer XT 17
- The Observer XT Trial Version
- Preferences

System Requirements



Operating system

The Observer XT 17 has been thoroughly tested using a US English version of Windows 10 and Windows 11 (64 bit Professional edition). Minimal version number 20H2 (October 2020).

To check which version you have, type **Windows version** in the App window and click **See if you have a 32-bit or 64-bit version of Windows**. Note the information in the **Edition**, **Version**, and **System type** fields.

The Observer XT is not designed for use with the touch features of Windows.

Languages

The Observer XT was tested with the US English language packs of Windows. The Observer XT has also been tested with Cyrillic, Japanese and simplified Chinese language packs. It is possible that certain local language versions of Windows may affect how well the program runs.

For more information about using non-Latin characters in specific parts of the program, see File Management

Computer

The type of computer you need to run The Observer XT depends on how you will use the program. If you are carrying out a few live observations, then a simple netbook will suffice. If you are working with video or have a large number of observations in your project, then a professional workstation is necessary. If you purchase a complete setup from Noldus, then we will make sure your computer suits your purposes.

System requirements for live observations

For using The Observer XT for live observation (no video files, cameras or physiological data), with a maximum of 200 short observations, or a small number of observations with up to 5000 event lines, a simple netbook is sufficient. Coding schemes with non mutually-exclusive modifiers should not be used with such a computer, as this type of modifier has a severe impact on the performances. Noldus recommends in this case an ultrabook or laptop with at least 2 GHz processor and 2GB of memory.

System requirements for observations with video

For working with The Observer XT and video, we recommend that you use a professional workstation. It is possible to buy consumer-range computers with a high processor speed and plenty of memory, but in order to remain competitive regarding price, the manufacturers often economize on the underlying system architecture. That means those computers are suitable for home use, but not for running professional scientific software. You should select a computer which is intended for professional use or labeled by the manufacturer as a workstation.

If you use other software which installs codec packages on your computer, this can interfere with the codecs installed by The Observer XT. We recommend to uninstall DVD burner software, video editing packages and similar. This includes DVD-burning software.

See Codecs installed by Other Programs in Media Files

Recommended computer

The Observer XT has been tested with Dell Precision™ T3650 desktop PC and the M3551 mobile workstation.

If you order a complete solution from Noldus Information Technology, you will obtain a Dell Precision™ T3650 workstation (or its successor), or a M3551 mobile workstation (or its successor) with The Observer XT software installed and ready to use. These computers are the standard test platforms for The Observer XT, and we recommend that you use those computers.

Technical specifications Dell Precision™ T3650 PC:

- Processor: Intel Core i7-11700, 8 Core, 16 MB Cache, 2.5 GHz
- Internal memory: 8GB DDR4 memory.
- 1st Hard-disk: M.2 256GB PCIe NVMe Class 40 SSD
- 2nd Hard-disk: 3.5 inch 1 TB SATA (7200 rpm).
- Graphics card: NVIDIA Quadro P2200, 5GB.

Technical specifications Dell Precision™ M3551 mobile workstation:

- Processor: Intel I7-10750H (6-core), 2.2 GHz.
- Internal memory: 8 GB.
- Hard disk: 1 TB.
- Graphics card: 4 GB NVIDIA Quadro P620 w.

If you are planning to purchase a different computer than the ones mentioned above, please contact us for detailed advice.

Older computers

If you are upgrading from an older version of The Observer XT, you can still install the latest version on an older workstation. To use The Observer XT with video, the computer should have at least a 2.6 GHz dual core processor and at least 4 GB of memory as well as a video card supporting DirectDraw acceleration. We recommend a 2.8 Ghz quad core processor with 8GB of memory.

Video card

To be able to play back videos in The Observer XT, your video card should have Direct3D Acceleration. All newer cards support this feature, but older cards (in older PCs) do not. For Windows 10 and Windows 11 — Direct3D Acceleration is enabled by default.

Note: If you have video files on CD, DVD or mobile devices, copy these to your hard disk before scoring with The Observer XT.

See also Supported Formats in Media Files

Supported Hardware

Drivers of the supported hardware must be installed separately. These drivers are available on the MyNoldus portal of the Noldus website (my.noldus.com). The following hardware works with The Observer XT 17 running on 64-bit Windows 10 or Windows 11:

Video controlling device

Contour ShuttlePRO v2 Jog/shuttle device.

Mobile scoring device for Pocket Observer

Android devices for Pocket Observer 3.4

Pocket Observer 3.4 was tested with Android version 10 on a Samsung S9 phone and with Android version 11 on a Samsung S10 phone. We cannot guarantee that Pocket Observer will work well with future versions of Google Android. Please contact our Support center if you use a newer version and run into issues.

Before you install The Observer XT

When do you need this information?

If you ordered a new computer from Noldus Information Technology when you purchased The Observer XT, all your software and any internal hardware is already installed and tested. If you install The Observer XT yourself, please follow the instructions below, in the order they are presented. Please note that it is not possible to install The Observer XT on one computer and access it from another across a network. The program must be installed on the computer where it will be used.

Prior to installation, please check the packing list to make sure all the components are present. If any of the components listed is missing or damaged, please report this to us immediately.

Before you install The Observer XT, carry out the following steps:

- Turn off automatic updates for device drivers
- Select correct power options

Turn off automatic updates for device drivers

Aim

To make sure the device drivers are used that were tested with The Observer XT.

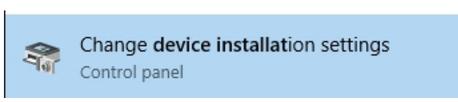
Background information

The general recommendation from Microsoft to use automatic updates is good, especially for security updates. However, automatic updates of hardware device drives can sometimes give problems. The Observer XT is tested with the device drivers that are available at the moment of the release. If device drivers are updated afterwards, we cannot guarantee that they work properly with The Observer XT. Therefore we recommend to switch off automatic updates of device drivers.

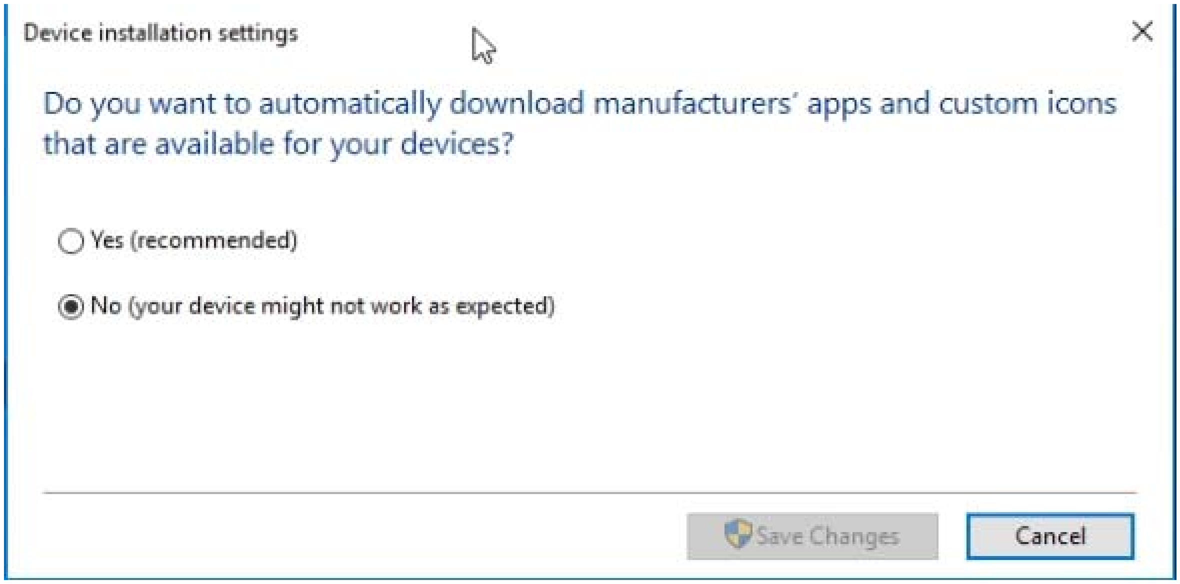
If you ordered a computer with The Observer XT from Noldus IT, the automatic updates for device drivers have already been turned off and you can skip this topic.

Procedure

1. Click the Windows icon on your desktop and type **Change device**.
2. Click **Change Device Installation Settings**.



3. Select **No (your devices might not work as expected)**.



4. Click **Save Changes**.

Select correct power options

Aim

To make sure the computer shuts down properly.

Background information

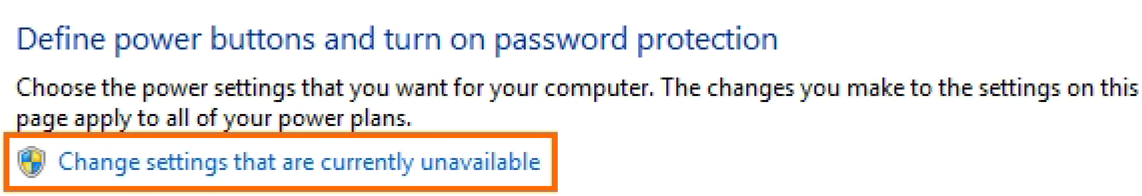
On computers with Windows 10 and Windows 11, by default the computer resumes rather than restarts after shutdown. This can cause problems with The Observer XT and associated software like N-Linx and MediaRecorder. Therefore, with installation of The Observer XT, the option that makes the computer resume is disabled. This way the computer is really restarted after shutdown.

However, with Windows updates the options can become enabled again. Therefore, check whether the computer shutdown settings are correct.

Procedure

1. In the Windows start window with apps, type **Power options** and then click the **Power options** tile.

2. Choose **Choose what the power buttons do**.
3. Click **Change settings that are currently unavailable**.

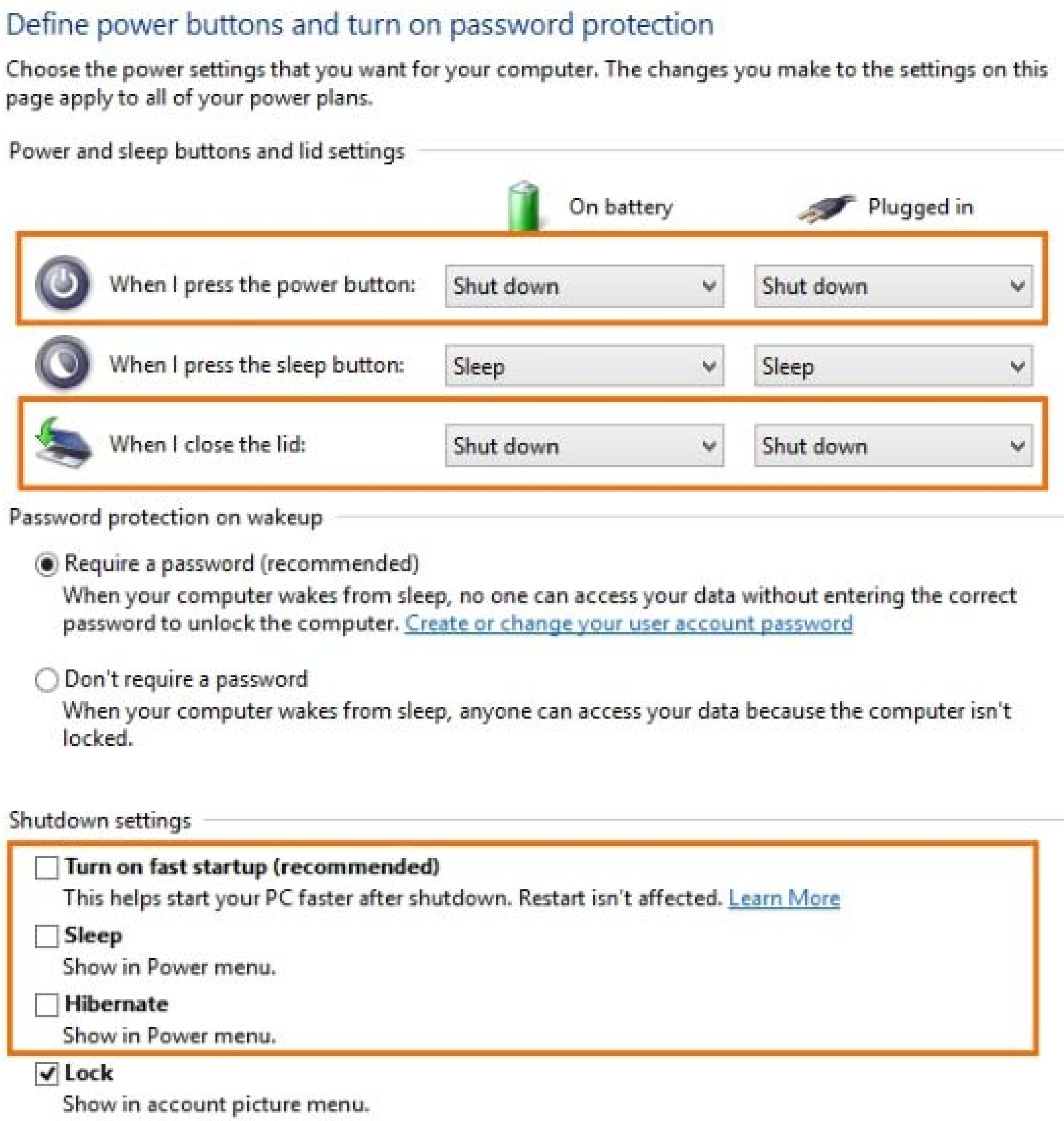


4. Select the following options:

   - When I press the power button – Shut down.

   - When I close the lid – Shut down.

   - Under Shutdown settings deselect the checkboxes **Sleep**, **Hibernate**, and **Turn on fast startup (recommended).**



Note

The option **Turn on fast startup (recommended)** under **Shutdown settings** is disabled when you install The Observer XT.

Install The Observer XT

Aim

To install The Observer XT with associated hardware.

Prerequisite

You have Windows administrator rights. This means you either are the system administrator or a member of the Windows group Administrators and have been assigned administrator rights.

Procedure

IMPORTANT If your license comes with a hardware key: first install The Observer XT and then connect the key to your computer, not the other way around!

1. Download the Observer installation zip file via your MyNoldus account: click on **Downloads** and then **Versions**.

   Browse to my.noldus.com if you do not have a MyNoldus account yet.

2. Unzip the zip file and double-click the file **The Observer XT 17 Setup.exe**.
3. In the window that appears, select **Standard**. Select **Custom** only if you want to change the default location where the program is stored and the default project folders.
4. Optionally, select **Adobe Acrobat Reader DC** in the **Drivers and Tools** field. Adobe Reader is needed to display the documentation.

   If you have the Shuttle Pro keyboard to control video playback, select **Shuttle Pro 2 Keyboard** in the **Drivers and Tools** field.

   See the Technical Note - ShuttlePro2 - The Observer XT that is present on the MyNoldus section of the Noldus website (my.noldus.com) for further installation instructions to use the ShuttlePro2 keyboard.

5. Click **Next** and follow the instruction on your screen to install.

Notes

- The Observer XT is installed in C:\Program Files\Noldus\The Observer XT 17. The project files are saved in the following folders:

  Projects – C:\Users\Public\Public Documents\Noldus \The Observer XT\Projects.

Templates - C:\Users\Public\Public Documents\Noldus \The Observer XT\Templates.

Video – C:\Users\Public\Public Documents\Noldus \The Observer XT\Video files.

Audio - C:\Users\Public\Public Documents\Noldus \The Observer XT\Audio files.

- If the installation software finds a previous version of Sentinel Runtime installed on your computer, it informs you that when clicking **Yes** it will de-install the previous version and install the new one.
- You can download The Observer XT installation file with or without codecs from the MyNoldus section of the Noldus website. The version without codecs is for scoring live only. The video tutorial can be downloaded separately.

  https://my.noldus.com

To install uASQ

uASQ is not shown in the **Setup** window. Install uASQ from the MyNoldus section of the Noldus website (my.noldus.com). You find the installation file under **Installation instructions**. If you upgrade from a previous version of The Observer XT, uninstall uASQ, with the **Programs and Features** item of the Control Panel. Then re-install uASQ from the MyNoldus section of the Noldus website.

See the Reference Manual - uASQ for details.

To install uLog

Install uLog from the MyNoldus section of the Noldus website (my.noldus.com). You find the installation files under **Installation instructions**.

Deactivate your Observer XT license

Aim

- To use your Fixed license for The Observer XT on another computer.
- To change a Fixed license for The Observer XT into a Floating license or the other way around.
- To make sure that The Observer XT cannot be used on a certain computer.

Procedure

From the **Help** menu select **License** and then **Deactivate**. A message appears informing you that deactivation has been successful and that The Observer XT will exit. You can now use the license to activate The Observer XT on another computer.

End-user license agreement

IMPORTANT – READ CAREFULLY. Please read this End-User License Agreement ("**EULA**" or "**Agreement**") carefully before checking the "accept" checkbox, downloading or using the Software (as defined below). By checking the "accept" checkbox, downloading, installing or otherwise using the Software, End-User agrees to be bound by the terms and conditions of this EULA. If you do not agree to the terms and conditions of this EULA, do not check the "accept" checkbox and do not download, install or use the Software.

The Software is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The Software is licensed, not sold.

1. DEFINITIONS

Terms used in this EULA but not otherwise defined shall have the meaning assigned to them below:

1.1. **Authorized Partner**: the individual or legal entity that has been granted permission by Noldus to promote, sell or otherwise distribute the Software on behalf of Noldus.

1.2. **End-User**: the individual or legal entity that has acquired or uses the Software under the terms and conditions of this EULA.

1.3. **EULA**: this End-User License Agreement.

1.4. **Indirect Losses**: any indirect loss, claim, damage, liability, or expenses (including reasonable attorney's fees), including lost profits, and damage due to the stagnation of business operations.

1.5. **Network License**: a licensing mechanism comprising a license file and accompanying software managing the number of concurrent users of the Software.

1.6. **Noldus**: Noldus Information Technology bv, with registered office at Nieuwe Kanaal 5, 6709 PA Wageningen, The Netherlands, listed in the Trade Register under Chamber of Commerce number 09094422, or its subsidiaries listed in the document

http://www.noldus.com/legal/noldus_corporate.pdf.

1.7. **Security System**: a system of software protection to limit installation and use of the Software to the authorized End-Users and computers.

1.8. **Security Device**: a device that forms part of or is attached to the computer, and is used as part of the Security System to control access to the Software.

1.9. **Software**: the software (including, but not limited to, any updates, upgrades and associated media, printed or electronic documentation and online services) provided to the End-User by Noldus or an Authorized Partner together with this EULA, that is not covered by third party terms and conditions and is included in the list under “Noldus software” in the Annex to the General Terms and Conditions

(http://www.noldus.com/legal/noldus_gtc.pdf).

2. LICENSE

2.1. Upon payment by the End-User of the license fees for the Software, Noldus grants End-User a revocable, non-exclusive license to download, install and use the Software in accordance with the terms and conditions of this EULA. This EULA does not grant any rights to obtaining future upgrades, updates or supplements of the Software. If upgrades, updates or supplements of the Software are obtained, however, the use of such upgrades or updates is governed by this EULA and the amendments that may accompany them and may be subject to additional payments and conditions.

2.2. The End-User may download, install and use the Software on as many computers as is reasonably necessary, however the Software may not be shared or used concurrently on more computers than for which EULA’s are granted. End-User shall take all reasonably required steps to ensure that this number is not exceeded.

2.3. End-User is allowed to store or install a copy of the Software for back-up or archival purposes.

2.4. End-User shall not (i) modify, alter, adapt, merge, decompile or reverse-engineer the Software or any part thereof nor create any derivative works based on all or any part of the Software, or (ii) remove or obscure any copyright, trademark or other ownership notices from the Software, or (iii) sub-license, sell, rent, lease, hire, loan, assign or otherwise transfer the Software or your rights in the Software or any part thereof, except as provided for in this EULA.

2.5. The Software may be protected by a Security System, including but not limited to the use of expiry dates, time-limited or feature-limited licenses, authorization codes, Security Devices and Network Licensing. End-User is prohibited to (attempt to) remove, alter or circumvent in any way any part of such Security System.

2.6. End-User is responsible for regular, frequent and effective backups of all files produced or modified while working with the Software.

3. INTELLECTUAL PROPERTY

3.1. All title, copyright and other industrial, intellectual or proprietary rights in and to the Software (including but not limited to any images, photographs, animations, video, audio, music, and text incorporated into the Software), the accompanying printed materials, and any copies of the Software are owned by Noldus or its Authorized Partners. All rights not expressly granted are reserved by Noldus.

3.2. The Software may include or make use of third party software, including open source software. Such third party software may be subject to the third party's terms and conditions provided in the documentation accompanying the Software and may contain copyright or other industrial, intellectual or proprietary rights of such third party. End-User hereby agrees to the terms and conditions for such third party software. In the absence of any third party terms and conditions, this EULA will govern the third party software in the Software.

3.3. End-User may, from time to time, provide Noldus with comments, suggestions, data, information or feedback ("**Feedback**") on the Software. End-User acknowledges and agrees that such Feedback may be freely used by Noldus, at its sole discretion, for the design, development, improvement, marketing and commercialization of its products and services, without any restrictions based on confidentiality or intellectual property rights.

4. TRANSFER

4.1. End-User is entitled to make a one-time, permanent transfer of this EULA and Software only directly to one other End-User. This transfer must include all of the Software (including all component parts, the media and printed materials, any upgrades and this EULA). Such transfer may not be by way of consignment or any other indirect transfer and shall be subject to the following provisions:

a. End-User will provide to Noldus prior to any such transfer the full name and address details of the new End-User and the expected date of transfer in writing;

b. The new End-User understands and agrees to all the terms and conditions of this EULA in the same way as if the new End-User had obtained the Software from Noldus or an Authorized Partner;

c. End-User will destroy all (partial) copies of the Software and all accompanying materials, including but not limited to installed copies and any backup copies on data storage devices and guarantee to Noldus in writing that this has been done. If the Software is an upgrade, any transfer must include all prior versions of the Software;

d. Noldus reserves the right to levy an administrative charge upon the End-User and/or the new End-User in relation to transfer of the Software to an End-User.

4.2. Any attempted transfer without prior written permission from Noldus shall constitute a material breach of this Agreement and shall be deemed null and void.

5. TERM; TERMINATION

5.1. This EULA shall enter into force on the date of acceptance by the End-User and continue until terminated in accordance with this Section 5.

5.2. If the Software is licensed on a subscription basis, the EULA shall continue until the end of the current subscription period.

5.3. Noldus is entitled to terminate the EULA immediately upon prior written notice upon:

> a. the breach of any material provision of this Agreement by the End-User if (i) such breach is not curable or (ii) if curable, the End-User has not cured such breach within 30 (thirty) day period following receipt of a written notice by Noldus substantiating such breach ("*ingebrekestelling*");
>
> b. the filing or institution of bankruptcy, liquidation or receivership proceedings of the End-User or in the event a receiver or custodian is appointed for the End-User’s business, or if its business is discontinued or if it has a petition presented by a creditor for its winding up or if the End-User enters into any liquidation (other than for purpose of reconstruction or amalgamation).

5.4. Upon termination of the EULA, the End-User shall immediately discontinue the use of the Software and remove the software of all computers, destroy all (partial) copies of the Software from all storage media and return the documentation and materials relating to the Software to Noldus or its Authorized Partner.

5.5. Termination of this Agreement does not remove or reduce End-User’s obligation to pay any outstanding license fees or other monies, all of which shall be due for payment immediately on termination of the EULA.

5.6. The following provisions shall survive termination of this EULA: Sections 3, 7, 9, 10 and this Section 5.6. In addition, any other provisions which are required to interpret and enforce the Parties' rights and obligations under the EULA shall also survive any termination or expiration of this EULA, but only to the extent required for the full observation and performance of the EULA.

6. WARRANTY

6.1. Noldus warrants that the Software as of the date of delivery to the End-User by Noldus or its Authorized Partner, the Software will, for a period of 90 days (“**Warranty Period**”) materially conform to the specifications set out in the user documentation accompanying the Software (“**Specifications**”), provided that:

> a. the Software is properly installed on a supported computer platform (as defined in documents that can be accessed on
>
> https://my.noldus.com
>
> and used in accordance with the provisions of the accompanying user documentation and/or any Noldus-approved training course;

b. Noldus is notified in writing within 14 days after any non-conformity of the Software was known or should reasonably have been known to End-User and the End-User has made available all the information that might reasonably be required to allow Noldus to investigate, recreate and where possible remedy a non-conformity;

c. the Software has not been (a) altered, repaired or modified by any party other than Noldus or a third party provider approved by Noldus; or (b) used with software or a computer platform other than set out in the documents that can be accessed on

https://my.noldus.com

or have been subjected to negligence, or computer or electrical malfunction; or (c) were used, adjusted, or installed other than in accordance with instructions by Noldus.

6.2. Other than set out in Section 6.1, no warranties are expressed or implied with respect to Software or any element thereof, including without limitation its quality, performance, accuracy, merchantability or suitability or fitness for any purpose, whether or not that purpose has been communicated by End-User to Noldus. The Software is a general product developed by Noldus for a wide range of solutions, requirements and situations and End-User is responsible for purchasing the Software required for his needs. Noldus explicitly does not warrant that the Software shall be entirely without error or fault nor that it will operate without interruption. End-User agrees that such errors, faults or interruptions shall not be deemed material and cause to terminate this EULA.

6.3. The warranty by Noldus set out in Section 6.1 applies only to the first installation of the Software and will not apply, resume or renew upon delivery or installation of any subsequent update or upgrade to the Software, alteration in the number of EULA's granted for use of the Software, or any other extensions, upgrades or alterations to the Software where the Software has previously been delivered to or installed by the End-User.

6.4. The warranty by Noldus set out in Section 6.1 shall further not apply to Software that is licensed or otherwise made available at no cost, or Software that is designated as 'prototype', 'alpha' or 'beta' code, all of which are provided 'as is' and without warranty, representation or liability.

6.5. Upon receipt of an End-User's written notice of the Software not conforming to the Specifications during the Warranty Period, Noldus shall at its option and in its sole discretion (i) assist the Customer in correcting or replacing the non-conforming Software or, (ii) terminate the EULA immediately and refund the purchase price paid by the End-User. The remedies described above shall be End-User's sole and exclusive remedies. Upon expiration of the Warranty Period, Noldus shall have no obligation to provide such remedies.

6.6. Noldus and Authorized Partners, are not responsible for maintaining or supporting use of the Software or obligated to provide any updates, fixes or support to the Software unless otherwise expressly agreed in writing between End-User and Noldus or the Authorized Partners.

7. USE LIMITATION; LIABILITY; INDEMNIFICATION

7.1. End-User acknowledges that the Software is intended for research or training purposes only and agrees not to use the Software for diagnosis or treatment of disease in human subjects. End-User agrees not to use the Software in any application where the failure, malfunction or inaccuracy of the Software carries the risk of death or bodily injury.

7.2. Noldus Software shall not be used for collection of biometric data from human subjects without prior informed consent from the person whose data is being captured.

7.3. Noldus does not allow the use of its Software for the following applications:

a. Active defense, i.e. embedding Noldus Software in a weapon system.

b. Biometric data collection in a judicial context with the aim to use such data as evidence in court. Noldus Software cannot and shall not be used as a lie detector.

c. Surveillance of people in public spaces for security purposes.

d. Any other use that may potentially violate fundamental human rights.

7.4. If Noldus notices that its Software is used for applications that it does not approve, this may lead to discontinuation of customer support and termination of the EULA.

7.5. To the fullest extent permitted by law, and not withstanding any other provision of this EULA to the contrary:

a. In no event will Noldus or the Authorized Partners be liable to the End-User for Indirect Losses or for special, incidental, consequential, exemplary, enhanced, or punitive damages, including without limitation, any damages resulting from interruption of business, loss of use, loss of profits or revenue, or loss of business, arising out of or in connection with this EULA, the Software, or the performance of Noldus, the Authorized Partners, or third parties engaged by Noldus in the performance of this EULA, regardless of whether Noldus, the Authorized Partners, End-User, or any other person or entity has been advised of (or could have reasonably foreseen) the possibility of such damages or Indirect Losses. If, despite the provisions in this EULA, liability exists anyway, only direct damage will be eligible for reimbursement.

7.6. Noldus' and Authorized Partners' liability shall also be excluded, and Noldus and the Authorized Partners shall not have any liability under this EULA in the event of:

a. End-User's use of the Software other than in accordance with Section 7.1;

b. direct and indirect consequences of the End-User's failing to adhere strictly to the user documentation provided or made available by Noldus or the Authorized Partner; or

c. any loss of or damage to files howsoever caused.

7.7. Save for gross negligence or willful misconduct of Noldus or its officers, the Authorized Partner or the third parties engaged by Noldus in the execution of this EULA, and except in connection with such party's indemnification obligations under this EULA, any and all liability of Noldus or the Authorized Partner (whether based in tort, contract, or on any legal or equitable ground or theory of recovery) arising out of or relating to this EULA or the Software is limited to an amount equal to the purchase price (or, if applicable, license fees) paid by the End-User to Noldus or the Authorized Partner for the specific Software from which the liability arises. In any event, a claim will be unenforceable and lapse unless Noldus or the Authorized Partner receives a written notice thereof no later than 6 months after the discovery of an event or circumstance that gives or may give rise to that claim.

7.8. Noldus will hold harmless, defend, and indemnify End-User from and against all losses, damages, claims, liabilities, and expenses incurred by End-User that arise out of, relate to, or are caused by any third party claim that End-User's use of the Software, pursuant to the terms of this EULA, infringes the intellectual property rights of such third party. If such a claim is made or appears likely to be made, Noldus, at its option, will have the right to either (i) procure for the End-User the right to continue to use the Software, (ii) modify or replace the Software so that it is no longer infringing (in a manner that substantially retains its functionality and quality), or (iii) require End-User to terminate the use of and return the Software and refund a pro rata portion, if any, of the amount paid by End-User to Noldus for the infringing Software. Notwithstanding the foregoing, Noldus will have no liability to End-User if the infringement results from use of the Software in combination with software not provided by Noldus or from modifications made by Noldus to conform to specifications provided by End-User. The indemnification obligations in this section are subject to: (i) End-User giving Noldus prompt written notice of any claim (provided that End-User's failure to provide prompt written notice will only relieve Noldus of its obligation under this Section to the extent such failure materially limits or prejudices Noldus' ability to defend or settle such claim); (ii) the transfer of sole control of the defense and any related settlement negotiations to Noldus; and (iii) End-User's cooperation, at Noldus' expense, in the defense of such claim. THIS SECTION STATES END-USER'S SOLE AND EXCLUSIVE REMEDIES FOR THIRD PARTY INTELLECTUAL PROPERTY INFRINGEMENT CLAIMS.

7.9. End-User shall indemnify, and hold harmless Noldus, the Authorized Partners, and the third parties engaged by Noldus from and against any and all losses (including Indirect Losses and special, incidental consequential, exemplary, enhanced, or punitive damages) arising out of or caused by (i) any failure in the performance of the obligations of the End-User under the law, this EULA or Noldus' General Terms and Conditions, or (ii) any and all third party claims on any grounds whatsoever, directly or indirectly related to the End-User's use of the Software, the contents thereof or any results or materials generated by the Software.

7.10. THE LIMITATION OF LIABILITY PROVISIONS SET FORTH IN THIS SECTION 7 SHALL APPLY EVEN IF END-USER'S REMEDIES UNDER THIS EULA FAIL OF THEIR ESSENTIAL PURPOSE.

7.11. Noldus and End-User acknowledge and agree that the parties entered into this EULA in reliance upon the limitations of liability set forth in this Section 7, that the same reflect an allocation of risk between the parties (including the risk that a contract remedy may fail of its essential purpose and cause consequential loss), and that the same form an essential basis of the bargain between the parties.

8. MISCELLANEOUS

8.1. Parties may communicate with each other by electronic mail. Parties recognize the risks associated with electronic mail and declare that they shall not hold each other liable for any damage incurred by either of them as a result of the use of electronic mail. If a Party is in doubt as to the content of an electronic message received, the content of the message originating with the sender shall be decisive.

8.2. The invalidity or unenforceability of any provision this EULA shall not affect or limit the validity or enforceability of any other provisions thereof. Any such invalid or unenforceable provision shall be deemed to be substituted by a provision that is considered to be valid and enforceable. The interpretation of the substituting provision shall be as close as possible to the economic, legal and commercial objectives of the severed provision.

8.3. Failure by Noldus or the Authorized Partner to enforce any of its rights under the EULA shall not constitute a waiver of such rights thereunder and shall not relieve End-User of its obligation to comply with such provisions. No waiver or amendment of any provisions therein shall be effective unless signed in writing by a Noldus representative. Any such written waiver shall only be applicable to the specific instance to which it relates and shall not be deemed to be a continuing or future waiver.

8.4. Amendments or changes to this EULA can only be agreed upon in writing between the Parties.

8.5. The EULA shall be binding upon the Parties thereto, their legal representatives, successors and assigns. End-User shall not assign any right or obligation arising out of this EULA without the prior written consent of Noldus. Any attempt by End-User to assign or delegate any obligation hereunder shall be deemed null and void.

9. GOVERNING LAW: END-USERS USA OR CANADA

9.1. If End-User is a legal entity and its principal place of business is located in the United States of America or Canada, or if End-User is an individual whose primary residence is located in the United States of America or Canada:

a. This EULA is exclusively governed by the laws of the Commonwealth of Virginia and the applicable federal laws of the United States of America, without regard to the conflicts of law provisions of any jurisdiction. Without limiting the previous sentence, End-User and Noldus expressly agree: (i) that the Virginia Uniform Computer Information Transactions Act, Virginia Code §§ 59.1-501.1 *et seq.* ("UCITA"), and the United Nations Convention on Contracts for the International Sale of Goods ("CISG") are expressly excluded from this EULA, (ii) that any and all terms contained in UCITA or CISG will have no force or effect on any portion of this EULA, and (iii) that UCITA and CISG do not apply to this EULA or the Software.

b. Any and all claims and disputes arising out or in connection with this EULA, the Software, or the performance or non-performance by either party of any of its obligations under this EULA, which End-User and Noldus cannot resolve amicably within a reasonable period of time, will be commenced and maintained only in a state of federal court of competent subject matter jurisdiction situated or located in the United States of America. Noldus and End-User consent to the exclusive personal jurisdiction of and venue in any such court.

c. To the extent permitted by law: End-User must commence or file any claim or action arising out of or relating to this EULA or the Software within six months after the cause of action accrues, otherwise, such claim or cause of action is permanently barred. To the extent permitted by law, End-User expressly waives the right to commence or file any such claim or action under any longer statue of limitations.

10. GOVERNING LAW: END-USERS OTHER COUNTRIES

10.1. If End-User is a legal entity and its principal place of business is located in any country other than the United States of America or Canada, or if End-User is an individual whose primary residence is located in any country other than the United States of America or Canada:

a. This EULA is exclusively governed by the laws of The Netherlands. The United National Convention for Contracts on the International Sale of Goods is expressly excluded.

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Revised June 17, 2021

NOTE A PDF copy of this End-User License Agreement can be found in the folder Documentation**Legal**, located in your application folder (default: C:\Program Files\Noldus\The Observer XT 17).

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For the complete terms and conditions in PDF format, see the PDF files in the folder Documentation\Legal**Acknowledgments**, located in your application folder (default: C:\Program Files\Noldus\The Observer XT 17).

Name	**Description**	**Link/ License**
Boost	Open source (Boost community) software library, C++ templates	Boost software license http://www.boost.org/users/license.html
HASP	Library for software protection	Safenet EULA https://safenet.gemalto.com/DownloadNotice.aspx?dID=8589947119 Sentinel Gemalto https://sentinel.gemalto.com/
LEADTOOLS DirectShow filters	Video encoder and decoder software	LEADTOOLS https://www.leadtools.com/
Wix Toolset	Tools to author software installers	Wix Toolset http://wixtoolset.org/ .NET Foundation https://dotnetfoundation.org/ Microsoft Reciprocal License (MS-RL) http://wixtoolset.org/about/license/

Adobe Acrobat Reader DC	Software for viewing PDF files	Adobe http://www.adobe.com/ Distribution Agreement https://www.adobe.com/products/clients/all_agreement.html
RabbitMQ	Robust messaging for applications	Pivotal https://pivotal.io/ Mozilla Public License 1.1 https://www.rabbitmq.com/mpl.html
Erlang OTP 18	A programming language used by RabbitMQ.	Erlang http://www.erlang.org/ Apache License 2.0 www.apache.org/licenses/LICENSE-2.0
Apache Thrift	Combines a software stack with a code generation engine to build services that work efficiently and seamlessly between C++, Java, Python, PHP, Ruby, Erlang, Perl, Haskell, C#, Cocoa, JavaScript, Node.js, Smalltalk, OCaml and Delphi and other languages.	Apache Software Foundation http://www.apache.org/ Apache License 2.0 http://www.apache.org/licenses/LICENSE-2.0
Telerik UI for WPF	WPF controls	Telerik http://www.telerik.com/ Telerik EULA for UI for WPF http://www.telerik.com/purchase/license-agreement/wpf-dlw-s
SimpleAmqpClient	N-Linx C++ client for RabbitMQ	Alan Antonuk https://github.com/alanxz/SimpleAmqpClient/blob/master/LICENSE-MIT

Upgrade to The Observer XT 17

Aim

To start working with a newer version of The Observer XT.

Prerequisites

- You have an old version of The Observer XT and bought an upgrade for version 17.
- Your computer meets the System Requirements for the new version.

Procedure

Carry out the following steps:

- Install The Observer XT 17.

  See Install The Observer XT

- Upgrade the license

Upgrade the license

Upgrading the license is needed if you bought a newer version of The Observer XT, or if you bought extra modules or tools with the current version. The procedure differs for software licenses and hardware keys.

If you have a software license key

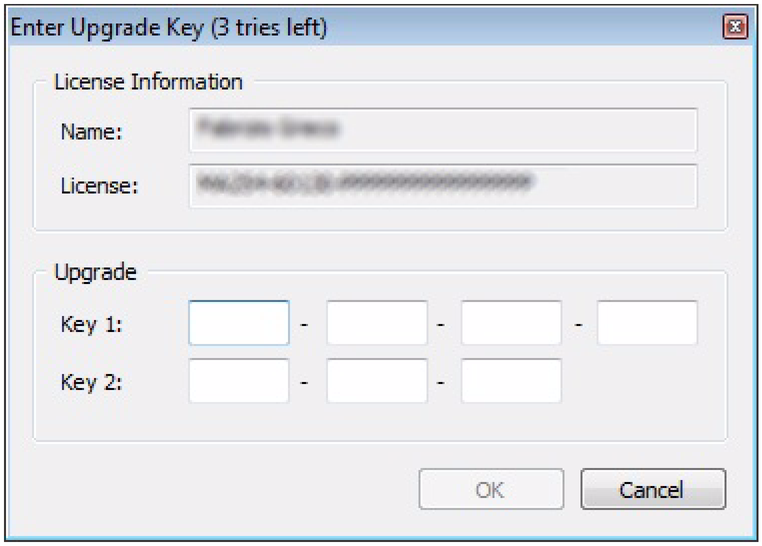
1. Start The Observer XT and deactivate your current license following the procedure in Deactivate your Observer XT license. The software will close.
2. Re-start The Observer XT and activate your license with your new software license key following the procedure in Activate The Observer XT with a software license key.

If this is the first time that you use a software license key, you can skip step 1.

If you use a hardware key

1. Insert the hardware key into a USB port of the computer with The Observer XT.
2. Start The Observer XT 17. The program automatically detects the old license on the hardware key. The **Enter Upgrade Key** window appears.

3. Enter the numbers that were supplied to you by Noldus IT. These numbers are normally sent by e-mail or are present in your welcome letter.



If you already upgraded to The Observer XT 17 and bought an extra module:

1. In The Observer XT 17, choose **Help** > **Upgrade**.
2. Enter the upgrade key that was supplied to you by Noldus IT.

Notes

- Installing The Observer XT 17 installs beside the previous versions of Observer XT.
- You cannot record video in The Observer XT 17. If you used to record videos in a Live Observation project with The Observer XT 12.5 or an older version, the recording devices such as webcams are removed from this project. We recommend to use MediaRecorder to record video. Control the start and stop of recording with commands from The Observer XT. To do so, select MediaRecorder as external device, according to the procedure in External Programs.

The Observer XT Trial Version

Aim

To try out The Observer XT for free for a limited period.

Restrictions

- Valid for 14 days (from the day of activation).

Prerequisite

Your computer meets the System Requirements

Procedure

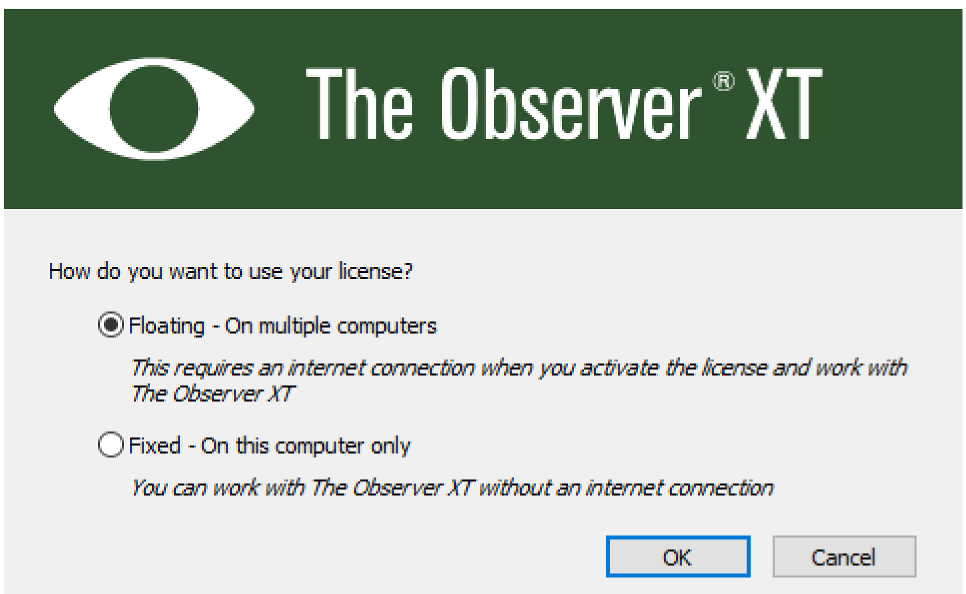
1. Go to the following web page:

   https://www.noldus.com/animal-behavior-research/products/the-observer-xt

   or

   https://www.noldus.com/human-behavior-research/products/the-observer-xt
2. Click **Free Trial** to receive a free Trial license number by e-mail.
3. Install The Observer XT 17 and start it.
4. The following window opens, choose **Activate software license key** and click **OK**.

5. In the following window select either Floating or Fixed and click **OK**.



See What is the difference between a Floating and a Fixed activation?

6. In the window that appears, enter your activation key and click **OK**.

Notes

- To see how many days are left in your trial, choose **Help** > **About The Observer XT** >**License info**.

Preferences

Aim

To specify:

- Terminology in the program.
- Select which warning messages to display.
- Change file locations.
- The time interval at which The Observer XT saves your project.
- Connection settings with other software, for example, MediaRecorder.
- Connection settings with Viso.

Procedure

Choose **File** > **Preferences >** one of the options below.

Restart The Observer XT after you edited these preferences.

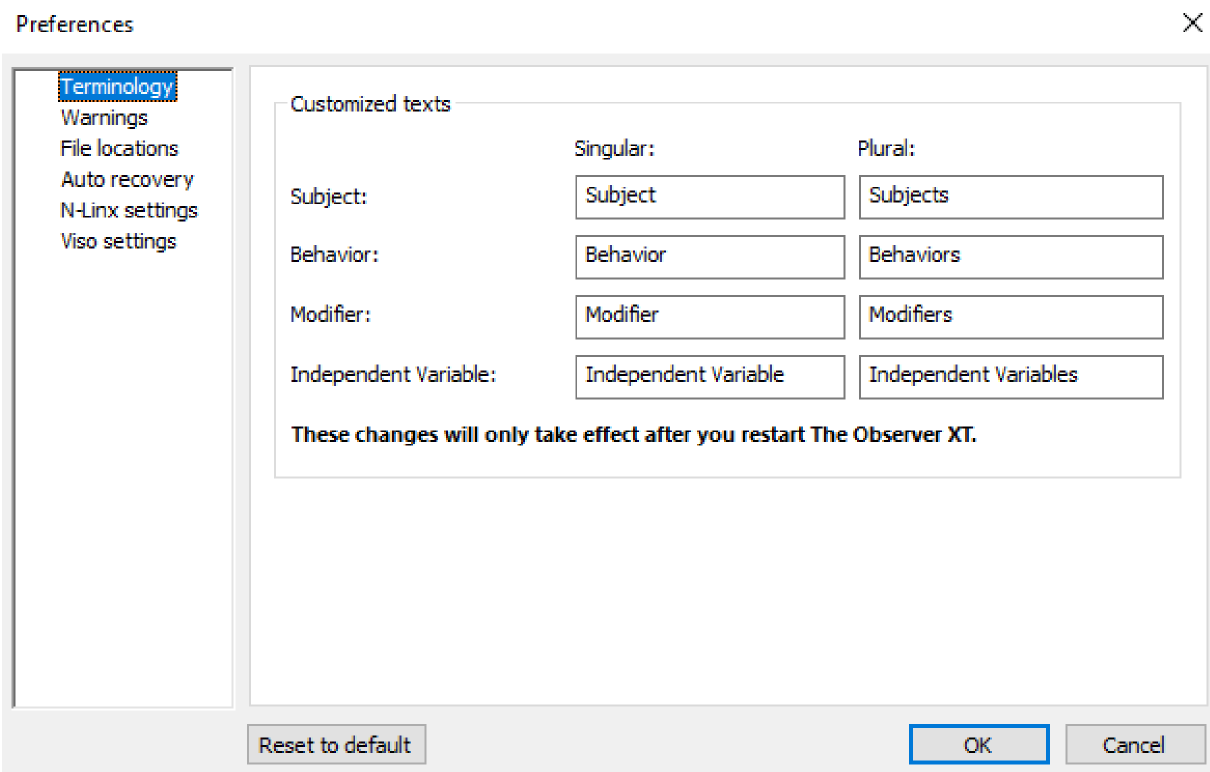
Restore defaults

To return to the default settings, click the **Reset to default** button. Please note that this returns the preferences in all tabs to their default settings, not only the ones on the current tab.

IMPORTANT If you entered settings for N-Linx or Viso, you must do this again after you clicked **Reset to default**. Write down the settings before you return to the default settings.

Terminology

Choose **File** > **Preferences** > **Terminology**.

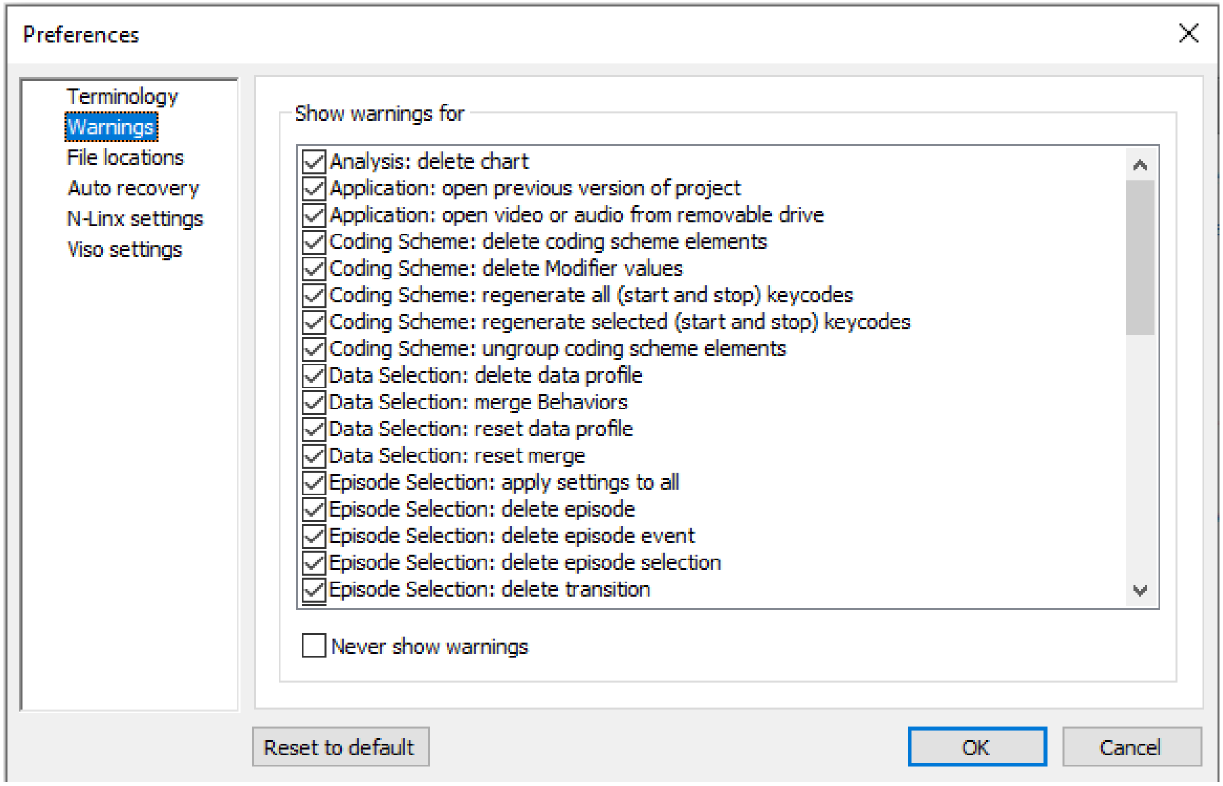


For instance, when the subjects of your observational study are children, you can enter 'child' and 'children' as the singular and plural terms for your subjects.

Be aware that when you change the terminology, the terms in this Help and in other documentation does not match with the terms in the program.

Warnings

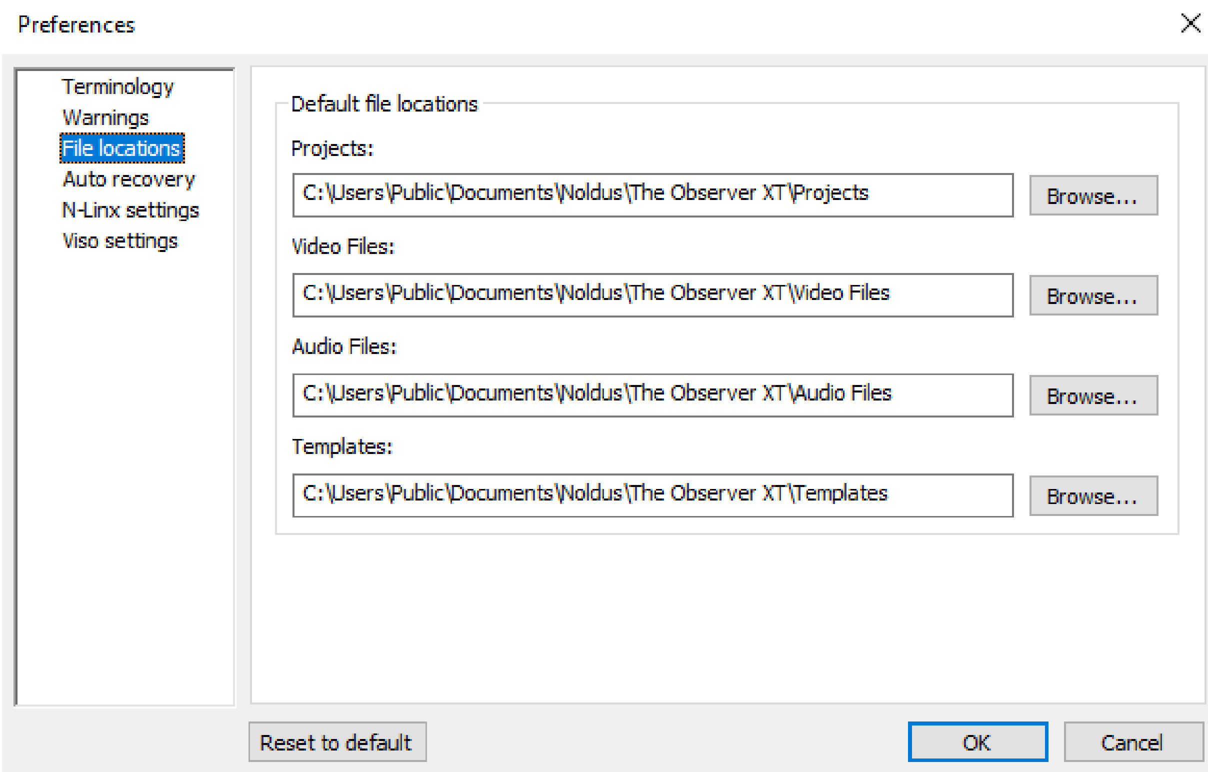
Choose **File** > **Preferences** > **Warnings**.



Select the situations that you think you should be warned about when they occur. By default all warnings are selected. When you select the Never show warnings check box, you do not get any warnings.

File locations

Choose **File** > **Preferences** > **File locations**. The default file locations are set during installation.



You can change file locations for:

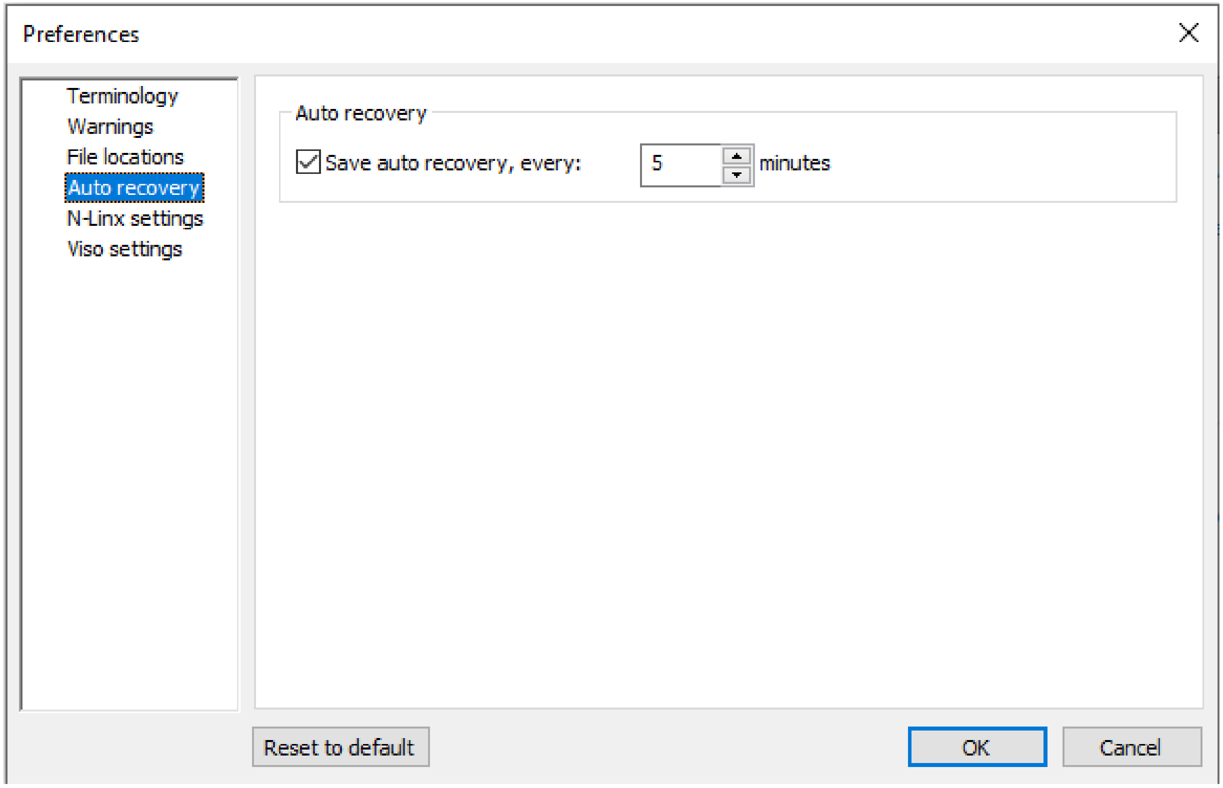
- **Projects** – The location you choose here, will be the default project location when you Create a new project
- **Video Files** – The location you choose here, will be the default video file location in the **Video Selection** window when starting a new observation (see Create an Observation.
- **Audio Files** – In this location you can store the audio files used for coding.
- **Templates** – The location you choose here, will be the default location in which the templates are stored.

  See Save a Project as a template

Auto recovery

Choose **File** > **Preferences** > **Auto recovery**. Auto recovery saves all data from The Observer XT to a temporary file. You can find this file in the folder with the same name as your project starting with a tilde ("~") in the folder C:\ProgramData\Noldus\The Observer\XT 17\Temp. Media files, or external data files are not saved to this temporary folder.

See Recover Data



Your data are only saved in the project file when you manually save them (choose **File** > **Save Project**).

By default auto recovery is enabled and your data are saved to a temporary file every five minutes. Optionally change the interval. We recommend to leave auto recovery enabled.

N-Linx settings

Choose **File** > **Preferences** > **N-Linx settings**.

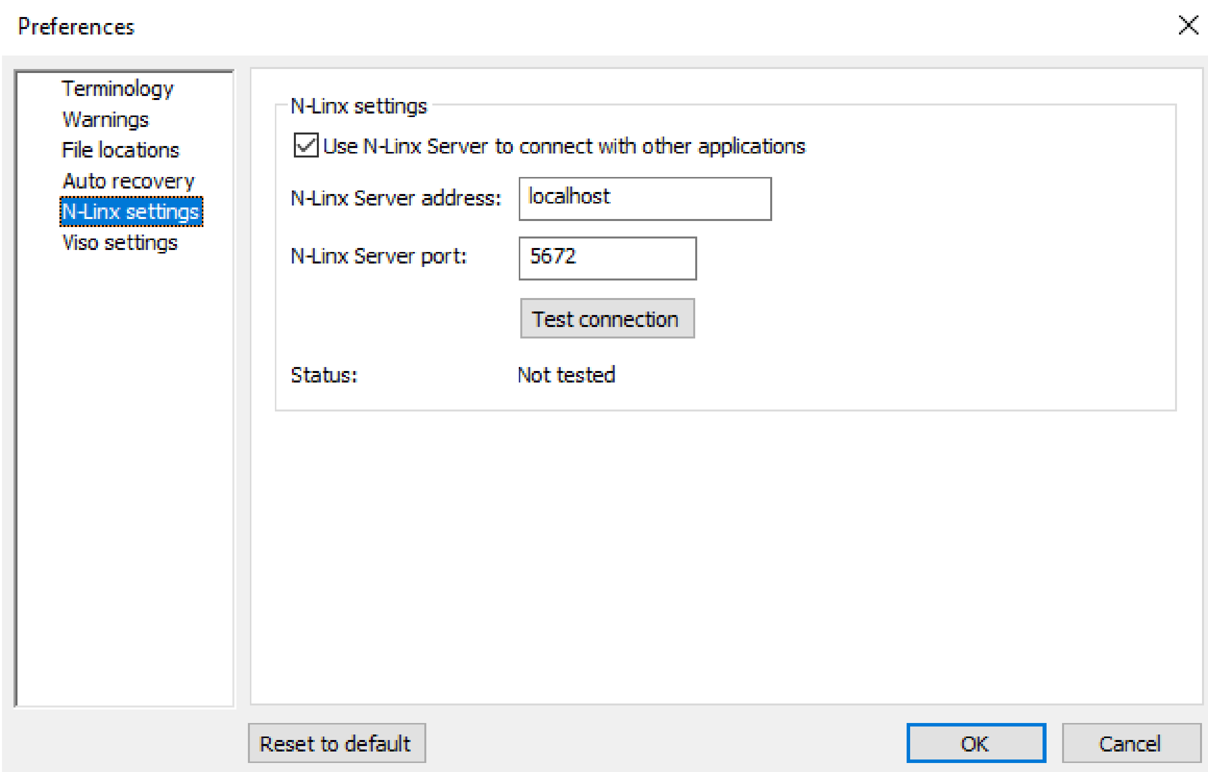
The Noldus network communication protocol N-Linx is used for communication between The Observer XT and other Noldus IT software programs like MediaRecorder and external programs like BIOPAC AcqKnowledge, Tobii Pro Studio, Tobii Pro Lab and Tobii Glasses software and Bitbrain EEG acquisition software. All programs communicate with The Observer XT using N-Linx Server.

For details on using N-Linx for the communication between The Observer XT and other software, see the Reference Manual - N-Linx, or the technical note of the program to control.

To connect The Observer XT with N-Linx Server:

1. Select **use N-Linx Server to connect with other applications**.

2. In the **N-Linx Server address** field, enter the name of the computer with N-Linx Server. You can also enter the IP address, but then the IP address of the computer with N-Linx Server must be fixed.
3. In the **N-Linx Server port** field, leave the default port number 5672 unless this port is in use by other programs. You must enter the same port number for all N-Linx components.



See also:

- Observe Live and Record Video with MediaRecorder
- Observe Live and Analyze with FaceReader

Documentation

- Reference Manual - N-Linx
- Technical Note - BIOPAC MP system - The Observer XT
- Technical Note - Tobii Pro Eye Trackers - The Observer XT
- Technical Note - Tobii Glasses - The Observer XT
- Technical Note - Bitbrain EEG - The Observer XT

You can download these documents from the MyNoldus section of the Noldus website.

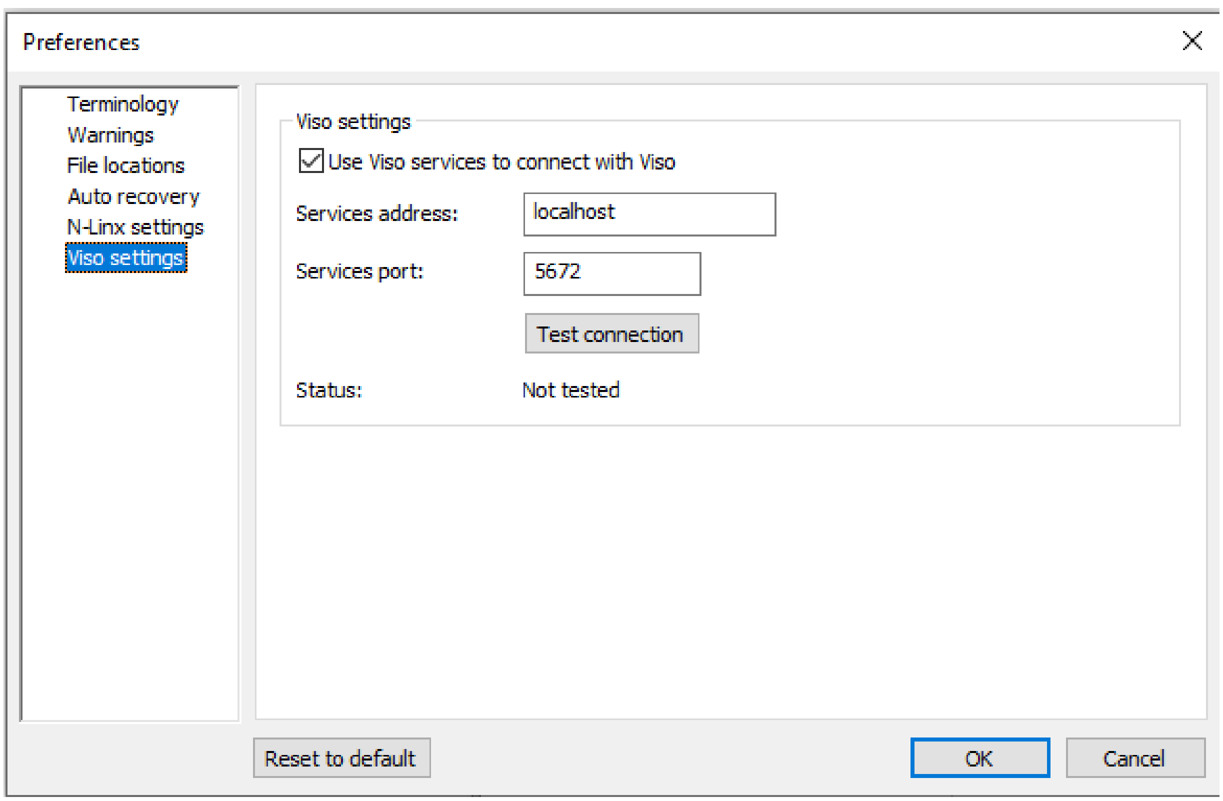
https://my.noldus.com

To use N-Linx with your own software

N-Linx can also be used to control your own software. For example to start and stop your own application with The Observer XT or to import data from your own software real time into an observation. Consult Noldus support for the options and documentation on how to work with the N-Linx Software Development Kit.

Viso settings

Choose **File** > **Preferences** > **Viso settings**. Viso settings are needed if you want to import sessions created in the observation recording program Viso into The Observer XT.

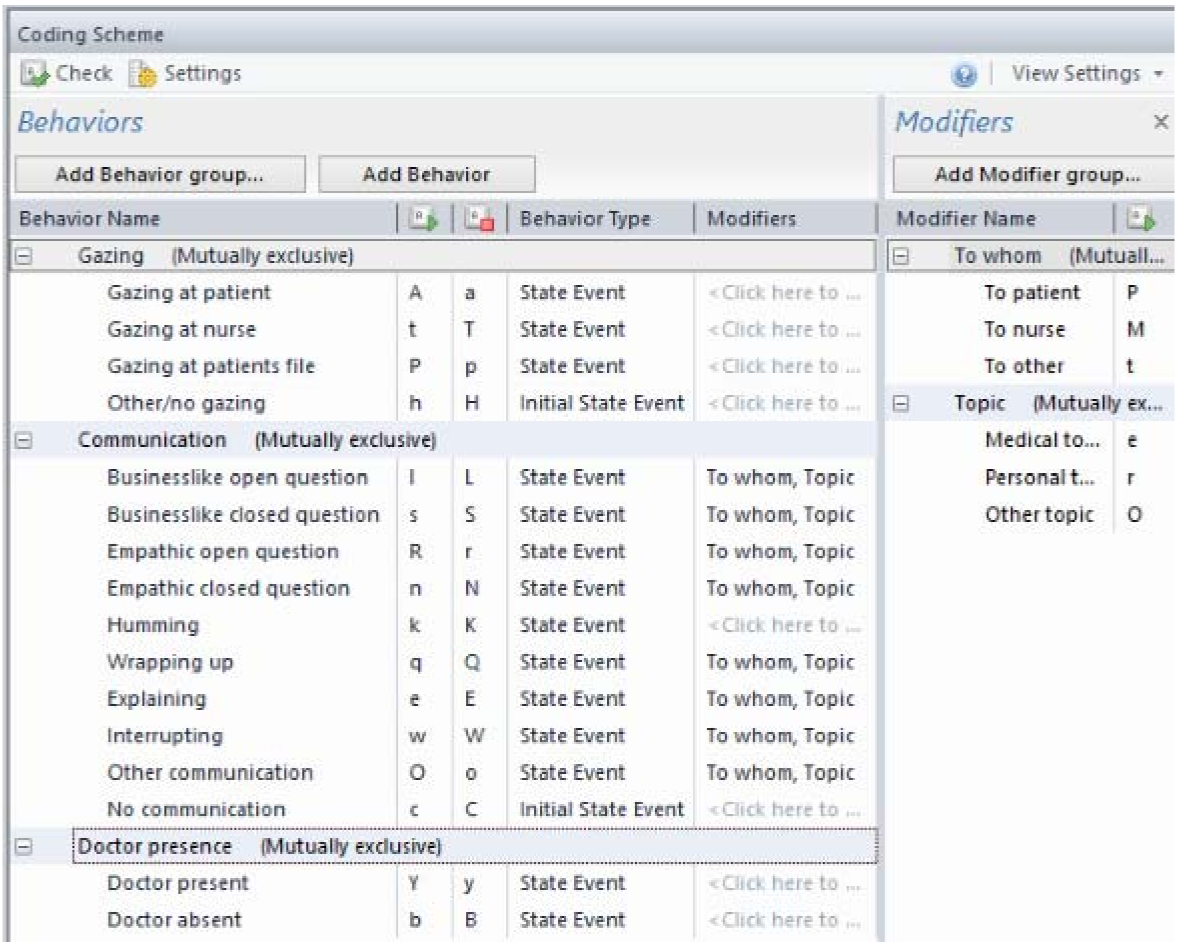


With **Viso settings** you set the connection between the computer with The Observer XT and the computer with Viso Services.

Enter the IP address of the computer with Viso Services in the **Services address** field. Do not change the **Services port** *5672*. Then click the **Test connection** button. If the two computers are connected properly, the **Status** *Connected* appears.

See also Import Viso Sessions in File Management

Set up your Project



Main topics

- Get started
- Create Coding scheme
- Independent Variables
- Project Settings
- Other Project Setup Options
- External Programs

Get started

Follow these steps:

1. Start The Observer XT
2. Create a new project
3. Define Project Setup
4. Define Project Settings
5. Create Coding scheme
6. Create Independent Variables

Start The Observer XT

Aim

To start working with The Observer XT.

Procedure

The procedure depends on your license type. You may either have:

- A software license key
- One or more hardware keys

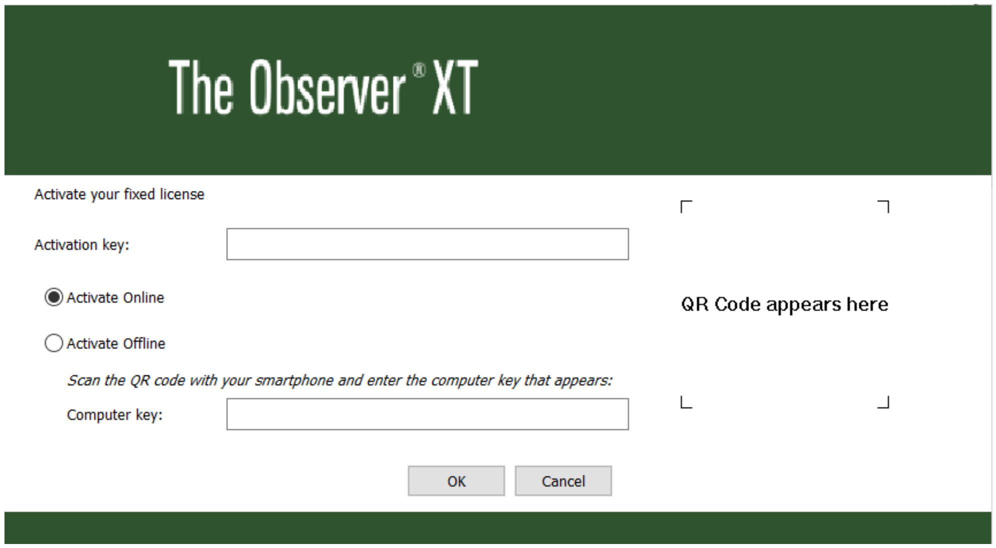
Activate The Observer XT with a software license key

1. Start The Observer XT and select **Activate software license key** and click **OK**.
2. Select either **Floating** or **Fixed** and click **OK**.

3. Enter the Activation key that you received with the software. If you selected **Fixed** you can choose between:

   - Activate Online if the PC is connected to the internet. When you click **OK** the Observer software opens.

- Activate Offline if the PC does not have an internet connection. Scan the QR code with your smartphone and click **WEB**. Copy the **Computer key** shown on your smartphone to the **Computer key** field on the Observer PC and click **OK**. The Observer software opens.



What is the difference between a Floating and a Fixed activation?

When you have a software license key you can choose between a Floating and a Fixed activation.

- **Floating activation** — Choose this option if you want to be flexible on which computer you use The Observer XT. If you bought, for instance, a software key with two licenses, you can simultaneously use the software on, for instance, the Observer XT computer in your lab and on the computer in your office. If your student wants to use The Observer XT as well (on his/her personal laptop) then this is possible. You can install and activate The Observer XT on as many computers as you want but with two licenses you can use the software only on two PCs at a time. If you want to use The Observer XT on a third PC the software should not be running on one of the other two PCs. Please note that a computer must have an internet connection to activate and work with a floating license.
- **Fixed activation** — A Fixed activation is linked to one computer. The advantage of having a Fixed activation is that you do not need an internet connection to work with the software. If you bought a software key with, for instance, two activations, you can activate The Observer on two computers (if you choose 'Fixed' for both activations). If you want to use The Observer XT on a third computer, you have to deactivate one of the licenses and

activate it on the third computer. See Deactivate your Observer XT license for more information. Please note that a computer must have an internet connection to activate/deactivate a Fixed license. After you have activated the license you can use The Observer XT without internet.

Instead of activating both licenses as Fixed licenses, you can also choose to activate one as Fixed and the other one as Floating.

Hardware key

1. Insert the hardware key into a USB port of the computer with The Observer XT. If it is correctly connected, a red light glows inside it.

2. Start The Observer XT. Keep the key inserted in your computer while you work with The Observer XT.

   If you forgot to connect the hardware key, a window opens that no hardware key was found. Insert the key and choose **Check hardware key again**.

3. Continue with Create a new project

Create a new project

A project is a container with all your observations, video files, and analyses. Choose **File** > **New project**. Give the project a name, select where to store the project, and click **OK**. Continue with Define Project Setup

Note

You cannot use the characters \ / : ; * ? “ < > |. for a filename.

Define Project Setup

Aim

To define whether you want to observe live, or from prerecorded video, whether you want to score continuously or with intervals and how long you want to score.

Procedure

1. Choose **Setup** > **Project Setup**.
2. Choose the Observation source
3. Choose the Observation method
4. Choose the Observation duration (see Specify the Duration of the Observation) and, optionally, Enter Project Information

Observation source

Choose one of the options:

Offline Observation

To score data from previously-recorded video or audio files.

See Supported Formats for the supported video and audio formats.

Live Observation

If you want to score data from a live scene. If you select this option, the **Devices** window opens. See Control External Devices or Programs during a Live Observation for the options.

Choose this option also:

- To record video with MediaRecorder while you observe simultaneously.

  See External Programs).

- To record data other than events, for example, physiological data.

  See External Programs

Note

You can change the observation source for different observations, for example if you want to analyze the video you created of a live observation. Select the observation source before you create a new observation.

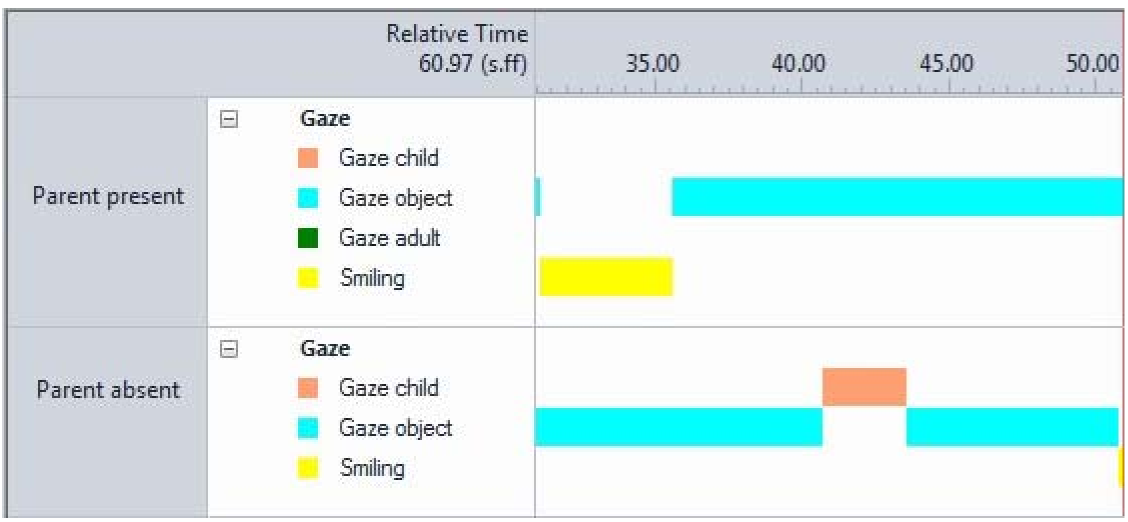
Observation method

Choose one of the options:

- **Continuous Sampling**

  With this method you record all occurrences of the behaviors of interest of one or more subjects as they occur. You obtain full descriptive statistics of the behaviors, like the duration per instance, the total duration and frequency. Choose Continuous Sampling to calculate absolute frequencies and durations of the behaviors of interest.

  Example – You want to record the interaction between a parent and child and calculate the duration and frequency of the child smiling in presence and absence of the parent.

- **Instantaneous Sampling**

  With this method you record the behavior of one ore more subjects at preselected moments in time. You obtain frequencies of the behaviors, not their durations.

  This method is also referred to as “scan sampling”, “interval sampling”, “intermittent sampling” or “point sampling”. It is not the same as “one-zero sampling”; with one-zero sampling it is recorded whether a behavior occurred (one) or not (zero) during the previous sample period.

Choose Instantaneous Sampling when your observations are too long, or your number of subjects is too large to score every behavior of every subject as it occurs. Instantaneous sampling is commonly used to calculate time budgets, general activity of one or more subjects, behavioral synchronization of several subjects and spatial relations in groups.

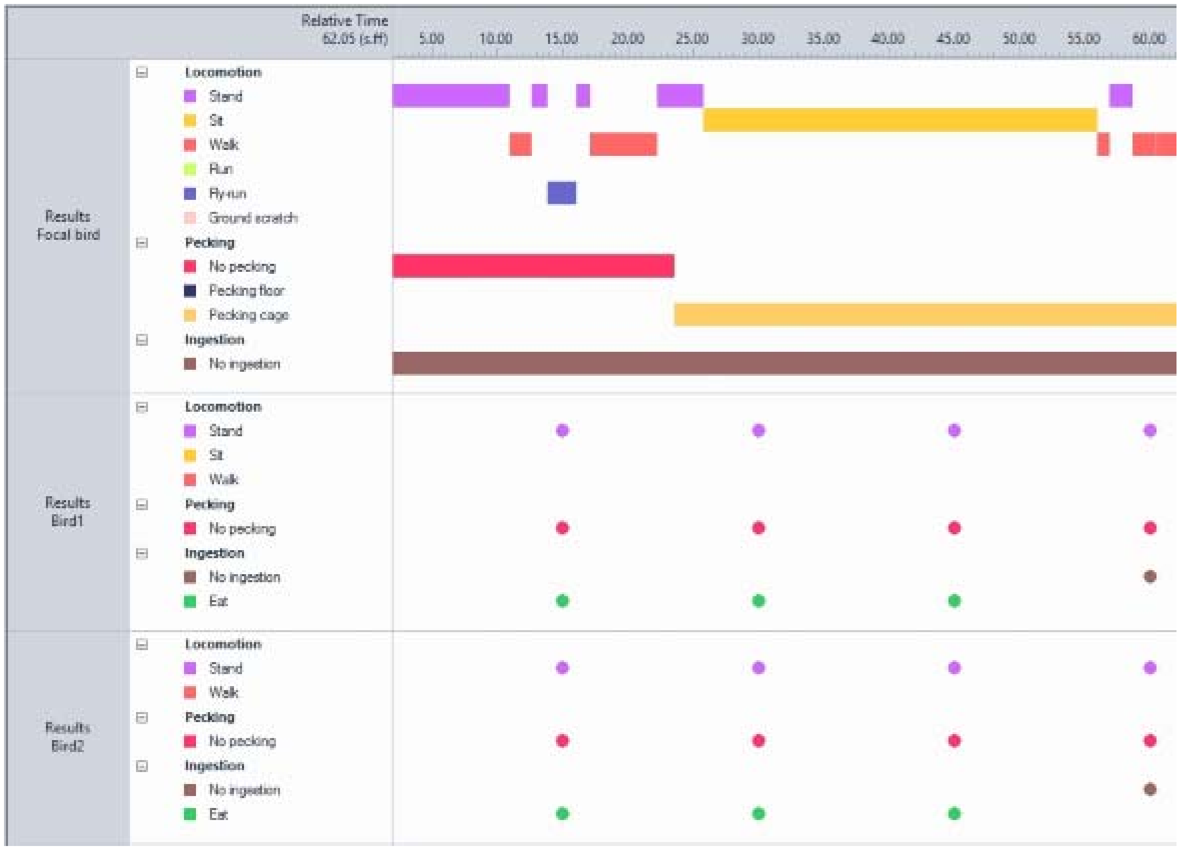
Instantaneous sampling is not suitable when you want to record behaviors with a very short duration (for example, individual pecks or jumps). Also do not use instantaneous sampling if you plan to create episode selections with your data.

Example – You observe a group of children and want to know the spatial distribution of the group over different tables.

- **Combine Continuous and Instantaneous Sampling**

  This method combines Continuous Sampling and Instantaneous Sampling. Use it when you want to record the behavior of one or more subjects in detail (focal subjects) while recording the behavior of other subjects in less detail.

  Example – You observe a group of chickens and want record the behavior of one chicken in detail and the behavior of the rest of the group at regular time intervals.



Sample interval length

If you select **Instantaneous Sampling** or **Combine Continuous and Instantaneous Sampling**, the **Sample interval length** field appears under **Observation duration**. It is important to choose an appropriate interval between samples to yield meaningful data. If the sample interval is long, collecting a decent amount of data is time-consuming. If the sample interval is too short, data from successive samples are not independent. For more information on the sample interval see: Engel, J. (1996). Choosing an appropriate sample interval for instantaneous sampling. Behavioural Processes 38: 11-17.

More options

See Other Project Setup Options

Define Project Settings

Aim

To define the way you record data, for example how many characters keycodes have, the time format and which playback control buttons to use.

Procedure

Choose **Setup** > **Project Settings**.

See Project Settings for a full description of the options.

Note

You can change project settings at any time, also if you have already carried out observations. To return to the default options, click the **Reset to default** button. Note that this resets the options of all the tabs to their default settings, not only the ones on the current tab.

Create Coding scheme

Aim

To create the set of elements that describe the events to be recorded. The Coding Scheme may consist of the following elements:

- Subjects (optional) – The individuals (persons, animals) that are observed.
- Behaviors – The behaviors or actions that are relevant for your research hypothesis.
- Modifiers (optional) – Factors that describe the behaviors in more detail.

Each element in the coding scheme is linked to a keycode.

See Keycodes

Procedure

1. Choose **Setup** > **Open Coding Scheme**
2. Create Subjects (optional), Behaviors, and Modifiers (optional).
3. Check your Coding Scheme for errors.

Notes

- The coding scheme can contain maximally 250 subjects, 250 behaviors, and 250 modifiers (in up to 100 modifier groups). The maximum number of combinations of subjects x behaviors is 5000.
- All coding scheme names should be different and may consist of maximally 64 characters.
- Different limits apply if you use Pocket Observer. See the Pocket Observer Reference Manual for details.
- It is not mandatory to score subjects, behaviors or modifiers. It is possible to record only free text in the comments column. However, you can only visualize and analyze an observation that contains scored behaviors.

Keycodes

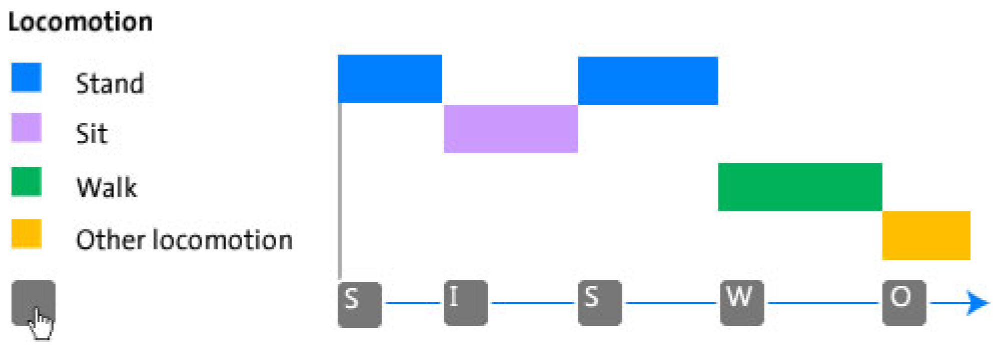
Aim

To explain the concept of keycodes, what the restrictions are and how they are generated.

Background

Each of the elements can be linked to a keycode, which is a key or a combination of keys on the keyboard that you press to code events. If you code without keycodes, you have to click on the screen with your left mouse key, which is generally slower, and means that you have to take your eyes from the observed scene to the computer monitor.

The assignment of keycodes is crucial, because it determines the efficiency and convenience with which you can do your recording. Your code definitions should be logical, easy to memorize and ergonomic.



Procedure

The Observer XT can generate keycodes automatically while you build your Coding Scheme. The automatically generated keycode is based on the name of the element, for instance "w", "wa" or "wal" for "walk" (using a default keycode length of 1, 2 or 3, respectively). If the keycode is already in use, the next character in the name is used. If the resulting keycodes are also in use, the next suitable character in the alphabet is used.

See Generate keycodes automatically

To choose another keycode, click the cell next to the element in the coding scheme and type another code. Make sure this code is not already in use.

Conditions

- Maximum keycode length is 3 characters.
- Within a category (subjects, behaviors, or modifiers), all keycodes must be unique.
- For keycodes of more than one character, you can, for example, use code ‘ab’ for subject 1 and ‘ac’ for subject 2. But you cannot use 'a' and ‘ab’.
- The keycode length may be different for subjects, behaviors and modifiers and may also differ within the categories.
- The characters must be ASCII characters in the range between 32d and 127d.
- You cannot use the space bar as keycode.

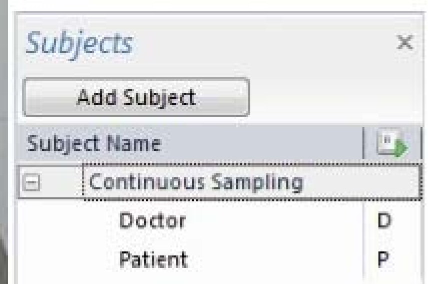
Notes

- To regenerate a keycode because it is conflicting with another one, right-click the code in the coding scheme and select **Regenerate selected keycodes**. To regenerate all codes, right-click any code and select **Regenerate all keycodes**.
- If you have keycodes with the **Shift**-key, you may press the right-**Shift** key for a long time while scoring. Pressing the right-**Shift** key for 8 seconds enables the **Filter keys** option in Windows. With Filter keys, rapid keystrokes are ignored. To disable Filter keys, press the **Windows** key + **U**. Click **Make the Keyboard easier to use**. De-select **Turn on Filter Keys** and click **Set up Filter Keys**. Deselect the check boxes in front of **Turn on Filter Keys** and **Turn on Filter Keys when right Shift is pressed for 8 seconds**. Click **OK** twice.

Subjects

What are subjects?

When you are observing more than one individual at a time, you normally not only want to record what somebody is doing, but also who that somebody is. These individuals are referred to as 'subjects'. Subjects are usually the roles of the individuals, like child and mother, a doctor and a patient, or alpha male and subdominant male.



Subjects can be individual animals or humans, but also, for instance, hands (on a keyboard), muscles in the face or shoals of fish.

It is not compulsory to specify subjects. If you observe only one person or animal in each observation, do not define subjects.

See Notes

Examples or subjects

- Mother-child interaction – *Mother* and *Child*.
- Social interaction in a short-term study of a group of animals – *Alpha male*, *Sub-dominant male*, *Female*.
- Imitation in twins – *Twin A*, *Twin B*, *Parent*...
- School environment – *Teacher*, *Pupil 1*, *Pupil 2*....
- Test participant, where one person is observed in each test session – No subject needed (see the notes below).

Notes

- If you want to specify the name or other properties of each subject, create Independent Variables with scope *Subject* and enter the properties as values.

  See Variable scope

- If you observe only one subject in each observation, do not define subjects. Specify the actual names or identities of the subjects as Independent Variables.

Define Subjects

Aim

To define the roles in your study.

Prerequisites

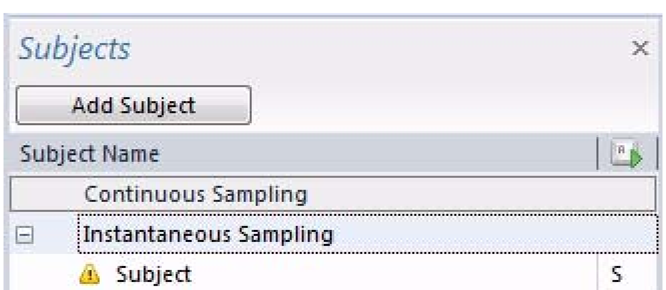
- Your Coding Scheme is open. If this is not the case, choose **Setup** > **Open Coding Scheme.**
- The Subjects pane is visible. If this is not the case, choose **View Settings** > **Subjects**.
- You study more than one person or animal in each observation.

Procedure

1. Click the **Add Subject** button.
2. Enter the subject name.

Notes

- A Subject group is created for each Observation method you have selected. The figure below shows the **Subjects** pane with a subject group for continuous sampling and instantaneous sampling. By default, the continuous sampling subject group contains no subject, whereas the instantaneous sampling subject group contains one subject.
- The instantaneous sampling group also initially contains an error: “Missing Combinations”. When you first open the coding scheme window, no behavior groups have yet been defined. However, a subject should be linked to a behavior group to score for that subject.



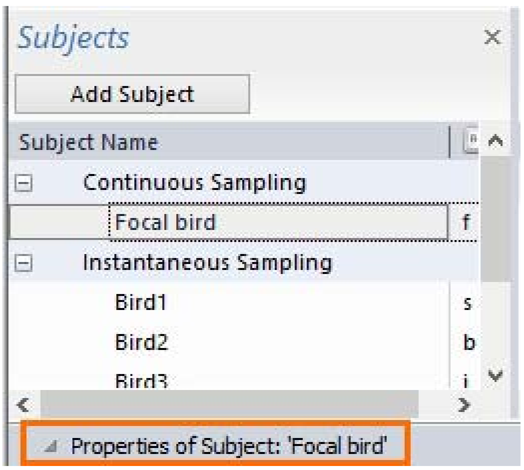
Define Subject Properties

Aim

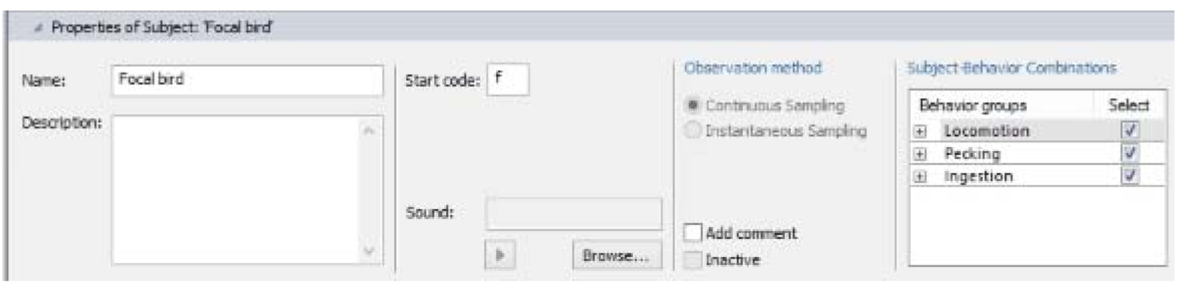
To specify details for the subject.

Procedure

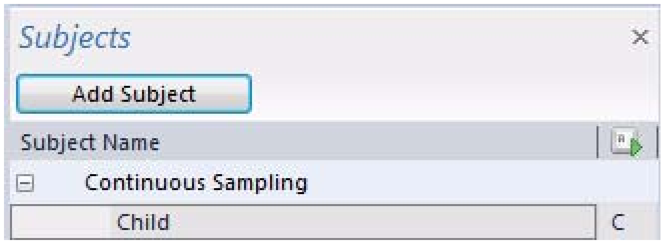
Open the **Subject Properties** pane. To do so, click the subject name and then the **Properties** button at the bottom of the **Subjects** pane.



Enter the following details:



- **Description** – Optionally add a description to your subject in the Description field (maximally 1024 ASCII characters). This is particularly useful if two or more people are using the same coding scheme and need to know who the various subjects are.
- **Start code** – The code to score the subject. With the option Generate keycodes automatically the key code is automatically assigned to the subject. Optionally, change it.



- **Sound** – Optionally browse to a sound (*.wav file) you want to hear when you score that subject. To play the sounds, you must select the **Use Coding scheme sounds (for elements only)** check box in the Sound feedback tab of the Project Settings.
- **Observation method** – You can see here to what subject group (Continuous Sampling or Instantaneous Sampling) a subject is assigned. If you use both continuous and instantaneous sampling, you can change the group a subject is assigned to. The instantaneous subject group must contain at least one subject.
- **Add comment** – To enter a comment every time you score that subject.
- **Inactive** – To make the subject inactive when you do not want to use it anymore.

  See Delete a coding scheme element or group
- **Subject-Behavior Combinations** – To specify which behavior to score for which subject. Examples of Subject-Behavior combinations are:

  Mother-child interaction study - You are observing a mother and her two-year-old child and decide to score Play behavior of the child only. You define a Play behavior group and assign this to the subject Child, not Mother.

  Primate study - You are observing a group of primates and decide to follow two of them as focal subjects (a mother and her baby). You have defined four behavior groups: Individual behavior, Social behavior, Location and Distance to Mother. For one focal subject (Baby), you record behaviors of all four groups. For the other subject (Mother) you only want to make a record of two behavior groups, Individual behavior and Social behavior since you do not want to score Location and Distance to Mother for the Mother itself. In this case, you would then define a total of 4+2 = 6 combinations.

Notes

- Many of the properties can be shown on columns in the **Subjects** pane, but are hidden by default. To show these columns, right-click one of the headers and select **Show all columns**. To hide a column, right-click that column's header and select **Hide column**. To choose a subset of columns, right-click a header, select **Show column** and make your selection.

- If you delete a **Subject-Behavior Combination** and you have already scored data for that combination, the observation contains errors. Restore the combination, remove the events with errors, or re-score them using valid combinations.

  See Correct Event log errors manually in Carry out an Observation

Behaviors

What are Behaviors?

Behaviors are actions, tasks, movements, situations and locations of the subjects under study that are relevant for your research question. Behaviors must be organized in groups.

Examples of behaviors

- Mother-infant interaction study – *Gaze mother*, *Baby smile*, *Vocal imitation* etc.
- Research on Monkeys – *Walk*, *Forage*, *Groom*, *Chase away*, etc.
- Usability study – *Task 1*, *Task 2*, *Usability hit*, *User error*, etc.

Behavior groups

Behaviors are organized in groups. Behavior groups contain behaviors that are closely related. Behaviors cannot be part of groups within larger groups. Examples of behavior groups are:

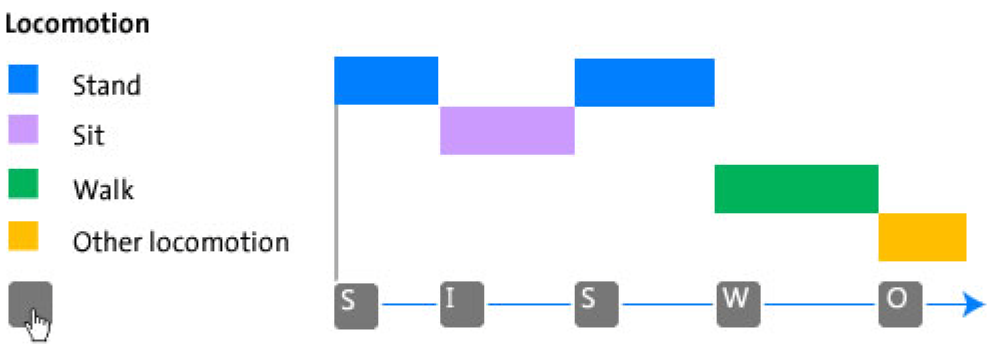
- Mother-infant interaction study – A Gaze group including Gaze mother, Gaze elsewhere; An Emotion group including Baby smile, Baby neutral, etc.
- Research on Monkeys – A Locomotory group including Walk, Climb, etc.; A Social group including Bite, Groom etc.
- Usability study – A Tasks group including Task 1, Task 2, etc.; A User experience group including Usability hit, User error, etc.

Behavior group types

The Observer XT has the following group types:

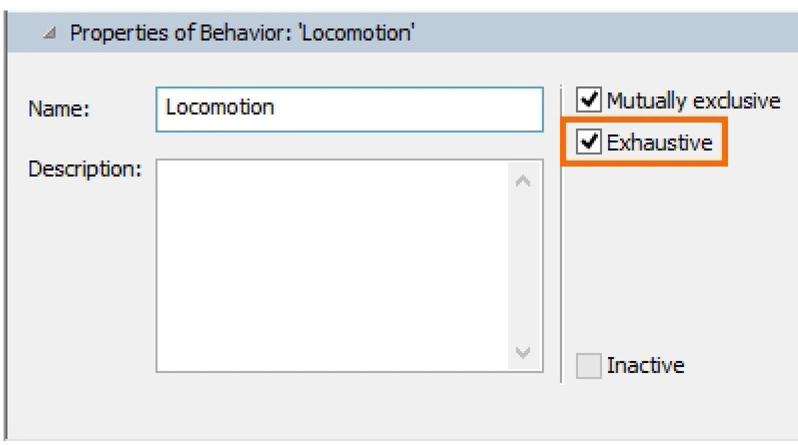
A group in which behaviors cannot occur at the same time

In this group type behaviors exclude each other. When one of the behaviors is active, the other behaviors within the same group cannot be active. This group type is called **Mutually exclusive**. The advantage of having mutually exclusive behaviors is that during coding you only score the start of behaviors. When you code the start of a new behavior, the previously coded behavior of the same group automatically stops.



A mutually exclusive and exhaustive behavior group

This is a special case of a group in which behaviors cannot occur at the same time. A group in which behaviors cannot occur at the same time can have gaps between behaviors. If you want all behaviors to add up to 100%, select the group name in the **Behaviors** panel of the Coding Scheme and click the **Properties** button at the bottom of the screen. Then select the checkbox **Exhaustive**. This way you make the group **Exhaustive**, which means that always one behavior is active within the group. Fill the gaps between the events with a behavior like *Other*, for example *Other locomotion*, or *No locomotion* in a behavior group *Locomotion*.



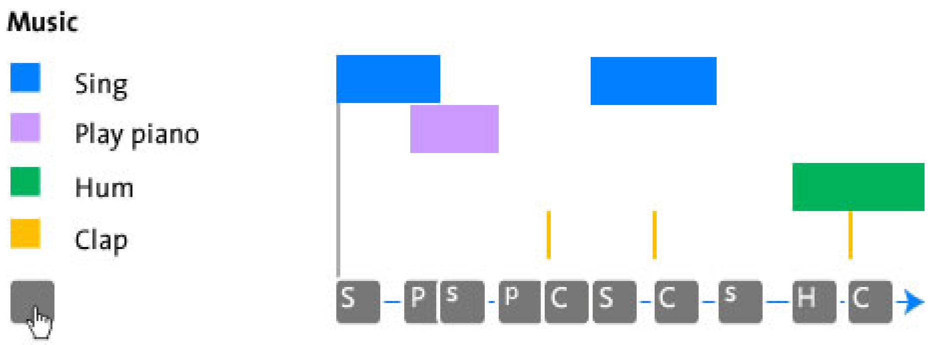
If you use a mutually exclusive and exhaustive behavior group, a behavior must be scored at the start of the observation. For this purpose, one of the behaviors in this group must be the Initial State Event.

See Behavior types

In The Observer XT versions 12.0 or lower a Mutually exclusive group was exhaustive by default. This is no longer the case. Therefore, it is no longer necessary to define and score Initial State Events.

A group in which behaviors can overlap

In this group type behaviors can overlap and there can be gaps between behaviors. You need to code both the start and the stop of each behavior. Therefore, this group type is called **Start-Stop**. In this group type you need more key presses than in a group in which behaviors cannot occur at the same time.



We recommend to use behavior groups in which behaviors cannot occur at the same time, since the scoring effort is less.

Sample group

When you use instantaneous sampling (see Observation method), the behaviors are defined in sample groups. Behaviors in sample groups do not have a duration. You score which behaviors are occurring at regular intervals and obtain frequencies of these behaviors, not durations.

Behaviors in a sample group for instantaneous sampling always exclude each other. This means that in each sample only one behavior from this group can be scored. If you have behaviors that can occur at the same time, define them in different sample groups.

Behavior types

There are three types of behaviors:

Behaviors without duration

Behaviors without measurable or relevant duration. Either their duration is very (immeasurably) short (for instance, for a behavior like 'hitting') or you are not interested in the duration of the behavior but only in its frequency (for instance, in the case of 'talking'). Such behaviors are called Point events.

Behaviors with duration

Behaviors that have a distinct start and end. Besides the frequency of occurrence, the duration is recorded. Examples are walking, playing, grooming, etc. Such behaviors are called State events.

Initial state events

This behavior type is only needed in a A mutually exclusive and exhaustive behavior group. In such a group always one behavior is active, also at the start of the observation. An Initial State Event is automatically scored at time 0. If you notice at the start of the observation that another behavior is occurring, press the key for the correct behavior before you start the observation.

Define Behaviors in a Behavior Group for Continuous Sampling

Aim

To specify the behaviors for continuous sampling observations.

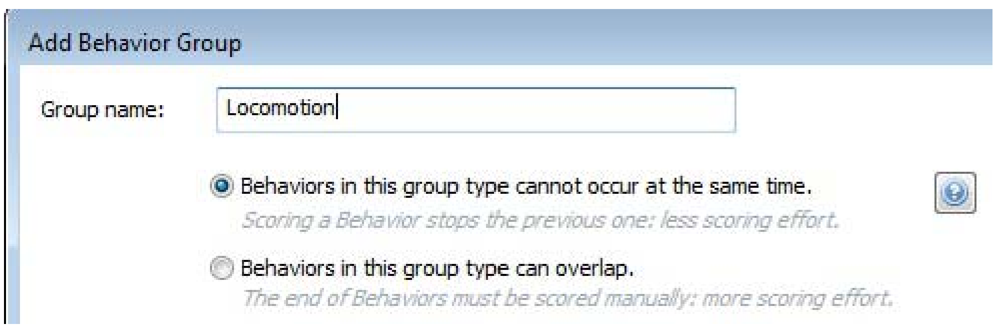
See Observation method

Prerequisite

Your Coding Scheme is open. If this is not the case, choose **Setup** > **Open Coding Scheme.**

Procedure

1. Click the **Add Behavior group** button.
2. In the window that appears, enter the **Behavior Group** name.

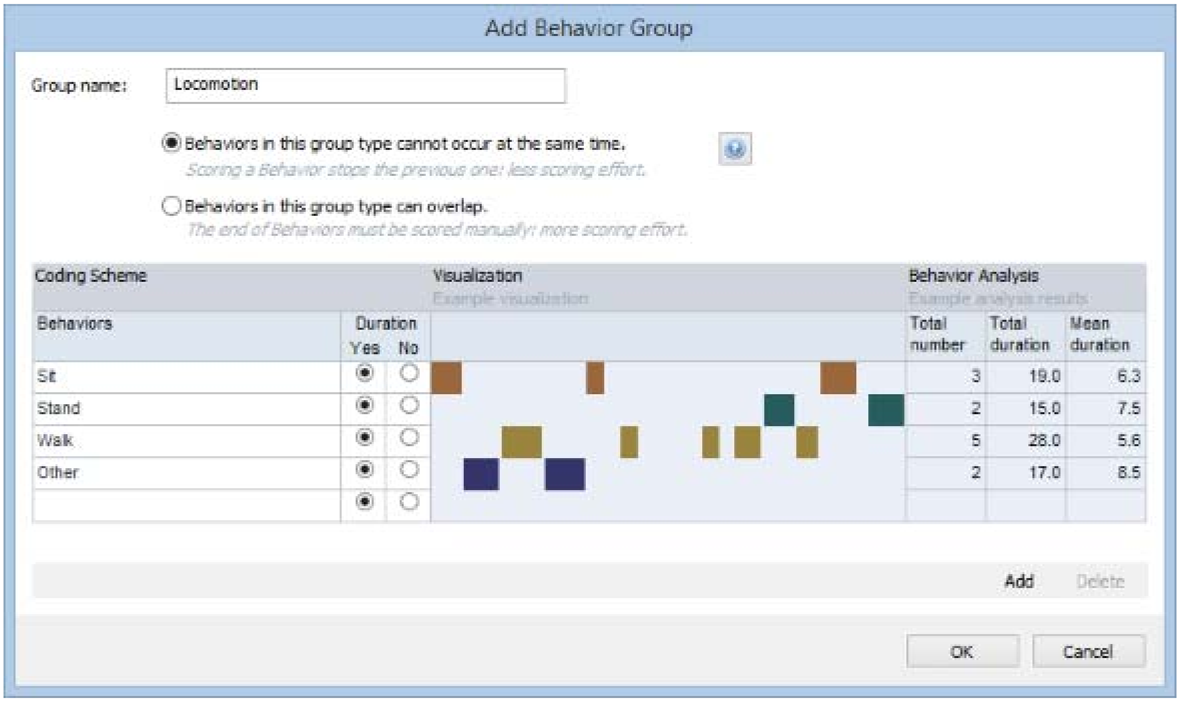


3. Choose whether the behaviors in the group type cannot occur at the same time or can overlap.

   See Behavior group types

4. Add the behaviors and select whether they have duration or not. Take notice of the example of the data you can obtain with this behavior type under **Behavior Analysis**.

   See Behavior types



5. When done, click **OK**. The new group appears in the Behaviors panel.
6. Repeat the procedure for the other behavior groups.

Define Behaviors in a Sample Group for Instantaneous Sampling

Aim

To specify the behaviors for instantaneous sampling observations.

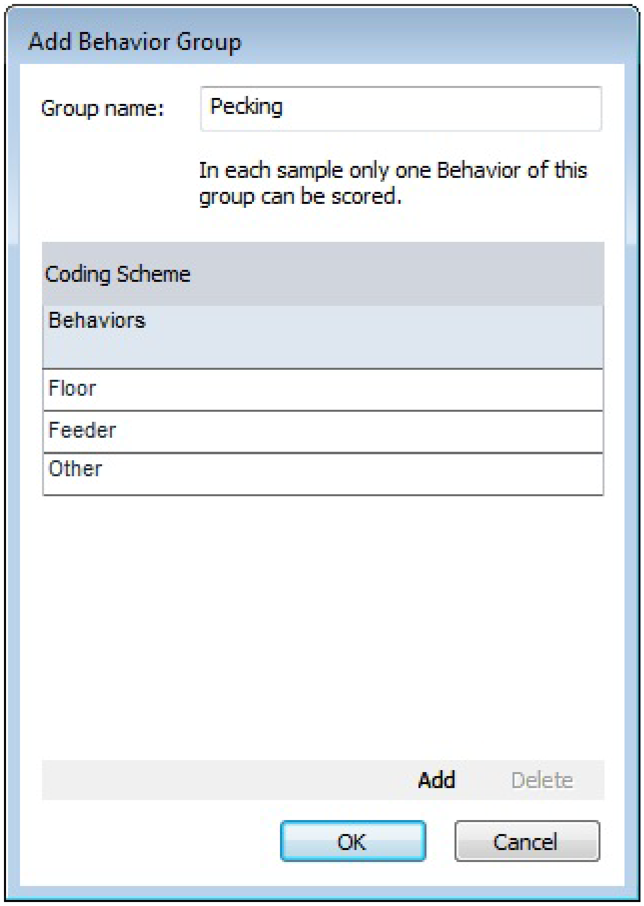
See Observation method

Prerequisite

Your Coding Scheme is open. If this is not the case, choose **Setup** > **Open Coding Scheme.**

Procedure

1. Click the **Add Sample** group button.
2. In the window that appears, enter the **Group name**.
3. Add the behaviors.



4. When done, click **OK**. The new group appears in the **Behaviors** panel.
5. Repeat the procedure for the other sample groups.

Notes

- By default, each behavior/sample group is connected to each subject in a Subject-Behavior Combination, which means that you score every behavior/sample group for each subject. To change that, see Define Subject Properties.
- To re-open the behavior/sample group, double-click the name in the **Behavior Name** column.

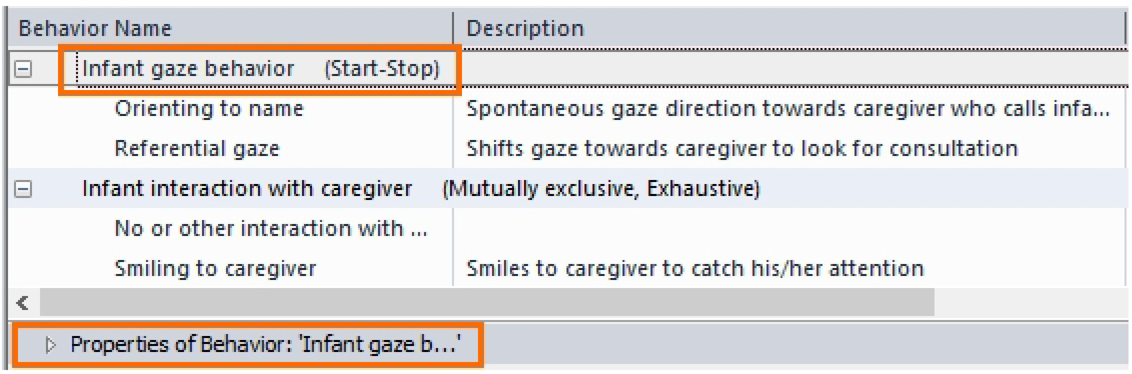
Define Behavior (Group) Properties

Aim

To specify details for the behavior or behavior group.

Behavior group properties

Open the **Behavior group properties** pane. To do so, select the group name and click the **Properties** button at the bottom of the screen.



Enter the following details:

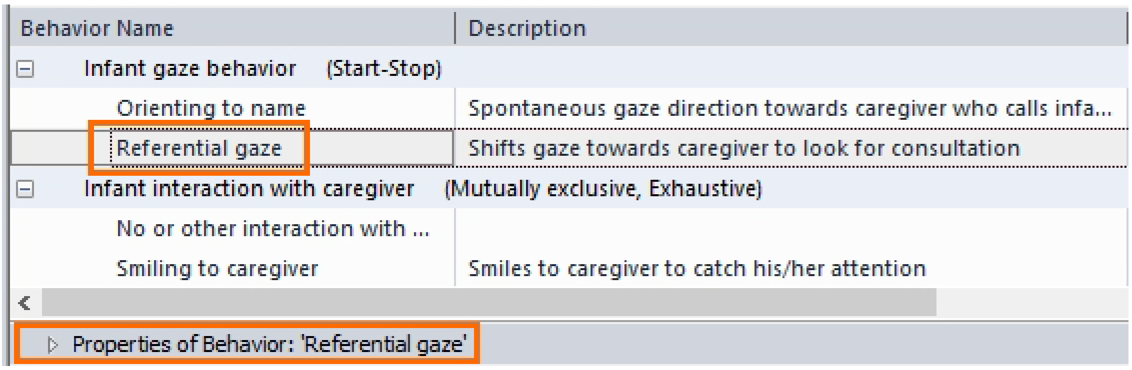
- **Description** – Optionally add a description to your behavior in the Description field (maximally 1024 ASCII characters). This is particularly useful if two or more people are using the same coding scheme and need to know how the behaviors are defined.
- **Mutually-exclusive** – To change a group in which behaviors can overlap (start-stop) group into a group in which behaviors cannot occur at the same time (mutually exclusive) or vice versa.
- **Exhaustive** – By default, gaps can occur in a group in which behaviors cannot occur at the same time. If you do not want that, select the checkbox Exhaustive. If you do so, also define one of the behaviors in this group as Initial State Event.

  See Behavior types
- **Inactive** – To make the behavior group inactive when you do not want to use it anymore.

  See Delete a coding scheme element or group

Behavior properties

Open the **Behavior properties** pane. To do so, select the behavior name and click the **Properties** button at the bottom of the screen.



Enter the following details:

- **Description** – Optionally add a description to your behavior in the Description field (maximally 1024 ASCII characters). This is particularly useful if two or more people are using the same coding scheme and need to know how the behaviors are defined.
- **Start code** – The code to score the behavior. With the option Generate keycodes automatically the key code is automatically assigned to the behavior. Optionally, change it.
- **Color** – This color and pattern are shown in the **Data and Audio Visualization** window and in the Visualization. Click the **Color** cell to change it and to add a pattern (optionally).
- **Sound** – Optionally browse to a sound (*.wav file) you want to hear when you score that behavior. To play the sounds, you must select the Use Coding scheme sounds (for elements only) check box in the Sound feedback tab of the Project Settings
- **Event Type** – Optionally, change the behavior type.

  See Behavior types
- **Add comment** – Select this checkbox if you want to add a comment every time you score that behavior.

  Selecting **Add Comment** is especially useful if you score from audio files and want to transcribe spoken text into comments. Then, select the **Add Comment** check box for each behavior separately.
- **Inactive** – Select this check box if you want to make the behavior inactive when you do not want to use it anymore.

See Edit a coding scheme element after observing in Carry out an Observation

- **Modifiers** – Choose the modifier groups you want to link to that behavior. See Modifiers for information about modifiers, how to define them and how to assign modifier groups to behaviors.

Note

Many of the properties can be shown on columns in the **Behaviors** pane, but are hidden by default. To show these columns, right-click one of the headers and select **Show all columns**. To hide a column, right-click that column's header and select **Hide column**. To choose a subset of columns, right-click a header, select **Show column** and make your selection.

Frequently-Asked Questions about Behaviors

When to use Behaviors with or without duration?

Define behaviors with duration (State events) if you need to know the duration of activities. Behaviors without duration (Point events) are recommended for behaviors of negligible duration, like eye blinks (in most applications). The behavior 'look at screen' can be defined as a state, and each blink as a point event. However, if you want to know the durations of the time between blinks you need to define them as states. So then you record with every event 'blink' the start of an interval between two blinks. Point events can be placed anywhere in the coding scheme, they do not stop mutually exclusive states.

When to use a group type in which behaviors cannot occur at the same time?

Use behavior groups in which behaviors cannot overlap (Mutually exclusive) when you want to calculate time budgets, or when you are interested in the durations of the events. Use this kind of groups also when you plan to analyze the time when a specific event occurred during a certain episode. For example, if you want to calculate the number of user errors during each task performed, define the tasks in a mutually-exclusive group.

When to use mutually-exclusive exhaustive behavior groups?

Make the behavior group in which behaviors cannot overlap Exhaustive if you want the durations within the group to add up to 100%. This way you can compare figures from different calculations. Mutually exclusive groups were exhaustive by default in The Observer XT 12.0 and earlier versions. This is no longer the case.

When to use behavior groups in which behaviors can overlap?

You use a group in which behaviors can overlap (Start-Stop) when the behaviors in the group do not exclude each other. Scoring effort is higher in such a group, because you have to press a key for both the start and the stop of each behavior. If possible, divide the behaviors over multiple behavior groups in which behaviors cannot occur at the same time.

When to use Sample groups?

You use sample groups when the observation method is instantaneous sampling.

See Observation method

Can I use Point Events in a behavior group for Instantaneous Sampling?

You cannot define point events when you use instantaneous sampling. You can use them if you use Combine Continuous and Instantaneous Sampling.

See Observation method

Modifiers

What are Modifiers?

Modifiers can be attached to behaviors. They are used to limit the scope of a behavior. Like Behaviors, Modifiers are defined in groups. You assign a modifier group to one or more behaviors.

Scoring modifiers involves making extra keystrokes. If you have a simple coding scheme without numerical data, it can be better to define more behaviors and not use modifiers. For example, the two behaviors *Play alone* and *Play in a group* instead of one behavior *Play* with two modifiers (*Alone* and *In a group*) attached.

Examples of modifiers

- Child behavior study – To describe the object that is being played with, a modifier group *Object* is defined that includes the elements *Cards*, *Ball*, *Castle* for the behavior *Play*.
- Usability study – To describe the type of error by the test participant, a modifier group Error type is defined that includes *Wrong value*, or *Wrong weblink* for the behavior *User error*.
- Aggression in lobsters – To describe the level of aggressiveness in territorial interactions, a modifier group Level is defined that includes the values 0 to 5.

Modifier group types

Modifier groups can be nominal (text) or numerical (numbers).

For nominal modifiers you can calculate the same descriptive statistics as for behaviors, like mean duration and frequency.

For numerical modifiers you can calculate additional statistics like the average and other numerical statistics of the numbers scored. For example, the numbers 1, 2, 3 and again 2 scored in an observation result in Total number= 8, Average= 2, Minimum = 1 and Maximum = 3.

Define Modifiers

Aim

To specify the modifiers attached to a behavior.

Prerequisites

Your Coding Scheme is open. If this is not the case, choose **Setup** > **Open Coding Scheme.**

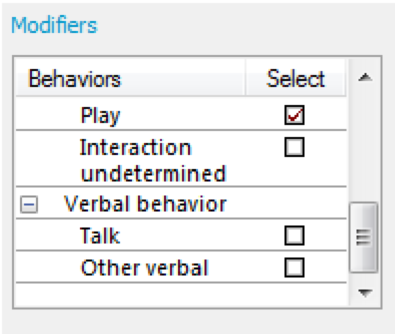
The Modifiers pane is shown. If this is not the case, choose **View Settings** > **Modifiers**.

Procedure for Nominal modifiers

1. Click the **Add Modifier group** button
2. Choose **Add Nominal Modifier group**
3. Give the modifier group a name and, optionally, select the following:

   Mutually exclusive – Select this for a mutually exclusive group (see Behavior group types for an explanation of mutually exclusive). If you select this option, you can only score one modifier at a time for that group, that is, you cannot score two or more modifiers from the same group for a specific event.

   Modifier group must be scored – Selecting this option makes scoring a modifier compulsory when you score the associated behavior.
4. Enter the modifiers in the **Value** fields.
5. Define to which behavior the modifier group should be attached in the **Link to behaviors** field.

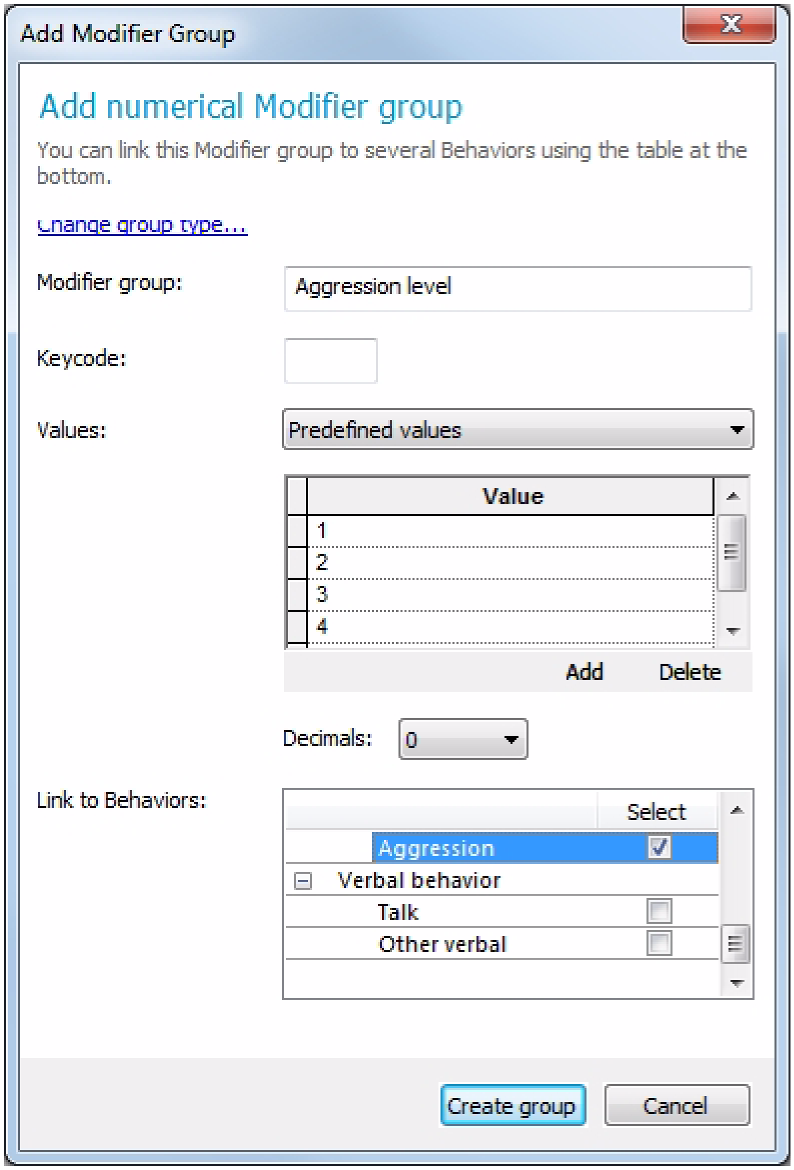


Procedure for Numerical modifiers

1. Click the **Add Modifier group** button
2. Choose **Add Numerical Modifier group**.
3. Give the modifier group a name and define the keycode to activate this modifier group. From the **Values** list, select one of the following:

   Predefined values – Make a list of predefined options from which to choose. For example if for the modifier group *Aggression level*, you want the observer to choose between 0, 1, 2 and 3.

   Range of values – Score the modifier by entering a value between a minimum and a maximum value. For example if for the modifier group *Speed* you want the observer to score a value between a minimum of 0 and a maximum of 150 with a precision of 1 decimal.



4. Define to which behavior the modifier group should be attached in the **Link to behaviors** field.

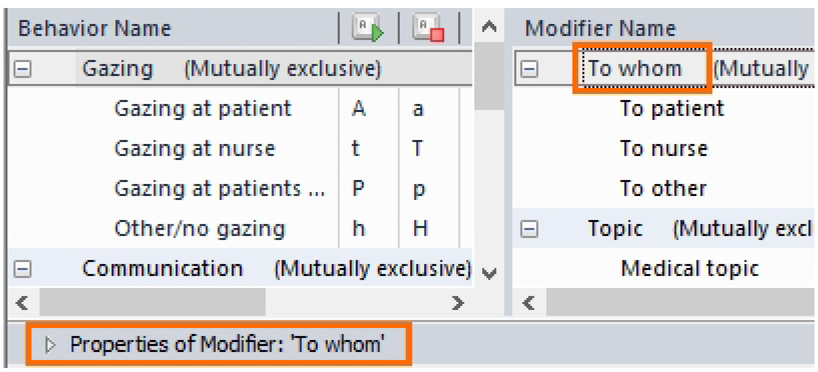
Define Modifier (Group) Properties

Aim

To specify details for the modifier group or modifier.

Modifier group properties

Open the **Modifier group properties** pane. To do so, select the group name and click the **Properties** button at the bottom of the screen.



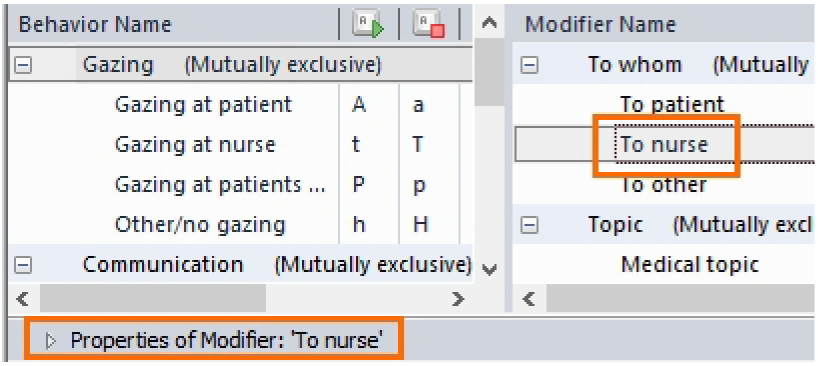
Enter the following details:

- **Description** – Optionally add a description to your modifier group in the Description field (maximally 1024 ASCII characters). This is particularly useful if two or more people are using the same coding scheme and need to know how the modifiers are defined.
- **Inactive** – Select this checkbox if you want to make the modifier group inactive when you do not want to use it anymore.

  See Edit a coding scheme element after observing in Carry out an Observation
- **Modifiers** – Select to which behaviors the modifier group should be attached.

Modifier properties

Open the **Modifier properties** pane. To do so, select the Modifier name and click the **Properties** button at the bottom of the screen.



Enter the following details:

- **Description** – Optionally add a description to your modifier in the **Description** field (maximally 1024 ASCII characters). This is particularly useful if two or more people are using the same coding scheme and need to know how the modifiers are defined.
- **Start code** – The code to score the modifier. With the option Generate keycodes automatically the key code is automatically assigned to the modifier. Optionally, change it.
- **Color** – This color and pattern are shown in the **Data and Audio Visualization** window and in the Visualization. Click the **Color** cell to change it and to add a pattern (optionally).
- **Sound** – Optionally browse to a sound (*.wav file) you want to hear when you score that behavior. To play the sounds, you must select the Use Coding scheme sounds (for elements only) check box in the Sound feedback tab of the Project Settings
- **Inactive** – Select this check box if you want to make the behavior inactive when you do not want to use it anymore.

  See Edit a coding scheme element after observing in Carry out an Observation

Notes

- Many of the properties can be shown on columns in the **Modifiers** pane, but are hidden by default. To show these columns, right-click one of the headers and select **Show all columns**. To hide a column, right-click that column's header and select **Hide column**. To choose a subset of columns, right-click a header, select **Show column** and make your selection.
- To score an action of A directed to B, B must be defined as a modifier. You can therefore create a modifier group containing the names of your subjects that can be the receivers of an action. You can copy your list of

subjects and paste them into a modifier group. The header **Subject** name is also pasted. Right-click it and select **Delete**.

- You can create a coding scheme by importing a data file, for instance an ODX file from The Observer XT. In the coding scheme which you create in this way, all the subjects, behaviors and modifiers are ungrouped. This means that you may need to reorganize your coding scheme. Note that there are limits to the number of subjects, behaviors, and modifiers that you can import (see Create Coding scheme). You can only import files that comply with these restrictions.

  See Import Observational Data in File Management

Check your Coding Scheme

Aim

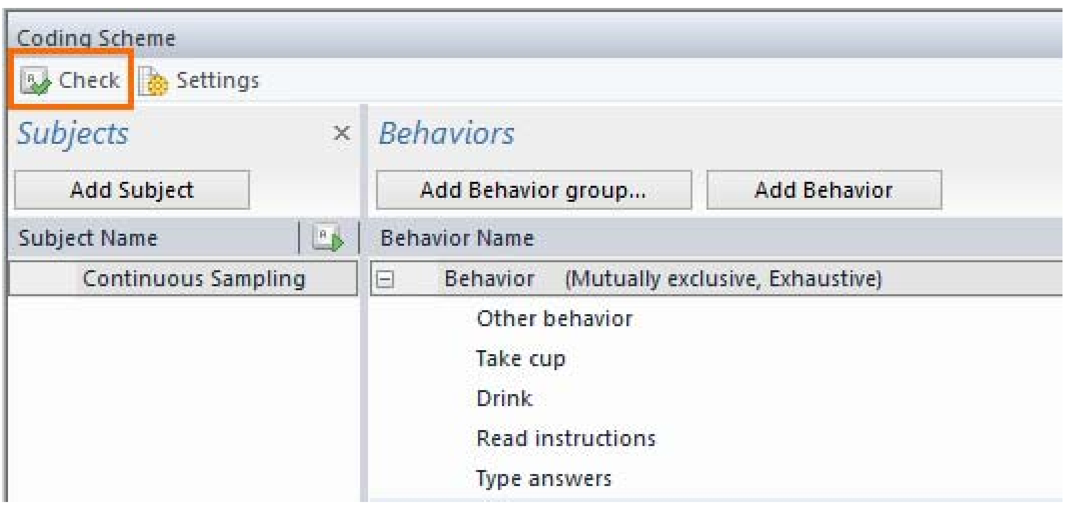
To check whether the coding scheme is free of errors.

Background

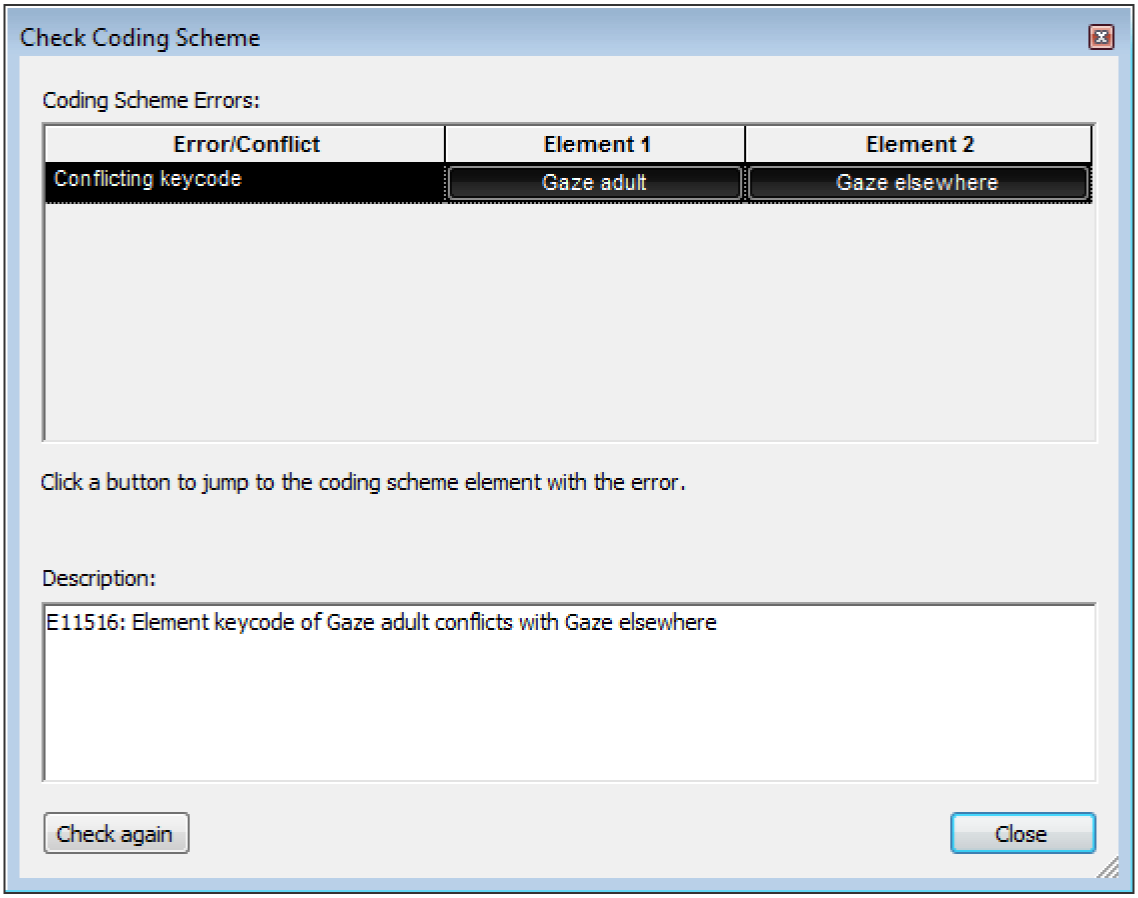
You cannot carry out an observation when your coding scheme contains errors. When you have the Check coding scheme while editing option selected in the Coding scheme settings window, a warning triangle appears in front of the coding scheme element as soon as you enter an element with an error. When you point with the mouse at an icon with a warning triangle, a description of the coding error pops up.

Procedure

For a detailed overview of the coding scheme errors, click the **Check** button.



The window that opens lists all the errors in your coding scheme. In the example below, the behaviors *Gaze adult* and *Gaze elsewhere* have the same keycode (conflicting keycodes).



To correct coding scheme errors

1. Select an error to view a description of the problem.
2. Click the element to jump to it in the coding scheme. There correct it.
3. Click the **Check again** button to check whether the errors were corrected successfully.
4. Click **Close** when all the errors are corrected.

Common errors in the coding scheme:

- Two or more subjects, behaviors or modifiers are given the same keycode, or the same name.
- A behavior or modifier group does not contain any elements.
- A mutually-exclusive and exhaustive behavior group does not contain an Initial state event.

  See Behavior types

- You have selected the Use Pocket Observer with... option in the Coding Scheme settings and you have created a behavior group with only one behavior.
- You have selected the Use Pocket Observer with... option in the Coding Scheme settings and the element name exceeds 16 characters.

Edit the Coding Scheme

What do you want to do?

- Add a coding scheme element
- Sort coding scheme elements
- Edit a coding scheme element
- Delete a coding scheme element or group

Add a coding scheme element

- To add a subject, click the **Add Subject** button in the **Subjects** panel.
- To add a behavior or modifier, click first the group of behaviors/modifiers you want to add the element to, then click the **Add** button on top of the panel that applies.
- To add a behavior group or modifier group, click the **Add behavior group**, or **Add Modifier group** button.

Sort coding scheme elements

You can change the order of the elements of your coding scheme for visualization purposes. For example, when creating a plot of the events, you may want to view the Verbal behaviors at the top and the Play behaviors at the bottom of the event plot, not the other way round.

To change the order of elements or groups, click an element or group and drag it below the name of other elements/groups.

Edit a coding scheme element

You can change the name and the properties of a coding scheme element at any time. Do this either in the coding scheme, or in its properties window. To open the properties window, select the element and click the **Properties** button at the bottom of your window.

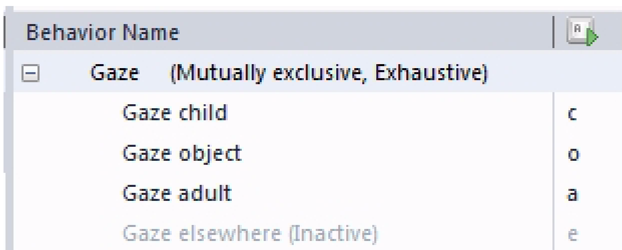
To move an element from one group to another, drag it to the name of the group where you want to place it.

Delete a coding scheme element or group

You can only delete a coding scheme element or group when it has not been scored yet. Select the element and press **Ctrl+Del**. If you delete a group, you also delete the individual elements within that group.

When the element was scored in at least one observation, a question appears whether you want to inactivate it. If you want to delete the element anyway, you must first delete all the observations in which it was scored.

When a coding scheme element is set to inactive, it is not used anymore although it is still present in the coding scheme. An inactive element is grayed out in the coding scheme:



If the element was already scored, it will remain present in the event log. However, it is not shown in the Codes window of new observations, so you cannot score it. In event plots and analysis results, the element is displayed as [Element name] (Inactive). You can use the keycode of an inactive element for new elements.

To reactivate an inactive element, right-click it and select **Activate**.

Independent Variables

What are Independent Variables?

Independent variables are assumed to remain constant within observations but may differ between observations.

To open the Independent Variables list, choose **Setup** > **Independent Variables**. Alternatively, click **Independent Variables** in the Project Explorer.

The Observer XT distinguishes five kinds of independent variables:

- User-defined variables – Variables that describe the subjects, observation sessions and environmental conditions. Examples of user-defined variables are the name of the subject, the name of the observer, the weather during the observation (see the figure below for an example).

  See Create User-Defined Variables

- Video files – Name and location of the video files used in the observation. They are added automatically to the independent variable list when you create an observation. The scope of a video file is always observation.

  See Variable scope)

  If you already have observations, click **Add Video** to add video files to your observation.

- Audio files – Name and location of the audio files used in the observation. The scope of an audio file is always observation.

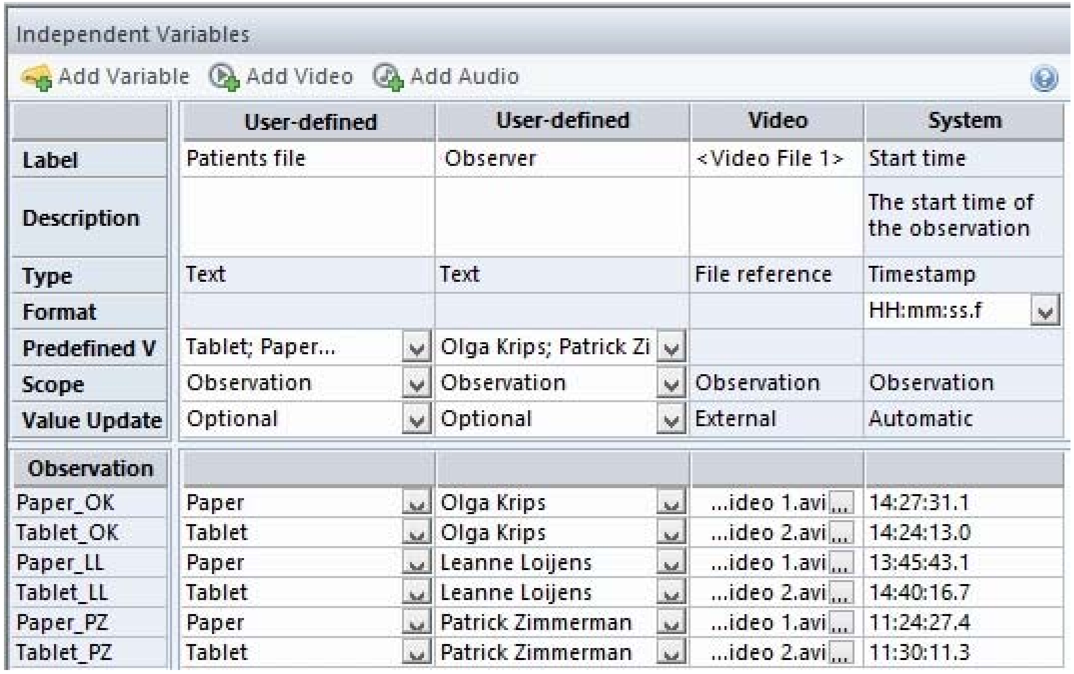
  See Variable scope

  If you already have observations, click **Add Audio** to add audio files to your observation.

- External data files – This column is only present when you have the External Data Module. It shows the name of the external (physiological) data files imported into an observation. The scope of an external data file is always observation.

  See Variable scope and External Data

- System variables – Three variables are automatically created by the system: the start time, stop time and the duration of an observation. To change the format of these variables, click the arrow in the **Format** field and make your selection in the window that appears.



Independent Variables

Add Variable Add Video Add Audio

	User-defined	User-defined	Video	System
Label	Patients file	Observer	<Video File 1>	Start time
Description				The start time of the observation
Type	Text	Text	File reference	Timestamp
Format				HH:mm:ss.f
Predefined V	Tablet; Paper...	Olga Krips; Patrick Zi		
Scope	Observation	Observation	Observation	Observation
Value Update	Optional	Optional	External	Automatic
Observation				
Paper_OK	Paper	Olga Krips	...ideo 1.avi	14:27:31.1
Tablet_OK	Tablet	Olga Krips	...ideo 2.avi	14:24:13.0
Paper_LL	Paper	Leanne Loijens	...ideo 1.avi	13:45:43.1
Tablet_LL	Tablet	Leanne Loijens	...ideo 2.avi	14:40:16.7
Paper_PZ	Paper	Patrick Zimmerman	...ideo 1.avi	11:24:27.4
Tablet_PZ	Tablet	Patrick Zimmerman	...ideo 2.avi	11:30:11.3

Create User-Defined Variables

Aim

- To define variables that potentially influence the value of a dependent variable.
- To list the names or numbers of the subjects in your observations.

Prerequisite

The Independent Variables list is open. If this is not the case, choose **Setup** > **Independent Variables**.

Procedure

1. Click **Add Variable**
2. Enter the following options:

   - Variable type

   - Variable format

   - Predefined variable values (optional)

   - Variable scope

   - Value update

Notes

- You can add maximally 40 user-defined variables.
- The Independent Variable name may have maximally 64 characters. The description may have maximally 255 characters.

Variable type

Click the arrow in the **Type** field and from the list choose one of the following options:

- Text – A text variable is denoted by alphanumeric characters, composed of letters, numbers or both. For example, the name of the observer.
- Numerical – A variable represented by numbers only, for example, the age of the subject.

- Timestamp – A variable represented by a time stamp, for example the starting date and time of the experiment.
- Duration – A variable represented by a duration, for example, the duration of the treatment.
- Boolean – A variable that is either 'False' or 'True'. For example, the presence of the observer during the test.

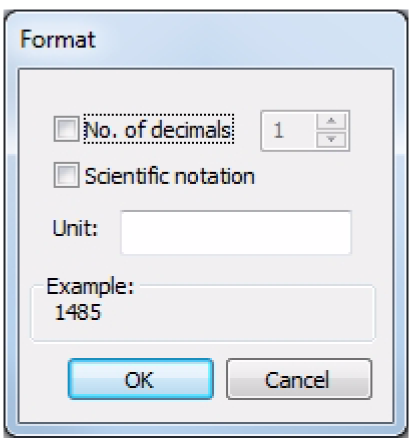
Variable format

- Text and Boolean variables – For Text and Boolean variables you cannot specify a format.
- For the other types of variables, click the arrow in the **Format** field and specify the format.
- Numerical variables – Choose the number of decimals (maximum 9).

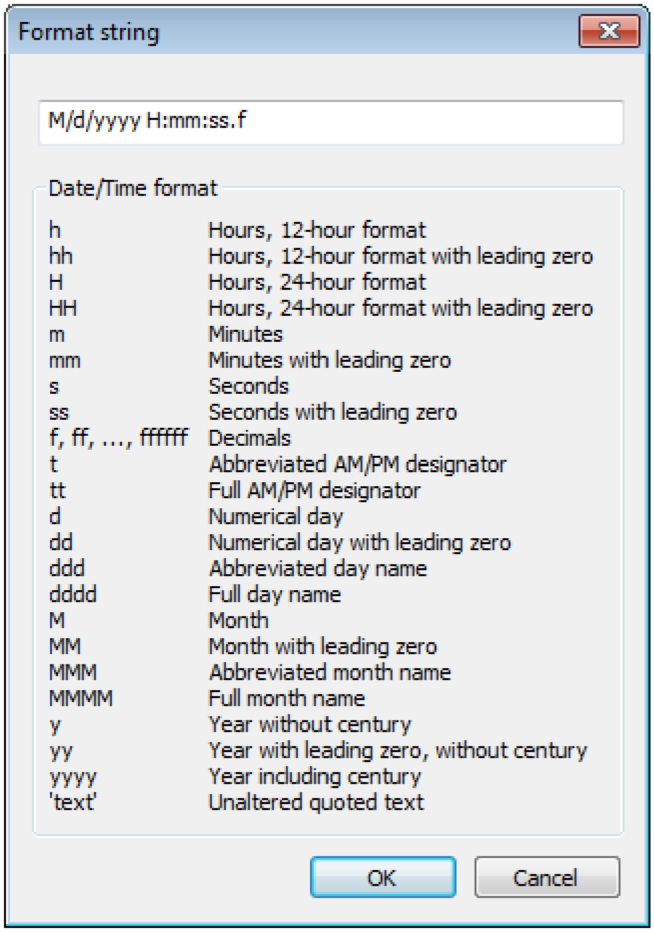
  Deselecting **No. of decimals** will result in using integers.

  Select **Scientific notation** to display numbers as, for example, 1.485e+0.03 instead of 1485.236.

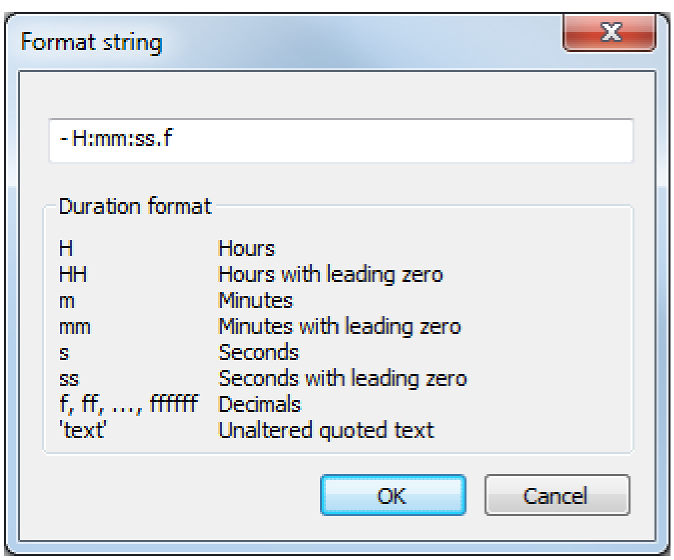
  In the **Unit** field, enter the unit of your variable, for instance, 'years' for the age of the subject. Click **OK**.



- Timestamp variables – Specify the format. The format f represents the decimals you specified in the Time formats tab of the Project Settings window.



- Duration variables – Specify format. The format f represents the decimals you specified in the Time formats tab of the Project Settings window.



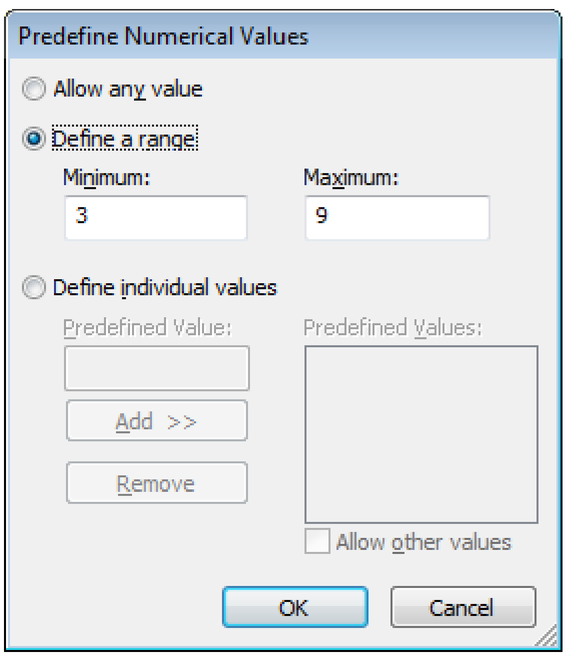
Note

The program uses the decimal separator specified in your computer's regional settings (**Control Panel** > **Region**). If you change regional settings, close and restart The Observer XT.

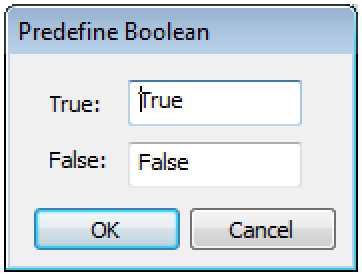
Predefined variable values

Optionally predefine values. By doing this you can select from the predefined values when you enter the user-defined variables. For Timestamp and Duration variables you cannot specify predefined values.

- Text variables – Enter the text you want to choose from. Select **Allow other values**, if you are not sure whether the values you have defined are exhaustive. This allows you to add new values as they are needed.
- Numerical variables – Choose whether your variable can have any value, can have a value in a range, or predefine values. Select **Allow other values** if you are not sure whether the predefined values are exhaustive, so you can add new values when needed.



- Boolean variables – Enter the names to display. For instance, if your variable is *Parent present*, you may define the values *No* (False) and *Yes* (True).



Variable scope

The scope of a variable is the portion of the observation for which the variable has a specific value.

Choose between the following:

- Observation – A variable has scope **Observation** if it has the same value during the entire observation. Typical examples of variables with scope Observation are the name of the observer, or the temperature in the observation room. Also, if you observe only one subject per observation, and therefore did not define subjects in your Coding Scheme, variables like *Age* or *Gender* of the subject will have scope Observation.

  The scope of a video or audio file and of external data files is always Observation.

- Event Log – In general there will be no difference between scope **Observation** and scope **Event Log**, because each observation contains only one event log. An observation can only have multiple event logs if you imported data as event logs into an observation. This happens, for example, if you import FaceReader facial states into an observation. In this case you can set the scope of a user-defined variable to **Event Log** if it has different values per event log.
- Subject – This option is only available if you defined Subjects in your coding scheme. If your observation contains multiple subjects and the user-defined variable has different values per subject, select scope **Subject**. Typical examples of user-defined variables with scope Subject are *Age*, *Gender*, and *Identity* of your subjects.

Notes

- If you plan to create groups of observations for analysis, set the scope to either **Observation** or **Subject**, not Event log.

  See Create Groups of Data in Select Data for Analysis

- You can change the scope of a variable at any time. If you do, the variable column shows the first values previously stored for each observation. Enter the variable values according to the new scope.

Value update

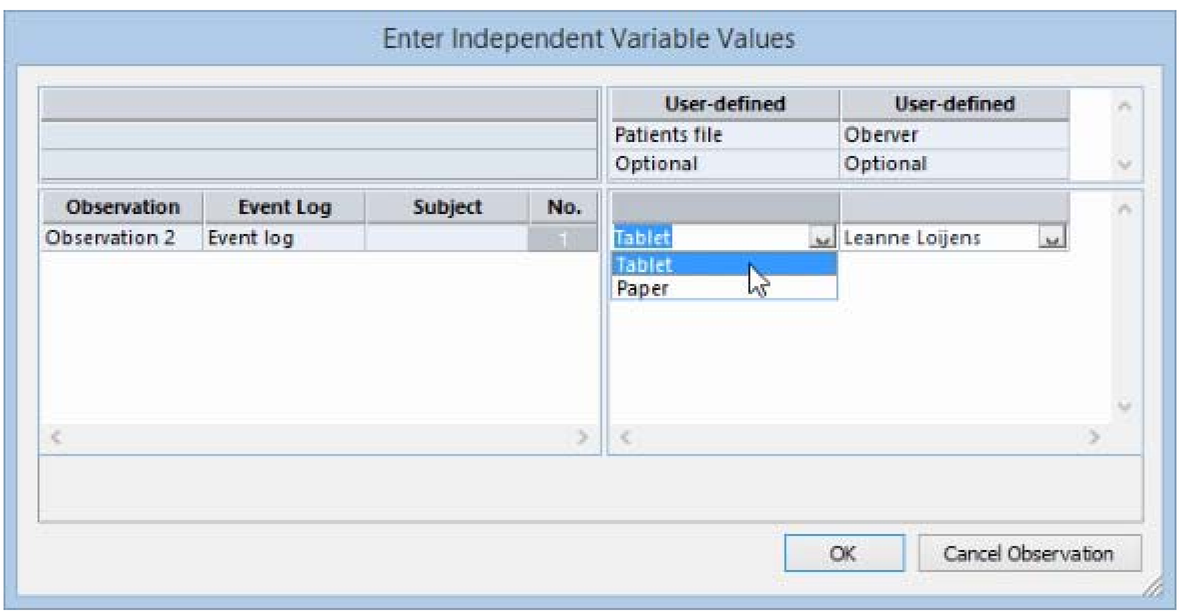
Dependent on your preferences, you are asked to enter Independent Variables before, after, or before and after you carried out an observation. Choose in the **Value update** field whether entering variable values is:

- Compulsory – You must enter a value to proceed.
- Manual – If you specified to **Hide manual variables** in the Project Settings (see Edit Independent Variables), **Manual** variables are not shown when you are asked to enter the independent variables. Open the independent variable list to update the values.
- Optional – You do not need to enter a value.

To enter variable values

Define in the Observation settings (**Setup** > **Project Settings**) whether to enter the independent variables before the start of an observation, after the end of an observation, or both.

Enter the user-defined variable values in the window that opens when you start or end an observation. It is also possible to enter the values in the independent variables list. You can also copy and paste values from, for example, Excel. However if you predefined a range, the values should fall within that range.



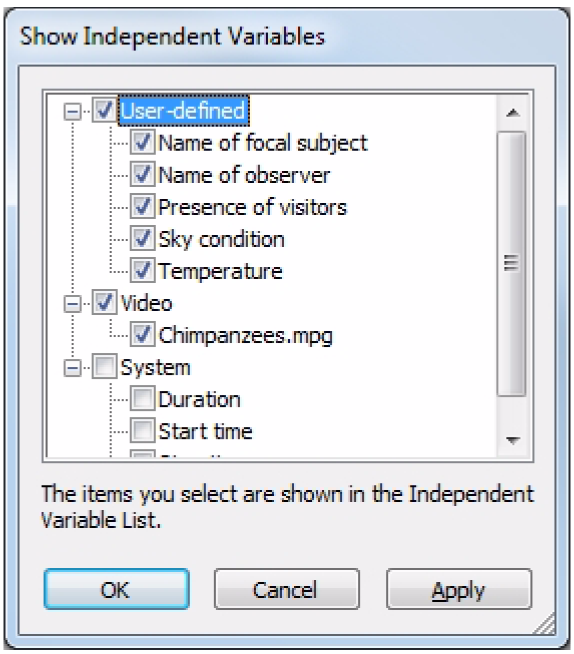
Manage Independent Variables

What do you want to do?

- Show/hide variables
- Export Independent Variables
- Edit predefined values
- Print the Independent Variables List

Show/hide variables

You can select which columns to display in the Independent Variables list. To do so, right-click a column header and select **Show Independent Variables**.



To hide one column, right-click in one of the variable fields and choose **Hide Independent Variable**.

Export Independent Variables

To export the independent variables and their values, choose **File** > **Export** > **Independent Variables**.

See Export Independent Variables in File Management

Edit predefined values

To replace or delete predefined values, delete first all the values from the variable column. Then delete the values. To remove variables, right-click the column header and choose **Delete Independent Variable**.

Print the Independent Variables List

In the current version of The Observer XT, printing is not fully supported. To print the independent variable list, copy and paste the columns into another program such as Excel. If you copy the columns to Microsoft Word, you can use the convert text to table function.

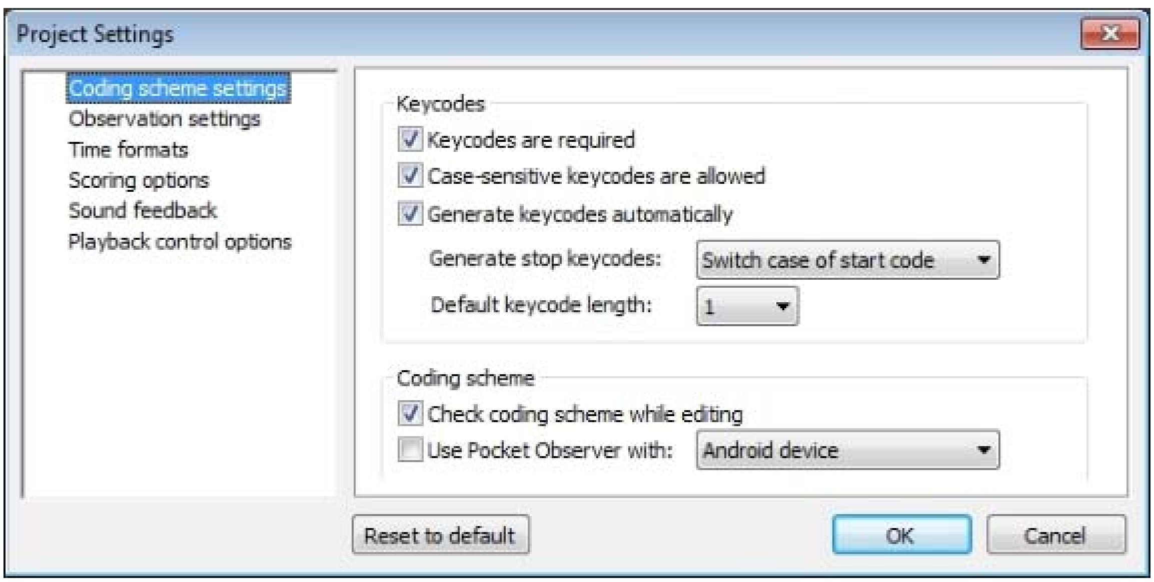
Project Settings

Choose **Setup** > **Project Settings**. The following settings are available:

- Coding scheme settings
- Observation settings
- Time formats
- Scoring options
- Sound feedback
- Playback control options

Coding scheme settings

Choose **Setup** > **Project Settings** > **Coding Scheme Settings**.



Specify:

Keycodes are required

Select this option to code your observations by pressing keys on the keyboard and not with mouse clicks on the screen.

Case-sensitive codes are allowed

Select this option to distinguish between UPPER-CASE (capital letters) and lower-case (small letters) codes. Selecting this option gives the possibility to define more elements, but using capitals will slow down your scoring.

Generate keycodes automatically

Select this option if you want the keycodes for your subjects, behaviors and modifiers to be generated automatically while building your coding scheme.

If your project contains Start-Stop behaviors (see Behavior groups), choose from the **Generate stop codes** list how to generate these automatically.

- Same as start code – for instance, 'w' for start and stop walking.
- Switch case of start code – for instance, 'w' for start walking and 'W' for stop walking. Note that it is only possible to have case-sensitive keycodes if you have the option Case-sensitive keycodes are allowed are selected (see above).

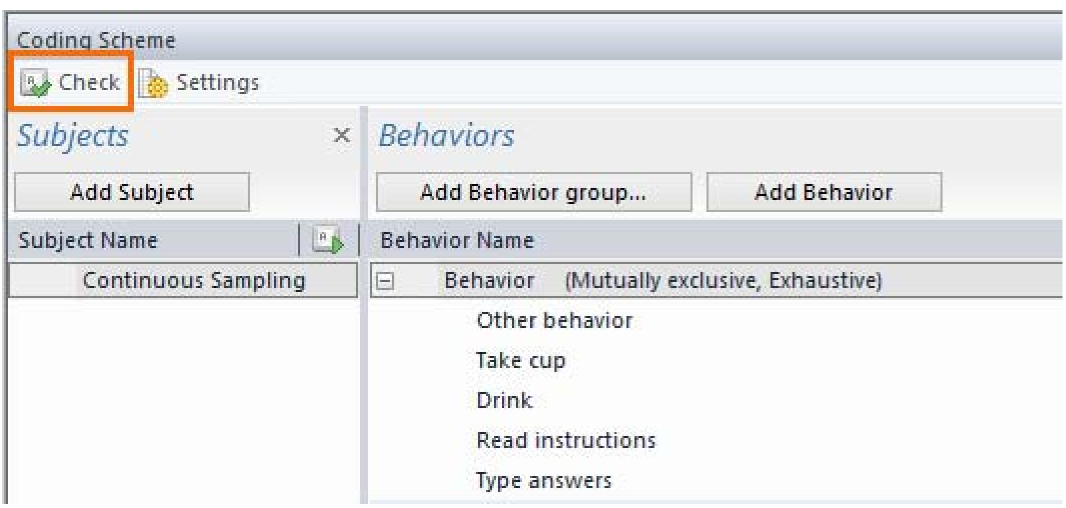
Default keycode length

The keycode length for keycodes that are automatically generated.

Check coding scheme while editing

When this option is selected, you get visual feedback when you make a mistake while editing the coding scheme. A warning triangle in the icon in front of the coding element warns you when the element contains an error. When you point with the mouse at an icon with a warning triangle, a description of the coding error pops up. Click the **Check Coding Scheme** button at the top of the coding scheme screen for more detailed information on the errors.

See Check your Coding Scheme

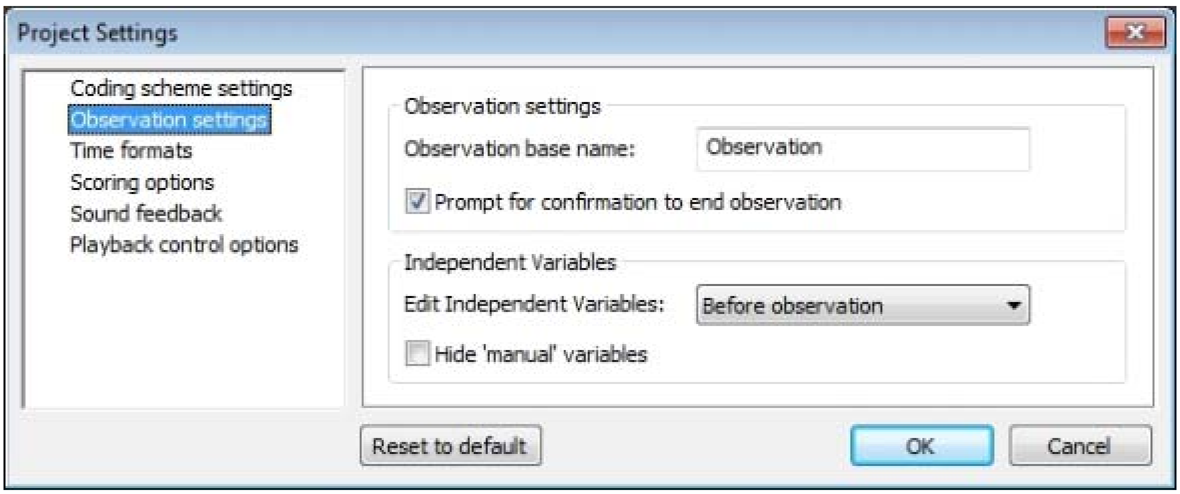


Use Pocket Observer with...

When you want to send your coding scheme to Pocket Observer and score data on a Pocket PC, your coding scheme must be compatible with Pocket Observer. See the Pocket Observer Reference Manual for more information.

Observation settings

Choose **Setup** > **Project Settings**. The Project Settings window appears with the Observation settings tab open.



You have the following options.

Observation base name

Type a common name for your observations. The default base name is Observation. The observations will be named <Base Name> 1, <Base Name> 2, etc., unless you give them another name when you start an observation.

Prompt for confirmation to end observation

Keep this option selected if you want The Observer XT to ask you whether you really want to end the observation, when you stop it.

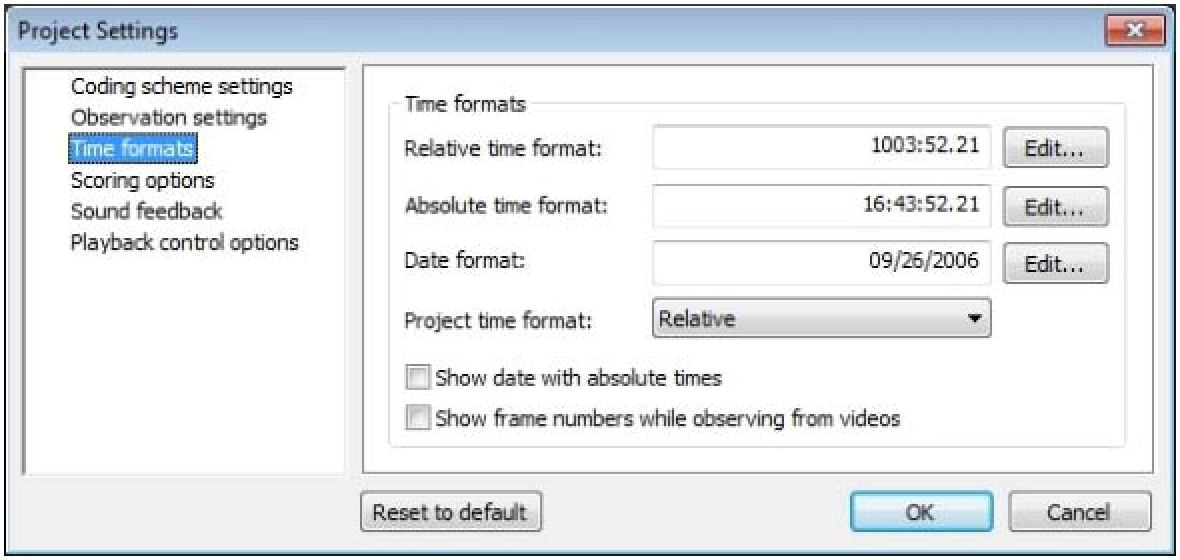
Edit Independent Variables

Specify whether to enter the values of independent variables before, after, or both before and after the observation.

Select **Hide 'manual' variables** if you want The Observer XT not to show variables that are specified as **Manual** in the Value update field of the independent variables list. If you select this option and all user-defined variables are defined as Manual, the Independent Variables List is not shown at the start/end of the observation. If at least one of the variables is defined as Optional or Compulsory, the variable list is shown at the start/end of the observation, but the Manual variables are hidden.

Time formats

Choose **Setup** > **Project Settings** > **Time formats**, to change the time format. The time format is used in the **Event Log** window, **File Synchronization** window, **Timers** window, **Playback Control** window, **Visualization** and the **Analysis Results**.



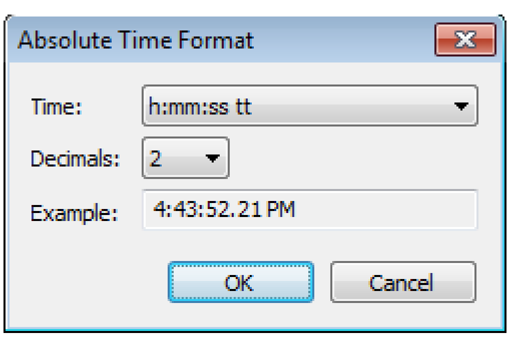
Time formats

Select the preferred format and decimals.

Project time format

Select either Absolute (the actual time during observing), or Relative (the time from the start of the observation).

If you select a format with AM or PM notation, it may happen that you do not see this in the event log.



This is caused by the settings of Windows for your clock time. To change these settings, click the clock, which is (usually) in the lower-right corner of your screen. **Click Change date and time settings** > **Change date and time** > **Change calender settings** > **Time**. After **AM symbol** choose **AM** and after **PM symbol** choose **PM**.

Show date with absolute times

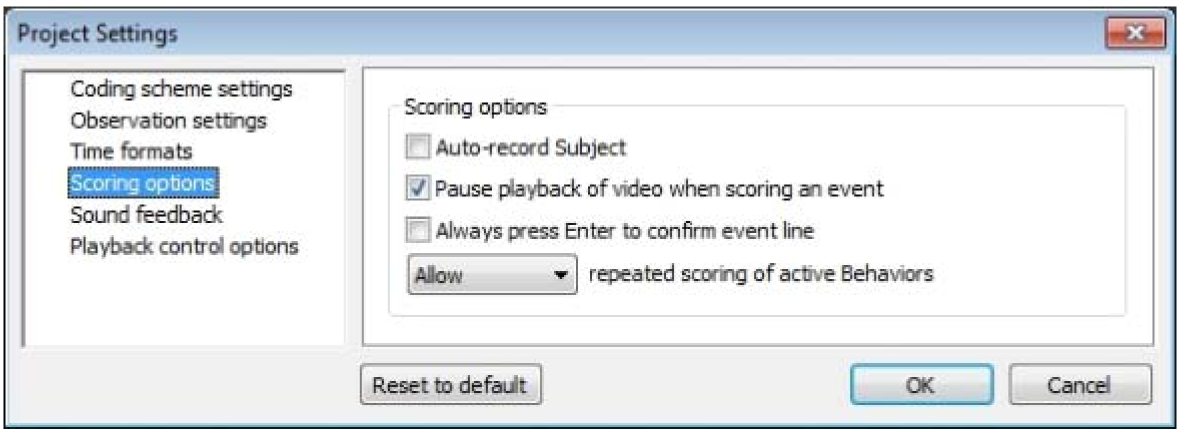
Select this option to include the date in the time stamps.

Show frame numbers while observing from video

Select this option to display frame numbers in the event log instead of times.

Scoring options

Choose **Setup** > **Project Settings** > **Scoring options**.



Auto Record Subject

Select this to score the same subject for consecutive events. Use this option when you score from video, have multiple subjects and go through the video for every subject.

How to score a new subject – As soon as you want to enter the event for a different subject, click the cell where the subject was entered automatically, and score the new subject, the behavior and so on. The new subject is now scored for all the next events.

Pause playback when scoring an event

With this option the video pauses when you score the first element of an event. Playback resumes after scoring the last element of the event or pressing Enter to confirm the event line (see below). When you carry out an Offline observation with the Instantaneous Sampling method, the media file automatically stops at the moment of sampling.

This option is also very useful if you score from audio files and you want to transcribe spoken text into comments).

Always press Enter to confirm event line

An event can consist of more than one elements (Subject, Behavior, Modifier). By default, The Observer XT automatically ends the coding of the event and moves to the next line in the event log when no further elements can be scored for that event. By selecting Press Enter to confirm Event line, you can press Enter once you have scored all the elements you require. This way, you can end an event when not all elements have been scored. For example, an event type where the Behavior is linked to a Modifier could be ended by scoring the Behavior, and then pressing Enter. The Modifier is then not scored.

Repeated scoring of active behaviors

Suppose an event started at the start of the observation. You score it again at ten seconds without having scored intermediate events. Select one of the options below to specify how both states are recorded.

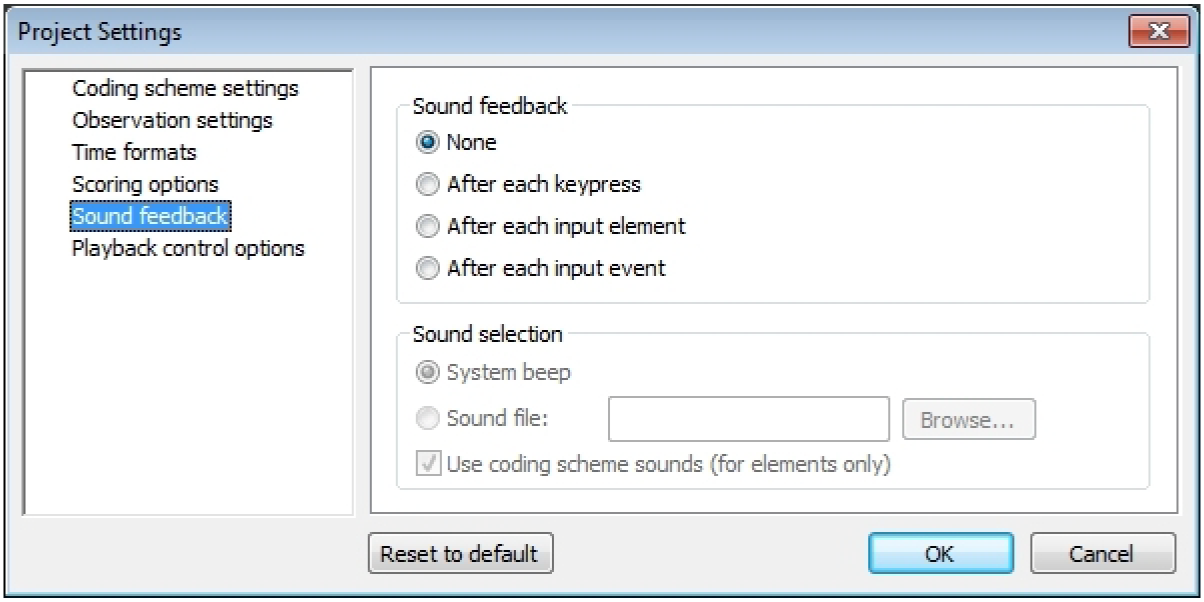
- Allow repeated scoring of active Behaviors – The Observer XT records the end of the first event at T=10s and starts the same behavior at this point. This means that two different states will be recorded, that is one from T=0 to T=10 and one from T=10 to the stop of this event. The frequency of this event would be 2. If the second event is stopped at T=15 the average duration will be 7.5 s.

- Ignore repeated scoring of active Behaviors – The Observer XT ignores the second start of the event at T=10s and gives an error message. With the example above the frequency of the event will be 1 and the average duration 15 s.

- Ask me for repeated scoring of active Behaviors - Select this option if you want The Observer XT to ask you what you want to do (whether to allow, or to ignore the recurring start).

Sound feedback

Choose **Setup** > **Project Settings** > **Sound feedback**.



Select one of the options for Sound feedback:

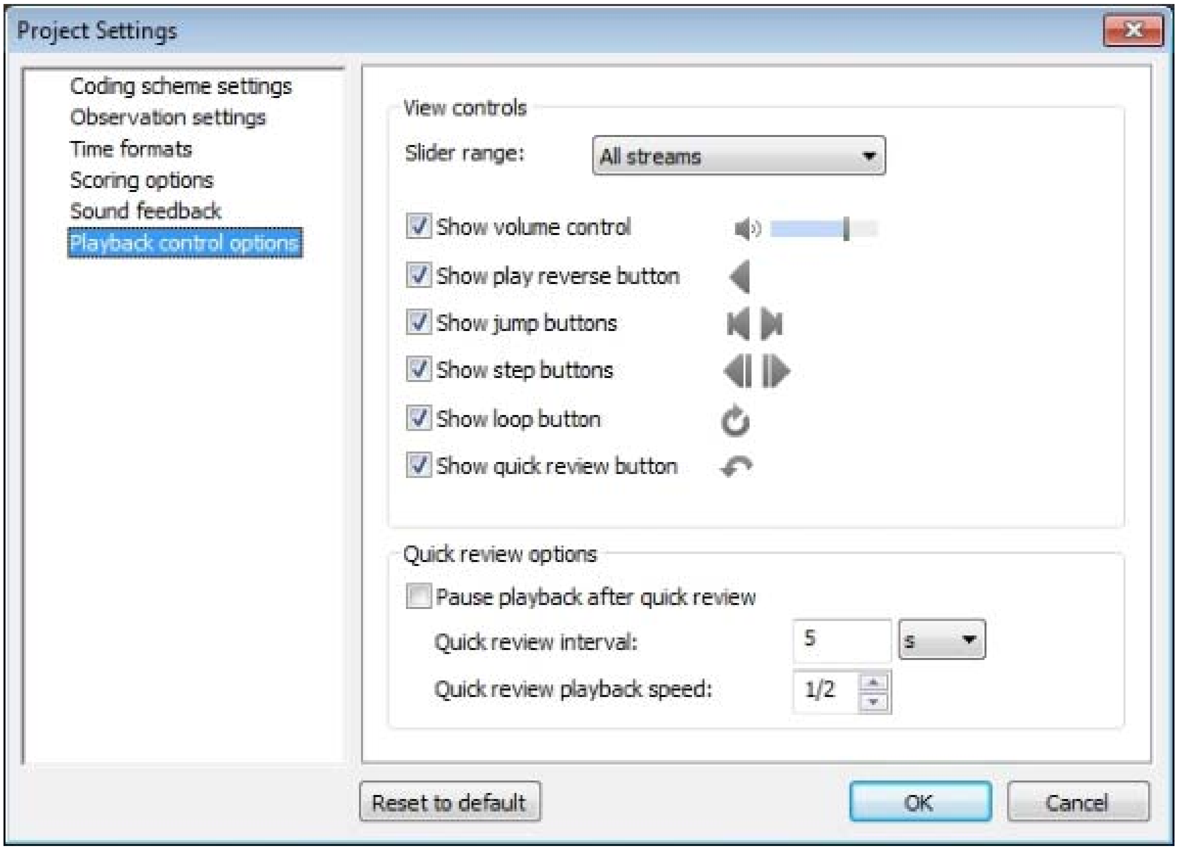
- None – No sound feedback.
- After each key press – A sound at each key press.
- After each input element (default) – A sound after each element (Subject, Behavior, etc.) was entered.
- After each input event – A sound after the event has been completely coded.

Sound selection

If you selected select to play sounds, select what to play under **Sound Selection**. Select **Use coding scheme sounds (for elements only)** to play the sounds specified in the coding scheme (Subjects, Behaviors, or Modifiers). This option only applies when you have selected a sound feedback After each input event (see above).

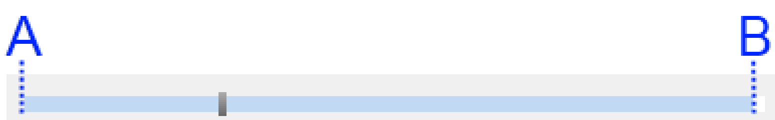
Playback control options

Choose **Setup** > **Project Settings** > **Playback control options**.



Slider range

Choose the segment of time you want to have displayed by the playback slider:



- All streams – The segment between A and B represents the time between the start of the earliest event/external/media file and the end of the latest event/external/media file.
- Observation – The segment between A and B represent the time interval that data was scored in, no matter how long the other data/media file streams are.

Note: the selection above affect the behavior of the Jump to begin or Jump to end buttons:,

As an example, if the event log starts 60 s later than the first video frame, and you select Observation as Slider range, clicking Jump to begin will position the slider cursor to the start of the observation (at 60s in the video), not at the start of the video. If you select All streams, the same action positions the slider cursor to the start of the earliest of all streams, that is the start of the video.

Select Playback control buttons

By default some buttons are hidden in the Playback control window. You can select them or deselect buttons that you do not need while scoring.

See The Playback control window for more information on the buttons.

See Playback control options for the buttons that can be hidden.

Loop options

To replay a video fragment for accurate scoring or demonstration purposes.

- Loop interval – By default the option **User defined** is selected. With this option selected, you either loop the entire video, or set an interval manually. If you select the option **Fixed interval**, a loop of a fixed length is created.

  See The Playback control window
- Interval length – This option is enabled if you select Fixed interval in the Loop interval list. Set the length of the loop.

Quick review

With the Quick review function (see The Playback control window) you can automatically rewind to a certain point and play the media file at a certain speed. Here, you customize your Quick Review function:

- Pause playback after quick review – Select this checkbox if you want the video to pause after the video fragment is played back.
- Quick review interval – Enter the number of seconds you want the video to be rewound before reviewing.
- Quick review speed – Select the speed at which the media file is played back. Note that not all speeds are available with certain video formats.

Other Project Setup Options

Options

Apart from the options described in Define Project Setup, the following options are available:

- Control External Devices or Programs during a Live Observation
- Specify the Duration of the Observation
- Enter Project Information
- Lock the Project Setup

Control External Devices or Programs during a Live Observation

You can control external devices or programs when you carry out a live observation with The Observer XT. For example, start a Data Acquisition System (DAQ) system, or video recording with MediaRecorder when you start an observation. This ensures synchronization of data streams.

To select external devices:

Choose **Setup** > **Project Setup** > **Live Observation** under **Observation source**.

The **Devices** window opens. If not, click the **Devices** button under **Live Observation**. You have the following options (see also External Programs):

- DAQ Settings (available with the External Data Module) – Select this option to co-acquire external (physiological) data during your observations.

  See External Data for details.

- Automatic linking of video files – To associate videos that were recorded with, for example an eye tracker, to an observation. Instruct the program how to locate the video files (see Automatic Linking of Digital Media Files). If you control MediaRecorder 4 or higher with The Observer XT, the videos are automatically linked to the observation, so do not select this option.
- Other options – Depending on what devices or programs are connected, more options may be available, like MediaRecorder, FaceReader, uASQ, or E-Prime. You can also create settings to control a program with command lines.

  See External Programs and the manual of those programs for details.

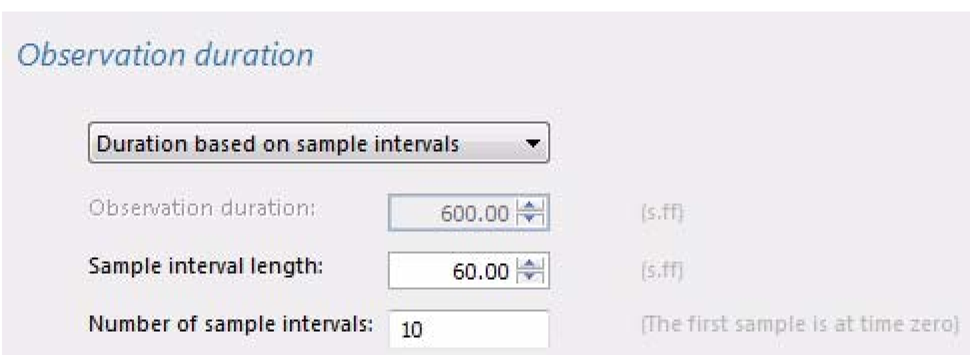
If you change the Observation method from live to offline between observations, you can no longer see the devices set for the live observations. To view them, right-click the observation in the Project Explorer, select **Properties** and go to the **Devices** tab.

Specify the Duration of the Observation

Select one of the following options:

- Open ended observation – The observation ends when you stop it manually, or when the end of the video file has been reached. Select one of the other two options if you want the observation to stop automatically after a predefined time.
- Duration based on elapsed time – The observation stops after a predefined time. Enter the time in the Observation duration field that appears.
- Duration based on observed time – The observation stops after a predefined time, excluding the time the observation was suspended. (see Suspend an observation). Enter the time in the Observation duration field that appears.

  If you observe from pre-recorded video, there is no difference between the elapsed and observed time. There is only a difference when you observe live and at some point you suspend the observation (see Suspend an observation).
- Duration based on sample intervals – This option is only available when you chose Instantaneous Sampling, or Combine Continuous and Instantaneous Sampling as observation method. Enter the Sample interval length and the Number of sample intervals in the fields that appear. The Observation duration is calculated automatically based on the combination of Number of sample intervals and Sample interval length.

  The first sample is taken at 0 seconds, and there is no sample at the stop of the observation. Therefore, the duration of the observation is actually one sample interval shorter than the displayed Observation duration.

  Example –The observation duration is set to Duration based on sample intervals. You set the Sample interval length to 60 secs and the Number of sample intervals to 10. The Observation duration is then automatically set to 600 seconds. However, the first sample is at 0 seconds, so the last sample is at 540 seconds. There is no sample at the exact stop time of the observation.

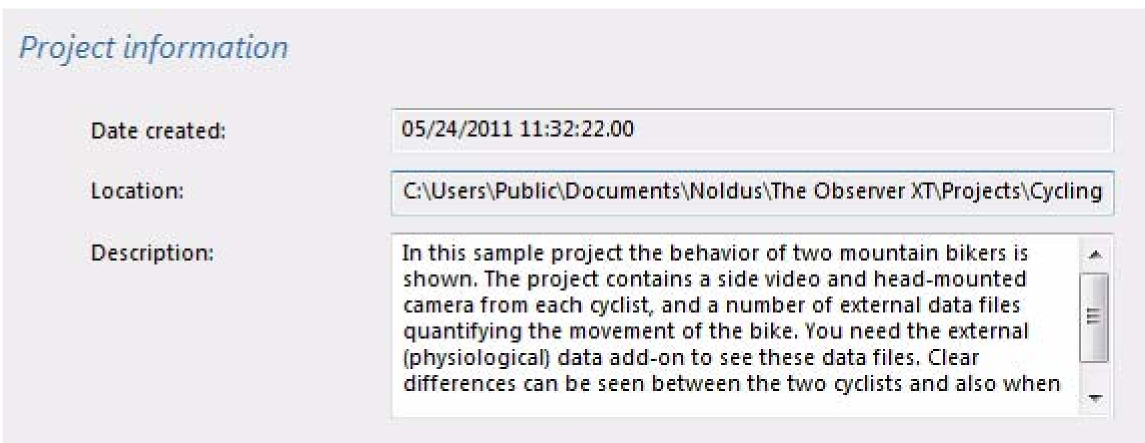
Enter Project Information

Under Project information, you can enter important information about your project. The following project information is available:

- Date Created – The date and time when the project was created. This field cannot be edited.
- Location – The location where your project is stored on your computer.

  For the default location, see File Locations in File Management.

  To change the default location of future projects, see File locations in Installation
- Description – Enter information about your project such as: location, date or time of year of the study, observers, the scientific research question that you aim to answer with this study, etc. You can edit the description at any time. You can enter maximally 2047 ASCII characters.



Template information

If your project is based on a template, the **Project Setup** window also contains **Template information** with the **Name**, **Date created** and additional information. The template information cannot be edited.

See also: Create a new Project from a template in File Management

Lock the Project Setup

To prevent changes to the setup, lock your setup. Choose **Setup** > **Lock Configuration**.

In a locked configuration the following items cannot be edited:

- Observation source – You cannot change the observation source from Offline Observation to Live Observation or vice versa. However, if the observation source is live, you can select new devices, de-select devices, edit settings for the devices or add new external programs.

  See External Programs for more information about selecting devices for live observation.

- Observation method
- Observation duration.

  See Specify the Duration of the Observation

- Sample interval length
- Project information.

  See Enter Project Information

- Coding Scheme.

  See Create Coding scheme

- Independent Variables – You cannot define new independent variables or change the properties of existing variables. Entering/editing independent variable values is possible. If you observe offline, you can add new video files.

When you save your project as a template project, the project setup in the new project created with the template is locked.

To unlock the Project setup

To unlock the project setup choose **Setup** > **Unlock Configuration**.

External Programs

Aim

To control external programs with The Observer XT.

Examples

- Example 1 – Start video recording with MediaRecorder when you start an observation and stop recording when the observation ends. See:

  - Observe Live and Record Video with MediaRecorder

  - Example 2 – Start and stop facial expression analysis with FaceReader together with an observation. See:

  - Observe Live and Analyze with FaceReader

  - Example 3 – Start and stop an eye tracker that cannot be controlled with N-Linx together with an observation.

  - See Add a Custom External Device

Observe Live and Record Video with MediaRecorder

Aim

To obtain the following:

1. When you create a new Observation, MediaRecorder starts and loads a camera configuration (see the MediaRecorder Reference Manual for information on configurations files).
2. When you start an Observation, MediaRecorder starts recording.
3. When you stop an Observation, MediaRecorder stops recording.
4. The recorded videos are automatically linked to the observation.
5. The recorded videos are automatically synchronized with the events.

Prerequisites

- You have MediaRecorder 4 or higher.

  For earlier versions of MediaRecorder, the procedure may be different. Consult the documentation of that version.

- The Observer XT, MediaRecorder, and N-Linx Server are installed on computers that are in the same network.
- On the computer with MediaRecorder, you installed N-Linx Agent and selected **Noldus MediaRecorder** in the installation window.
- In N-Linx Agent, you entered the computer name or IP address of the computer with N-Linx Server.
- In MediaRecorder, you selected **Allow communication with N-Linx** as N-Linx Settings and entered the computer name or IP address and the port of the computer with N-Linx Server.
- If MediaRecorder, N-Linx Server and The Observer XT do not all run on the same computer, you created exceptions in Windows FireWall for the default port 5672 on all computers.

  If you chose another port, you created exceptions in Windows FireWall for that port.

- If MediaRecorder and The Observer XT run on different computers, you made sure that the computer with The Observer XT can access the MediaRecorder video files.

See Access the video files on another computer

See the following documentation for additional information on the prerequisites:

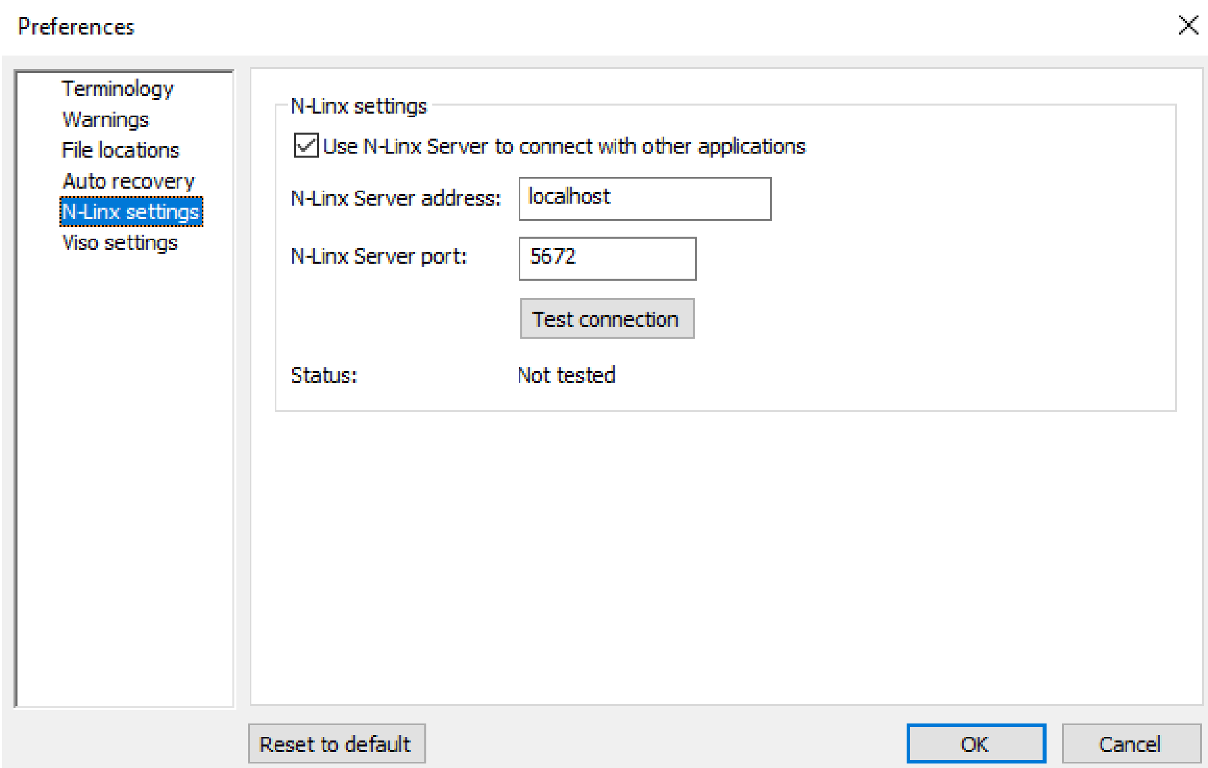
- MediaRecorder Reference Manual. Press **F1** in MediaRecorder to open it.
- Reference Manual - N-Linx. You find this manual under **Documentation** on the MyNoldus section of the Noldus website (my.noldus.com).

Procedure in short

NOTE The detailed procedure to set this up is present in the chapter **MediaRecorder with The Observer XT** in the MediaRecorder Reference Manual. Press **F1** in MediaRecorder to open the Reference Manual.

In The Observer XT

1. Choose **File** > **Preferences** > **N-Linx Settings**.
2. Select **Use N-Linx Server to connect with other applications**.

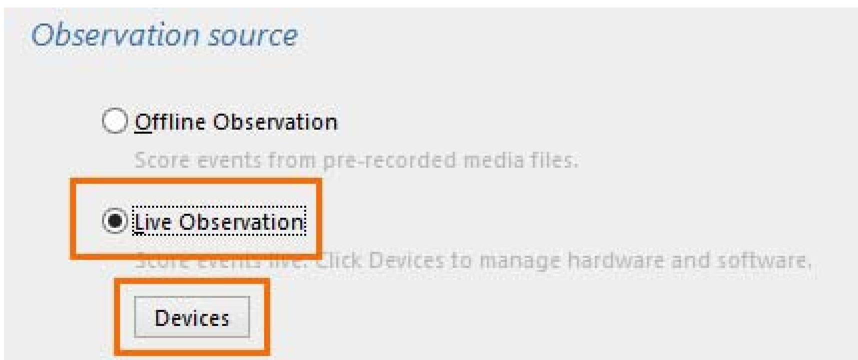


3. In the **N-Linx Server address** field, enter the computer name of the computer with N-Linx Server. If N-Linx Server is on the same computer as The Observer XT, leave the default entry *Localhost*.

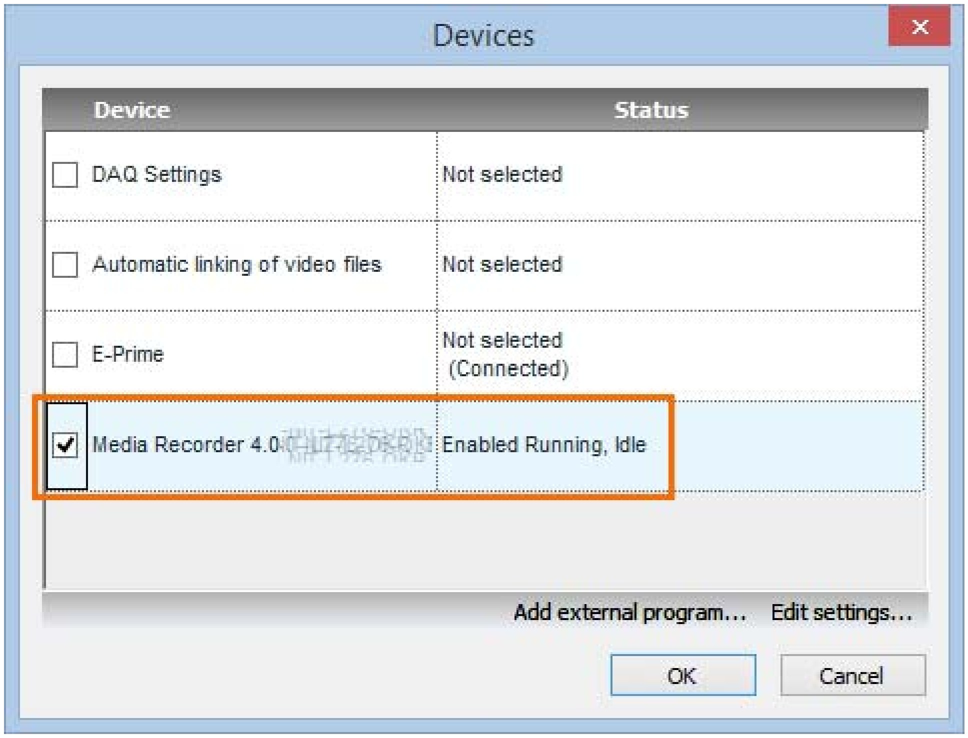
4. In the **N-Linx Server port** field, leave the default port *5672*. Ask your system administrator for assistance if this port is used by another program.

   If you change the port number, enter the same number in the N-Linx connection settings in MediaRecorder. Also, create exceptions in Windows FireWall for this port on all computers with MediaRecorder, The Observer XT, and N-Linx Server. See the MediaRecorder Help for details.

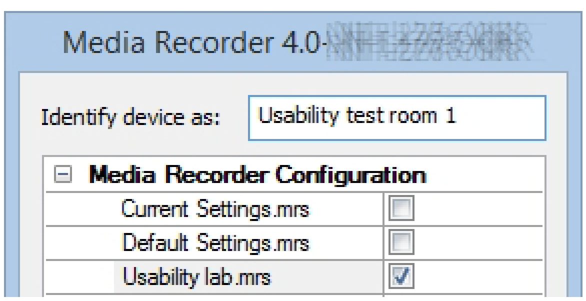
5. Click **Test connection**. If connection with N-Linx is found, the **Status** will change to **Connected**. If not, enter the correct settings and click **Test connection** again.
6. Click **OK**.
7. Choose **Setup** > **Project Setup**.
8. Under **Observation source**, select **Live Observation**. The **Devices** window now opens. If not, click the **Devices** button.

9. Select the checkbox in front of **MediaRecorder [version number-computer name]** and click **Edit Settings**. This opens MediaRecorder when it is not already open.

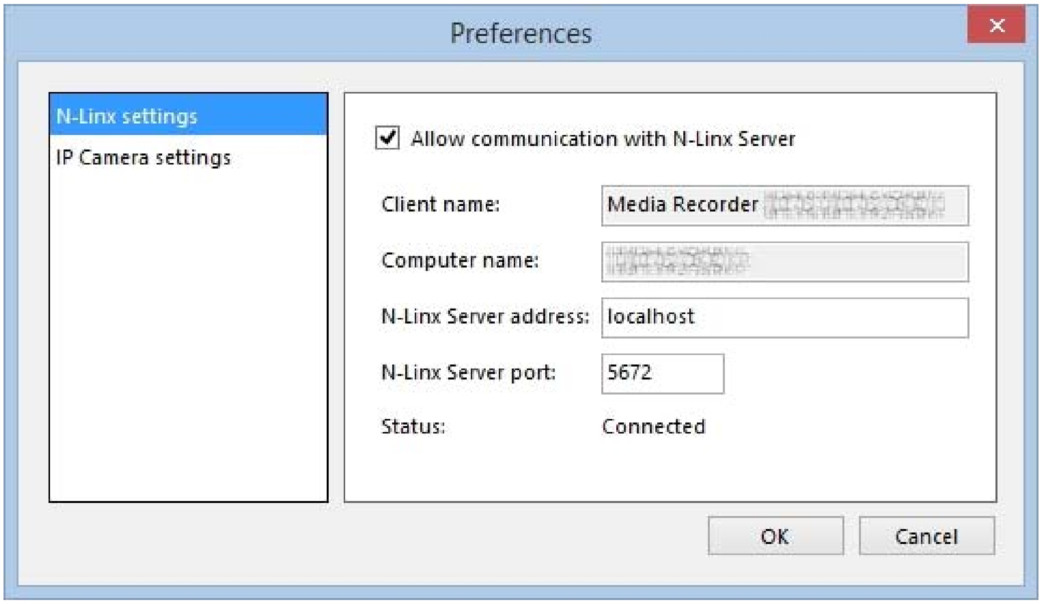


10. Click **Edit Settings** again. A window with the available MediaRecorder configuration files (see the MediaRecorder documentation) now opens. Select the configuration file you want to use and click **OK**. If you do not select a configuration, **Current Settings.mrs** will be used.
11. Enter a name in the **Identify device as** field. This allows you to control multiple MediaRecorders on different computers with The Observer XT.



In MediaRecorder

12. Choose **File** > **Preferences** > **N-Linx settings**.



13. Select **Allow communication with N-Linx Server**.
14. In the **N-Linx Server address** field, leave the default value *Localhost* if MediaRecorder runs on the same computer as N-Linx Server.

    If both programs are on different computers, enter the IP address or computer name of the computer with N-Linx Server.
15. In the **N-Linx Server port** field, leave the default port *5672*. Ask your system administrator for assistance if this port is used by another program.
16. When the connection with N-Linx Server is established the **Status** will be **Connected**. Click **OK**.
17. If MediaRecorder and The Observer XT run on different computers, select the mapped drive as location to store the video files.

    EXAMPLE You mapped the default folder C:\Users\Public Documents\Noldus\MediaRecorder\Video files as **X:**. Set the default video file location where MediaRecorder stores its video files to **X:** and not to the original folder. The original folder is locally on the computer with MediaRecorder and cannot be accessed by The Observer XT.

Carry out observation

When you now create a new observation, MediaRecorder opens, when it is not already open. When you carry out an observation, MediaRecorder starts video recording. When you stop an observation, video recording stops. The videos are automatically linked to the observation and synchronized with the events.

See Carry out an Observation

Note

If MediaRecorder is not open, the MediaRecorder line in the **Devices** window (step 9) is grayed out and the status is **Disabled**. MediaRecorder will be started when you create an observation.

Observe Live and Analyze with FaceReader

Aim

To obtain the following:

1. When you start an Observation, FaceReader starts analyzing with the selected settings (see the FaceReader Help for information on the settings). FaceReader also records a video of the test participant's face.
2. When you stop an Observation, FaceReader stops analyzing.
3. The FaceReader analysis results are automatically imported into The Observer XT and synchronized with the events.
4. The recorded video is automatically linked to the observation and synchronized with the events and FaceReader analysis results.

Prerequisites

- You have FaceReader 8 or higher.

  For earlier versions of FaceReader, the procedure may be different. Consult the documentation of that version.

- The Observer XT, FaceReader, and N-Linx Server are installed on computers that are in the same network.
- Your license for The Observer XT includes the External Data Module
- FaceReader is open.
- You created a project with at least one participant in FaceReader.
- You selected a default camera in FaceReader and selected to record video.
- In the FaceReader Data Export Settings, you selected **Enable N-Linx** and entered the IP address or computer name of the computer with N-Linx Server.
- If FaceReader, N-Linx Server and The Observer XT do not all run on the same computer, you created exceptions in Windows FireWall for the default port 5672 on all computers.

  If you chose another port, you created exceptions in Windows FireWall for that port.

- If FaceReader and The Observer XT run on different computers, you made sure that the computer with The Observer XT can access the FaceReader video files.

  See Access the video files on another computer

  See the following documentation for more details on these prerequisites:

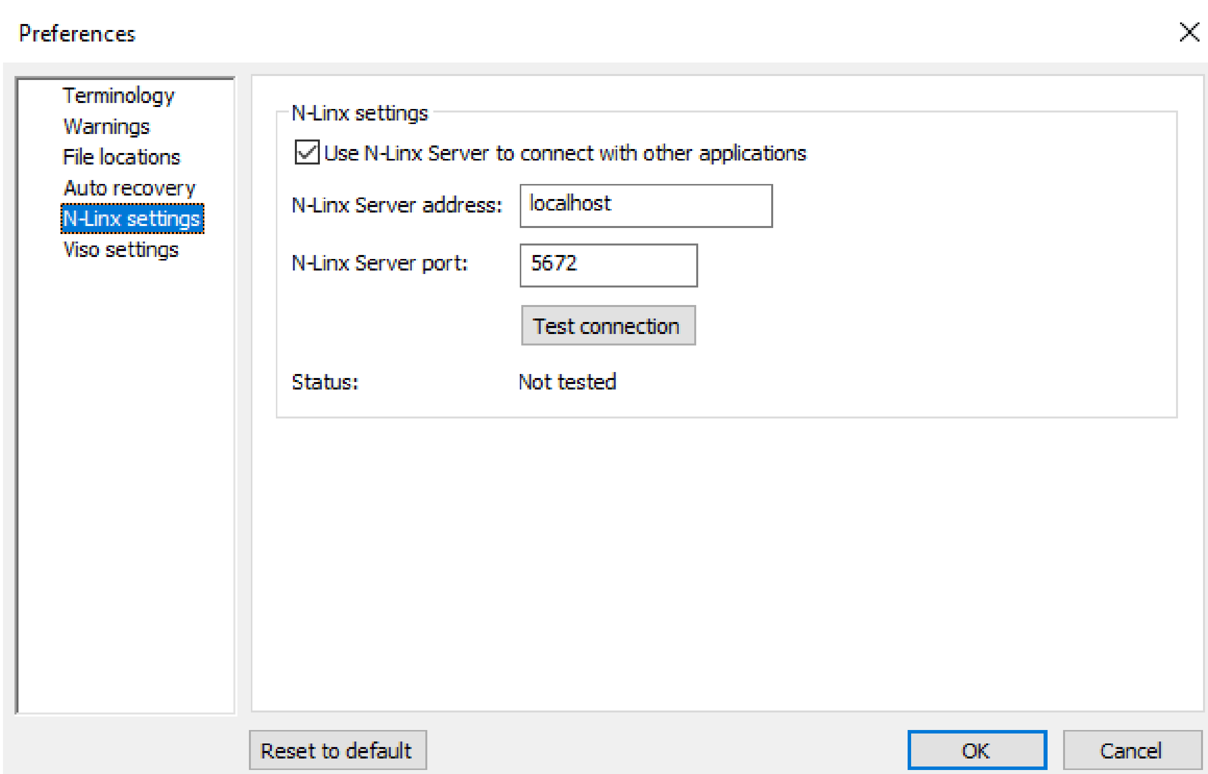
- FaceReader Help. Press **F1** in FaceReader to open it.
- Reference Manual - N-Linx. You find this manual under **Documentation** on the MyNoldus section of the Noldus website (my.noldus.com).

Procedure in short

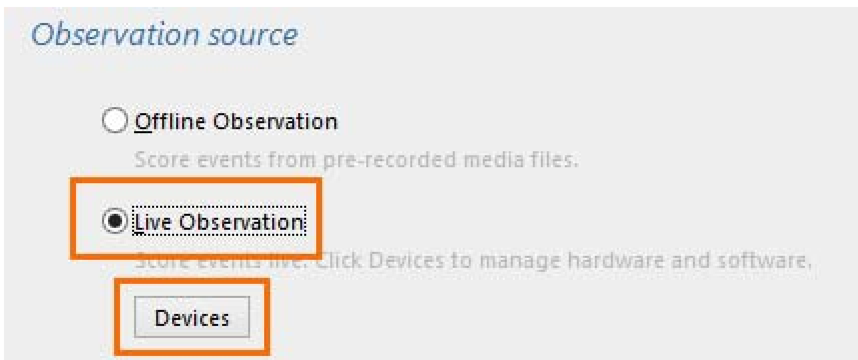
NOTE The detailed procedure to set up FaceReader with The Observer XT is present in the topic **FaceReader with The Observer XT** in the FaceReader Help.

In The Observer XT

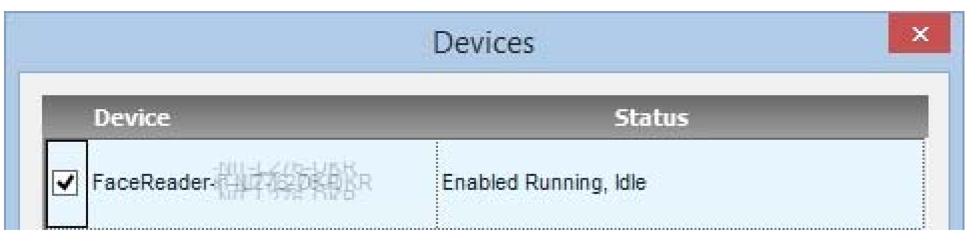
1. Choose **File** > **Preferences** > **N-Linx Settings**.
2. Select **Use N-Linx server to connect with other applications**.



3. In the **N-Linx Server address** field, enter the IP address of the computer with N-Linx Server. Leave the default entry *localhost if N*-Linx Server is on the same computer as The Observer XT.
4. In the **N-Linx Server port** field, leave the default port *5672*. Ask your system administrator for assistance if this port is used by another program.
5. Click **Test connection**. If connection with N-Linx is found, the **Status** will change to **Connected**. If not, enter the correct settings and click **Test connection** again.
6. Click **OK**.
7. Choose **Setup** > **Project Setup**.
8. Select **Live Observation**. The **Devices** window now opens. If not, click the **Devices** button.

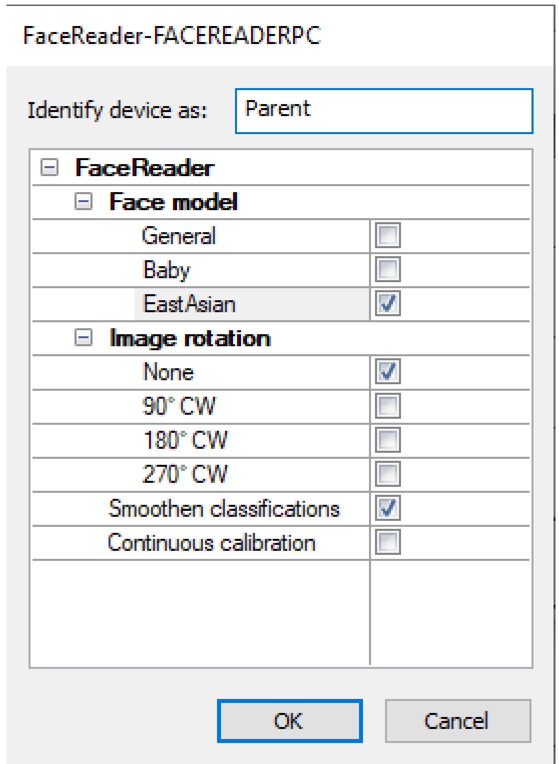


9. Select the checkbox in front of **FaceReader -[computer name]** and click **Edit Settings**.

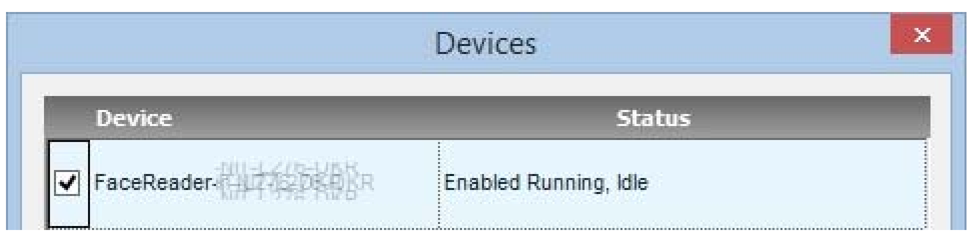


10. Select the FaceReader settings for your experiment. See the documentation for details on the settings.

    Optionally, enter a name in the **Identify device as** field. This name will be added to the Coding Scheme as Subject. Entering a name allows you to control multiple instances of FaceReader, that run on different computers, with The Observer XT.

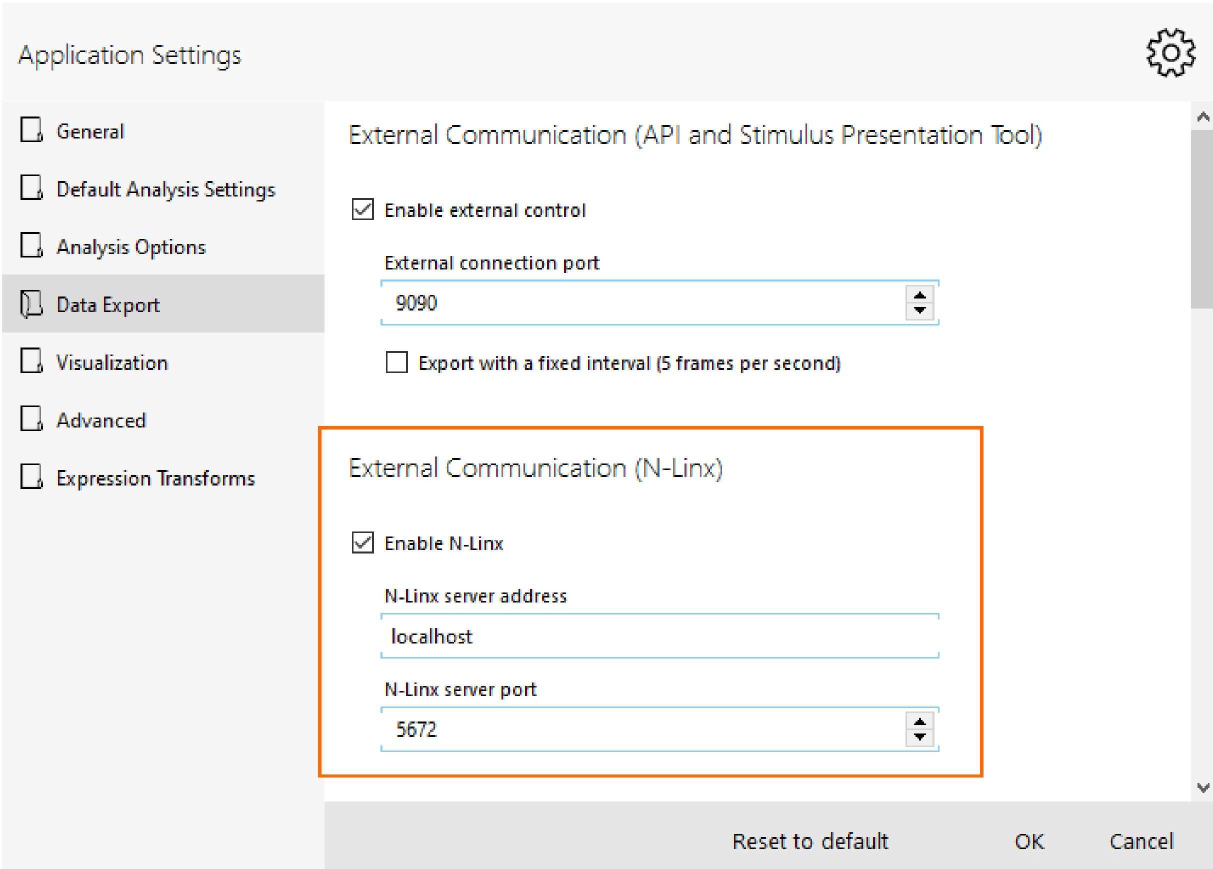


11. Click **OK** and select the checkbox in front of the line **FaceReader - [computer name]**.

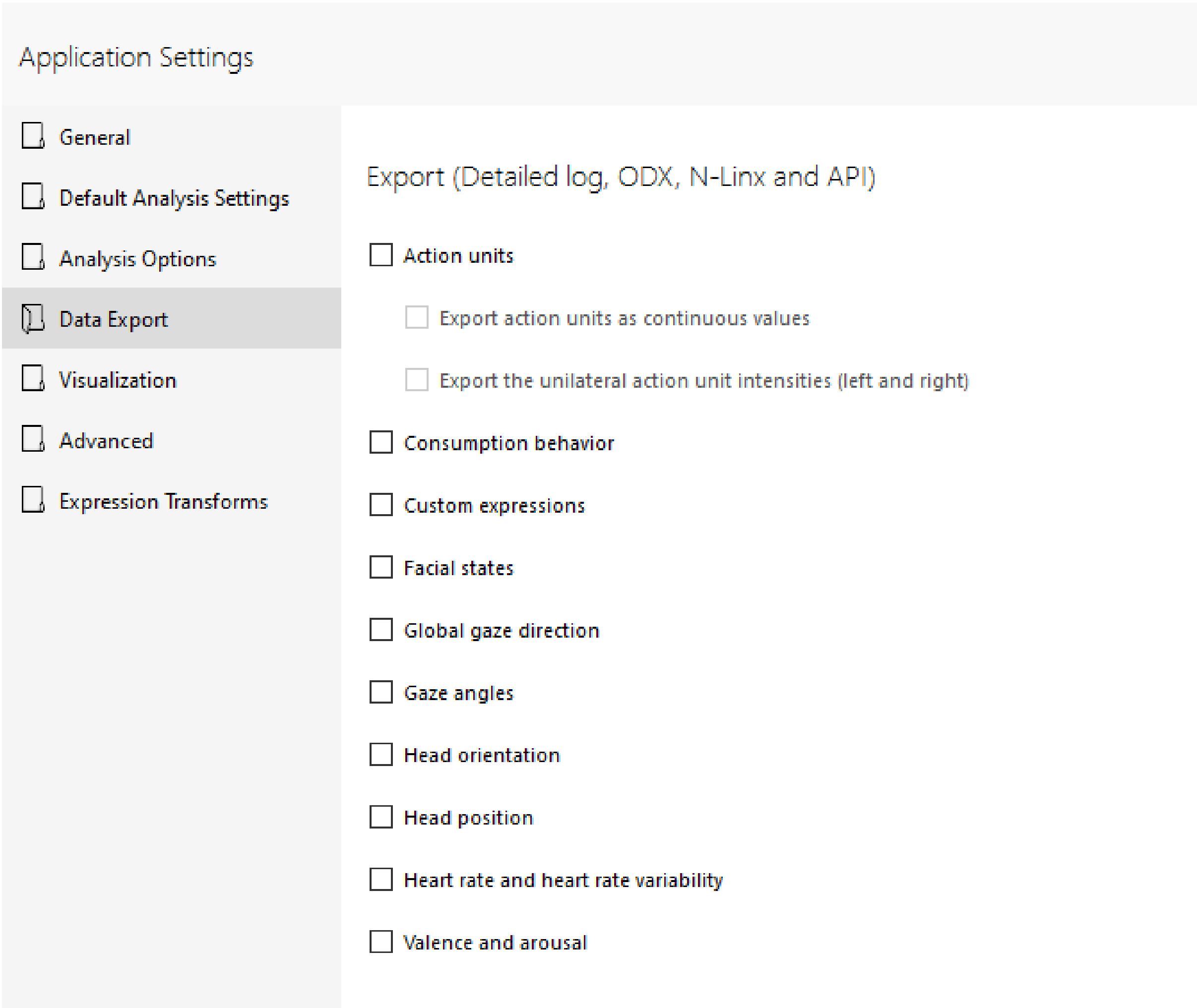


In FaceReader

1. Choose **File** > **Set Default camera**, choose your camera and select the option **Record**.
2. Choose **File** > **Settings** > **Data Export**.
3. Under **External Communication (N-Linx)**, select **Enable N-Linx**.



4. If FaceReader and N-Linx Server run on the same computer, leave the default address *localhost* in the **N-Linx server address** field. If the programs run on different computers, enter the IP address or computer name of the computer with N-Linx Server. To find that name, open the Control Panel and choose **System**.
5. In the **N-Linx server port** field, leave the default port *5672*. Ask your system administrator for assistance if this port is in use by another program.
6. Under **Export (Detailed Log, ODX, N-Linx and API)**, choose which data to send to The Observer XT.



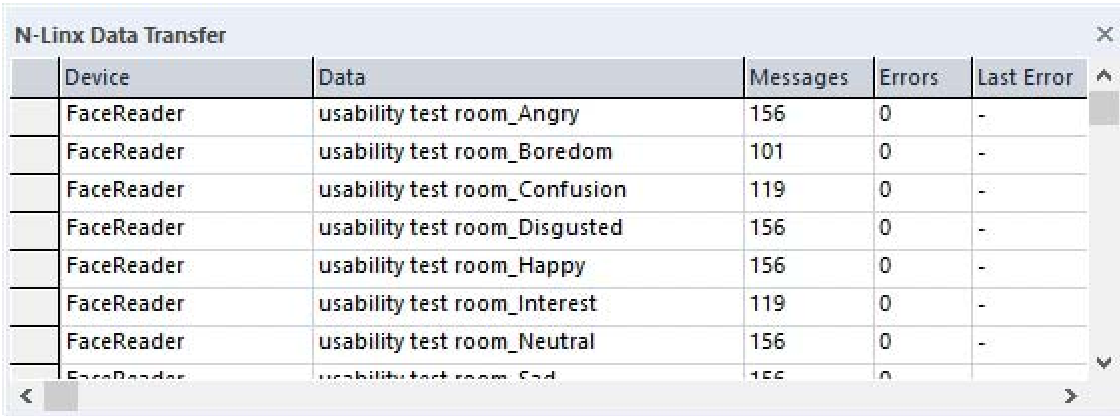
Carry out observation

When you now carry out an observation, FaceReader analysis starts.

See Carry out an Observation

You can follow the data transfer in the **N-Linx Data Transfer** window.

See The N-Linx data transfer window



When you stop the observation, the FaceReader data are imported into the Observation. The name you entered in step 10, is imported as Subject in the Coding Scheme. The video is also imported into The Observer XT automatically.

The **N-Linx data transfer** window

Rows

Each row represents a data stream.

Stream

The name you gave in the **Identify devices as** field in step 10 with the name of the data stream.

Messages

The number of times information was sent from FaceReader to The Observer XT.

Error

An error can occur when a package contains data that The Observer XT cannot handle. For example, when time information in the package is incorrect. Check the setup if many errors occur.

Last Error

The last time an error occurred.

Notes

- See the FaceReader documentation for details on how FaceReader data are imported into The Observer XT.

- **TIP** Enter the name of the test participants in the Independent Variables list, instead of defining it as Subject.

  See Independent Variables

- When you enter a name in the **Identify device as** field in step 10, this name is added as a subject to the Coding Scheme. When you now manually score events, The Observer XT expects that for each event you first score a subject and then a behavior. Define a subject in the Coding Scheme. Then choose **Setup** > **Project Settings** > **Scoring Options** and select **Auto-record subject**. You now have to score the subject only once at the start of the test.

Access the video files on another computer

Aim

(for two computer setup)

To make sure The Observer XT can access videos from, for example, FaceReader or MediaRecorder on another computer. The videos are not copied to The Observer XT. The Observer XT creates a link to the videos.

Procedure

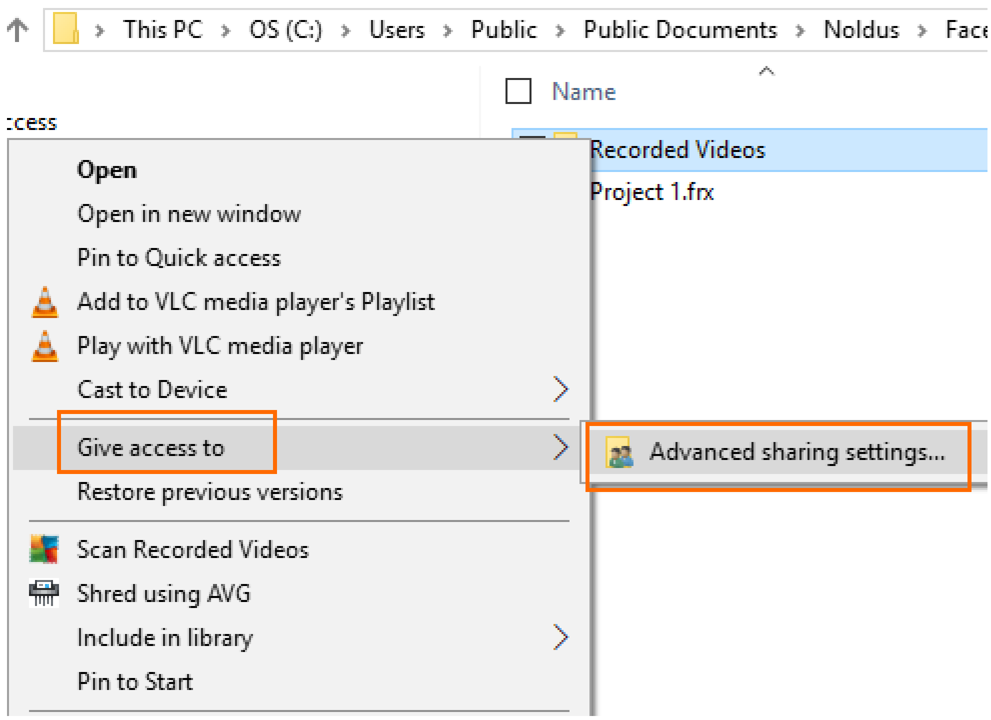
Carry out the following steps:

1. Share the folder where the video files are stored.
2. Turn off password protected sharing on the FaceReader computer.
3. Create a mapped drive from the shared folder on both computers.

Share the folder where the video files are stored

Procedure

1. Right-click the folder where the video files are going to be stored and select **Give access to** and then **Advanced Sharing Settings**.

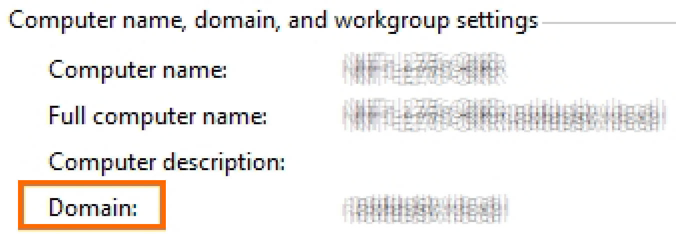


2. Change the sharing options for all your network profiles ('Private', 'Guest or Public' and 'Domain'): select the option **Turn on file and printer sharing** for all your profiles.
3. Under 'All Networks' select the option **Turn on sharing so anyone with network access can read and write files in the Public folders**. Then click **Save Changes**.

Switch off password protected sharing on the computer with the video files

This procedure is needed to make sure that the folder where the video files are stored can be accessed without a password by the computer with The Observer XT.

The procedure differs for a Windows workgroup or a domain. To see whether a computer is in a workgroup or a domain, open the Control Panel and choose **System**. The type of network is listed under **Computer name, domain, and workgroup settings**.



Procedure for workgroup

1. Follow the procedure in Share the folder where the video files are stored to open the Advanced sharing settings.
2. Under **Password protected sharing**, select the option **Turn off password protected sharing**.

   IMPORTANT If you do not see this option, most likely your computer is in a domain, not a workgroup. Carry out the procedure for domain below.

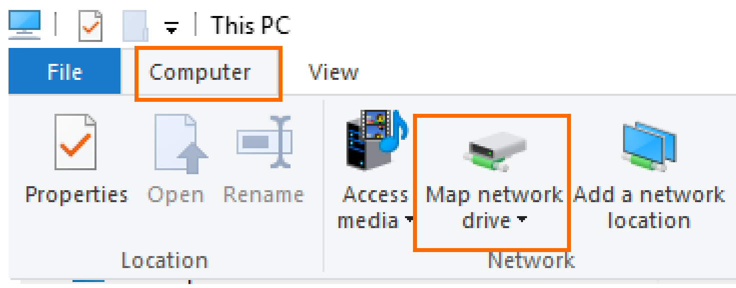
Procedure for domain

1. Press the **Windows key** + **R**.
2. Type **lusrmgr.msc** and press **OK**.
3. Open the **Users** folder and double-click **Guest**.
4. Deselect Account is disabled and click **OK** and close the **lusrmgr** window.
5. Press the **Windows key** + **R**.
6. Type **gpedit.msc** and press **OK**.
7. Open Computer Configuration\Windows Settings\Security Settings\Local Policies\User Rights Assignment and double-click **Deny access to this computer from the network**.
8. Click **Guest** and then choose **Remove** > **OK**.
9. Close the **Local Group Policy Editor** window.

Map the shared video file folder

Carry out this procedure on both computers.

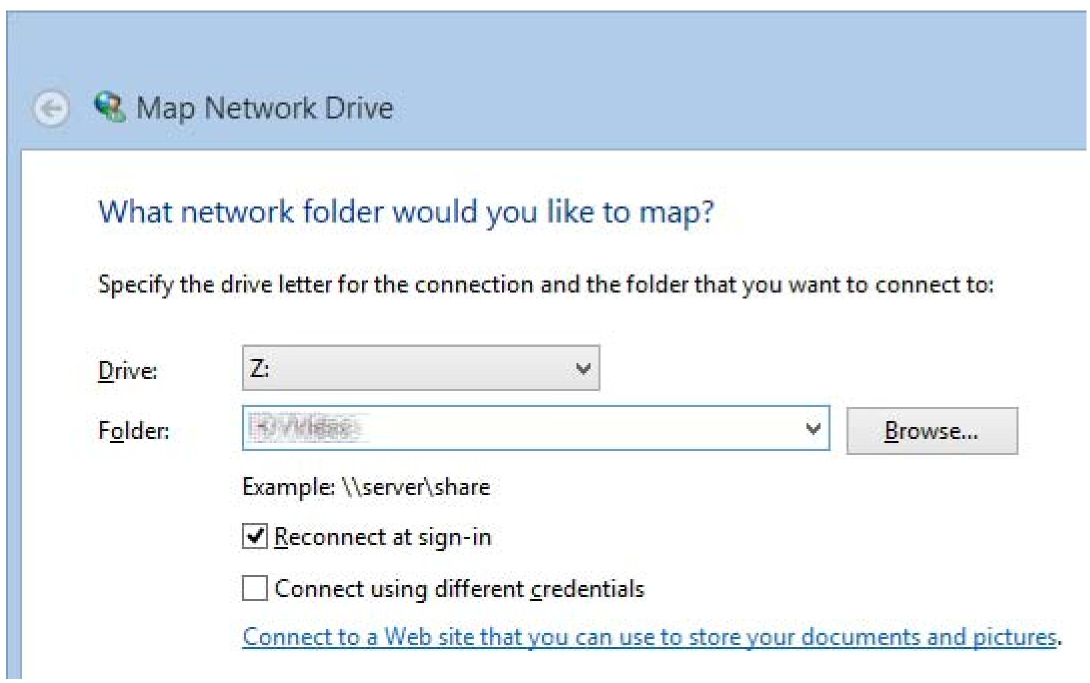
1. Open File Explorer and then **This PC**.
2. Click **Computer** and then click the **Map network drive** icon.



3. Choose a name for the drive and browse to the shared folder.

   IMPORTANT Make sure you select the same drive letter on both computers.

4. Click **Finish**.



Notes

- When you now start the computer with The Observer XT you need to enter the login details for the computer with the video files.
- Make sure the computer with the video files is switched on when you open your project in The Observer XT. Otherwise The Observer XT will not be able to open the videos.

Add a Custom External Device

Aim

To control a device that cannot communicate with The Observer XT using the Noldus communication protocol N-Linx. Examples of such devices are older versions of MediaRecorder and FaceReader, some physiological data acquisition systems, and some eye trackers.

Note

BIOPAC AcqKnowledge 5, Tobii Pro Studio,Tobii Pro Lab and Tobii Glasses software and the Bitbrain EEG acquisition software can be controlled using N-Linx, which simplifies data acquisition and ensures synchronization with events with the acquired data.

See:

- Technical Note - BIOPAC MP System - The Observer XT
- Technical Note - Tobii Pro Eye trackers - The Observer XT
- Technical Note - Tobii Glasses - The Observer XT
- Technical Note - Bitbrain EEG - The Observer XT

You can download these technical notes from the MyNoldus section of the Noldus website.

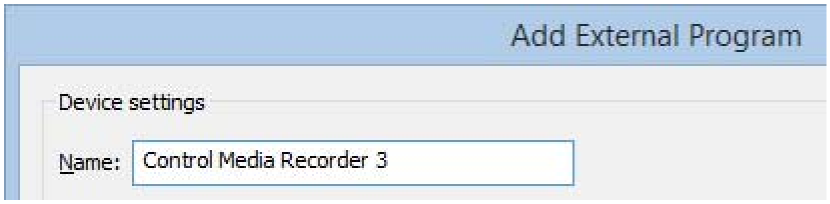
https://my.noldus.com

Prerequisite

The external device can be controlled with a command line.

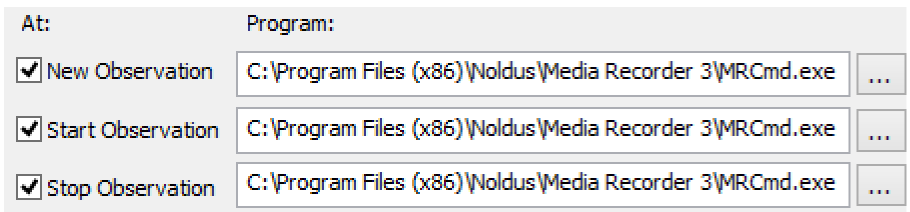
General procedure

1. Choose **Setup** > **Project Setup**. Under **Observation source**, select **Live Observation**.
2. The **Devices** window opens, If not, click the **Devices** button. Click the **Add external program** button at the bottom of the table.
3. Enter a name for the action, for example, *Control MediaRecorder 3*.



4. Under **At:,** select when you want the program to run. The action will be defined in step 5.

5. In each of these three rows, click the button next to the **Program field**, and browse to the program to control. See the picture below for an example to control MediaRecorder 3.



6. In the command line options field, enter the command to be carried out, for example:

   /R in the Start Observation row for MediaRecorder 3.

   In the **Command line options** field you can also enter the following commands:

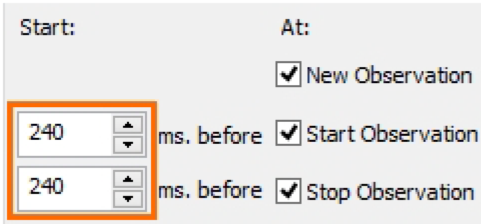
   %ON% – Enters the current observation name in the command line.

   %SN% – Enters all available subject names in the command line, separated by spaces.

   Use these options, to, for example, run a batch file and enter the current observation name, or the subject names, in the file name it produces. It is not possible to combine these options with other commands in the command line.

7. There may be a delay between the observations and the commands being carried out in the external program. Enter this delay in the **ms. before** fields. The Observer XT now sends the commands the specified time before the observation starts/ends.

See also: How do I determine the delay?



8. Click **OK**. The **Devices** window shows the newly added action of the external program. Select the checkbox in front of it.

   Click **Edit Settings** to change this action. To rename or delete an action, right-click the corresponding row and select the option.

9. To add more actions, repeat steps 2 to 9 for each external program.
10. Optionally, set up Automatic Linking of Digital Media Files to automatically import videos created by the external program into the observation.

Notes

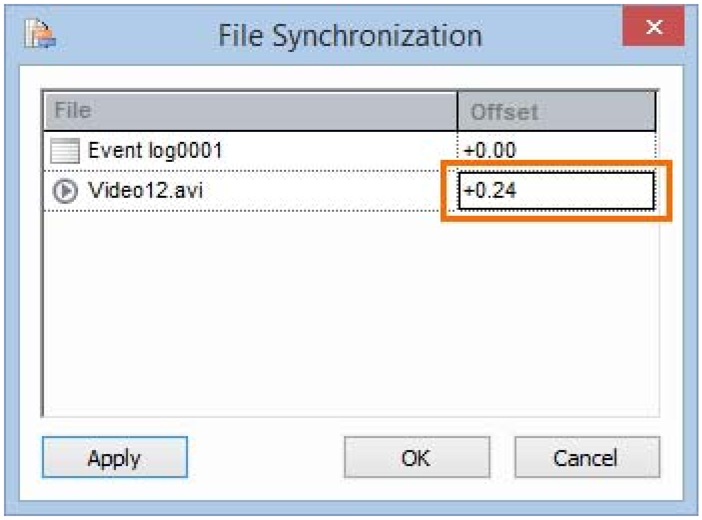
- For detailed procedures for, for example, older versions of MediaRecorder or FaceReader, consult the Reference Manual of that version.
- Videos created by MediaRecorder 2.5 or higher are automatically synchronized with the Event log when you import them in The Observer XT.

How do I determine the delay?

1. Carry out a test observation and make sure that with The Observer XT you score some conspicuous event that is also visible in the imported video or data file. For example, you record pressing the key on video.
2. Manually synchronize the event log and the imported file using the logged event.

   See Manual Offset

3. Open the **File Synchronization** window (see Numerical Offset); the offset of the data file relative to the event log is displayed here.



4. Enter this value in the **ms. before fields** in step 7 in Add a Custom External Device

Note

For complex lab setups, with various external applications, you can use the Noldus SyncBox to facilitate determining this delay. See the SyncBox -The Observer XT Technical Note which you can download from the Noldus website.

https://my.noldus.com

Automatic Linking of Digital Media Files

Aim

To automatically import videos into the observation and synchronize them with the Event log.

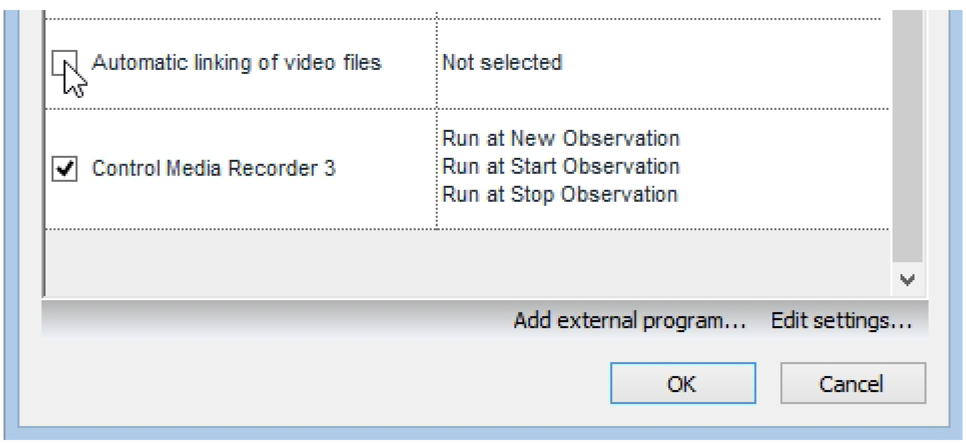
Prerequisite

You have an external video recording device that can be controlled with command lines. For example, MediaRecorder 3 or lower.

Current versions of Noldus software support data transfer and video linking with N-Linx, which is the recommended method. See, for example Observe Live and Record Video with MediaRecorder or Observe Live and Analyze with FaceReader.

Procedure

1. First, follow the procedure Add a Custom External Device to start and stop the video recording software with commands from The Observer XT.
2. Then select **Automatic linking of video files** in the **Devices** window.

   The **Automatic Linking of Video Files** window opens. If not, click **Edit settings**.
3. **Video linking folder** – Browse to the folder with the video files.

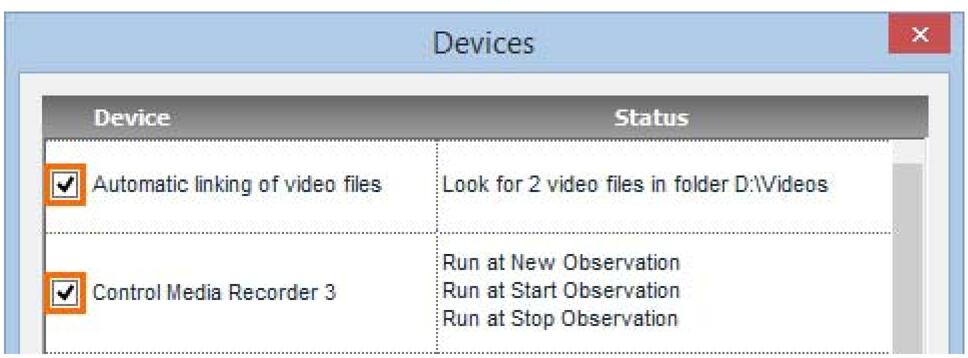
   IMPORTANT if the video files are stored in a shared folder, for example for in case of a two computer setup, select the shared folder, not the original folder. The original folder is a local folder on the computer with the video files and cannot be accessed by The Observer XT. Also make sure in the application that the videos are stored in the shared folder and not in the original folder.

EXAMPLE You shared the default folder C:\Users\Public Documents\Noldus\MediaRecorder\Videos as **MediaRecorder 3 videos**. Then select MediaRecorder 3 as default location where MediaRecorder stores its video files. In addition to this, browse to **MediaRecorder 3 videos** in the **Video linking folder** field.

4. **Link video extensions** – Make sure the video file format is present in this list. To specify multiple extensions, enter a semicolon (;).
5. **Link video based on** – choose one of the following:

   Observation name found in media file name – To let The Observer XT look for video files that contain the name of or have the same name as the current observation.

   Video start time (later than observation start time) – To let The Observer XT search for video files that are saved after the observation start time.
6. **Search for** – Specify here the number of videos per observation The Observer XT should look for.
7. Stop searching after – Specify the time The Observer XT should look for video files. Maximum time is 600 seconds.
8. Visualize audio of video files –To view the audio stream of the video files as waveforms.
9. Make sure the **Automatic linking of video files** option and the **External command** option are selected in the **Devices** window.



10. Carry out an Observation. After you have stopped the observation, the videos are imported into the observation.

Troubleshooting

No media files are detected

This can be because:

- You have set the wrong folder in the **Video linking folder** box.
- You have set the time in **Stop searching after** too short to detect any media files.
- You have selected **Observation name found in media file name** but the current observation name and media file name do not match.
- The video file extension is not present in the **Link video extensions** box.
- In case of a two-computer setup you shared the video file folder, but you selected the original folder name as linking folder instead of the shared folder. The original folder is a local folder on the computer with the video files and cannot be accessed by The Observer XT.

  EXAMPLE You shared the default folder C:\Users\[your username]\Documents\Noldus\FaceReader 9\Projects\[project name]\Recorded Videos as **FaceReader videos**. Then browse to **FaceReader videos** and not to the original folder.

- In case of a two-computer setup you shared the video file folder, but the application saves its videos to the original folder. See the previous bullet. Choose the shared folder as location where the application stores its video files.

Not all my media files are detected

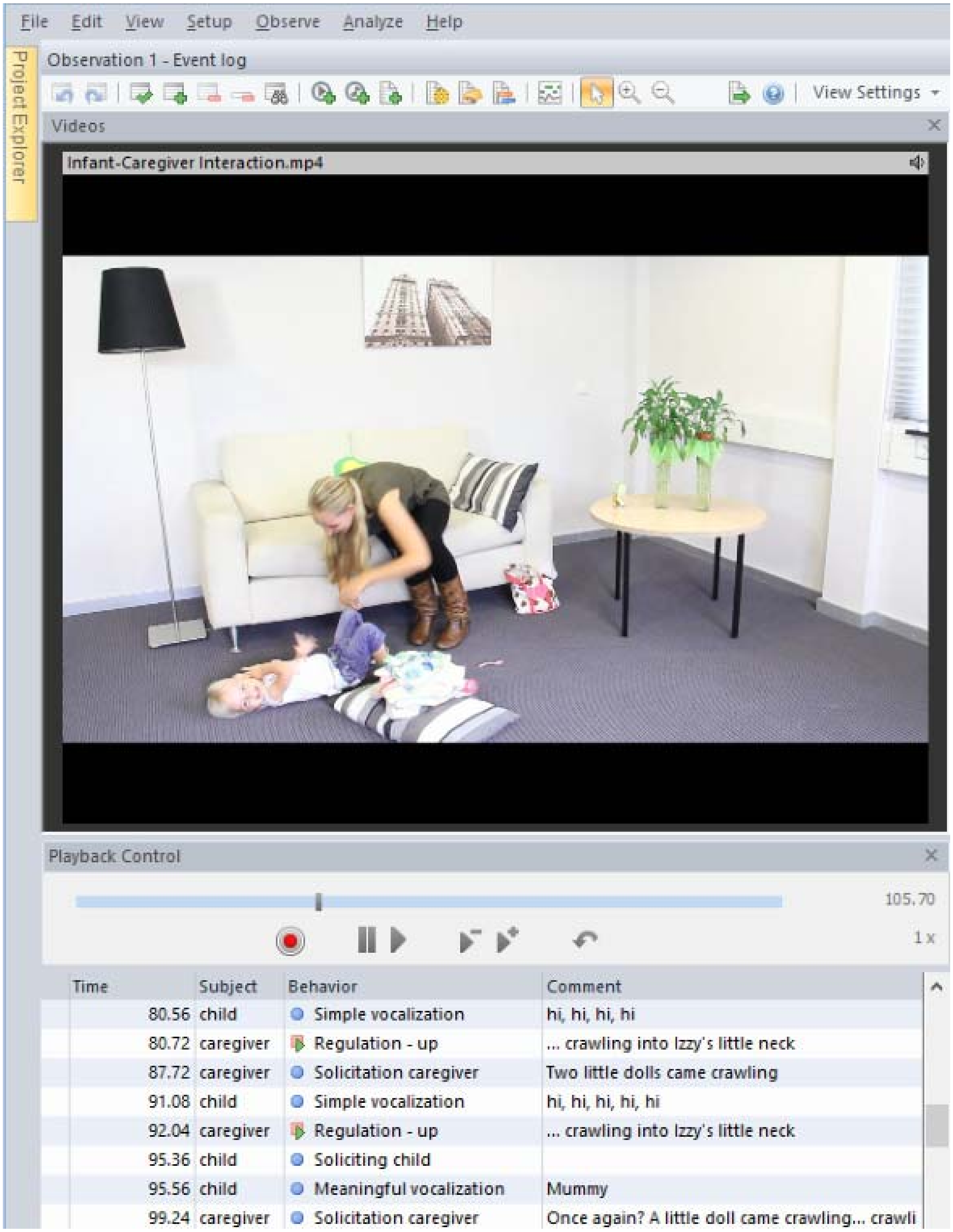
This can be because:

- You have set the time in **Stop searching after** too short to detect all media files.
- The number of video files set next to **Search for** is smaller than the number of video files actually created in one observation.

All my media files have been detected but monitoring continues

This can be because the number of media files set next to **Search for** is larger than the number of video files actually created. Click **Stop search**.

Carry out an Observation



Main topics

- Carry out an Observation
- Score Data; Detailed Procedure
- How to...
- The Observation Screen
- Manage Media Files
- Observations with Multiple Event Logs

Carry out an Observation

Carrying out an observation involves the following steps:

1. Create an Observation and (for offline observations only) load the videos.
2. Position the Video (offline observations only)
3. Choose the Active States at Observation Start (mutually exclusive and exhaustive behavior groups only)
4. Start the Observation
5. Score Data
6. Stop the Observation

Create an Observation

Aim

To create an empty worksheet for event logging, called an Event Log.

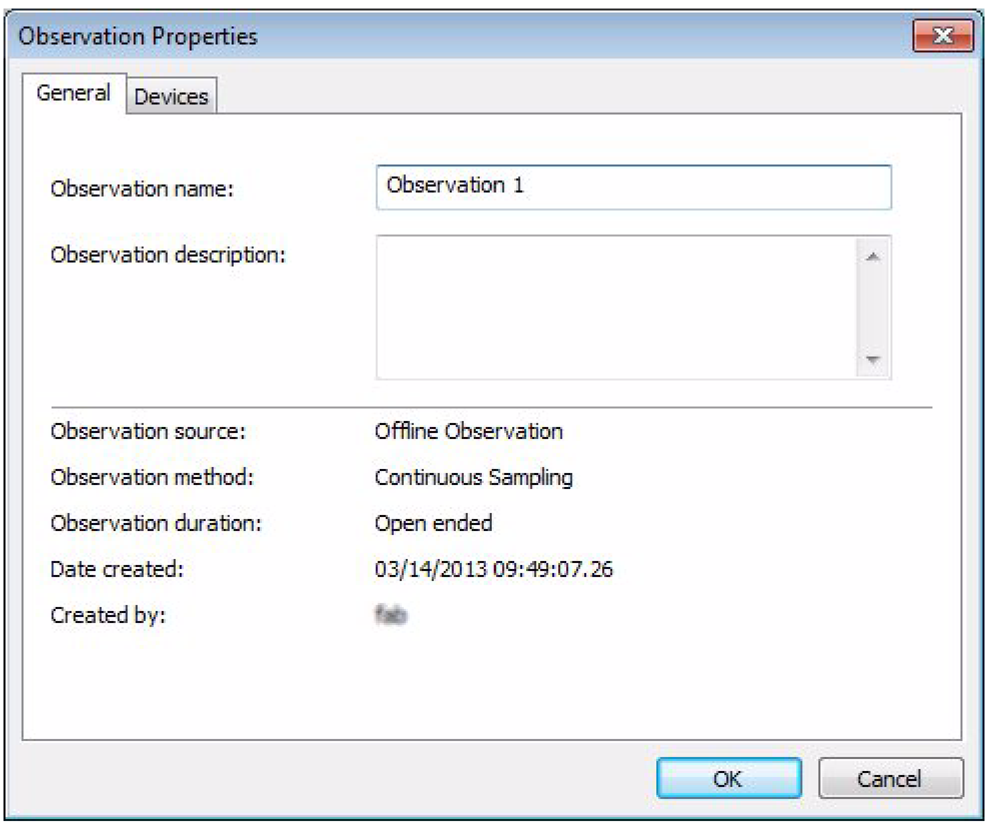
Prerequisite

You followed the procedure in Set up your Project

Procedure

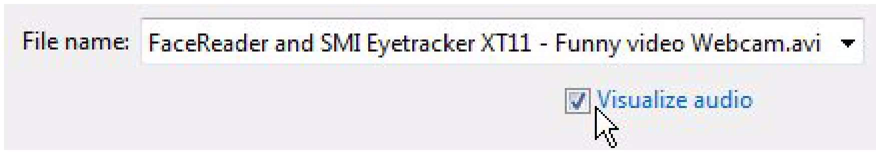
1. Choose **Observe** > **Observation** > **New**.
2. Optionally, enter an observation name and add a description.
3. Live observation – Optionally, select devices in the **Devices** tab (see Control External Devices or Programs during a Live Observation in Set up your Project). Click **OK**.

   Offline observation – the **Devices** tab is grayed out. Click **OK**.



4. Offline observation only – Select your video. To visualize the audio of a video file as a waveform, select **Visualize audio.**

   See Visualize audio waveforms from a video file

   To code from audio files without video, close the **Select Videos** window and click the **Import audio** button on the toolbar. Select the audio file and click **OK**.

Note

To modify the name and description of an observation or event log, do the following:

1. For observations – In the Project Explorer, open the **Observations** folder, right-click the observation and select **Properties**.

   For event logs – In the Project Explorer, open the **Observations** folder, and unfold the observation and then the **Event Files** item. Right-click the event log and select **Properties**.

2. Edit the name of the Observation or Event Log and **Description**, then click **OK**.

Position the Video

Aim

To choose the moment in the videos where you want to start scoring. This is needed for offline observations only.

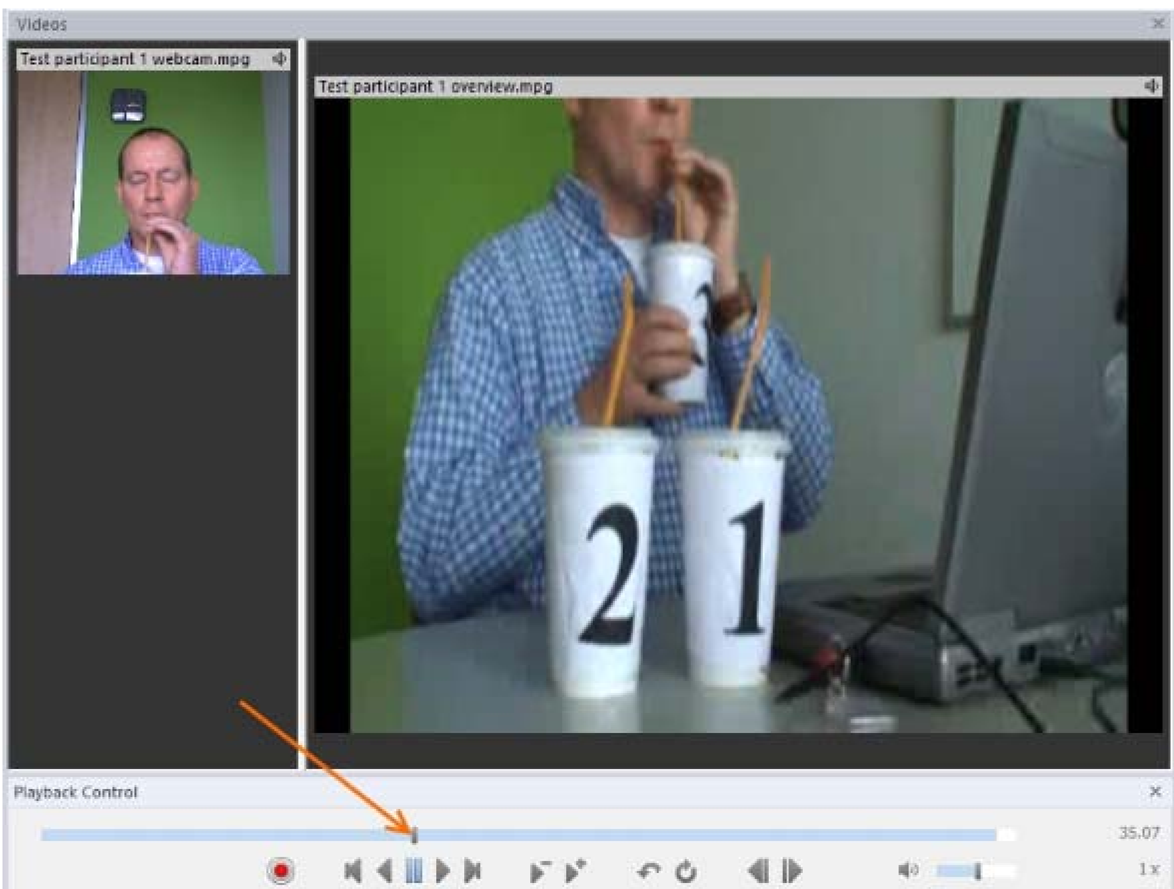
Prerequisites

- You chose Offline Observation as Observation source
- You created an observation and selected the videos.

Procedure

Move the playback slider to where you want to start scoring. Use the playback buttons for fine positioning.

See The Playback control window



Note

If you do not see the Playback Control window, choose **View Settings** > **Show Window** > **Playback Control**.

Choose the Active States at Observation Start

Aim

To make sure the correct events are scored at the start of the observation. This is only needed if you have mutually exclusive and exhaustive behavior groups.

Prerequisites

- You defined A mutually exclusive and exhaustive behavior group in your Coding Scheme.
- You created an observation.

Procedure

1. If you defined A mutually exclusive and exhaustive behavior group in your coding scheme, Initial State events (see Behavior types in Set up your Project) appear in your event log and Data and Audio Visualization window when you create an observation. Check that the states are correct.

   The Initial State events run from time 0 until the end of the video. When you work live the Initial State events have a duration of 15 minutes. The duration will be corrected as soon as you start coding.

2. If an Initial State event is not correct, select the cell and score the correct event behavior by pressing the key code. This behavior is now recorded at time 0.

   Example – The initial state event in the mutually exclusive and exhaustive group *Playing* is *Not Playing*. After you have created the observation, *Not Playing* appears in the event log at time 0. When you notice the child is playing with a toy, code the behavior *Play toy* before you start the observation.

3. If the initial state events are linked to one or more modifiers that must be scored (see Define Modifier (Group) Properties in Set up your Project), score the modifiers as well.
4. Repeat the steps above for all Initial state events.

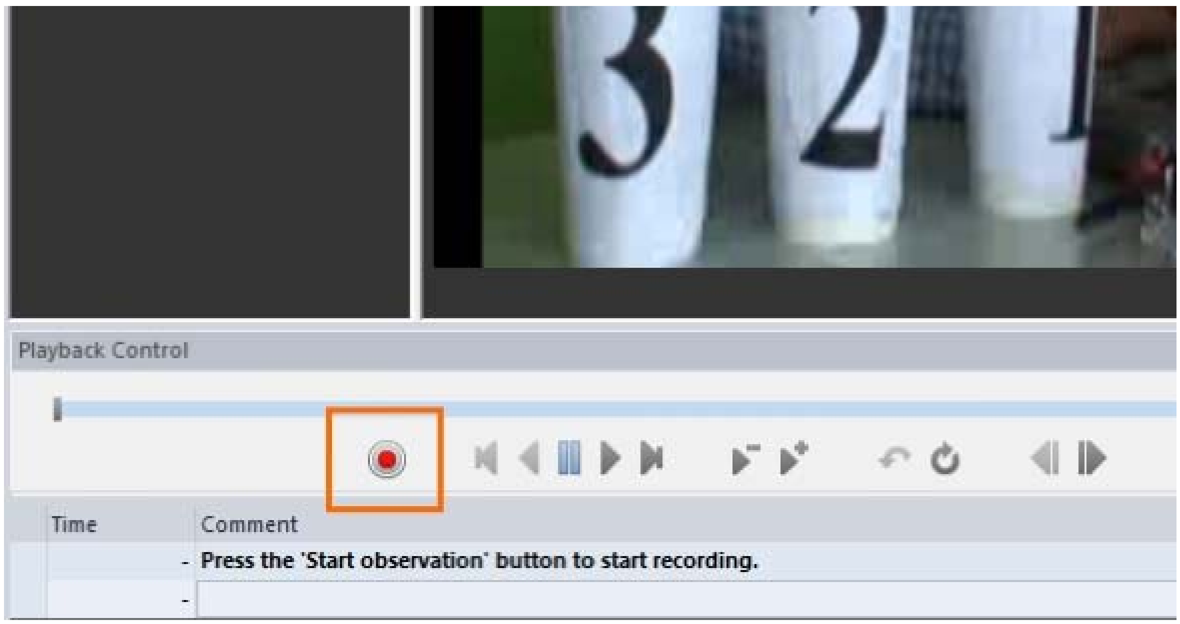
   In the example below, the subject Mother has one initial state *Gaze Undefined*, while Child has two initial states *Not Playing* and *Gaze Undefined*). The **Time** column shows no time for the initialized states, because the observation has not started yet.

Time	Subject	Behavior	Comment
-	**Press the 'Start observation' button to start recording.**		
-	Mother	Gaze Undefined	
-	Child	Gaze Undefined	
-	Child	Not playing	
-			

Start the Observation

Procedure

1. Click the **Start Observation** button.



2. If you have defined independent variables in your project setup and you chose to edit them before the observation (see Edit Independent Variables in Set up your Project), enter the values in the window that appears. You can skip values that are not compulsory.

   See Value update in Set up your Project

3. Now score your data.

   For general procedure, see Score Data

   For detailed procedures see:

   - Continuous Sampling

   - Instantaneous Sampling

   - Continuous and Instantaneous Sampling

   To pause a live observation, see Suspend an observation

Score Data

Aim

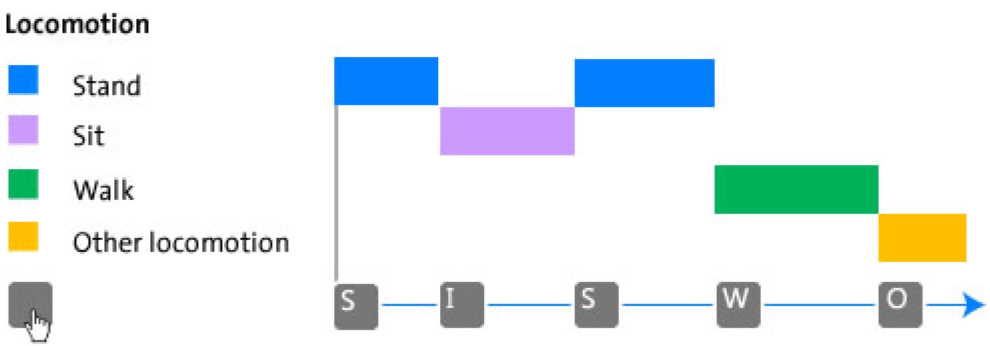
To carry out an observation.

Prerequisites

You created and started an observation.

Procedure

Score the subjects, behaviors and their modifiers by typing the predefined key code or by clicking the keycode in the **Codes** window. Typing key codes is generally faster.



What you have scored appears in the Event Log window and is visualized in the **Data and Audio Visualization** window. Each row in the event log corresponds to one event.

You can also only type free text in the **Comment** column, and press **Enter.**

See Enter events as free text

Scoring order

For each event line, score the subject first, then the behavior and then the modifiers that are linked to that behavior. Of course you score subjects and modifiers only if these are defined in your coding scheme. The **Codes** window displays which element should be scored next.

The following symbols appear in your Event log.

The start of an event with duration (state event).

 The stop of an event with duration (state event).

 The start of an event in a mutually exclusive and exhaustive group. The state is active from that moment and the previous state is no longer active.

 An event without duration (point event).

 An instantaneous sample event.

For the detailed scoring procedures see the following topics:

- Continuous Sampling
- Instantaneous Sampling
- Continuous and Instantaneous Sampling

Notes

How and where observations are saved

When you save the project, the Event Log file is saved in the Event Data subfolder within your regular project folder.

When there are long intervals between scored events

Make sure that the time before your computer goes into standby-mode or hibernation is set to longer than the longest likely interval between scored events. To specify the interval for system standby and hibernation, in the Control Panel choose **Power Options**, click **Change when the computer goes to sleep** and make your selection.

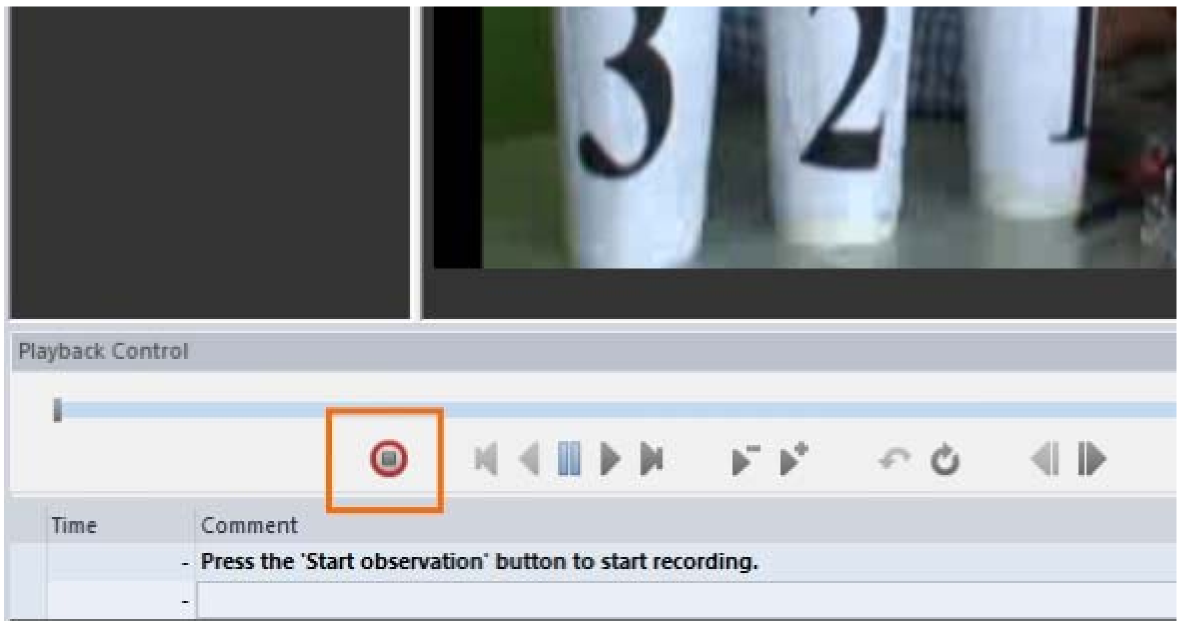
Stop the Observation

Procedure

An observation is ended when either the maximum recording time has elapsed, the video ends, or you manually end the observation.

To stop the observation manually:

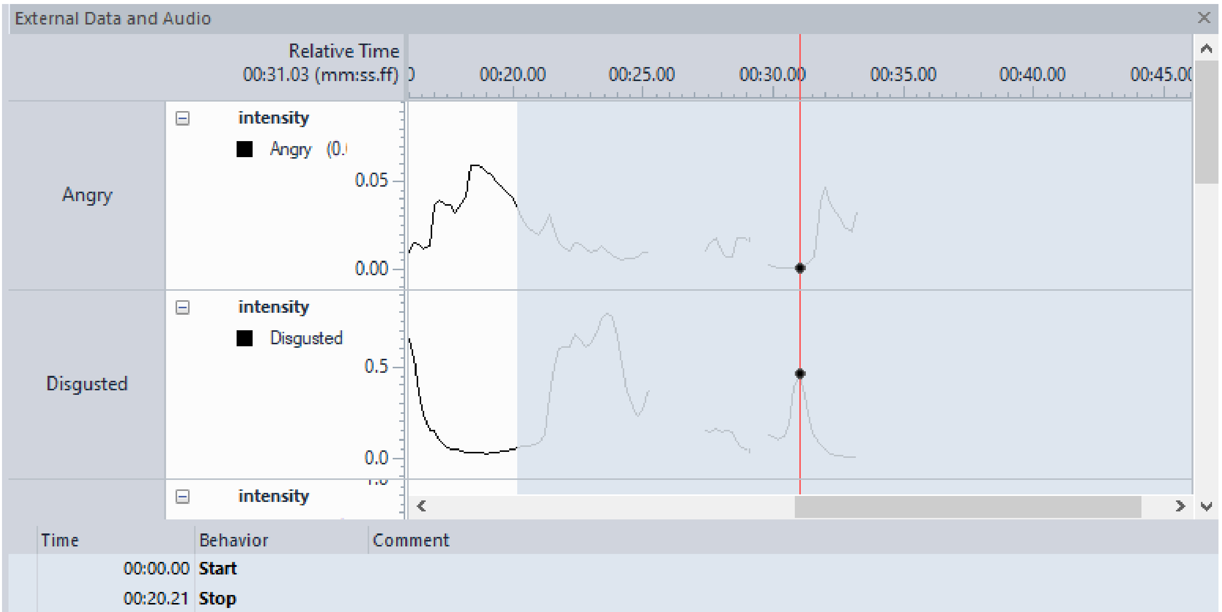
1. Click the **Stop Observation** button in the **Playback Control** window.



2. Dependent on your Project Settings (see Value update and Edit Independent Variables in Set up your Project), the Independent Variables window may appear. If so, enter the values.

Note

A confirmation window pops up when you stop the observation, unless you unselected this option in the **Observation settings**. The event log ends at the time point that you clicked the **Stop observation** button. This is the **Stop time** that you see in the Event log. The observation stops at the time that you click **Yes** to indicate that you really want to end the observation. That means that if you co-acquire external data, they extend beyond the end of the event log and are, therefore, grayed out.



What's next?

To play back the data, use the **Play** button in the The Playback control window (not the Start Observation button!).

To Visualize Data without the Event log and Codes window, choose **Analyze** > **Visualize Data**, or click the **Visualize** button on the toolbar.

To analyze data, Select Data for Analysis, then choose an option from the **Analyze** menu.

See Calculate Statistics

Check for errors – When closing an observation, the program checks if the event log currently open contains errors, for example a start code without a matching stop code. Event logs with errors are not analyzed nor visualized.

See Check the event log for errors

Notes

What happens at the exact stop time of the observation?

An event scored at the exact moment the observation stops is not included in the analysis.

If the maximum time is reached while you are in the middle of scoring elements in an event line, that line is saved, but is not complete. You can either delete, or edit the incomplete line.

See Correct Event log errors manually

Score Data; Detailed Procedure

What is your Observation method?

- Continuous Sampling
- Instantaneous Sampling
- Continuous and Instantaneous Sampling

Continuous Sampling

Aim

To code your observation with continuous sampling

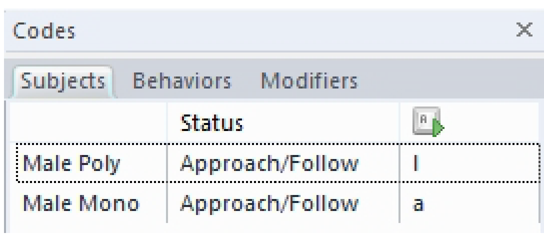
Prerequisites

- You created and started an observation.
- You chose Continuous sampling as Observation method

Procedure

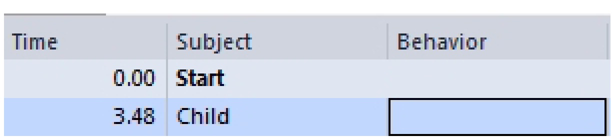
The procedure described below is very general and may not apply to your own coding scheme. If you, for example, did not define subjects or modifiers, then ignore the instructions referring to them. Furthermore, you can change the usual order of scoring, for example to first score the behavior and then the subject.

1. The first cell in the **Subject** column is selected. The **Codes** window shows all subjects.

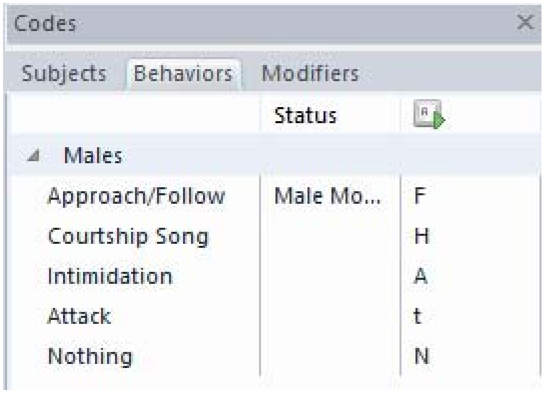
   

   When a subject performs a behavior you are interested in, score the subject.

   Result – The row is time-stamped and the time appears under **Time**.

2. The **Behavior** cell in the event line is now selected. The **Codes** window now shows all possible behaviors for this subject.



Score the behavior.

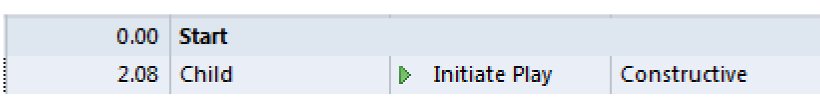
Result – The name of the behavior appears in the row in the Event log and the event is visualized in the Data and Audio Visualization window.

The event runs until the end of the video. The duration will be corrected as soon as you code the next event.

3. If the behavior was linked to one or more modifiers, the **Modifier** cell in the event line is now selected. The **Codes** window now shows all the modifiers that can be attached to the scored behavior.

Score the modifiers.

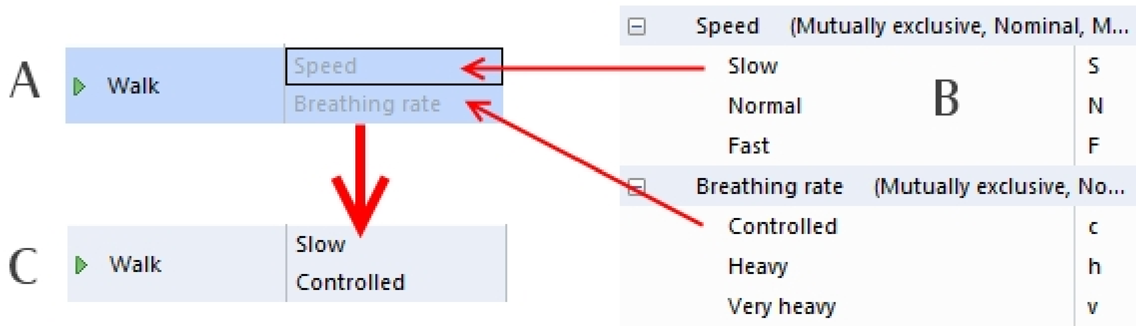
Result – The name of the modifier appears in the row in the Event log.



For numerical modifiers with a predefined range - first score the numerical modifier group and then type the value.

4. Score the other modifiers that are linked to that behavior.

If scoring modifiers is compulsory, the name of the modifier group which contains required modifiers is displayed in the event log before you actually score it. This helps you to see which modifiers (from which modifier group) still must be scored (see the example in the figure below) You can score required modifiers in any order you want. But they will appear in the event log in the same order as in the coding scheme.



In this example, the behavior 'Walk' has two modifier groups: 'Speed of walking' and the associated 'Breathing rate' of the subject.

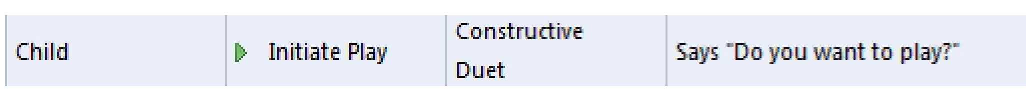
A - The Event Log before the Modifiers of behavior Walk are scored; the Modifier column indicates in gray the required Modifier groups.

B - The Codes window with required Modifiers groups and their Modifiers.

C - The Event Log after the modifiers of 'Walk' have been scored.

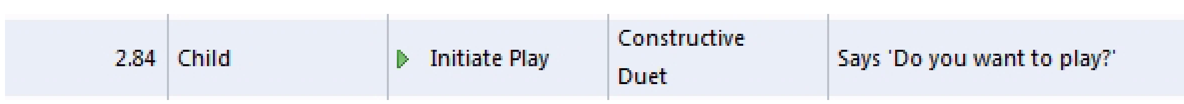
5. If you have selected **Add Comment** in the **Properties** pane of the subject or the behavior you have just scored (see Define Subject Properties), you must add a comment. The **Comment** cell in the event line will be activated, with the word **Comment** in gray. Enter the comment, and press **Enter**. You can also copy and paste comments.

   If the **Comment** column is not present in your event log, right-click a column header and select **Comment**.



   If you do not want to add any comment, just press **Enter**.

6. The event is now complete.



7. The **Subject** cell in the next row is selected, and the **Codes** window now shows the subjects again. Add new events by repeating the steps above.
8. To stop a behavior or modifier, first score the subject, then:

Start-stop behavior – score the stop of the behavior/modifier. You cannot do this before the subject was scored.

Mutually exclusive behavior – score another element in the same group and its modifier. Score the stop of the behavior if no other behavior is active.

Mutually exclusive modifier - score a behavior and then another modifier.

For more information, see the How to... procedures.

Notes

- The time is assigned to an event when the first element or the coding scheme is entered, no matter whether it is a subject, or a behavior. In the case you enter only free text, the time is assigned when you enter the first character under **Comment**.
- If scoring modifiers is not compulsory (see Define Modifier (Group) Properties), you can skip them by placing the cursor in the **Comment** column, or pressing **Enter**.
- If you do not want the **Comment** cell be selected every time you score an event, make sure that for all behaviors and subjects the **Add Comment** option is not selected.

  See Define Subject Properties and Define Behavior (Group) Properties in Set up your Project
- Press the **Undo** button on the toolbar to correct a mistake. To make a correction undone, press the **Redo** button. For information on how to correct scoring errors after you finished the observation, please see Correct Event log errors manually.

Instantaneous Sampling

Aim

To code your observation with instantaneous sampling

Prerequisites

- You created and started an observation.
- You chose Instantaneous sampling as Observation method

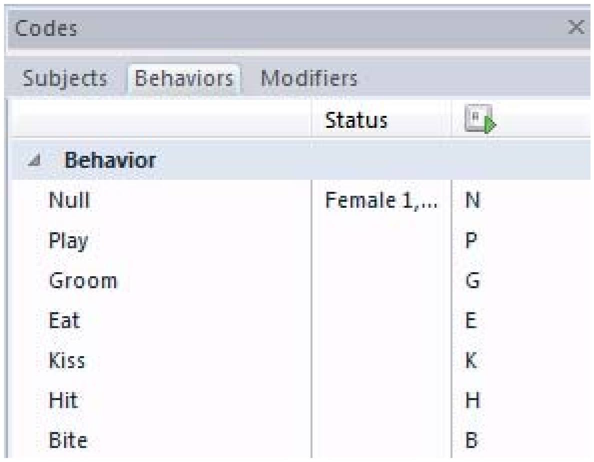
Procedure

1. A sound signal is given at the observation start. The Event log shows all subjects from the Instantaneous Sampling subject group at time 0. It also shows the behavior groups that are linked to the subjects and must be scored in gray (see Define Subject Properties).

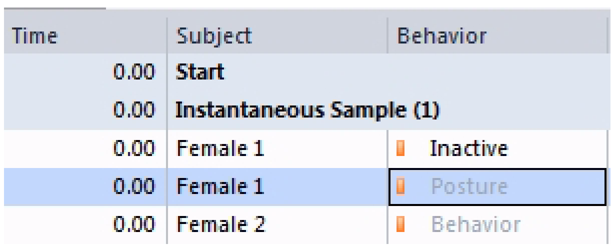
Time	Subject	Behavior
0.00	**Start**	
0.00	**Instantaneous Sample (1)**	
0.00	Female 1	Behavior
0.00	Female 1	Posture
0.00	Female 2	Behavior
0.00	Female 2	Posture
0.00	Juvenile 1	Behavior
0.00	Juvenile 1	Posture
0.00	Juvenile 2	Behavior
0.00	Juvenile 2	Posture
0.00	Juvenile 3	Behavior
0.00	Juvenile 3	Posture
0.00	Juvenile 4	Behavior
0.00	Juvenile 4	Posture

When you carry out an Offline observation, the video file pauses until you scored all subjects, irrespective of whether you selected the option Pause playback when scoring an event in the Project settings.

The Codes window shows the current Subject-Behavior combination in the **Status** column (Female 1 - Behavior in the example below) and the behavior group that needs to be scored.

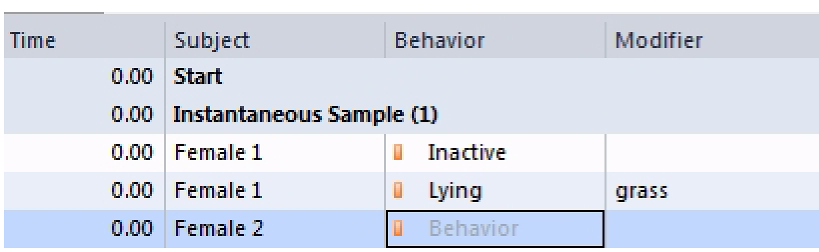


2. Score a behavior for each subject. As soon as the behavior is scored it appears in the event log.



3. If the behavior was linked to one or more modifiers, the modifier cell will be selected. The **Codes** window now shows all the modifiers that can be attached to the scored behavior. Score the modifier.

   Result – The modifier appears in the event log.



4. If you have selected **Add Comment** in the **Properties** pane of the subject or the behavior you have just scored (see Define Subject Properties or Define Behavior (Group) Properties), the **Comment** cell will be selected with the word 'Comment' in gray. Enter a comment, and press **Enter**.

Time	Subject	Behavior	Modifier	Comment
0.00	**Start**			
0.00	**Instantaneous Sample (1)**			
0.00	Female 1	Inactive		
0.00	Female 1	Lying	grass	Sleeping?

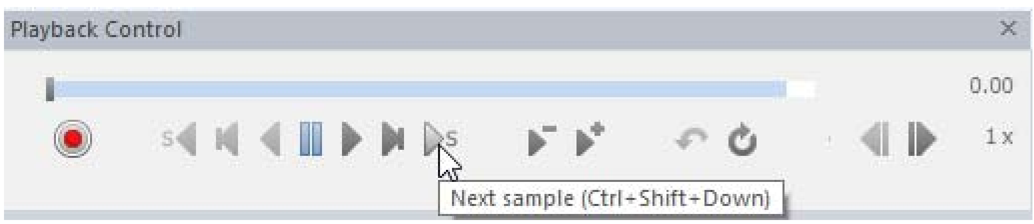
If you do not want to add a comment, just press **Enter**.

The event is now complete.

5. Add new events by repeating the steps above to finish scoring the complete sample.

   Live – Wait until the sample interval has elapsed to score the next sample (indicated by a sound signal).

   Offline – Click the **Next sample** button to position the video at the time of next sample.



TIP Use the **Quick review** button to play back the video/audio file a few seconds before the sample time sample. This is useful to be able to determine what behavior each subject is performing.

What’s next?

- To stop the observation, see Stop the Observation
- To correct scoring errors, see Correct Event log errors manually
- For more information, see:

  The Notes on Instantaneous Sampling

  How to… procedures.

Notes on Instantaneous Sampling

Timers

The **Timers** window displays the **Remaining Interval Time**.

- Live - the timer counts down until the next Instantaneous sample.
- Offline - the timer displays the sample interval length.

If no **Timers** window is visible, choose **View Settings** > **Show Window** > **Timers**. You can drag the Timers window to below or next to the Event log, so you can easily see how much time is left until the next sample. To hide specific timers, right-click in the Timers window and deselect the timer.

Timers

Timer (right click to show/hide)	Relative s.ff	Absolute HH:mm:ss.ff
Observation - Current Time	-	13:52:38.58
Observation - Elapsed Time	29.03	-
Observation - Observed Time	29.03	-
Observation - Remaining Time	-	-
Observation - Start Time	0.00	13:52:09.55
Observation - Stop Time	-	-
Event Log - Start Time	0.00	13:52:09.55
Event Log - Stop Time	-	-
Interval - Elapsed Time	29.03	-
Interval - Remaining Time	30.97	-

Subjects

Subjects in an instantaneous sample block appear in the order they are placed in the coding scheme. Click the behavior cell of another subject to score in a different order.

Modifiers

If modifiers are not required (see Define Modifier (Group) Properties), you can skip them and go to the **Comment** column (see below) or start a new event line. To do so, press **Enter**.

Comments

If you do not want the **Comment** cell be selected every time you score an event, make sure that for all behaviors and subjects the **Add Comment** option is not selected.

See Define Subject Properties and Define Modifier (Group) Properties in Set up your Project

Samples

- When the next sample begins before you finished scoring the previous sample (this only occurs in a Live observation), the non-scored events are set to “missing”.
- When your observation duration is a multiple of the sample interval (see More options), no sample is scored at the end of the observation. If you do want to score this sample, make the observation for example 1 second longer.

Continuous and Instantaneous Sampling

Aim

To code your observation with a combination of Continuous and Instantaneous sampling

Prerequisites

- You created and started an observation.
- You chose Combine Continuous and Instantaneous sampling as Observation method

Procedure

1. As soon as the observation is started, the first cell in the Instantaneous sample block is selected. Score this sample, according to the general procedure for Instantaneous Sampling
2. As soon as you finish scoring the Instantaneous sample, Continuous sampling starts and you can score data for the subjects you follow continuously. Follow the procedure described in Continuous Sampling

Time	Subject	Behavior
0.00	**Start**	
0.00	**Instantaneous Sample (1) Start**	
0.00	Juvenile 1	Walk
0.00	Juvenile 1	a
0.00	Juvenile 2	Run
0.00	Juvenile 2	a
0.00	Juvenile 3	Stand
0.00	Juvenile 3	c
0.00	**Instantaneous Sample (1) End**	
2.16	Adult	Stand
7.92	Adult	b
20.32	Adult	Walk
32.88	Adult	c
60.00	**Instantaneous Sample (2) Start**	
60.00	Juvenile 1	Locomotion
60.00	Juvenile 1	Location
60.00	Juvenile 2	Locomotion
60.00	Juvenile 2	Location
60.00	Juvenile 3	Locomotion
60.00	Juvenile 3	Location
60.00	**Instantaneous Sample (2) End**	
60.00	Adult	Run
113.80		

Notes on Continuous and Instantaneous sampling

- What do I do when I score live and my focal subject changes behavior while I am scoring the Instantaneous sample? – Click the row under **Instantaneous Sample (#) End** (see the figure above) and score the behavior for the focal subject. Next, click a row in the Instantaneous sample block to continue Instantaneous Sampling.
- When your observation duration is a multiple of the sample interval (see Specify the Duration of the Observation), no sample is scored at the end of the observation. If you do want to score this sample, make the observation for example 1 second longer. Also an event scored with continuous sampling at the exact moment the observation stops is not included in the analysis.
- When a new sample starts before you have finished scoring a continuous event, you are asked whether you want to finish or discard the event before scoring the sample. This is, for example, the case when you have not yet scored a required modifier.

How to...

Edit the Observation

- Check the event log for errors
- Correct Event Log errors automatically
- Correct Event log errors manually
- Synchronize data sets
- Change the observation's start time and duration

Edit the Coding Scheme

- Add an element to the coding scheme
- Edit a coding scheme element after observing

Miscellaneous Coding Actions

- Undo coding actions
- Enter events as free text
- Submit an incomplete event
- Score action-reaction data (triggering behavior)
- Score reciprocal behavior
- Suspend an observation

Advanced Observations

- Carry out observations with external programs
- Import data into an observation
- Score data after importing external data
- Export observational data

Find Events

Check the event log for errors

Aim

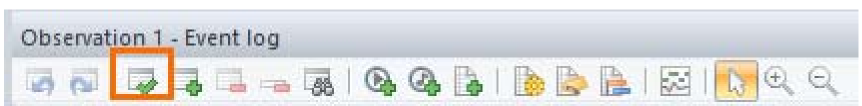
To check you scored your observation correctly so that you can analyze it.

Background

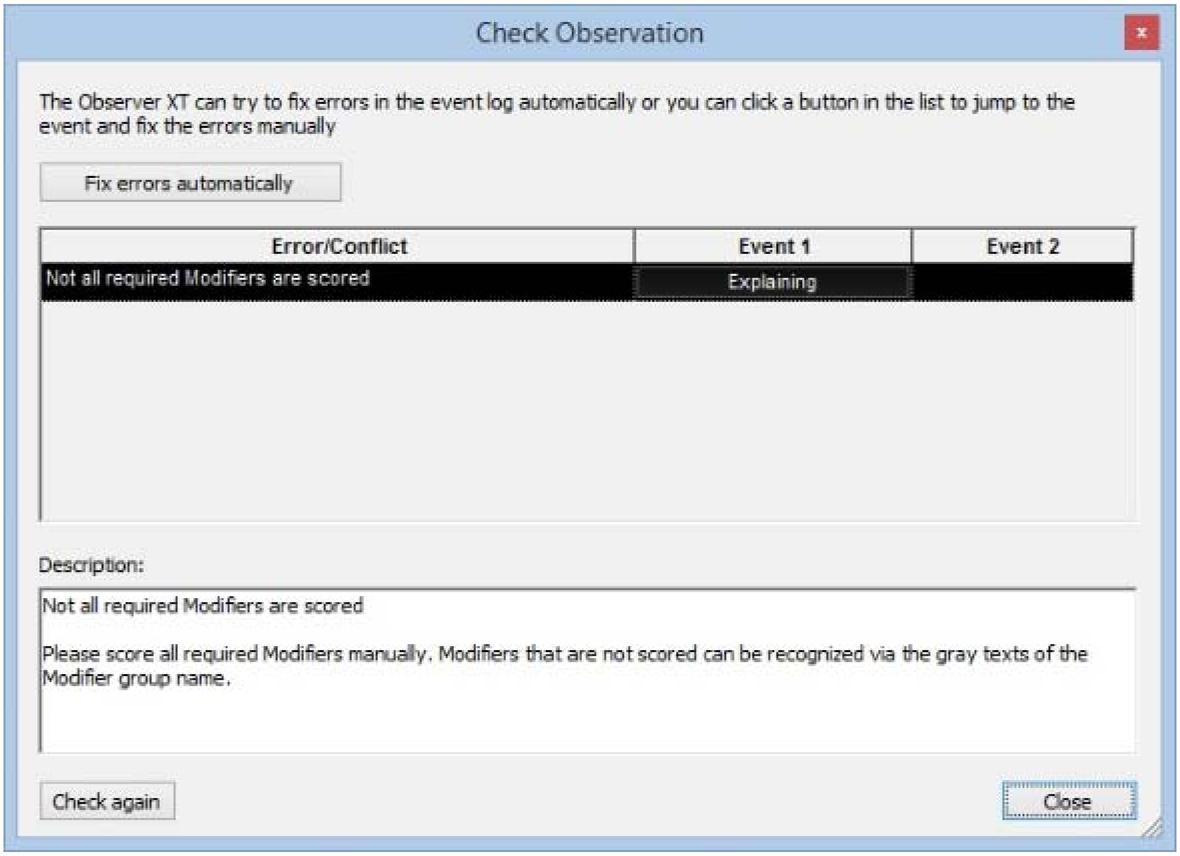
Errors in an event log may occur when, for example, you edited the Event log and accidentally removed start codes, but not the associated stop codes, or when you did not score all compulsory modifiers. Event logs with errors cannot be visualized or analyzed.

Procedure

1. Click the **Check Event Log** button on the Observation toolbar.



2. The **Check Observation** window opens with a list of the errors.



3. Now do one of the following:

   Correct Event Log errors automatically

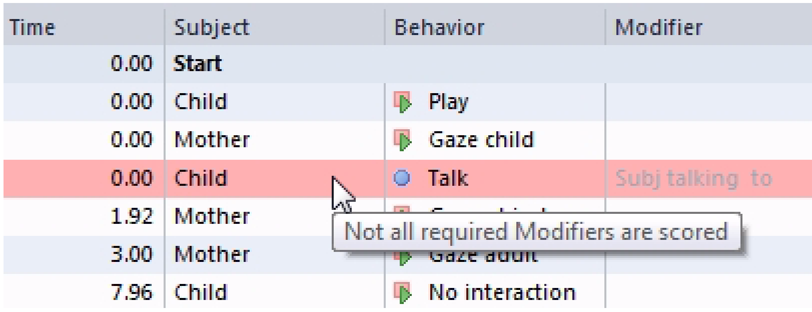
   Correct Event log errors manually

How Event log errors are indicated

An observation that contains an event log with errors has a warning sign next to its name in the Project Explorer.

The event rows with errors are highlighted in red. Hover with the mouse over a row for details of the error.

See Correct Event log errors manually


Time
Subject
Behavior
Modifier
0.00
Start
0.00
Child
Play
0.00
Mother
Gaze child
0.00
Child
Talk
Subj talking to
1.92
Mother
Not all required Modifiers are scored
3.00
Mother
7.96
Child
No interaction

Correct Event Log errors automatically

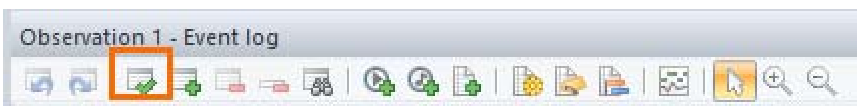
Aim

To let The Observer XT automatically correct the following errors:

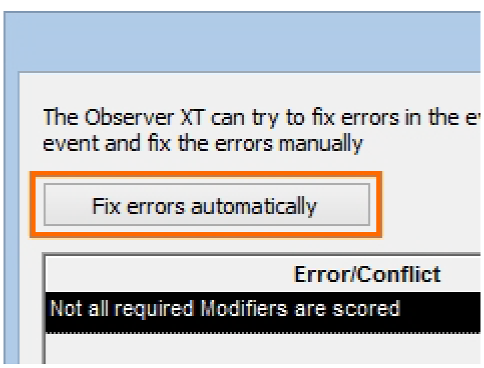
- Missing stop codes – These will be added.
- Stop codes without corresponding start code – These will be deleted.
- Gaps in a A mutually exclusive and exhaustive behavior group – These will be corrected. If no Initial state event (see Behavior types) was scored, it will be added. If there is a gap further on in the event log, it will be corrected by extending the behavior that was active before the gap.
- Missing combinations - You may have removed combinations between subjects and behaviors or behaviors and modifiers in your Coding Scheme, while these have been scored in an observation. The events with these combinations will be deleted.

Procedure

1. Click the **Check Event Log** button on the Observation toolbar.



2. The **Check Observation** window opens with a list of the errors. Click the **Fix Errors Automatically** button.



Notes

- If you have multiple event logs within one observation, the event log checker checks for errors between all event logs, for example whether there are overlapping events in the event logs. Such errors cannot be fixed automatically.

- If you find many errors in the event log, that could be caused by some accidental change in the coding scheme, for example the removal of a subject-behavior combination.

  See Define Subject Properties

Correct Event log errors manually

IMPORTANT Always make a backup of your project before editing data.

See Create a backup of a Project

What do you want to do?

- Replace an element in the Event log
- Delete an element in the Event log
- Add an element to a scored event
- Add a new event row in the Event Log
- Remove event rows from the Event log
- Change the time of a scored event

Replace an element in the Event log

Click its cell in the Event log and then score the correct element.

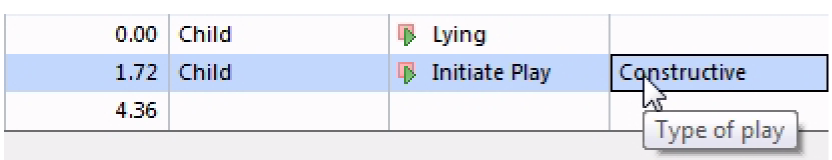
Delete an element in the Event log

Click its cell in the Event Log and press **Delete**.

Add an element to a scored event

Example – add one more Modifier Value' to the Behavior 'Initiate play'.

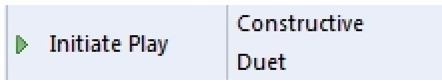
1. Click the cell where you want to add the element.



   The **Codes** window displays the elements that you can add in that cell.

2. Either type in the keycode for the new element or click the code in the Codes window.

   Result – The new modifier is added in a new cell that was inserted under the cell you wanted to edit.



Add a new event row in the Event Log

EXAMPLE To add an event between the event scored at 1.72 and the event scored at 4.36.

1. Click the row immediately above where you want the new row (in the example above, the header of the row with 1.72).
2. Click the Insert event button on the toolbar.

   Alternatively, right-click in the event row and select **Insert event above**, or **Insert event below**.

   Result – A new empty event is added below the selected row. The time stamp is the same as that of the selected row.
3. Score the data as usual. If necessary, change the time stamp (see below).

If you score events from a video file, it is also possible to insert a line in the following way:

1. Position the video to moment where the event occurs.
2. Score the event as usual. The new event line is inserted between two existing lines.

Remove event rows from the Event log

1. Click the left-most cell of the row, or rows, you want to delete.

   Result – The entire row is highlighted in black.
2. Click the **Delete Event** button on the toolbar.

Change the time of a scored event

Example – You have scored an event slightly later (or earlier) than the 'real' time. Instead of deleting the event and re-score it on the right time, change the time of the existing record.

1. Locate the event line you want to change and double-click the cell in the **Event Time** column.

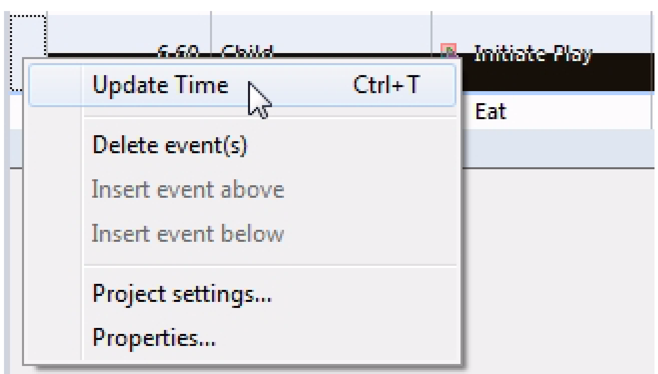
   Result – The time cell is highlighted in blue.

2. Click the number you want to change and type the new time, or use the two arrow buttons to adjust its value.

3. Press **Enter**.

   TIP Alternatively, use the option **Update Time**. Click the left cell of the event line to select the line, move the video/audio to the correct time and press **Ctrl**+**T** to update the time in the Event log to the correct timestamp. Alternatively, right-click the row and select **Update Time**.

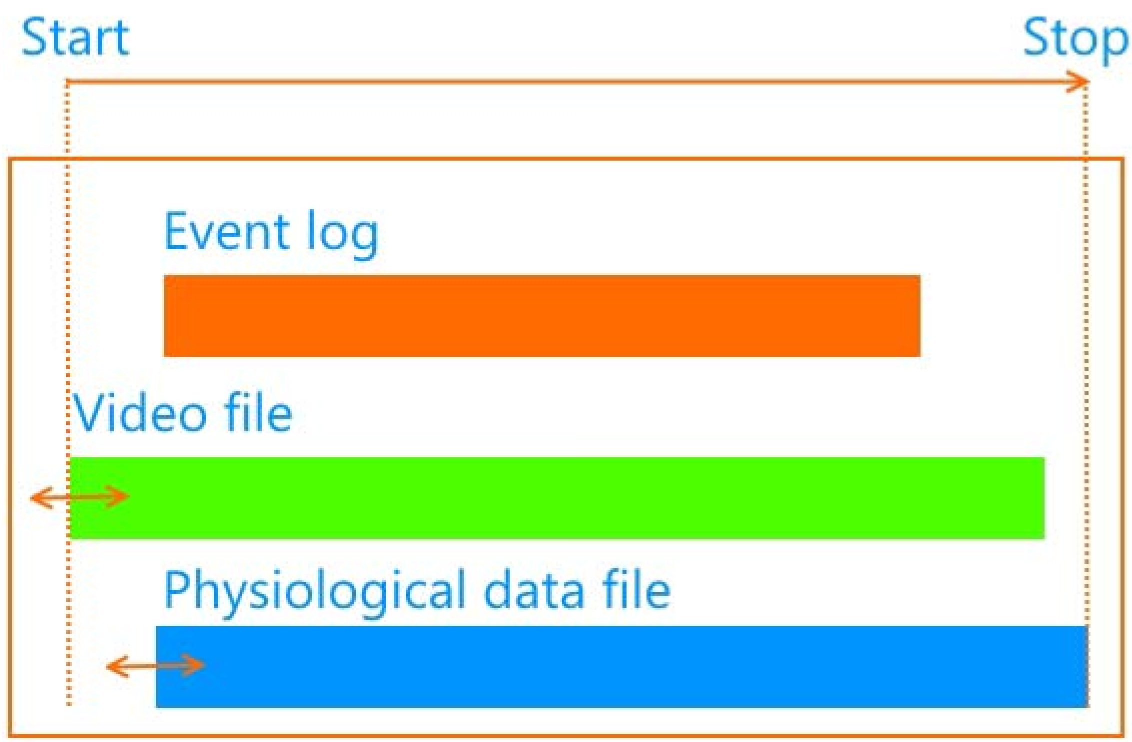


The new timestamp cannot be earlier or later than the timestamp of the previous or next event from the same Behavior group.

Synchronize data sets

Aim

To change the Start time of a data set (Event Log, Video, Audio, External Data) relative to others.



EXAMPLE 1 You started video recording with one camera 30 seconds earlier than with the other camera. Before you start observing, you want to synchronize the video files.

EXAMPLE 2 After the observation, you imported associated physiological data. You want to synchronize the physiological data with the events.

Prerequisite

An event can be recognized in all streams to synchronize. For example you type a key that is assigned to a behavior in the Coding Scheme and record that on video. The key press will appear in the event log and will be visible in the video as well.

When you record external data and you cannot use automatic synchronization (see External Data), the event can be recognized in the external data as well. For example you counted down aloud until you pressed the start button on the external data system and you recorded this on video.

Procedure

1. Open an existing observation, and make sure that the video, audio and external data linked to the observation are visible on your screen.

   If a data set is not shown on your screen, click **View Settings** on the far-right side of the toolbar and select that option.

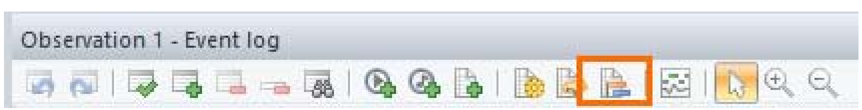
2. You can synchronize data sets in two ways. Numerically, by typing in the offset value, or Manually, by moving the slider of the video file or dragging the visual presentation of the data set.

See:

- Numerical Offset
- Manual Offset

Numerical Offset

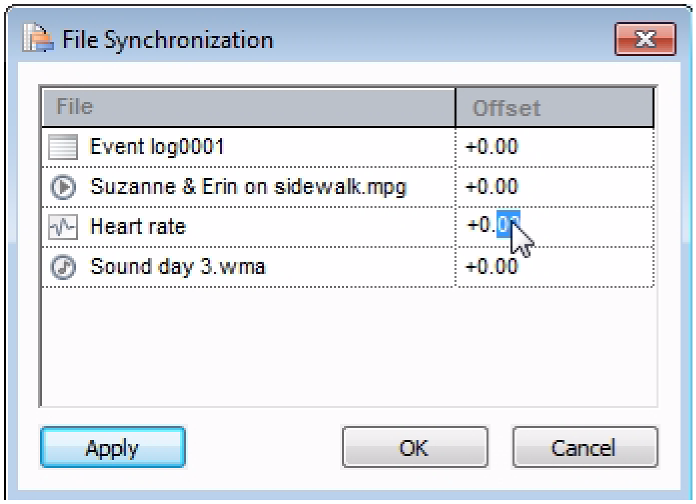
1. Click the **Offset** button on the Component toolbar, then choose **Numerical Offset**.

   Result – The File Synchronization window appears. This window lists the event log currently open, the video and audio files and the external data linked to it.

2. Locate the data set (event, video, audio or external data) of which you want to change the start time relative to others, and click the **Offset** cell.

3. Enter the offset value.

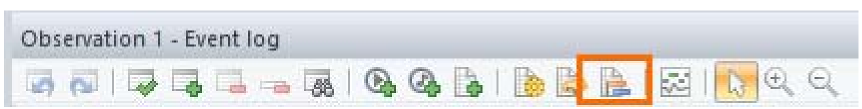


Example – If your event log starts 20 seconds after the video file, then locate the row of the video file and enter -20 in the seconds group of the Offset column.

4. Click **Apply**.

Manual Offset

1. Click the **Offset** button on the Component toolbar, then choose **Manual Offset**.



Result – The Synchronize window appears explaining the next three steps. Click Start Synchronization.

2. Click the window with the data you want to synchronize.

Result – A red border appears around the window. You can now alter the time in this window while the time in the other windows remains fixed (see the steps below).

3. Video or audio - Use the Playback Control buttons to play the media file to the new position

   External data - Click the window and move the data stream with the cursor to the new position.

   The aim is to position the video/audio/external data to the matching event in the Event log.

4. Click the **Offset** button again.

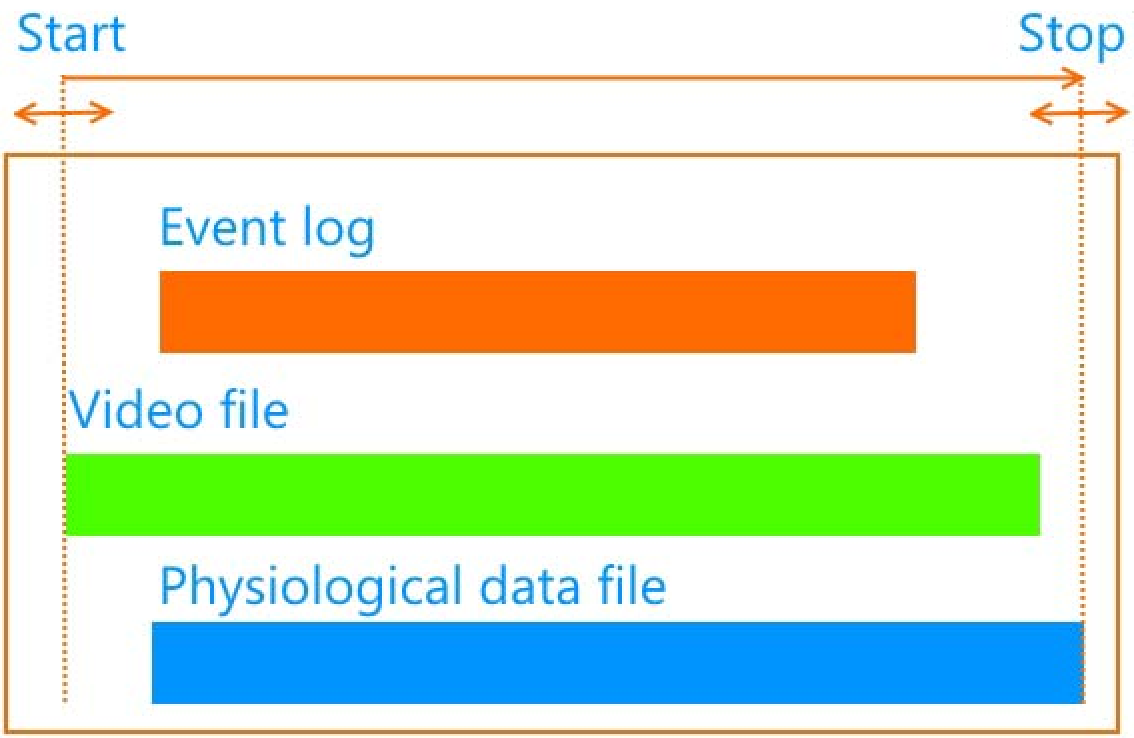
   Result – The red border disappears. The files are now synchronized as you have specified.

Notes

- If you use MediaRecorder 4 or higher to record video, the video files are automatically synchronized with your observation.
- You can use the File Synchronization window (see Numerical Offset to check that the time difference between video, audio, event log and other data streams is correct. You can change this difference at any time.

Change the observation's start time and duration

By default. the Start time and Stop time of an observation are the earliest Start time and the latest Stop time of any data set in that observation (see the picture below). You find those times in the Independent Variable List (Choose **Setup** > **Independent Variables**). If you, for example, want to exclude a section at the beginning of the observation, or when you stopped the observation too early, you need to change the start or stop time. You can change the start time and duration. The stop time is determined automatically from the start time and the duration.

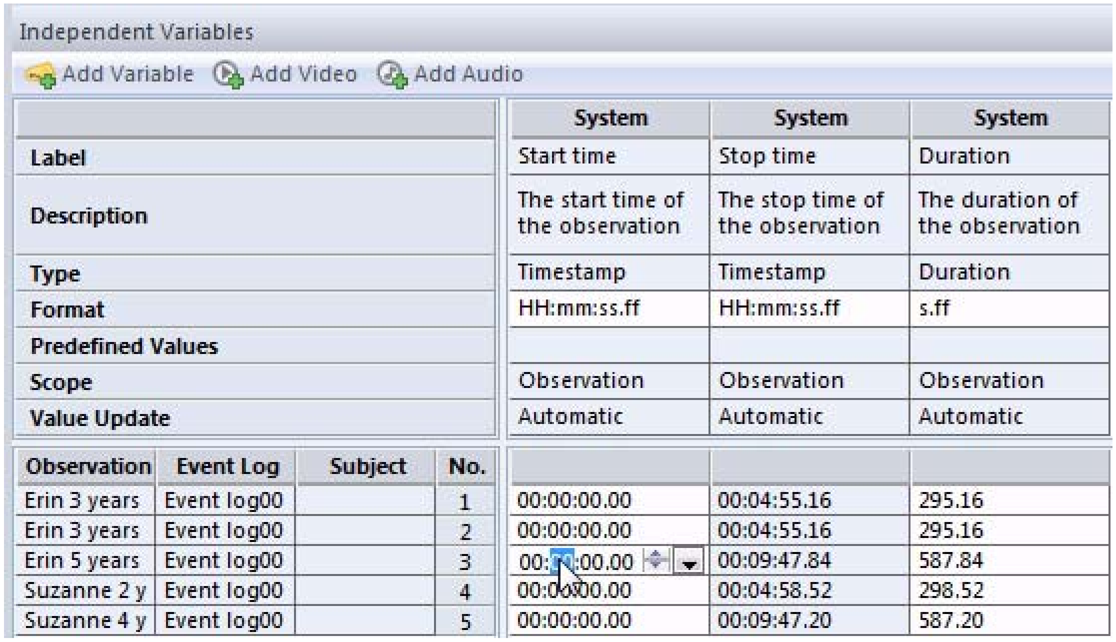


Changing the Start Time and/or Duration of an observation does not "move" Event Logs, Video, Audio and External Data files. If for example, you reduce the Start time (that is, you move the Start to the left in the figure above), the files belonging to that observation are not moved accordingly. This results in a larger gap between the Start time and the start of the files.

Procedure

1. Choose **Setup** > **Independent Variables**.
2. Choose **View Settings** > **Show Independent Variables** and select **Start Time**, **Stop Time** and **Duration**.

3. Edit the **Start Time** or **Duration** cell.



Independent Variables

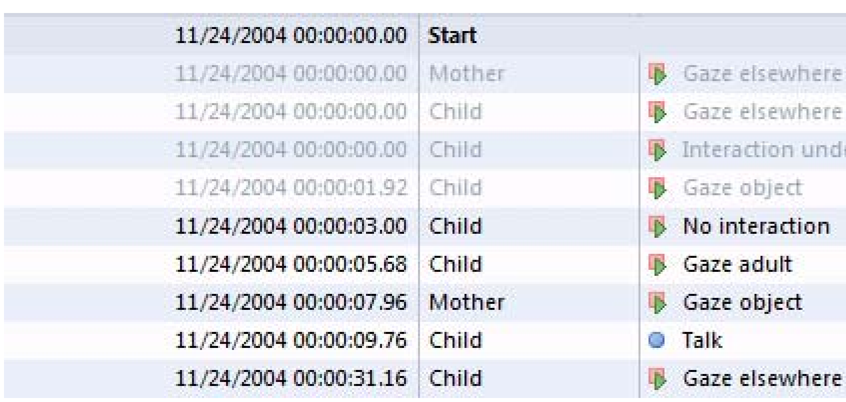
Add Variable | Add Video | Add Audio

	System	System	System
Label	Start time	Stop time	Duration
Description	The start time of the observation	The stop time of the observation	The duration of the observation
Type	Timestamp	Timestamp	Duration
Format	HH:mm:ss.ff	HH:mm:ss.ff	s.ff
Predefined Values			
Scope	Observation	Observation	Observation
Value Update	Automatic	Automatic	Automatic

Observation	Event Log	Subject	No.			
Erin 3 years	Event log00		1	00:00:00.00	00:04:55.16	295.16
Erin 3 years	Event log00		2	00:00:00.00	00:04:55.16	295.16
Erin 5 years	Event log00		3	00:00:00.00	00:09:47.84	587.84
Suzanne 2 y	Event log00		4	00:00:00.00	00:04:58.52	298.52
Suzanne 4 y	Event log00		5	00:00:00.00	00:09:47.20	587.20

Notes

- Changing the observation start time or duration does not affect synchronization between individual files, so the start time of one file relative to others. To change the synchronization between files, see Synchronize data sets
- The observation Stop time is changed automatically, according to the changes in the observation start time and duration and cannot be edited. Events that are recorded before the start time or after the stop time of the observation are shown in gray in the Event Log.



11/24/2004 00:00:00.00	**Start**	
11/24/2004 00:00:00.00	Mother	Gaze elsewhere
11/24/2004 00:00:00.00	Child	Gaze elsewhere
11/24/2004 00:00:00.00	Child	Interaction unde
11/24/2004 00:00:01.92	Child	Gaze object
11/24/2004 00:00:03.00	Child	No interaction
11/24/2004 00:00:05.68	Child	Gaze adult
11/24/2004 00:00:07.96	Mother	Gaze object
11/24/2004 00:00:09.76	Child	Talk
11/24/2004 00:00:31.16	Child	Gaze elsewhere

Edit the Coding Scheme

Add an element to the coding scheme

It may happen that you observe something that does not comply with any element in your coding scheme. You can add a new elements (Subjects, Behaviors, Modifiers) or element groups (Behavior and Modifier groups) in two ways:

- Method 1 (best for offline observations, and for extensive changes to the coding scheme) – Stop the observation, re-open the coding scheme (**Setup** > **Open Coding Scheme**) and add the new element, then re-open and start the observation.
- Method 2 (for both live and offline observations, and for limited changes to the coding scheme) – Add the new element while you are observing and score that element immediately. See Add a coding scheme element while observing

Add a coding scheme element while observing

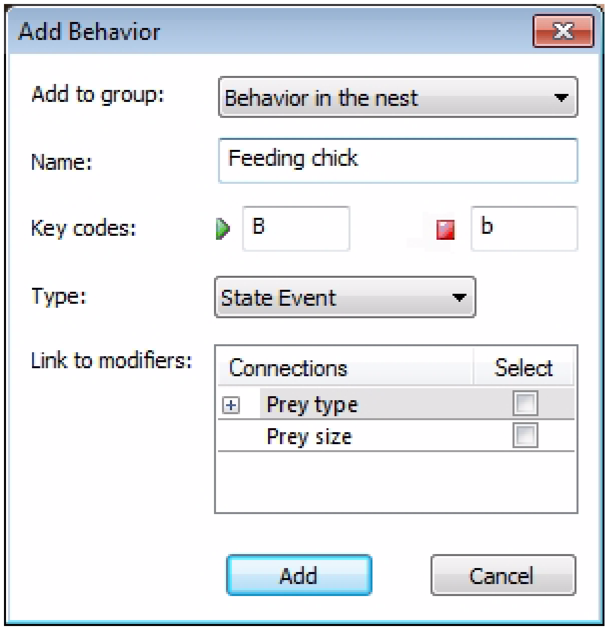
1. If you are carrying out an observation from video/audio, pause the video/audio file first.
2. In the **Codes** window, click the tab you want to add an element to. For example, if you want to add a behavior, choose Behaviors.
3. Choose one of the options at the bottom of the **Codes** window.

Add a subject

1. Enter the name of the new subject and its keycode, or accept the suggested code.
2. Click **Add**.

Add a behavior

1. From the **Add to group** list, select the behavior group that you want the new behavior be part of.



2. Enter the name and the keycodes for the new behavior, or accept the suggested ones.
3. From the **Type** list, select whether the new behavior is a Point Event, a State Event or an Initial State Event.

   See Behavior types in Set up your Project
4. In the Link to box, select the modifier groups you want to associate with the behavior.
5. Click **Add**.

Add a behavior group

When your observation method is Instantaneous sampling, you cannot add a behavior group. To add a behavior group for continuous sampling:

1. Enter a name in the **Group name** field.
2. Choose whether the behaviors in the group can or cannot occur at the same time.

   See Behavior group types in Set up your Project
3. Enter the behaviors and, for each behavior, choose whether it has duration or not.

   See Behavior types in Set up your Project

Add a modifier

1. Select the group to which the new modifier belongs. If the modifier does not belong to any existing group, create a new group first (see below).
2. Enter a **Value** and **Keycode**.
3. Click **Add**.

Add a modifier group

1. In the **Add Modifier** group window, choose a **Nominal** or **Numerical** group (see Modifier group types in Set up your Project for the difference).
2. Enter a name and all modifiers.
3. In the **Link to Behaviors** box, select the behaviors that you want to associate with the modifier group. Next, click **Create group**.

Notes

- Remember to also define connections between subjects and behaviors and between behaviors and modifiers.
- If the configuration is locked (see Lock the Project Setup in Set up your Project), it is not possible to add new elements to the coding scheme.
- In the **Codes** window, you can add new elements to your coding scheme, not modify or delete existing ones. To modify or delete existing elements, open the coding scheme.

Edit a coding scheme element after observing

1. Stop the observation.
2. Open the coding scheme (Choose **Setup** > **Open Coding Scheme**).
3. Click the element.
4. To change the element, and choose **Properties** at the bottom of the screen to open the **Properties** pane. Modify the element properties (see Create Coding scheme in Set up your Project for details)

   To delete the element press **Ctrl**+**Delete**.
5. Re-open the observation and resume scoring.

If at least one of the observations contains the element you want to delete, the program inactivates it instead. The element is still present in your data, so you can analyze it.

Miscellaneous Coding Actions

What do you want to do?

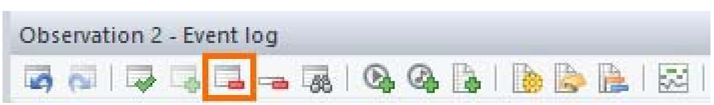
- Undo coding actions
- Enter events as free text
- Submit an incomplete event
- Score action-reaction data (triggering behavior)
- Score reciprocal behavior
- Suspend an observation

Undo coding actions

Example – You have coded the first element of an event. You realize that the event should not be scored, so you want to cancel that action.

When recording – Click the **Undo** button on the toolbar. To make a correction undone, press the **Redo** button.

When you inserted an incorrect event between two existing events – Select the event line and click the **Delete Event** button on the toolbar. Alternatively, right-click in the first column of the event you want to remove and select **Delete event(s)**.



Enter events as free text

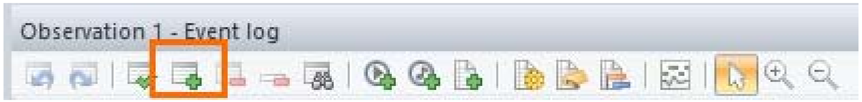
Log free text in the **Comment** column or choose **View Settings** > **Show Window** > **Comment** and type the text in the window that appears. You can also paste text that was copied from another source. You can enter maximally 1024 characters per event.

Enter text associated with a scored event

Score the event as usual, then click the **Comment** cell in that row and type the text.

Enter text only

To enter a new line of text only, press **Ctrl**+**I** or click the **Insert event** button on the toolbar.



Next, click the **Comment** cell for the new line and enter the text. The time stamp of an event line that only includes a comment is the time when you type the first character in the **Comment** column.

Notes on comments

- Comments are not visualized in the time-event plot (see Visualize Comments in Visualize Data) if they are not associated with an event. To visualize comment-only events, create a dummy behavior in the coding scheme and score that behavior in the row of the comment.
- To annotate only free text, hide the Subject, Behavior, and Modifier columns in the event log.

  See To customize the Event Log window
- You cannot analyze free text, but you can use the Find function to find text across all observations, including the number of events that contain a certain word or phrase.

  See Find Events
- To type text while listening to audio to transcribe speech, Choose **Setup** > **Project Settings** > **Scoring options** and de-select **Pause playback of video when scoring an event**.
- If you want to be reminded to add comments, open the properties for that element and select the option **Add a comment**.
- Pressing Enter does not separate text lines within the same comment, it enters the comment in the event log. To keep two or more lines of text separated, create multiple event lines.

Submit an incomplete event

If an event is made of several elements (for example, Subject, Behavior, and three Modifiers), The Observer XT checks that all the required elements are scored. You can allow incomplete events, for example if you score instantaneous samples and some subjects are not visible. Choose **Setup** > **Project Settings** > **Scoring Options** > Always press Enter to confirm event line. To submit an incomplete event, press **Enter**.

Score action-reaction data (triggering behavior)

Aim

To score data in a sequence like the following:

Subject1 - Behavior A - Subject 2 - Behavior B

Where Subject 2 performs Behavior B as a response to Behavior A by Subject 1.

Procedure

1. Define a group of modifiers (see Modifiers in Set up your Project) containing all subjects reacting (like Subject 2 in the example)
2. Define a group of modifiers containing all response behaviors (like Behavior B).
3. Score the data in sequence (Subject - Behavior - Modifier of first group - Modifier of second group).

Subject	Behavior	Modifier
Start		
Subject 1	▷ Behavior A	Subject 2 Behavior B

Score reciprocal behavior

Aim

To score behavior that has no specific direction, for example *Mark Plays with James*.

Procedure

1. Define both *Mark* and *James* as both subjects and modifiers.
2. Define Play as Behavior
3. Score two event lines:

   Mark - Plays - James

   James - Plays - Mark
4. If necessary, pause the video or edit the time in the event log (see Change the time of a scored event) afterwards to ensure the events get the same time stamp.

Suspend an observation

Aim

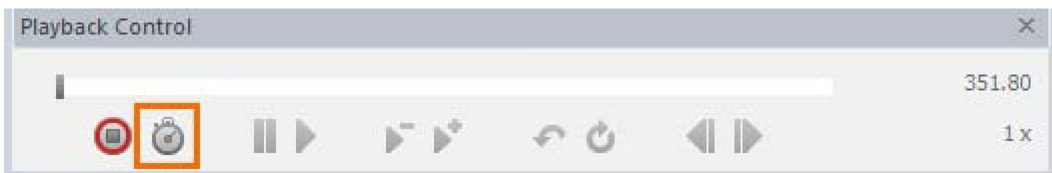
To temporarily stop observing, for example when a subject is out of view. The currently active states for all subjects are stopped. The Observer XT is put in standby awaiting that you resume the observation.

Prerequisite

You chose Live observation as Observation source. You cannot suspend when you score offline from prerecorded video.

Procedure

1. Choose **Observe** > **Suspend Observation**. Alternatively, click the **Suspend observation** button.

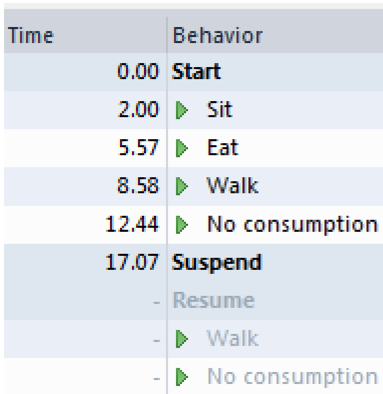


Result –

In the **Timers** window, the **Observation - Observed Time** timer stops and the **Observation - Elapsed Time** timer continues.

In the Event Log, two lines are added: **Suspend** (marked by the time when the observation was suspended) and **Resume** (with no time yet). For each state that was active at the time the observation was suspended, the program adds a row below the Resume row. The program assumes that those states are active when you resume the observation. You can change these states immediately before or after you resume the observation if the subjects have changed state in the meantime, or confirm them and resume the observation.

Example for mutually exclusive behaviors – In a chimpanzee study, the observation was suspended at 17:07 when the subject went out of sight. At that time, the states *Walk* and *No consumption* of two different mutually exclusive behavior groups were active. After the line **Resume**, the start events for those states are added automatically. T



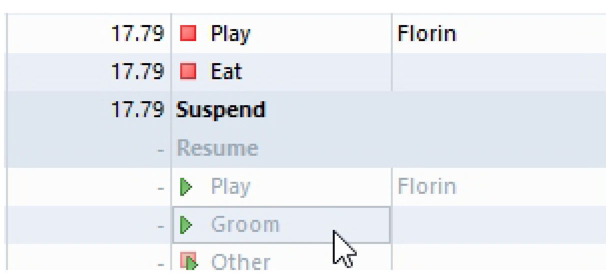
Time	Behavior
0.00	**Start**
2.00	Sit
5.57	Eat
8.58	Walk
12.44	No consumption
17.07	**Suspend**
-	Resume
-	Walk
-	No consumption

Example for Start-Stop behaviors– In the example below, the observation was suspended at 17.79. Before the line **Suspend**, stop codes are added for the active behaviors. Below the line **Resume**, two start codes are added for the behaviors that were active at the moment the observation was suspended.

17.79	Play	Florin
17.79	Eat	
17.79	**Suspend**	
-	Resume	
-	Play	Florin
-	Eat	

2. When your subject comes back into view or when you are ready to resume, update the behaviors in the lines below the **Resume** line. If the states do not need to be updated, go to the next step.

   To update the behaviors, click the cell you want to update, and score the new state. In the example below, *Eat* was changed to *Groom* (compare with the behaviors above the Suspend line).



17.79	Play	Florin
17.79	Eat	
17.79	**Suspend**	
-	Resume	
-	Play	Florin
-	Groom	
-	Other	

3. To resume the observation, choose **Observe** > **Resume Observation** or click the **Resume observation** button.

4. Continue scoring data as usual.

Notes

- The time period between suspending and resuming an observation is not considered for analysis.
- You cannot suspend Instantaneous Sampling. If you use both Continuous and Instantaneous Sampling, when you suspend the observation, only Continuous Sampling is suspended.
- Start codes cannot be changed into stop codes since this would lead to errors in the Event log.

Advanced Observations

What do you want to do?

- Import data into an observation
- Export observational data
- Carry out observations with external programs
- Score data after importing external data

Import data into an observation

Import event data

You can import event data in form of:

- Observational data files from The Observer 4/5, The Observer XT and Pocket Observer.
- External observational data files – That is, any data files in which events are organized in rows.

For the detailed procedure, see Import ODX files and Import other observational data in File Management

For transferring files between The Observer XT and Pocket Observer, see the Pocket Observer Reference Manual.

Import external (physiological) data

For the detailed procedure see External Data

Import video or audio files

Choose the option that applies:

- If you still have to create the observation in which to import the media files – Choose **File** > **Import** > **Video in New Observation** or **Audio in New Observation**. Name the observation and click **OK**. Then select the media file.
- If you have created an observation and you want to add media files to it – Make sure the observation is open on your screen. Choose **Observe** > **Video** (or **Audio**) > **Open in Current Observation**. Alternatively, click the **Import Video** or **Import Audio** button on the toolbar.

Browse to the video/audio files and click **Open**.

See Import Media Files in File Management

Export observational data

You can export observations to The Observer XT files (*.odx format), to Microsoft Excel format (*.xlsx format) or to text files.

Choose **File** > **Export** > **Observational Data**. Choose the observations to export.

If you want to export only one observation, open the observation and click the **Export current observation** button on the toolbar.

See Export Observational Data in File Management

Carry out observations with external programs

What is an external program?

In The Observer XT, an external program is software that you can use in combination with The Observer XT to record additional data. For example, MediaRecorder controlled with The Observer XT to automatically start and stop video recording together with an observation and import the videos into the observation.

See External Programs in Set up your Project

How to carry out observations with external programs?

Carry out an observation in the usual way. The external program starts and stops together with the observation, according to the settings you specified for the external program.

Score data after importing external data

1. Create a new observation.

   See Create an Observation

2. Import the external data.

   See Import External Data as Text Files in External Data

3. If necessary, synchronize the external data files with the (still empty) Event Log file by adjusting the Offset.

   See Manual Synchronization in External Data

4. Start the observation and score data.

   See Carry out an Observation

Find Events

Aim

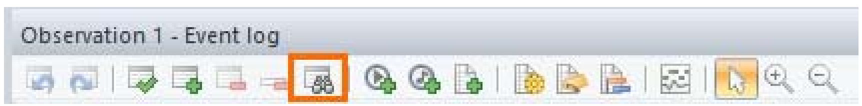
To find events, or free text entered in the Event log's **Comment** column. You can export these events or copy and paste them to another program.

Prerequisite

- You carried out at least one observation.
- One of your observations is open.

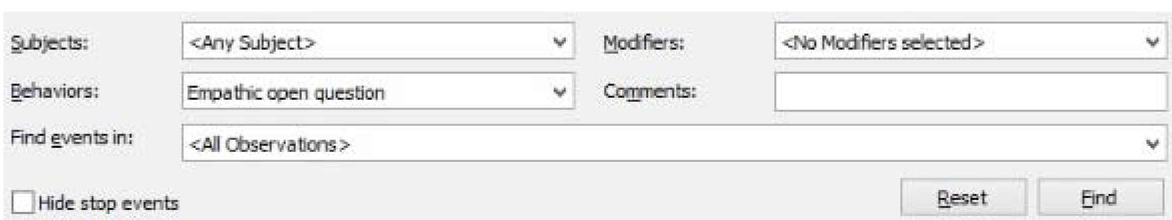
Procedure

1. Press **Ctrl**+**F** or click the **Find events in the selected observations** button.

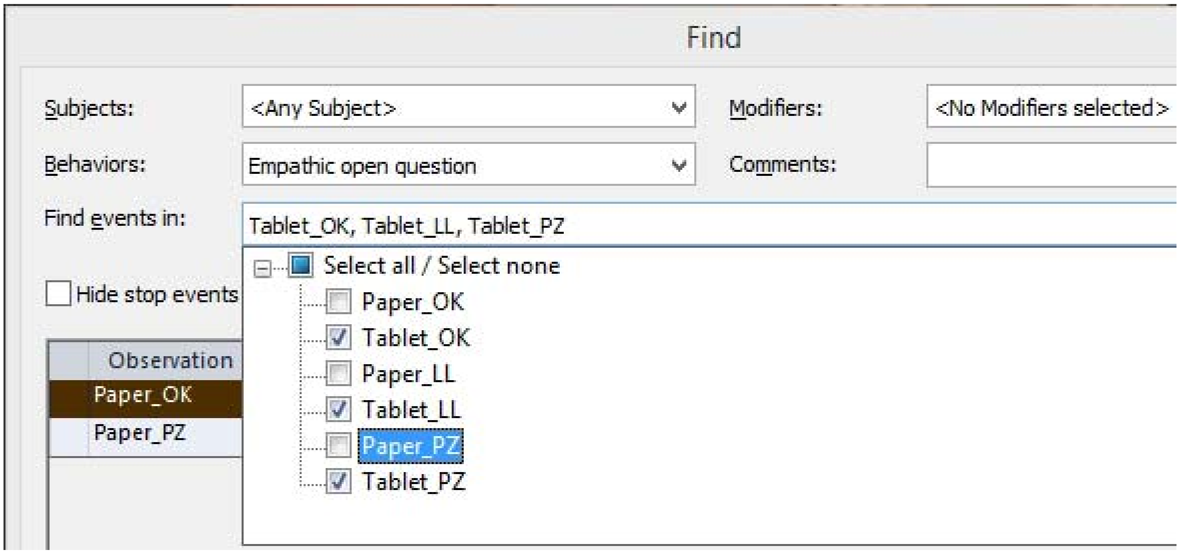


2. Specify the criteria by choosing options from the lists and click **Find**. For subjects and behaviors, you can either choose *Any*, or a specific one.

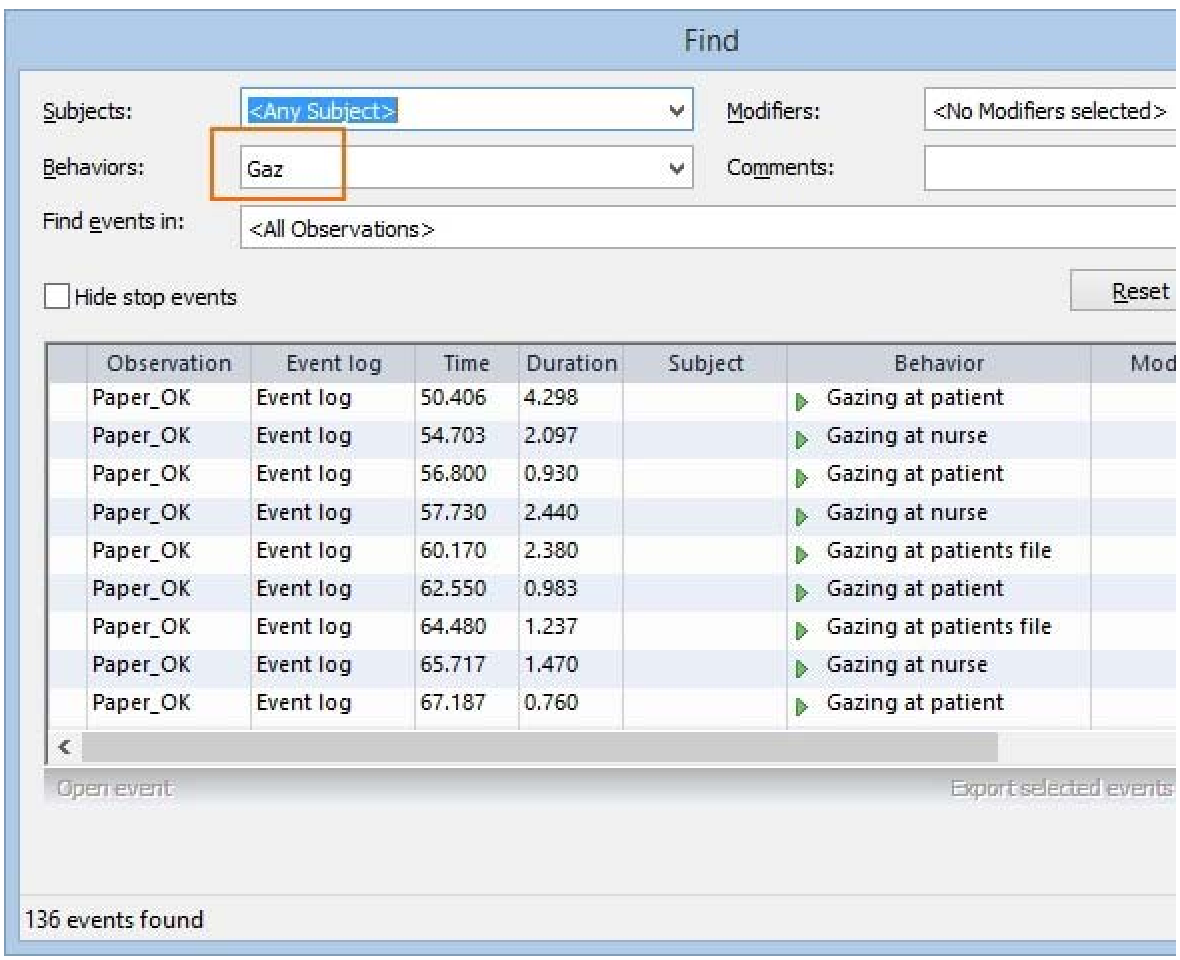
Example 1 - Find all events when an empathic open question is asked:



Example 2 - Find all events when an empathic question is asked in those observations where the doctor had a patients file on tablet:

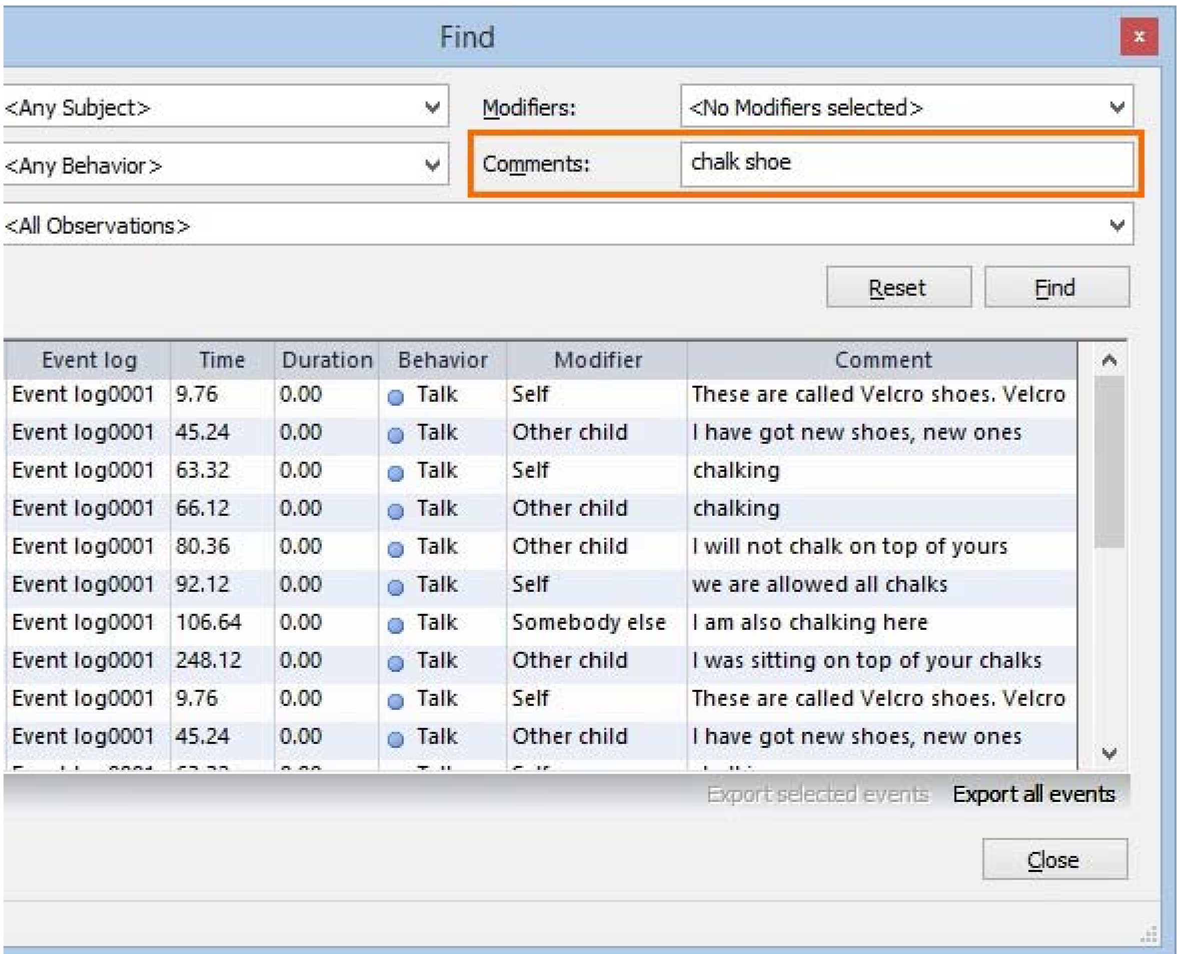


Example 3 - Find all events that start with *Gazing*, for example *Gazing at nurse* and *Gazing at patient*. Type the first letters that the events have in common and click **Find**.



Comments

- To search for an event containing specific text in the Event log's **Comment** column, enter this text in the **Comments** field.
- To search for a specific sequence of words, type the words between quotes, for example "Where is the puppet?".
- To search for a word OR another, type those words without quotes. (for example, chalk shoe).

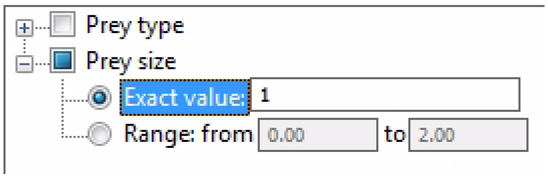


Modifiers

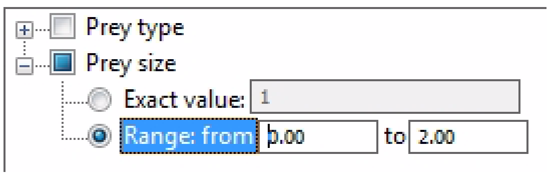
If you select modifiers in two or multiple groups, the program searches for the events which contain any of these modifiers. For example, if you select *Play alone* for the modifier group *Play mode* and *Play imaginary* for the group *Play type*, all the events containing either *Play alone* or *Play imaginary* are found.

Numerical modifiers

To search for events with a specific value of the modifier, unfold the **Modifier group** item, choose **Exact value** and enter that value.



To search for events with multiple values, unfold the **Modifier group** item and select **Range** and enter the limits.



Customize the found events

- Click a column header to sort the events.
- To show or hide columns, right-click a column header, choose **Show column** and make your selection.
- If you have start-stop groups in your coding scheme, you can hide stop events in the **Find** window. This can be useful if you want to export the list of events and use those data in, for example a statistical package. Select **Hide stop events**.
- To reset the search criteria, click **Reset**.

Export the found events

To export all events, click the **Export all events** button in the bottom-right corner of the **Find** window.

To export a selection of events, make your selection and click the **Export selected events** button.

You can also copy events and paste them into another program like Excel.

Notes

- You cannot use Find in another part of the program than the observation, for example when an Event Plot or Analysis Result is open.
- You cannot make a selection of some subjects/behaviors and not others. If this is what you want, create a Data Profile instead.

  See Select Data for Analysis

- You cannot use wildcards like * or ?. The Observer XT will then search for Events containing those characters.

The Observation Screen

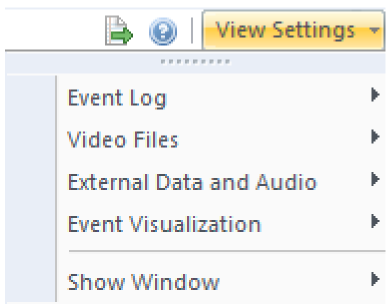
Options

- Choose the windows to view
- Position and resize the windows on the screen
- Read about The Timers window
- Read about The Codes window
- Read about The Event log window
- Read about The Data and Audio Visualization window
- Read about The Playback control window
- Read about The Videos window

Choose the windows to view

Procedure

1. Click **View Settings** in the upper-right corner of your toolbar.



2. Select the objects you want to view during the observation.

Event Log

To view Subjects, Behaviors, Modifiers or Comments in your Event Log.

Video files

To select which video files to view.

External Data and Audio

- **Visualization Window** — To view the **Data and Audio Visualization** window plotting external data, events and audio.
- **Show External Data** — Select which External Data streams you want to view.
- **Show Audio** — To visualize audio files or the audio of your video files.
- **Data Points** — To display data points in external data or audio graphs.

Event Visualization

- **Visualization Window** — To view the **Data and Audio Visualization** window showing your scored events and audio on the timeline.
- **Show Time-Event Plot** — Select which subjects to view in the **Data and Audio Visualization** window.
- **Show Comments** — To view the comments that you entered during scoring on the timeline in the **Data and Audio Visualization** window.

Show Window

- **Codes** — To view the Codes window, which you can use to score data with mouse clicks.
- **Playback Control** — To view the The Playback control window
- **Comment** — To view the Comment window. See Enter events as free text
- **Timers** — To view the Timers window with the absolute and relative time while scoring. See The Timers window
- **N-Linx Data Transfer** — To view feedback information about ongoing co-acquisition of external data. This window is available if you score data live and co-acquire for instance, FaceReader data or Biopac data. Each row in the table represents one channel. The **Data** column shows the channel name. The **Messages** column shows the number of samples recorded up to that time.
- **Time formats** — To change the format of your time stamps in the Event log.

Note

To undock the **View Settings** window, click the dots under the header **View Settings**. Then drag the window to a new location.

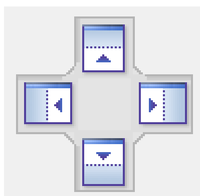
Position and resize the windows on the screen

Aim

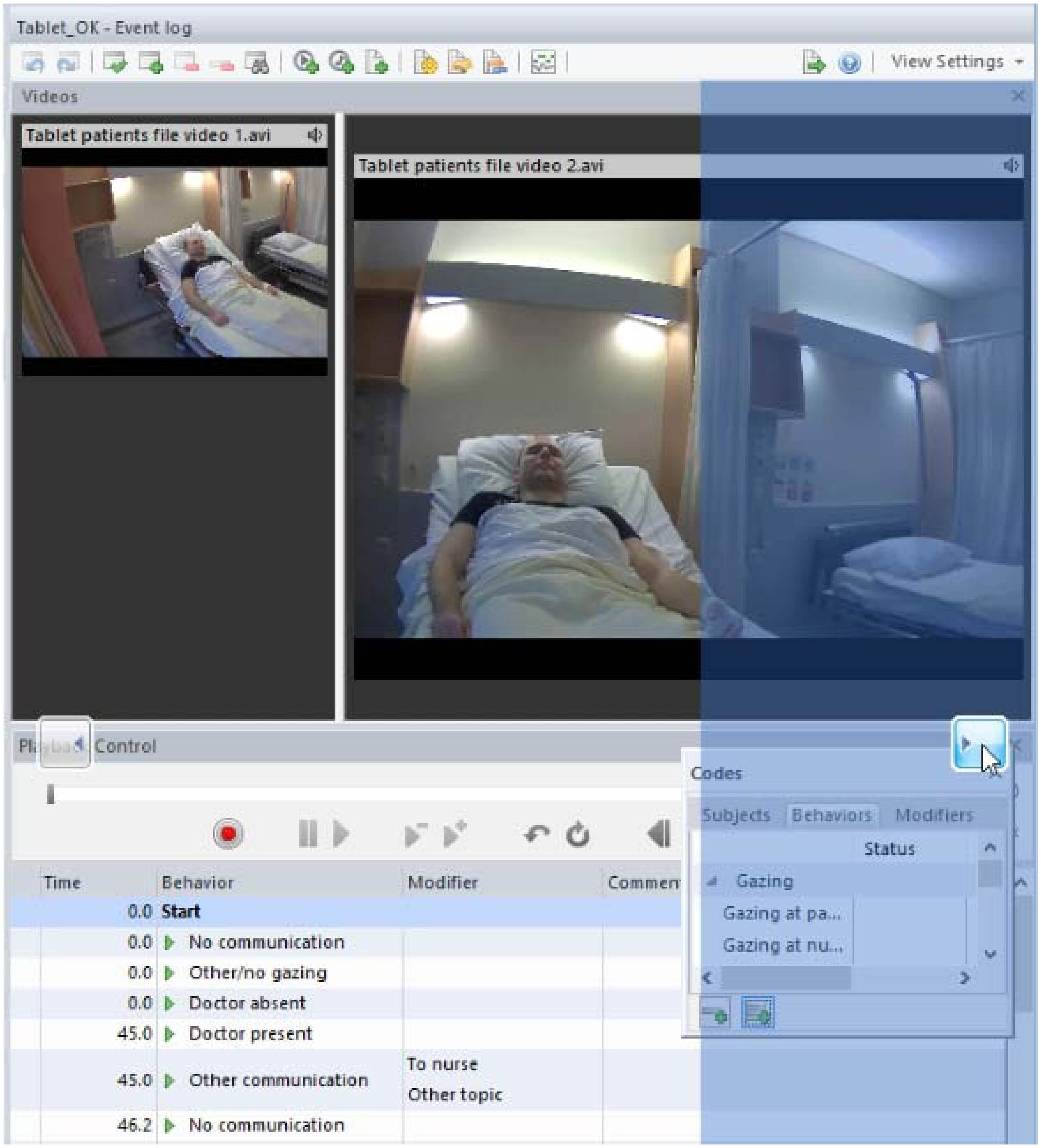
To move and resize the windows on your screen.

To move a window

1. Click its title bar and drag it to the new position. Docking icons appear, to show you where you can position the undocked window.

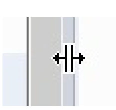
   

2. Hover with your window over one of the docking icons, the new position of the window is shown in blue.



3. Release the window, the window is positioned at the chosen location.

To resize a window



1. Hover with the mouse on one of its margins until the cursor changes to the symbol as shown in the picture.
2. Drag the margin to adjust window size.

The Timers window

The **Timers** window can display the following information:

Observation - Current Time

The current, absolute time during an observation.

When you stop the observation, the Observation - Current Time timer shows the Event Log - Stop Time, and no longer runs.

Observation - Elapsed Time

The elapsed, relative time during an observation.

Observation - Observed Time

The observed, relative time during an observation. This counter pauses when you Suspend an observation, and starts again when you resume the observation.

Observation - Remaining Time

The remaining, relative time in the observation. If you have defined a Maximum duration for the observation (see Specify the Duration of the Observation), this is the time left in the observation.

If you display the Observation - Remaining Rime, it is possible that the Observation - Remaining Time + Observation Elapsed Time in the event log is not exactly the Event Log - Stop Time. This is due to the rounding of decimals.

Observation - Start Time

The minimum start time of all data sets in the current observation.

If you score data from one media file, this is usually 00:00:00.000. However, if you have opened two or more media files, and these are not all synchronized on the first frame, this counter shows the time of the earliest media file when the latest media file is positioned on zero. That is, the minimum time at which data is available for all media files.

Observation - Stop Time

The maximum end time of all data sets in the current observation.

If you score data from one video file, this is usually the time of the last frame. If two or more media files are opened, it shows the end time of the longest media file.

Event Log - Start Time

The minimum start time of the current event log in the observation.

Event Log - Stop Time

The maximum end time of the current event log in the observation.

Interval - Elapsed time (hidden by default, also for interval sampling)

This timer is for instantaneous sampling and shows the elapsed time, since the previous interval. To show this timer, right-click the **Timers** window and select **Interval - Elapsed time**.

Interval - Remaining time (hidden by default, also for interval sampling)

This timer is for instantaneous sampling and shows the time until the next interval. To show this timer, right-click the **Timers** window and select **Interval - Remaining time**.

To customize the Timers window

- To change the time formats, choose **Setup** > **Project Settings** > Time formats
- To hide or show a timer, right-click in the Timers window and de-select or select the timer.

The Codes window

The Codes window displays the elements of the coding scheme and of their properties. The Codes window contains three tabs:

Subjects

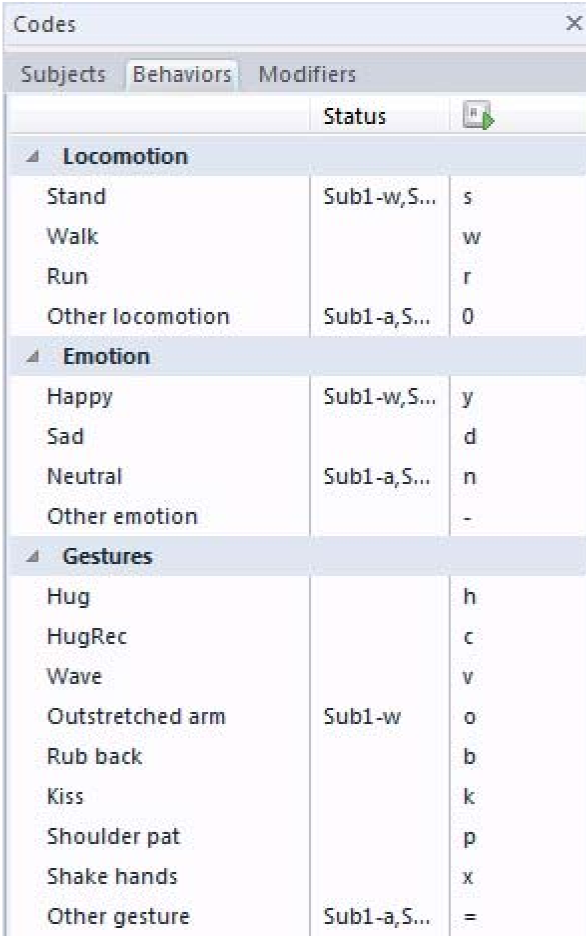
Lists the Subjects, and their code under **Start**. If one or more state events are active for a certain subject, these are shown under **Status**, separated by a comma.

Behaviors

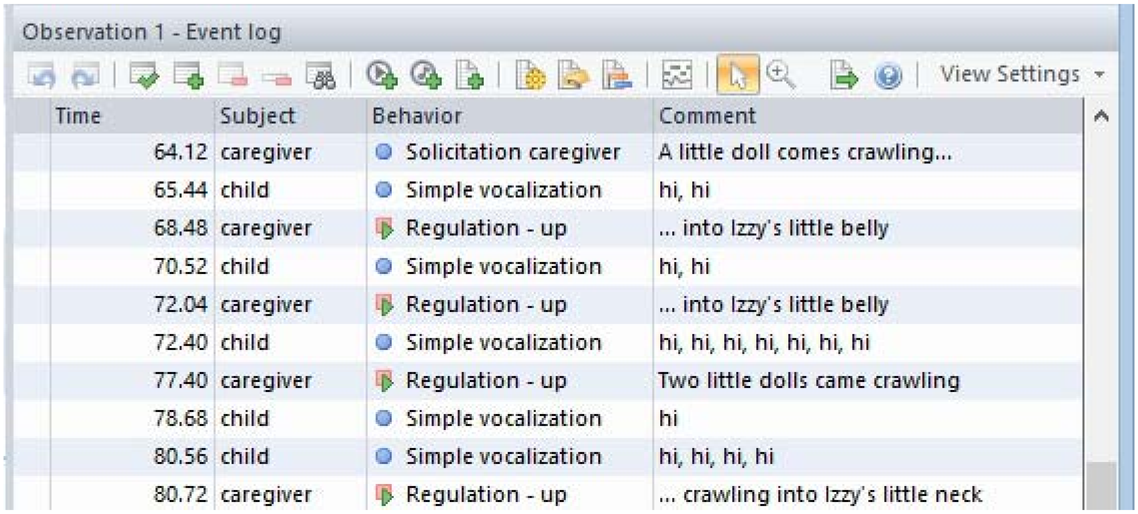
Lists the behaviors, and their start and stop code under **Start** and **Stop**. Behaviors in a A mutually exclusive and exhaustive behavior group only have a code under **Start**. If a state behavior is active for one or more subjects, the **Status** column shows those subjects separated by a comma.

Modifier

Lists the modifiers, and their code under **Start**. If state behaviors are active for a certain subject, these are shown under **Status**, separated by a comma.


Codes
Subjects
Behaviors
Modifiers
Status
Locomotion
Stand
Sub1-w,S...
s
Walk
w
Run
r
Other locomotion
Sub1-a,S...
0
Emotion
Happy
Sub1-w,S...
y
Sad
d
Neutral
Sub1-a,S...
n
Other emotion
-
Gestures
Hug
h
HugRec
c
Wave
v
Outstretched arm
Sub1-w
o
Rub back
b
Kiss
k
Shoulder pat
p
Shake hands
x
Other gesture
Sub1-a,S...
=

The Event log window



The Event Log is the window in which you score and edit your data. The Event Log is your data file.

The toolbar has the following buttons:

 Undo (Ctrl+Z) - To undo your latest entry.

 Redo (Ctrl+Y) - To undo your latest correction to your Event log.

 Check Event Log – To check for errors in the data.

See Check the event log for errors

 Insert event – To insert an event between two existing events.

See Check the event log for errors

 Delete event (Ctrl+DEL) – To delete the selected event from the event log (not from the coding scheme).

 Delete element (DEL) – To delete the selected element from the event log (not from the coding scheme).

 Finish sample (Ctrl+Enter)– To finish scoring the current sample without scoring all subject-behavior combinations.

 Find (Ctrl+F) - To find events.

See Find Events

Import Video – To import video files in the current observation. Use this button also to show audio from video in the form of waveforms. Select the checkbox Visualize audio in the Select Video window.

Import Audio - To import audio files in the current observation.

Import data - To import observational data, external data, and other types of data in the current observation.

See Import Observational Data in File Management and Import External Data as Text Files in External Data

Settings - To open the Project Settings.

See Define Project Settings in Set up your Project

Independent Variables (Alt+F3) - To open the Independent Variables list

Offset (Ctrl+Shift+=) – To synchronize video/audio/external data files.

See Manual Synchronization in External Data

Visualize (Alt+F8) - To visualize your current observation. When you select an Event line before you visualize the observation, the video will be positioned at that moment in the visualization.

See Visualize Data

Mouse pointer – To deselect the zoom in or zoom out button. This button is available when the observation contains External Data

Zoom in (Ctrl+.) – To zoom in the external data plot. This button is available when an observation contains External Data

Zoom out (Ctrl+,) – To zoom out the external data plot. This button is available when an observation contains External Data

Export current observation – To export the observation to another project in The Observer XT, Microsoft Excel, or a text file.

Quick help – For more information on carrying out an observation.

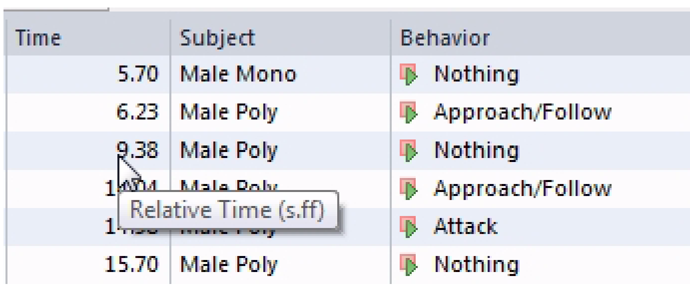
View settings – To choose which windows to display.

To customize the Event Log window

Choose the time format

Choose **View Settings** > **Show Window** > **Time formats**

TIP If you hover over the Time column with your mouse, a tool tip shows the time format.



Show or hide columns

By default all elements defined in the coding scheme appear in the event log. Also a **Comment** column is visible. To show or hide a column:

1 - Right-click one of the column headers of the event log.

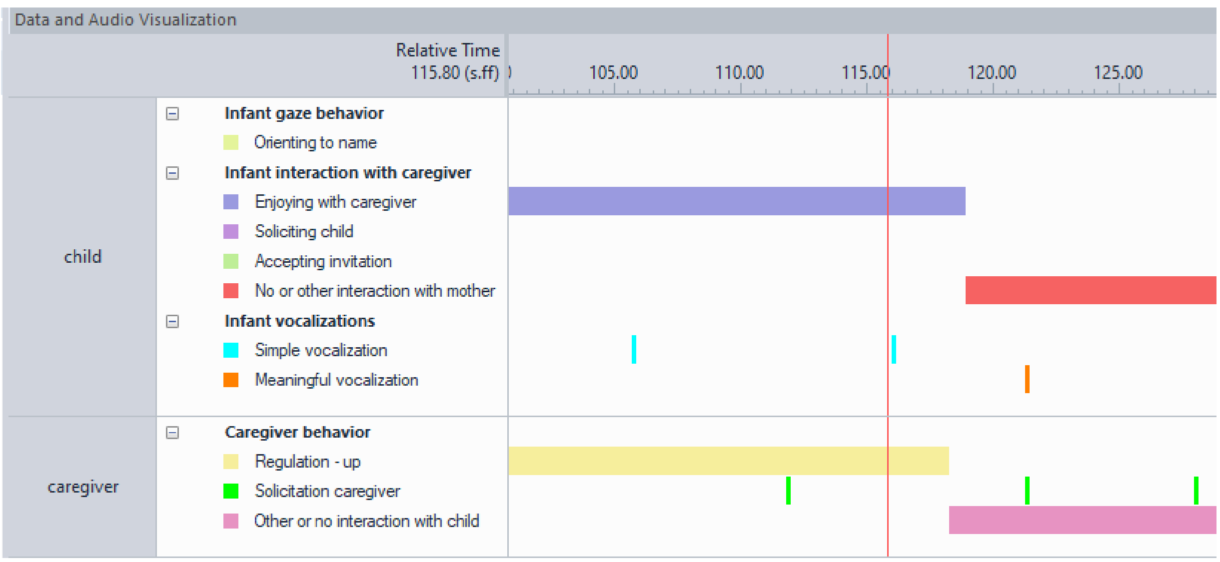
2 - Select or de-select the category you want to show or hide.

IMPORTANT If you hide a column in the Event log, you cannot score those elements anymore. If you click the tab of that element in the **Codes** window, the column re-appears in the event log. You can then score the element again.

The Data and Audio Visualization window

The **Data and Audio Visualization** window shows the data that you have scored in a **Time-Event Plot**. The window displays event plots for each subject with colored bars for state events, narrow vertical bars for point events and colored dots for Instantaneous Sampling data. If you co-acquire data (for instance, FaceReader data or Biopac data) a plot for each data stream is added to the **Data and Audio Visualization** window after you stop the observation.

Data selection does not affect your plot. If you do not want to see the data of all the subjects, then from the **View Settings** select **Event Visualization** > **Show Time-Event Plot** and select the subjects of your choice.



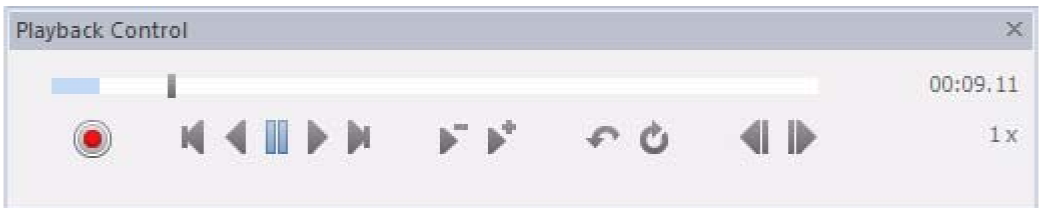
See the Visualize Data chapter if you want to

- Change the time format
- Show and hide events
- Sort plots within a visualization
- Change the colors
- Customize the audio plot

The Playback control window

With the Playback Control window you can:

- Start, pause and stop an observation.
- Control playback of video files, audio files and other data sets (event log, external data).
- Review segments of video, audio and other data sets.



Some playback control buttons are hidden by default. Others can be hidden.

See Optional playback control buttons

Playback control buttons

TIP Many playback control functions can also be controlled with Keyboard shortcuts. See Keyboard shortcuts in Playback Control for an overview

Start Observation – Starts the observation.

Stop Observation – Stops the observation.

Pause/Still – Pauses the video/audio. Pressing space bar toggles between Pause and Play forward at speed 1.

Play forward at speed 1 – Plays the video at the normal play speed. Pressing space bar toggles between Pause and Play forward at speed 1.

Increases the forward or backward playback speed with one step.

Decreases the forward or backward playback speed with one step.

Quick review – To review the latest segment of video/audio, for example to check that an event was scored at the correct time or to add/edit events. Press the button multiple times to let the video jump back more. The video segment plays back at lower speed. Set the review length and speed in the Project Settings

Quick Review is also useful when you carry out Instantaneous Sampling during an Offline observation. After you click the Next and Previous sample button, use the Quick Review button to get more information about which behavior the subjects are performing.

TIP To pause the video before quick review, set the quick review playback speed to 0. To pause the video after quick review, select the checkbox in front of Pause playback after quick review. You make these settings in the Playback control options tab of the Project Settings

Loop – To activate a loop to replay a fragment a number of times. The procedure depends on whether you chose User defined, or Fixed interval for Loop options in the Playback Control Options tab of the Project Settings window.

- User defined – Replay the entire observation, or a segment. Two flags appear when you click the Loop button, one at the start and one at the end of the slider. Move these flags to select a segment.

  Click the **Loop** button again to stop the loop.

- Fixed interval – A fixed interval can, for example, be useful to score whether an event occurs in fixed time fragments or not (1-0 sampling). The flags show an interval with the length you specified in the Playback Control Options tab of the Project Settings window. Move the flags to the episode you want to replay. You can move the flags with intervals that have the interval length you defined in the Playback Control Options tab of the Project Settings window. If you defined an interval length of 10 seconds, you can position the start of the loop at time 0 s, 10 s, 20 s etc. If you defined an interval length of 30 seconds, you can position the start of the loop at time 0 s, 30 s, 60 s etc. This way you can score the entire video accurately, after scoring the first interval, position the loop at the next interval. Use the shortcut key Ctrl + K (next interval) and Ctrl + J (previous interval) to jump to another interval.

Step forward – Moves the video one frame forward. Moves audio files 1 second forwards. When you click this button during video playback, the video is paused and moves one frame forward.

Step backward – Moves the video one frame back with each click. Moves audio files 1 second backwards. When you click this button during video playback, the video is paused and moves one frame backward.

2.88 Time – Shows the time elapsed from the start time of the observation.

If you select to display Remaining time, it is possible that the remaining time + elapsed time in the event log is not exactly the total duration. This is due to the rounding of decimals.

4 x Indicates the playback speed.

Notes

- The available playback speeds depend on the video frame rate and the video format. In general, the speed ranges from 1/25 or 1/30 to +16 if the video plays forward, and from -1/25 or -1/30 to -16 if the video plays backward.
- If the audio is spoken language, you will not be able to hear what your subjects say when you play the audio slower or faster. In most cases you won't hear any sound when playing forward at 2x or faster and backward at any speed.
- Occasionally, during scoring the playback of the audio file appears to jolt a bit. This is purely a cosmetic effect; the data you are scoring still have accurate time stamps.
- If you have multiple video files and one of them has fewer speeds than others, only those speeds are available for all videos.
- If you select to display Remaining time, it is possible that the remaining time + elapsed time in the event log is not exactly the total duration. This is due to the rounding of decimals.

Optional playback control buttons

The following buttons are hidden by default. To show them on the Playback control window, choose **Setup** > **Project Settings** > **Playback Control** options and select the buttons.

Play backward at speed 1 – Plays the video/audio/event log backward at the normal play speed.

Jump to begin – Moves the video/audio/event log to the start.

Jump to end – Advances the video/audio/event log to the end.

 Volume control – Move the slider to increase or decrease the volume of the audio file. The volume control in The Observer XT works independent from the Windows volume control. Click the speaker icon to mute or unmute the sound.

Note

If an offset exists between video/audio/data streams, clicking the **Jump to begin** or **Jump to end** button results in positioning to the start of the earliest or latest stream. For example, if the event log starts one minute after the first video frame, clicking Jump to begin results in positioning at the start of the earliest stream, that is the video.

Playback control buttons for live scoring

The following buttons are only available when you selected **Live Observation** under **Observation Source** in the Project Setup.

 Suspend Observation – Suspends the current observation.

 Resume Observation – Resume the observation.

Playback control buttons for instantaneous sampling.

The following buttons are only available when you selected **Instantaneous sampling**, or **Combine Continuous and Instantaneous sampling** under **Observation Method** in the **Project Setup**.

 Previous sample – Moves the video/audio to the previous Instantaneous sample.

 Next sample (**Ctrl**+**Shift**+**Up-arrow key**) – Moves the video/audio to the next Instantaneous sample.

To customize the Playback Control window

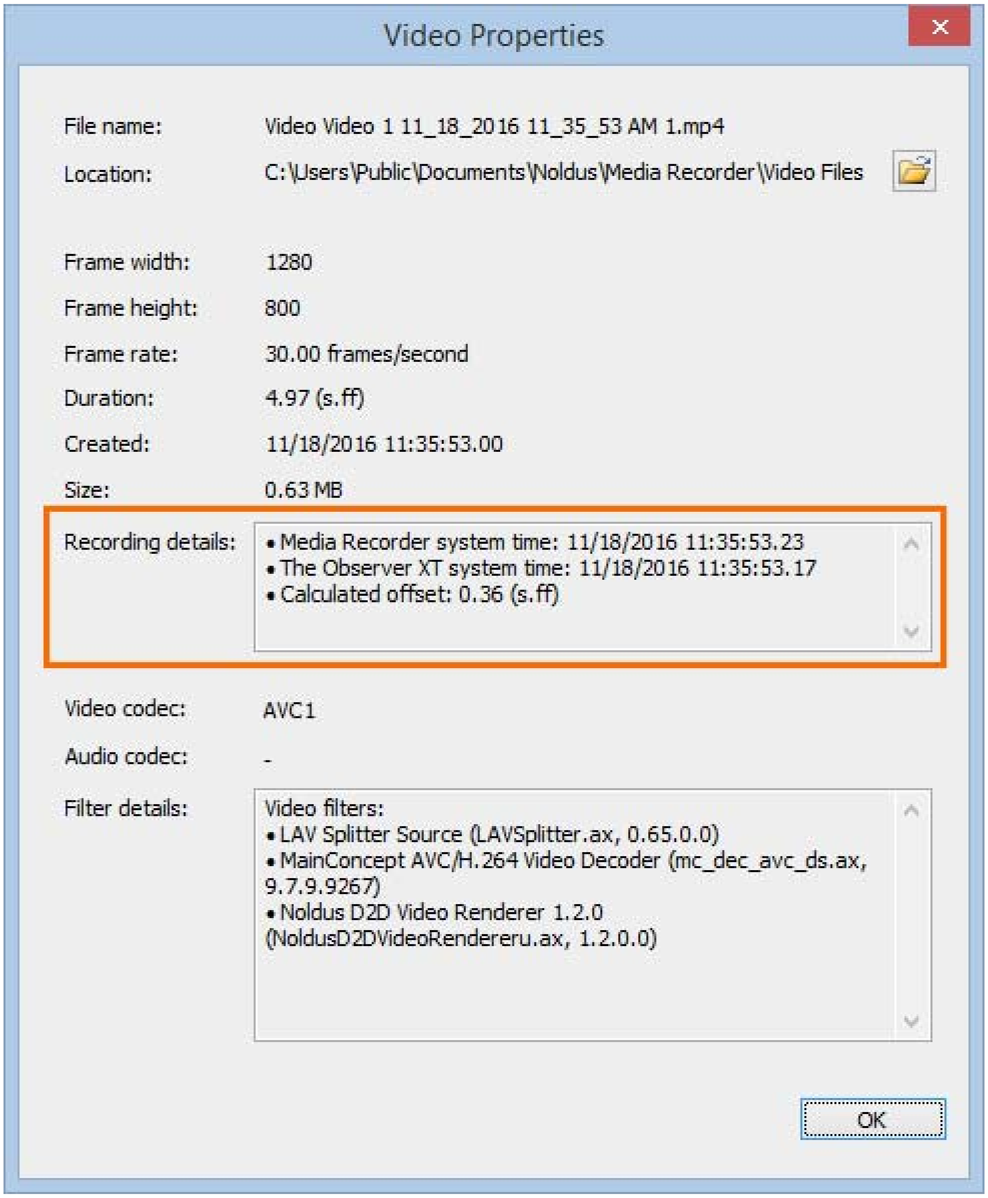
- To show and hide buttons, see Optional playback control buttons
- To resize and move the playback control window see Position and resize the windows on the screen.
- To customize the time interval represented by the slider, see Slider range

The Videos window

The **Videos** window is present if you score offline from video files. If you score data from more than one video file, additional **Video** windows appear on your screen. See also Switch between video files

Video Properties

Right-click the video image and choose **Properties**. The properties shows details about the video file like, frame rate, resolution and file size. **Video codec** and **Audio codec** shows the file formats The Observer XT reads from the video file. **Filter details** shows filters and codecs that The Observer XT uses to play back the video file.



To customize the Videos window

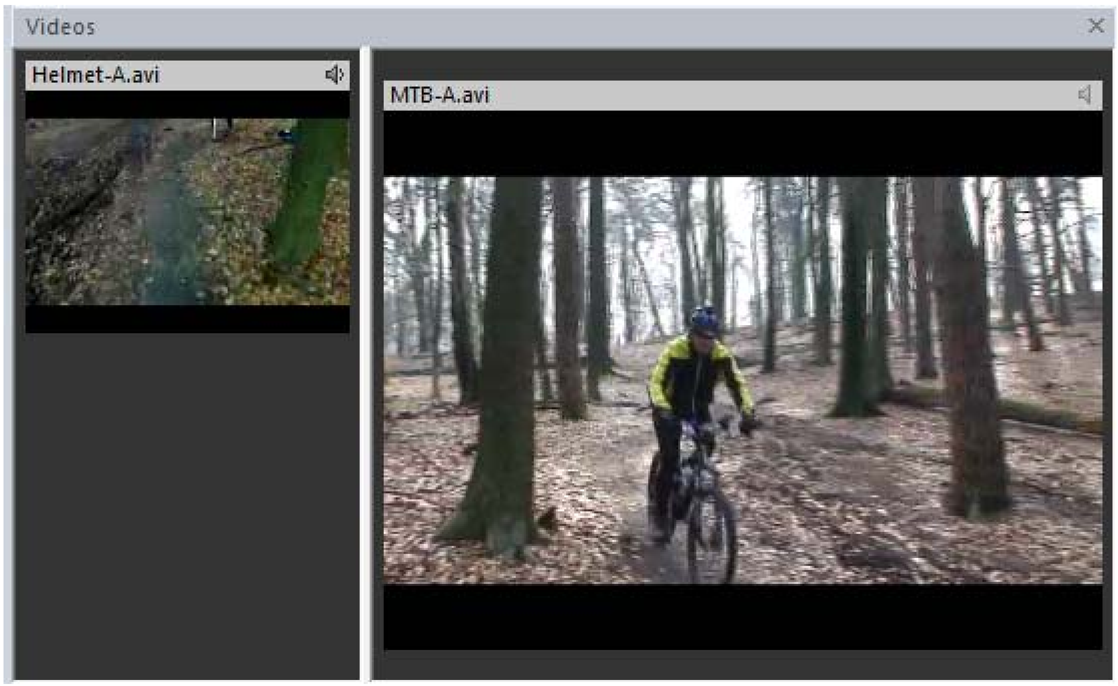
- Dock/undock videos - Right-click the video and choose **Undock**. This option is not available if you have only one video. In this case double-click the title bar instead. The video is now displayed at 100% size and you can, for example, move it to a second monitor for better view. To dock a window back, right-click and choose Dock.

-  Turn the audio on/off - Click the speaker symbol on the top right corner of the **Videos** window for a specific video file.

  If your observation has audio files, you can mute their sound by clicking the speaker symbol in the **External Data and Audio** window.

Switch between video files

One video file is positioned on the right part of the window, and the remaining on the left part.



Click one of the video files on the left to have it displayed as main video on the right. Drag the margins of the separation bar between the videos to adjust the size.

You cannot deselect your main video in the Videos window, you can only deselect the smaller ones on the left hand side. To deselect the main video, first click a smaller one of the left hand side to make it the main video.

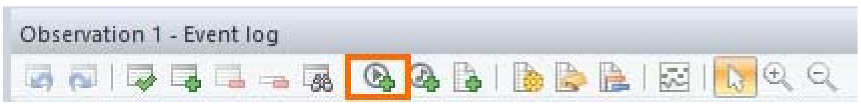
Manage Media Files

What do you want to do?

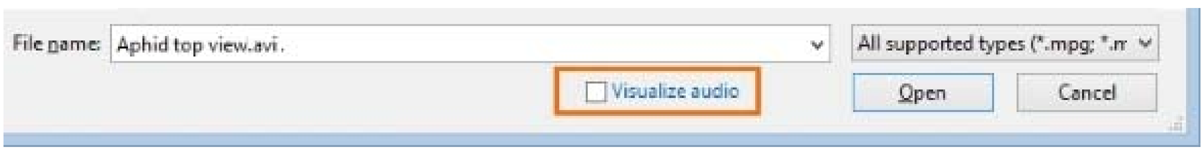
- Visualize audio waveforms from a video file
- Replace a media file
- Remove a media file

Visualize audio waveforms from a video file

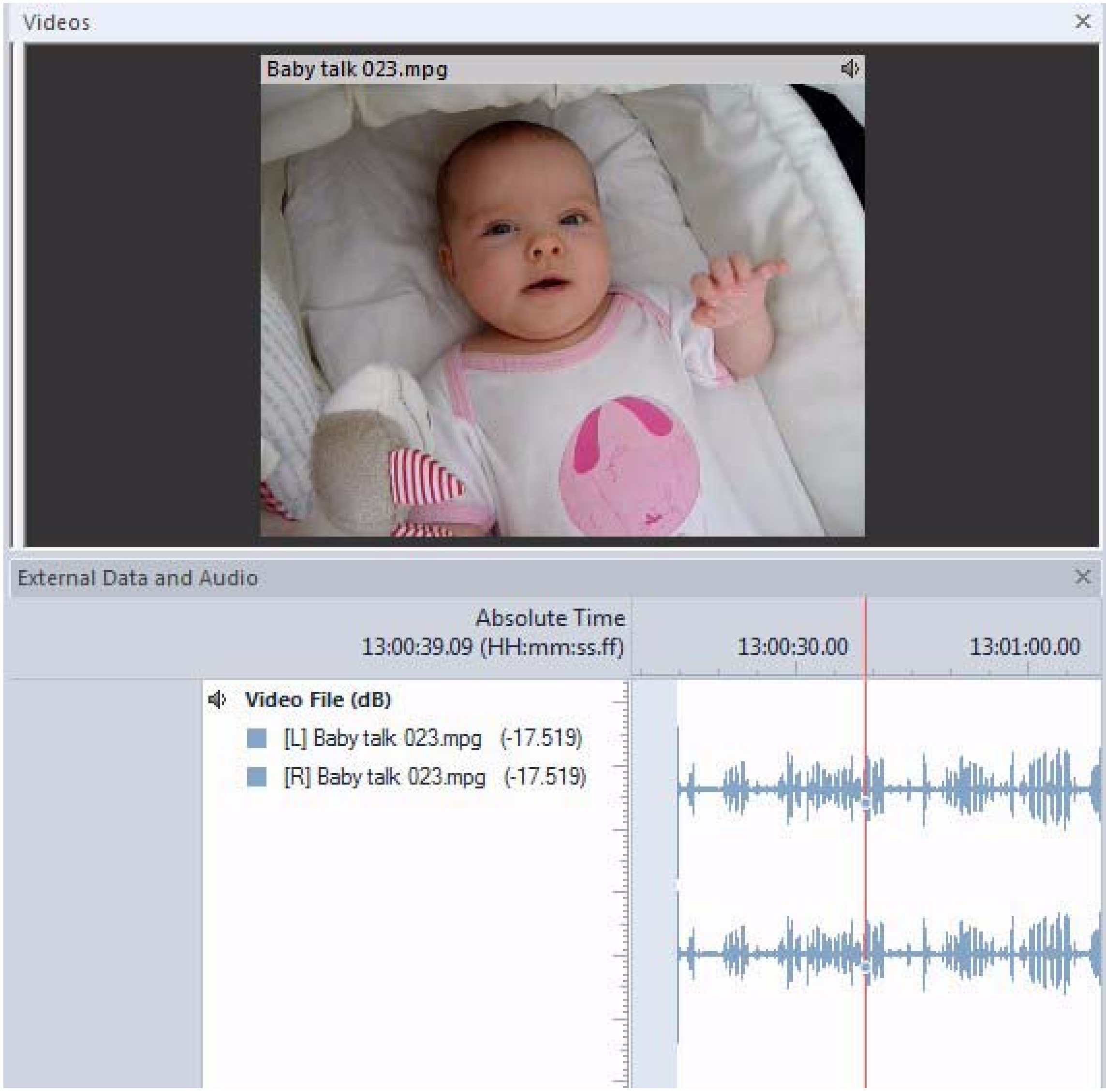
1. Open an observation.
2. Click the **Import video** button on the toolbar.



3. Select the video file and select **Visualize audio**.

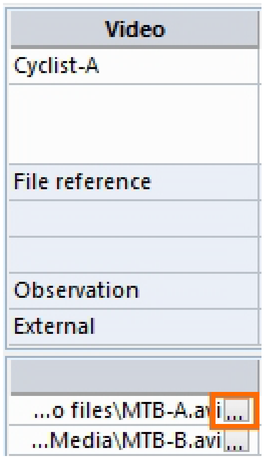


4. Click **Open**. The audio from the video file is converted and the audio waveforms are displayed in the **External Data and Audio** window. Up to two channels (Left and Right) are visualized. If video contains more channels, only the first two are visualized.



Replace a media file

1. Open the Independent Variables List (**Setup** > **Independent Variables**).
2. In the **Video** or **Audio** column, click the ellipsis button in the cell corresponding to the observation for which you want to replace the media file.



3. Select the new media file and click **Open**.

Remove a media file

1. Open the Independent Variables List (**Setup** >**Independent Variables**).
2. In the **Video** or **Audio** column, right-click the cell corresponding to the observation for which you want to delete the media file.
3. Select **Delete** and click **OK** to remove the file from the observation. The media file is not deleted from the hard disk.

Notes

- See Media Files for more information on visualizing audio waveforms and the supported audio formats and video containers.
- If the video was already in the observation, open the Independent Variables List, click the button next to the video file, select the **Visualize audio** option and click **Open**. Next, re-open the observation.
- The title of the audio waveforms plot from video is Video File (dB). See Audio values in Visualize Data for an explanation on the unit. Contrary to audio files, the audio waveforms from a video is not an independent variable.
- Audio waveforms from a video file are shown when the corresponding video is also shown. To select/deselect a video file, choose **View Settings** > **Video Files** > **Show Video** and select the file.
- To mute audio from video, click the speaker icon in the **External Data and Audio** window, or in the **Videos** window.
- To remove the audio file from your observation, remove the video file.

  See To remove a media file from an observation in File Management

- The number of media files you can use per observation depends on your The Observer XT license.
- The number of videos you can play back smoothly simultaneously depends on your computer.

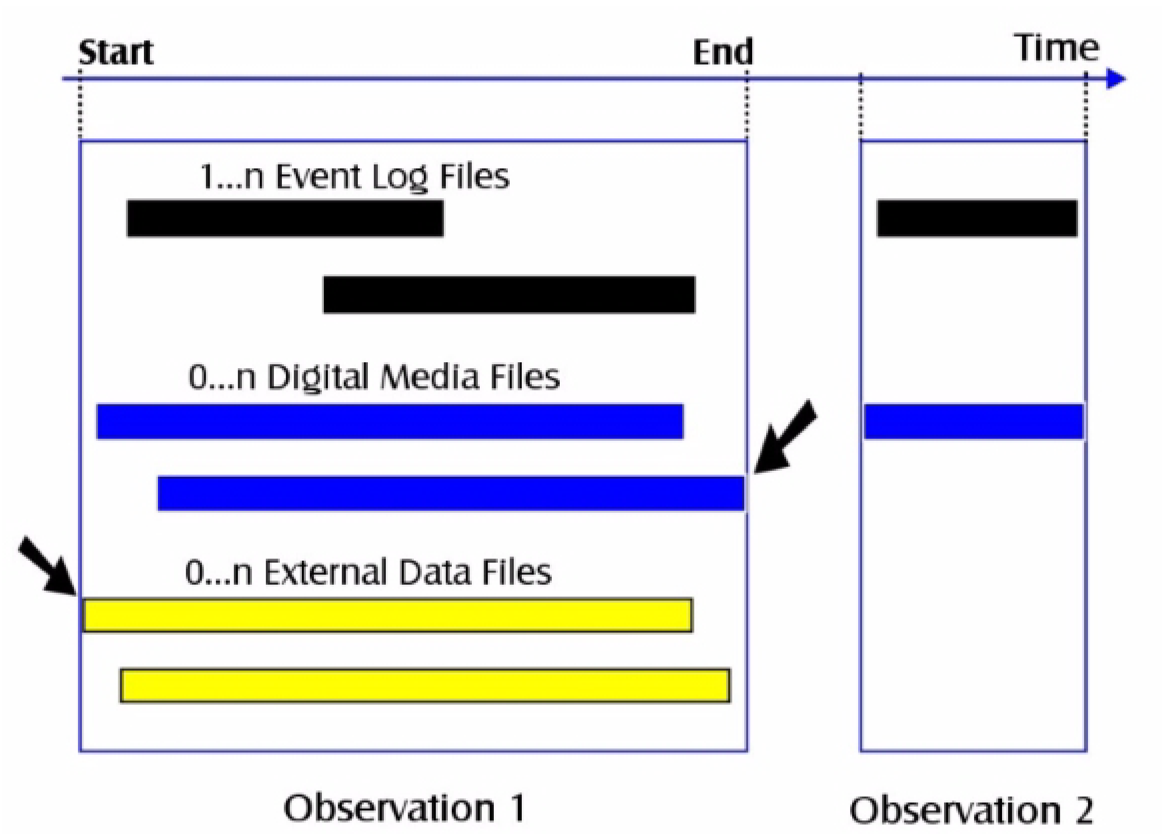
  See System Requirements in Installation for details.

Observations with Multiple Event Logs

Observations and Event logs

While you carry out an observation, events and comments are logged in what is called an Event Log. The data from your whole observation are stored in one event log. If you import event data from an external program, like FaceReader emotional expressions, or event data from an eye tracker, these are imported as separate event logs. Furthermore, Pocket Observer files and files from certain Plug-ins, such as the questionnaire tool Noldus uASQ, are also stored as separate event logs within your observation. So one observation can contain more than one event log (see the figure below). But you cannot add events in The Observer XT to the imported event logs.

Video files are also part of an observation. Similarly, if you import external data (see Import External Data as Text Files in File Management), those are part of an observation as well, although they are stored in separate files.



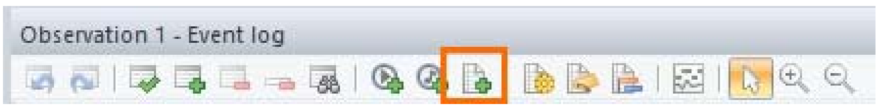
Manage observations with multiple event logs

Import event logs into an observation

1. Export the event logs as ODX files.

   See Export Observational Data in File Management

2. Open the observation, and click the **Import Data** button, then choose **Import Observational Data**.

3. Select **The Observer XT Data File (*.odx)** from the **Files of Type** list, and open your file.

Note:

If the odx-file contains more than one observation, only the event logs from the first observation are imported. To make sure that each odx-file contains one observation, select **Create separate file per observation** when exporting the event logs.

Check that data are imported correctly

1. Choose **Analyze** > **Visualize data** and select your observation.
2. Check that the event logs are properly aligned, and that the data you want to analyze fall within the white area. The left margin of the white area is Observation Start Time. The right margin is Observation Stop Time. Make sure that all your data fall in this interval.
3. If the alignment is not correct, re-open the observation and click the **Offset** button to adjust the time between event logs.

   See Synchronize data sets

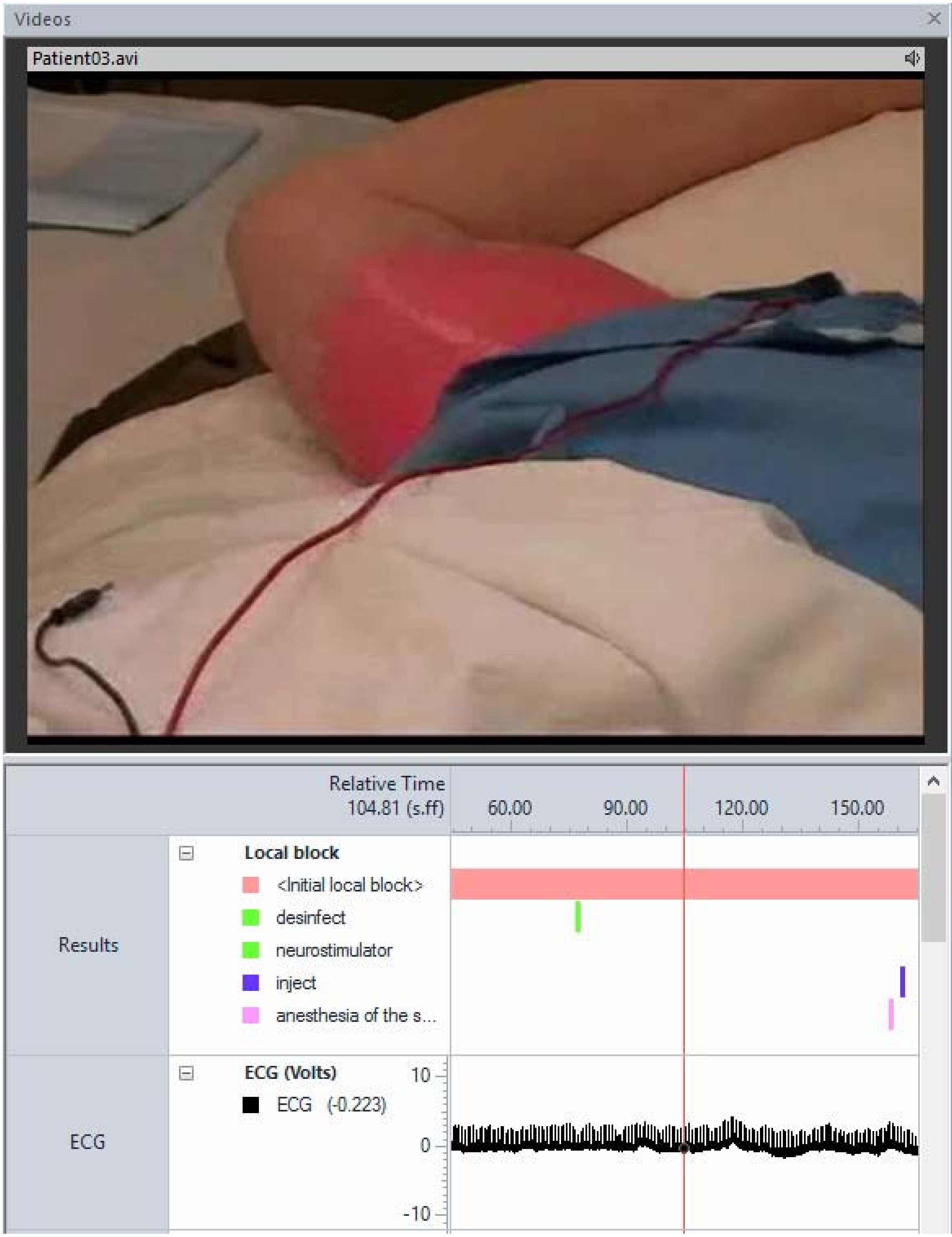
4. If some data fall outside the white area, Change the observation's start time and duration

Note

If you cannot select your observation, you may have a data profile active that does not contain your observation. Also make sure that no intervals are defined in your data profile.

See Select Data for Analysis

External Data



Main topics

- What is External Data and how do I work with it?
- Set up and acquire External Data
- Import External Data
- Import External Data, Special Cases

What is External Data and how do I work with it?

External data

External data can be data that have been acquired with a separate Data AcQuisition (DAQ) system, such as a MindWare or BIOPAC system. This can be, for example, physiological data (e.g., ECG, EEG, blood pressure, skin temperature), environmental data (e.g., temperature, humidity) or eye-tracking data.

To be able to work with external data in The Observer XT, your license must include the External Data Module.

N-Linx

BIOPAC AcqKnowledge 5, Tobii Pro Lab, Tobii Pro Studio 3.4.7 and Tobii Glasses software and the Bitbrain EEG acquisition software can be integrated with The Observer XT using the Noldus network communication protocol N-Linx. This simplifies the setup and ensures synchronization. For these systems, separate technical notes are available.

See:

- Technical Note - BIOPAC MP system - The Observer XT
- Technical Note - Tobii Pro Eye Trackers - The Observer XT
- Technical Note - Tobii Glasses - The Observer XT
- Technical Note - Bitbrain EEG - The Observer XT

In addition to this, technical notes are available for integration between The Observer XT and Mindware Biolab and SMI eye-trackers.

You can download these technical notes from the MyNoldus section of the Noldus website.

https://my.noldus.com

What can I do with external data?

You can import external data into The Observer XT and synchronize them with logged events. You can then visualize, select and analyze the external data, based on events. Or, the other way around, you can analyze events when external data have a certain value.

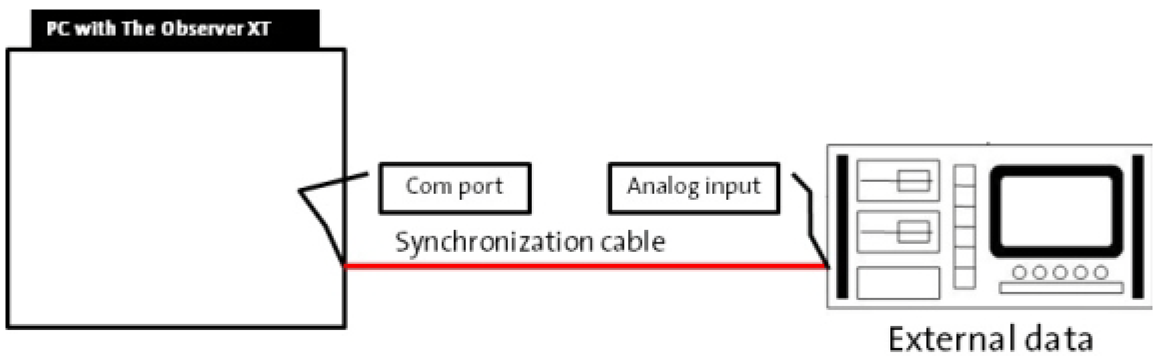
This topic focuses on the import of external data and the synchronization with logged events.

- For selecting external data, see Select Data for Analysis
- For visualizing external data, see Visualize Data
- For analyzing external data, see Calculate Statistics

How do I work with external data?

The procedure to work with external data in The Observer XT depends on the way these data are going to be synchronized with logged events. The Observer XT can send a synchronization signal to the DAQ system. The external data are then automatically synchronized with the events.

See External data acquisition with synchronization signal



You can also record external data stand-alone and import these data afterwards in The Observer XT. In this case you need to synchronize the data manually.

See Stand-alone external data acquisition

Workflow

External data acquisition with synchronization signal

1. Set up The Observer XT for live observation and to send a synchronization signal to the DAQ system. The synchronization signal is an analog signal which is fed into a free analog input of the DAQ system. In the DAQ device this signal is configured equally as a standard physiological signal (e.g. ECG, EEG, EMG). The time information in this synchronization signal is stored in the external data file.

   See Set up your Experiment with Synchronization Signal

2. Carry out a live observation and simultaneously collect the external data

See step 8 in Set up your Experiment with Synchronization Signal

3. Import the external data set together with the synchronization signal into The Observer XT and link it to an observation. The Observer XT uses the synchronization signal to synchronize the external data with the events.

   See Import External Data as Text Files

Stand-alone external data acquisition

1. Record the external data. Optionally, record a video of your test subjects with MediaRecorder as well, or carry out a live observation in The Observer XT.
2. Export the external data as text or EDF file.
3. Import the external data into The Observer XT.

   See Import External Data as Text Files or Import European Data Format files.

4. Synchronize the external data manually with the events in The Observer XT.

   See Manual Synchronization

5. Optionally, score your observation in more detail with the recorded video.

   See Carry out an Observation

What's next?

- Optionally, make a selection of external data or events in a data profile.

  See Select Data for Analysis

- Visualize the data.

  See Visualize Data

- Calculate statistics on behaviors/modifiers and/or external data.

  See Calculate Statistics

Set up and acquire External Data

What do you want to do?

- Set up your Experiment with Synchronization Signal
- Set up your Experiment with Stand-Alone External Data Acquisition
- Read about The Synchronization Signal

Set up your Experiment with Synchronization Signal

Aim

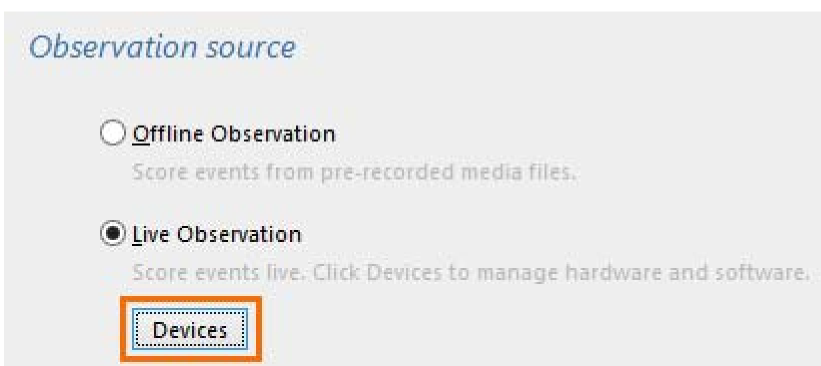
To have The Observer XT send a synchronization signal to your DAQ system. The synchronization signal is imported into The Observer XT with the external data and is used to synchronize the external data with the Event log.

Prerequisites

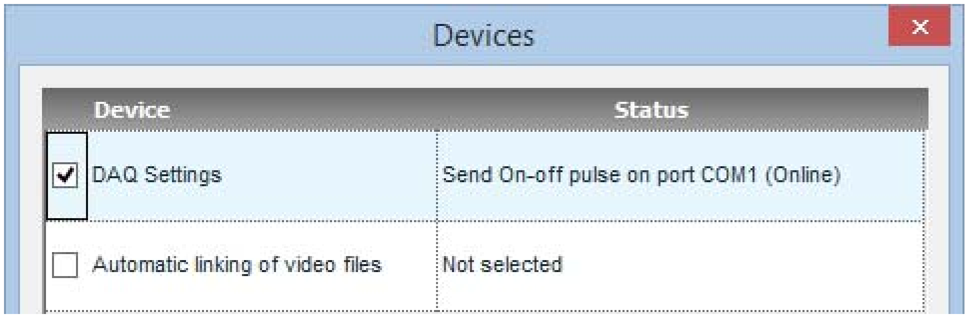
- Your license for The Observer XT includes the External Data Module.
- You have a synchronization cable.

Procedure

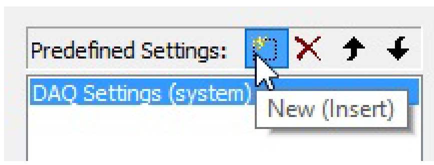
1. Connect your DAQ system to its dedicated computer (that is, the computer that records such data). Also connect it with the synchronization cable to the computer with The Observer XT. Use one of the computer's COM ports of the computer with The Observer XT. If the computer has no COM port, use a USB-RS232 adapter.
2. In The Observer XT, choose **Setup** > **Project Setup** > **Live Observations**. The **Devices** window opens. If not, click the **Devices** button.



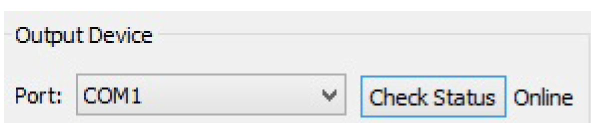
3. Choose **DAQ Settings** (or any other name indicating the external data acquisition device) and click **Edit Settings**.



4. Under **Predefined Settings**, select the item corresponding to your Data Acquisition device, or create a new one.



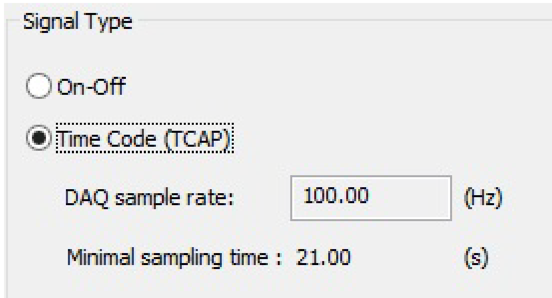
5. Under **Output Device**, select how the PC with The Observer XT is connected to the DAQ system. Select the correct COM port, or Noldus Mini-IObox sync if you use a Noldus mini USB-IO box.
6. Click the **Check status** button to check whether the selected port is Online. If it is Offline, check that other programs (also those not running) are not using that port. Change the port settings in those program or uninstall them when not necessary. When you use a USB-RS232 adapter, search for the COM port from the list that is Online.



7. Under Signal Type select:

   - On-Off if your DAQ system uses a low sample rate (< 10 Hz) or samples continuously (without regular intervals). Also select this option if you use the Noldus mini USB-IO box for synchronization.

   - Time Code (TCAP) in all other cases. Enter the Sample rate of your DAQ device. The program calculates the Minimal sampling time in seconds. This is the time The Observer XT needs to send the complete synchronization signal to the DAQ device at that sample rate. See The Time Code (TCAP) synchronization signal



8. Start the observation as usual (see Start the Observation in Carry out an Observation). The Observer XT now asks you to start data acquisition on your DAQ device.
9. Start the DAQ acquisition.
10. In The Observer XT, click OK.
11. After you finished the observation, export the data from the DAQ system as a text file. Name your synchronization data as 'sync' or use 'sync' as the type of Unit. The Observer XT then automatically recognizes your synchronization data upon import.
12. Continue with Import External Data as Text Files

Notes

- It is also possible to connect the computer with The Observer XT with a USB cable to a Noldus mini USB-IO box. The synchronization cable connects your DAQ system to one of the TTL ports of the Noldus mini USB-IO box. Select **Noldus Mini IObox sync** in the **Output device** list in step 5. Select **On-Off** in step 7. Contact your Noldus sales representative if you are interested in this option.
- If you click **Cancel** after you clicked the **Start observation** button in step 8, the observation starts anyway, but the synchronization signal is not sent to the DAQ device!
- If the DAQ system uses a filter for incoming external data, it might also affect the synchronization signal from The Observer XT! Watch the sync signal on your DAQ system; it should display square pulses.
- Automatic synchronization with the synchronization signal was tested with text export from the DAQ system only. You can also import EDF files into The Observer XT (see Import European Data Format files), but then we recommend to synchronize manually (see Manual Synchronization).

Set up your Experiment with Stand-Alone External Data Acquisition

Aim

To manually start and stop acquisition with a DAQ system and import the external data into The Observer XT. The imported data must be synchronized manually with the Event log.

Prerequisites

Your license for The Observer XT includes the External Data Module

Procedure

1. Make sure an event is recognizable in the Event log, the videos and the external data file, so that you can use it to synchronize the streams. Do so in, for example, one of the following ways:

   - Count down until you press the button to start the DAQ acquisition, and make sure you can hear this on the video file.

   - Define a dummy behavior in the Coding scheme and score that behavior at the same moment as you start the DAQ acquisition.

Time	Behavior	Comment
0.00	**Start**	
3.17	Start Heart rate	
9.91		

   - Synchronize the clock times of both computers with a time server to make sure the time stamps of the external data files match those of the Event logs.

- If the DAQ system does not require many computer resources, install the DAQ software on the same computer as The Observer XT. The time stamps in the external data file then automatically match the ones in the Event log.

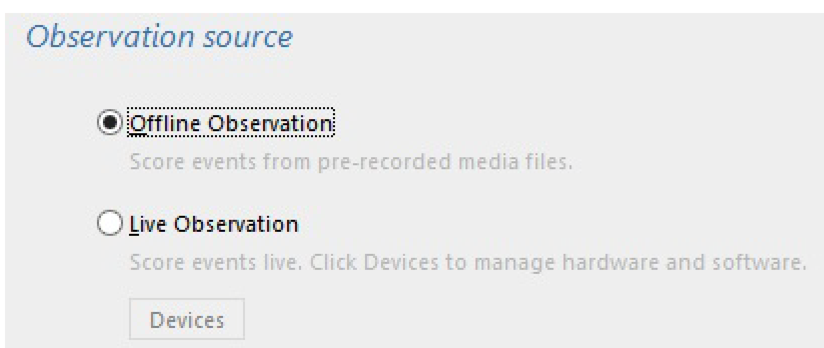
2. In The Observer XT, choose **Setup** > **Project Setup** and then:

   Live observation – if you score events simultaneously with recording the external data. Optionally, record video with MediaRecorder as well.

   See Observe Live and Record Video with MediaRecorder in Set up your Project

   Offline observation – if you recorded videos together with recording the external data and annotate them at a later stage.

   See Observation method in Set up your Project



3. Carry out the observation as usual.

   See Score Data in Carry out an Observation

4. Export the data from your DAQ system as text or EDF file.
5. Import the external data.

See Import External Data as Text Files or Import European Data Format files

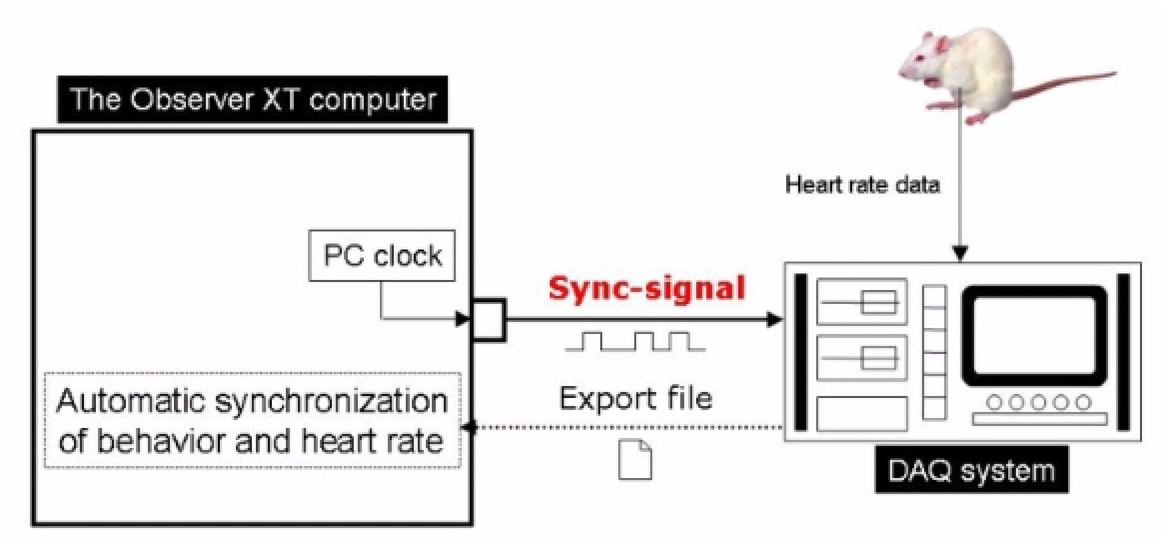
6. Synchronize the data manually with the observation.

   See Manual Synchronization

The Synchronization Signal

What is the synchronization signal?

If you score events and simultaneously acquire external data, you can synchronize external and event log data with The Observer XT. This is done by sending a synchronization signal from the Observer XT PC to the external DAQ system. This synchronization signal contains time information from The Observer XT PC. This time information is used to synchronize the event log data and the associated external data after import of the external data file.



There are two types of synchronization signals:

- The On-Off synchronization signal
- The Time Code (TCAP) synchronization signal

The preferred Signal Type depends on how the external data are sampled by the DAQ system.

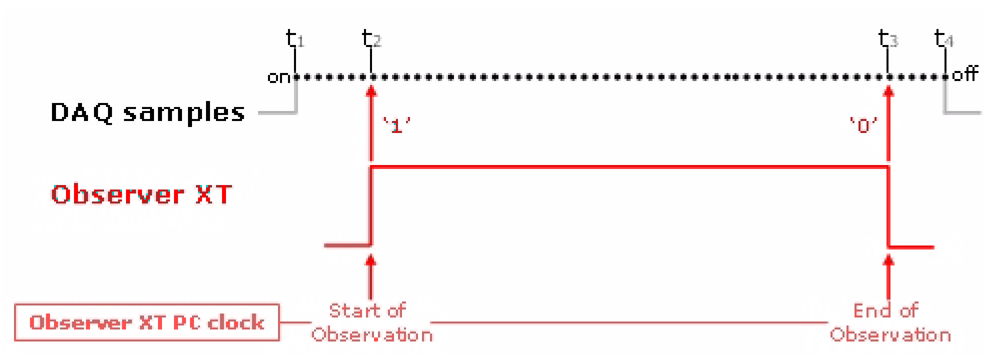
The On-Off synchronization signal

Use the On-Off signal in the following situations:

- The sample rate of the DAQ system is lower than 10 Hz.
- The collection of external data is uninterrupted.
- You use the Noldus mini USB-IO box for the synchronization signal.

The On-Off signal coincides with the start and stop of an observation. The Observer XT sends a 'one' at the start and a 'zero' at the stop of an observation.

When you use the On-Off signal you need to start the DAQ system before you start an observation and switch it off after the end of your observation.



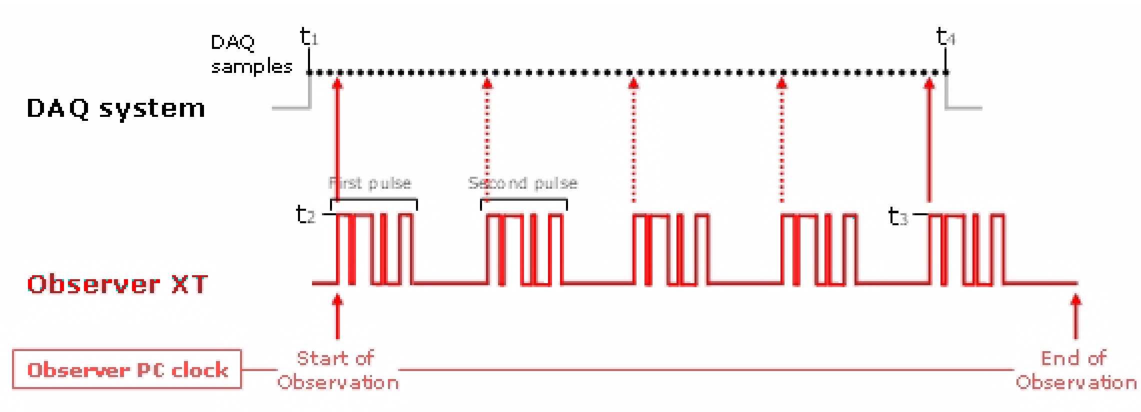
Schematic picture of the relation between the On-off synchronization signal from XT and the external DAQ samples.

The Time Code (TCAP) synchronization signal

Use the TCAP signal in the following situations:

- When the DAQ system uses scheduled sampling, i.e., when sampling is carried out at set intervals (for example, 5 minutes every hour).
- When the sample rate of the DAQ system is higher than 10 Hz.

With the Time Code signal The Observer XT continuously sends encoded pulses of zeros and ones to the DAQ system during an observation. Each pulse (consisting of 60 bits) contains time and date information in the initial bits. Pulses and the empty spaces between pulses are evenly divided over time. When you use the Time Code signal during an observation, you can start acquisition of physiological data any time during that observation, because the DAQ system can 'catch up' with The Observer XT based on the time and date information in each pulse.



Schematic picture of the relation between the Time Code (TCAP) signal from XT and the external DAQ samples. In this example the DAQ system is switched off before the last pulse has been received completely; information from this last pulse is not stored by the DAQ system.

The external data are saved in the computer dedicated to the DAQ device, not in the PC with The Observer XT. The Observer XT PC only records the manually coded data (events). During the observations, you do not see the external data on your Observer screen.

It is possible to import data sets from more than one DAQ system, each with its 0wn TCAP signal.

Import External Data

What do you want to do?

- Import External Data as Text Files
- Import European Data Format files
- Manual Synchronization

Import External Data as Text Files

Aim

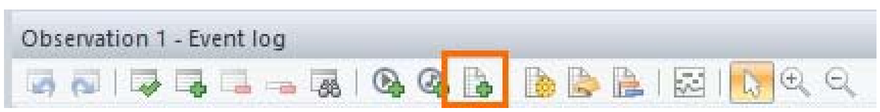
To import external data that were exported from your DAQ system as text files.

Prerequisites

- Your license for The Observer XT includes the External Data Module.
- You acquired the data with your DAQ system.
- You exported the data from your DAQ system as text file.

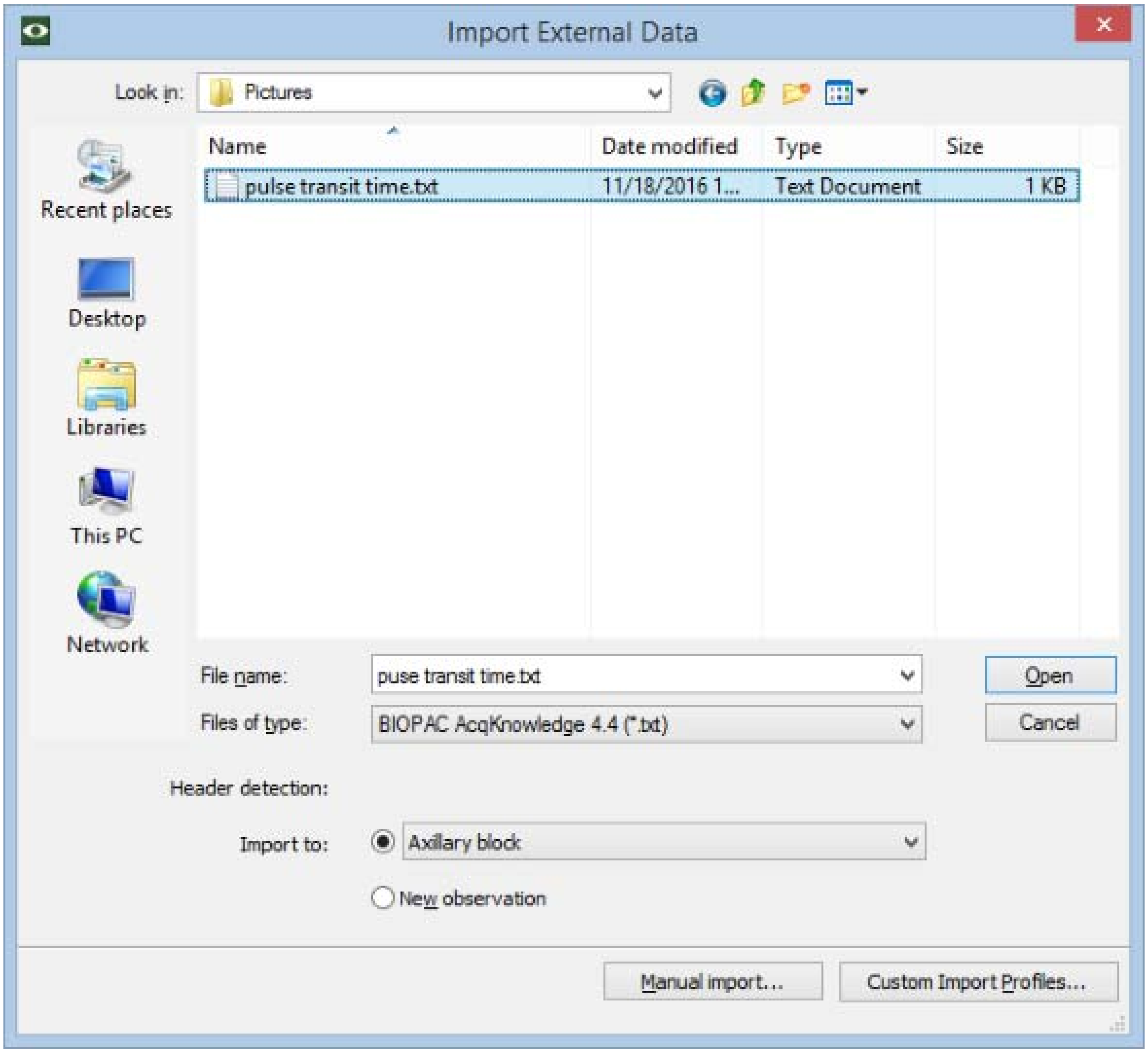
Procedure

1. Choose **File** > **Import** > **External Data**, or in the observation, click the **Import Data** button on the toolbar and choose **Import External Data**.

   .

2. The Import External Data window opens. The Observer XT contains import profiles for text files from several DAQ systems. Select your system from the **Files of type** list. Next, select the external data file. If your type of file is not in the list of predefined files of type you can Create an Import Profile, or contact Noldus Support to make one for you.



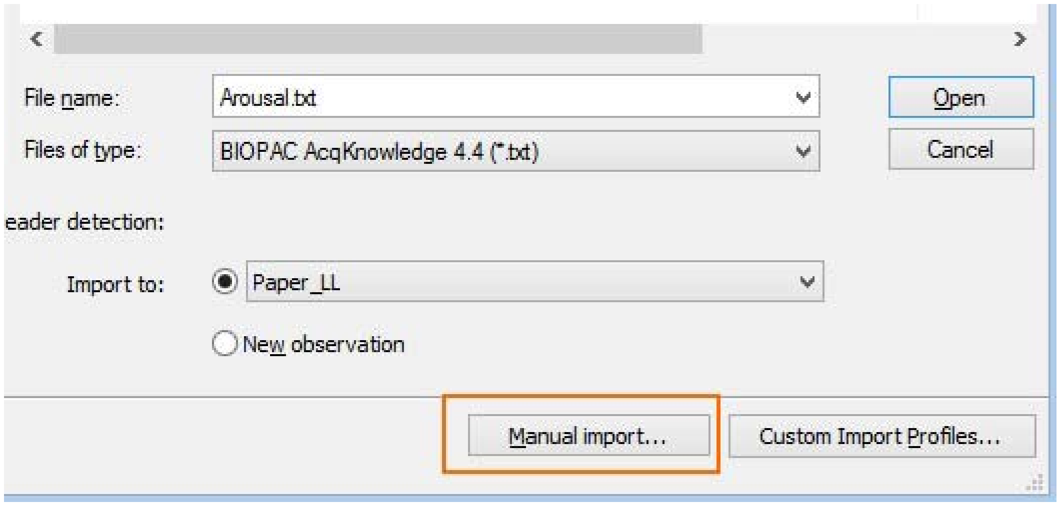
3. Next to **Import to**, select an existing observation from the list or choose New observation.
4. To import the complete file including all data sets, click **Open**.

   To import specific data sets from the external data file, continue at To import a specific data set

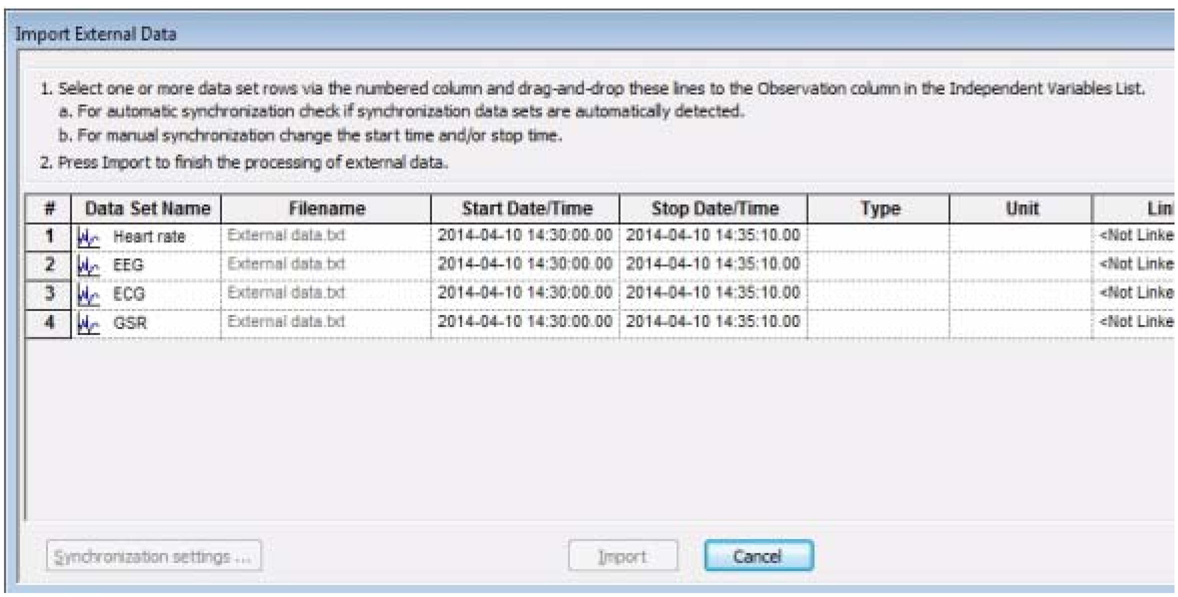
To import a specific data set

If your external data file contains more data sets than you want to import:

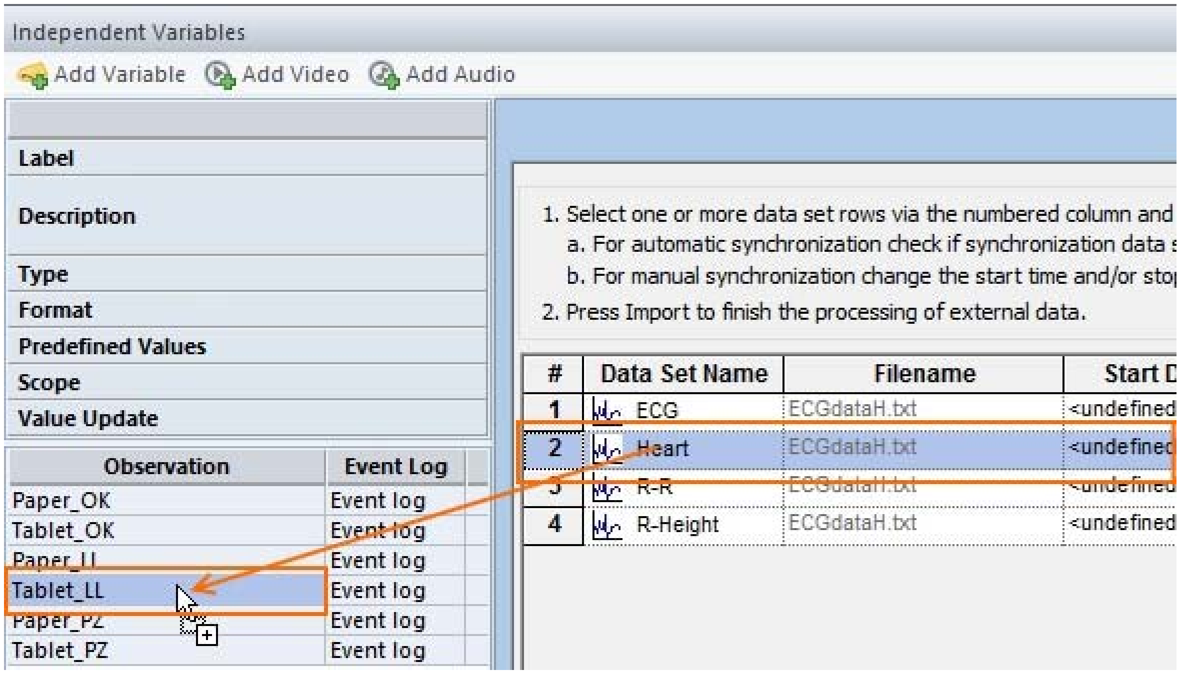
1. Follow the instruction above until step 3, then click the **Manual import** button.



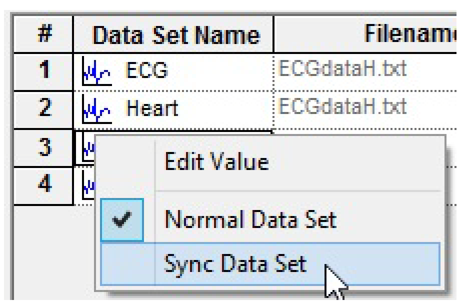
A new Import External Data window opens showing the data sets. The Independent Variable List also appears.



2. Select one or more data sets and drag-and-drop them to the observation in the **Independent Variable List** window.



If The Observer XT sent a synchronization signal to the DAQ system, make sure you import this data set as well. The row containing this signal has a clock icon at left side. If not, right-click the first cell in this row and select Sync Data Set.



3. Click **Import**.

4. If you used the DAQ system stand-alone, and therefore did not let The Observer XT send a synchronization signal, continue with Manual Synchronization.

Import European Data Format files

Aim

To import European Data Format (EDF) and BioSemi Data Format (BDF) files.

Background

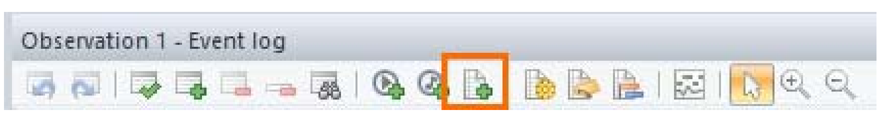
European Data Format (EDF) and BioSemi Data Format (BDF) are standard binary formats to store and exchange physiological data. BDF is the 24 bit version of EDF, which is 16 bit. Many systems to collect physiological data can export to EDF, or BDF.

Prerequisites

- Your license for The Observer XT includes the External Data Module
- You exported your external data as EDF or BDF files.

Procedure

1. Open the observation that you want to import the data into.
2. Click the Import data button on the toolbar and select **Import European Data Format Files**.

   Alternatively, choose **File** > **Import** > **European Data Format Files**.
3. Locate the file and click **Open**.

You can now:

- If necessary, synchronize the imported data with the event log.

  See Manual Synchronization
- Select data based on the value of the imported data.

  See Select Intervals by External Data in Select Data for Analysis
- Visualize the imported data.

  See Visualize External Data in Visualize Data

- Analyze the imported data with Numerical Analysis.

  See Calculate Statistics

Notes

- Importing European Data Format Files with a synchronization signal from The Observer XT was not tested. Therefore, we recommend to export text files instead and import these if you want to synchronize with a synchronization signal.

  See Import External Data as Text Files

- If you do not have an observation open, a new observation will be created.
- Importing EDF+ or BDF+ files, that contain annotations, is not supported.

Manual Synchronization

Aim

To synchronize the external dataset manually with the Event log and the videos.

Prerequisites

- Your license for The Observer XT includes the External Data Module
- You did not use automatic synchronization with a synchronization signal to acquire your external data

  See Set up your Experiment with Synchronization Signal

Procedure

There are three methods for manual synchronization:

- Numerical offset - If you know how many seconds the observational and external data are out of sync.
- Manual offset - For visual synchronization. Use this method when you score from a media file and the start of the observation or external data acquisition is signaled by a visual or auditory cue.

  Example - you counted down until you pressed the Start button in the DAQ system and you can hear this on the recorded video.

  See also Set up your Experiment with Stand-Alone External Data Acquisition
- Change the Start or Stop time with manual import.

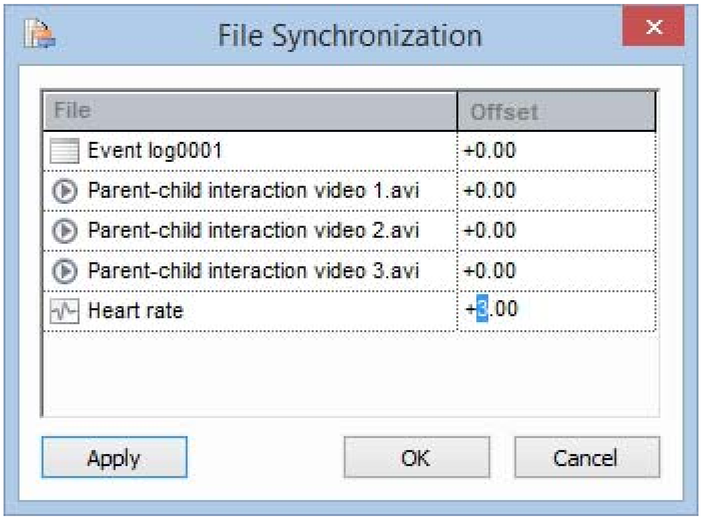
Numerical offset

1. Open the Observation in which you imported the external data.
2. On the component toolbar, click the **Offset** button.

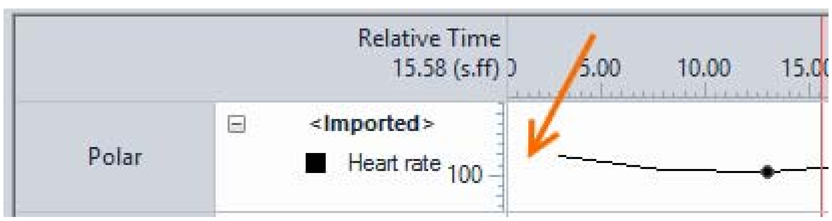
3. Select **Numerical Offset** to open the **File Synchronization** window.
4. Synchronize the files by entering the offset values.

   Example - You started your observation 3 seconds before you started acquisition of external Heart Rate data.

Enter 3.00 for the Heart rate.



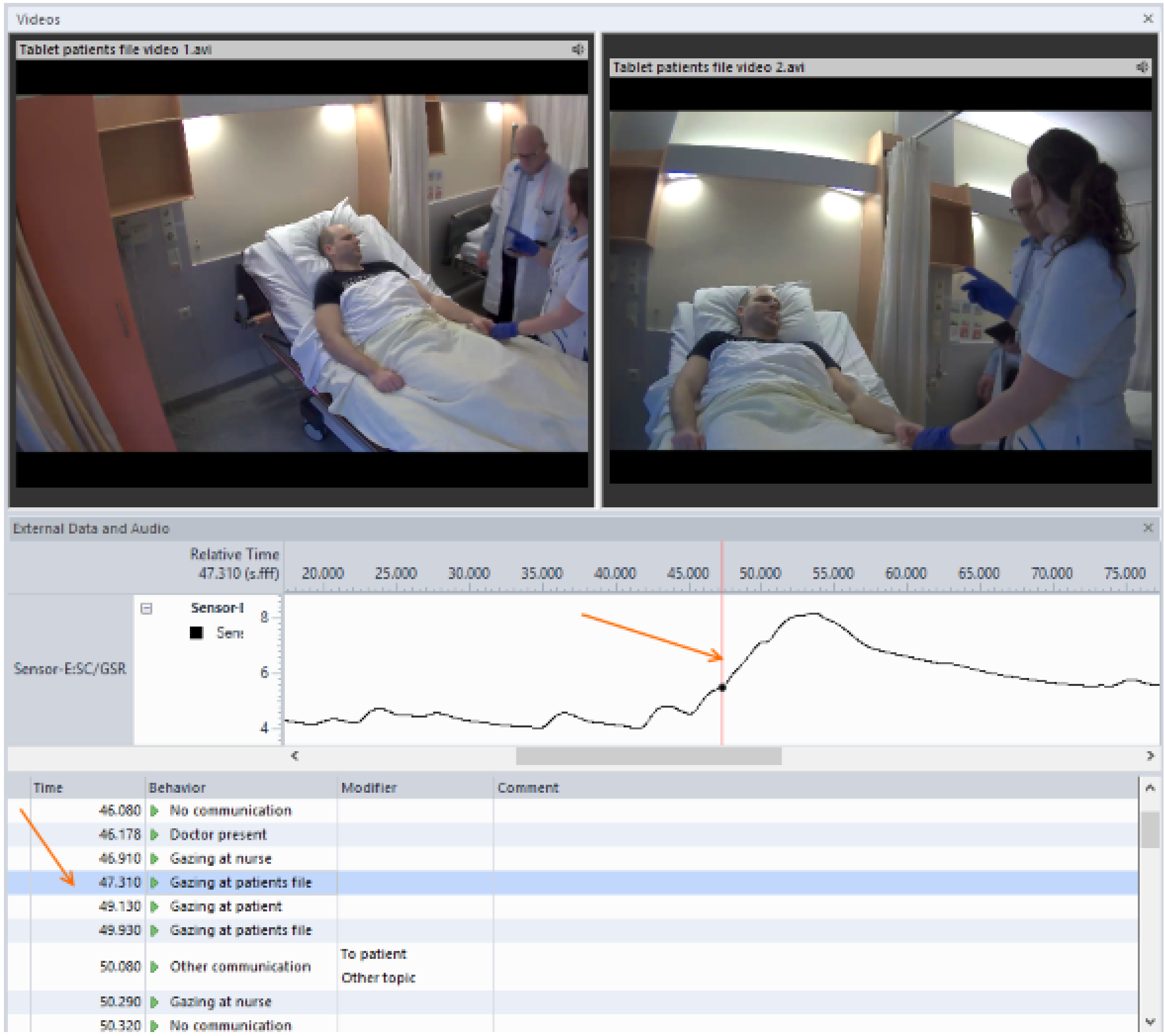
The external data stream now starts 3 seconds after the Event log.



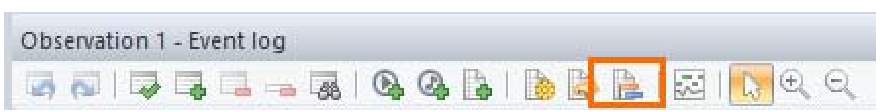
Manual offset

1. Open the Observation in which you imported the external data.

   The current position in the Event log is highlighted in blue and a red vertical line in the External Data window indicates the current position. See the arrows in the picture below.

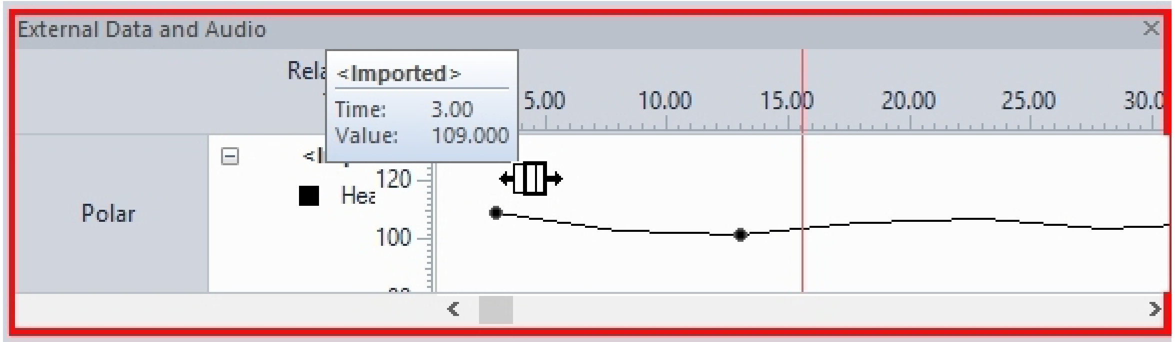


2. Click the **Offset** button on the toolbar and choose **Manual offset**.

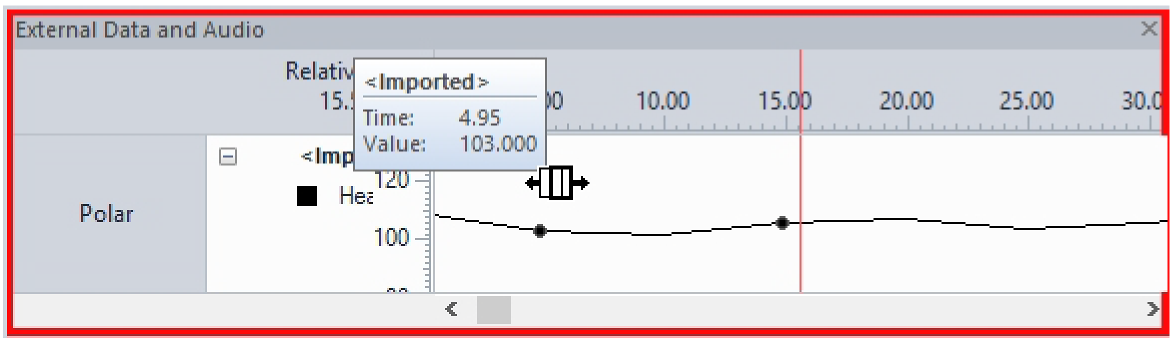


A window appears with instructions how to set the offset in a video, audio file or external data window.

3. Click **Start Synchronization**.
4. Click the **External Data** window; the border of this window turns red and the cursor becomes an offset-icon.



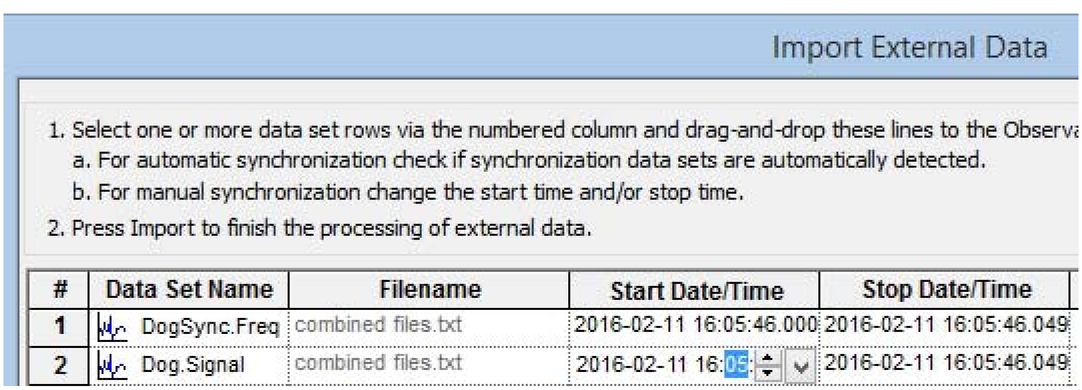
5. Keep the left mouse-button pressed to drag the graph window to the left or the right to the point where the external data match the event or the video frame.



6. Click the **Offset** button on toolbar once more to finish synchronization.

Change the Start or Stop time with manual import

When you import external data and choose **Manual import** (see To import a specific data set), a window with data sets appears together with the Independent Variables list. In the window with data sets, edit the **Start time** or **Stop time cell**.



By changing the start time you set the offset of a file. By changing the end time and/or start time you set the gain by stretching or shrinking your file.

Import External Data, Special Cases

What do you want to do?

- Create an Import Profile
- Import External Data Files with Missing Samples
- Import Heartbeat Intervals

Create an Import Profile

Aim

To import external data as text files when The Observer XT does not have a predefined import profile (see step 2 in Import External Data as Text Files). With an import profile you create a template based on the structure of the external data file.

Prerequisites

- Your license for The Observer XT includes the External Data Module
- You exported your external data as text files.

Procedure

1. Choose **File** > **Import** > **External Data**.
2. Click the **Custom Import Profiles** button and then the **New** button.
3. Browse to the external data file.
4. Build the import profile by specifying the structure of the data file. This is done by dragging and dropping cells. To make a selection undone, select the cell to which content was dropped and press **Delete**.

   Follow the procedure in these sections:

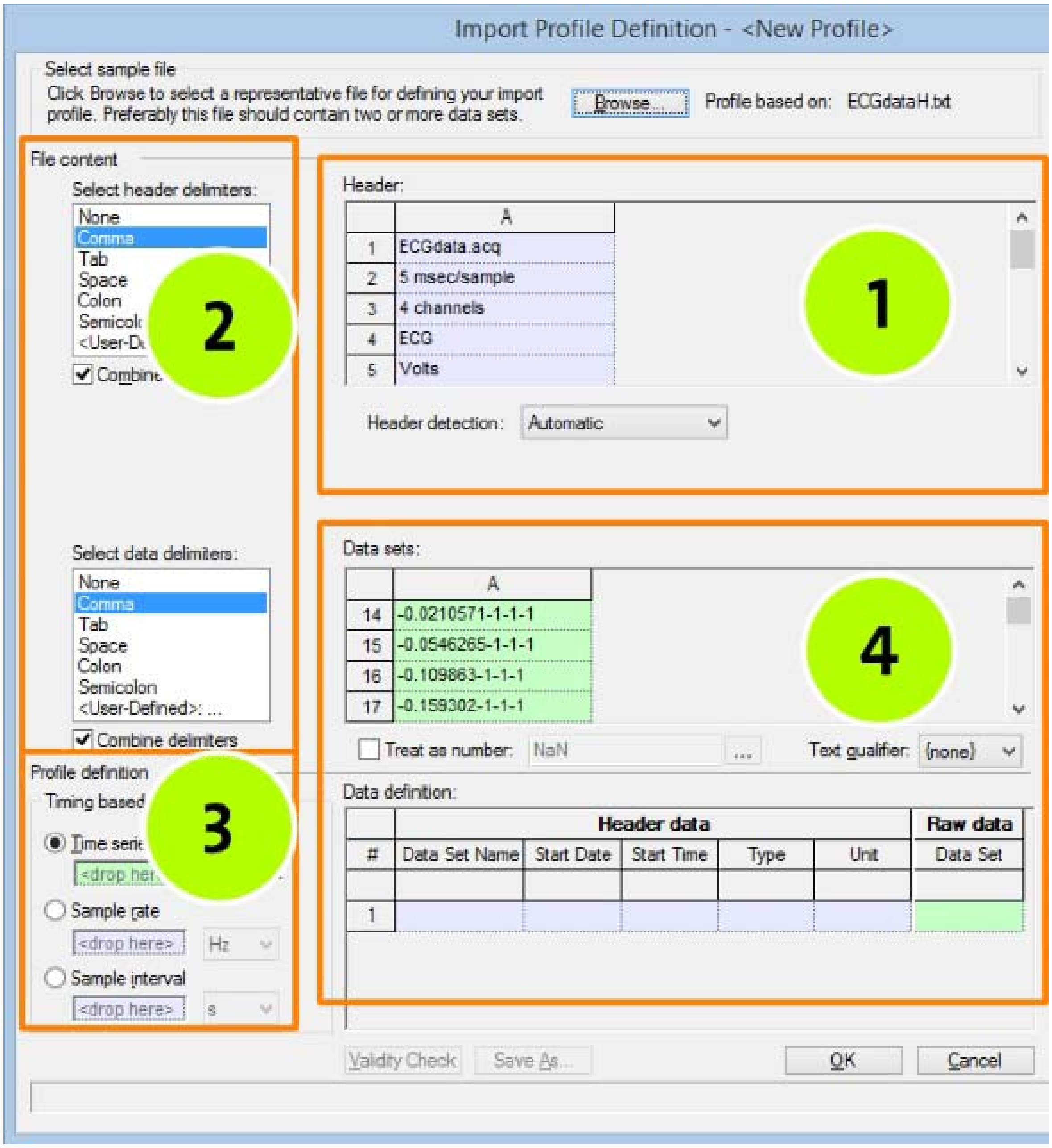
   1 - Header

   2 - Delimiters

   3 - Time information

   4 - Data
5. Import a text file with the new import profile

The numbers in this figure correspond with the numbers of the headers in the text below.



1 - Header

The Observer XT usually automatically detects header and data information in the file. If not, specify which part of the data file contains the header. Choose an option from the **Header detection** list:

- **Automatic** (default) – The Observer XT is set to automatically detect the header and data sections in the data file. Choose one of the other options if automatic header detection does not work.

- **Specify tag** - Select this option if the data file has a variable number of header lines and the header always ends with the same word. Specify the phrase (with either nominal or numerical information) that indicates the end of the header part of the file. If necessary, also specify the number of rows between the header line that contains this phrase and the data.

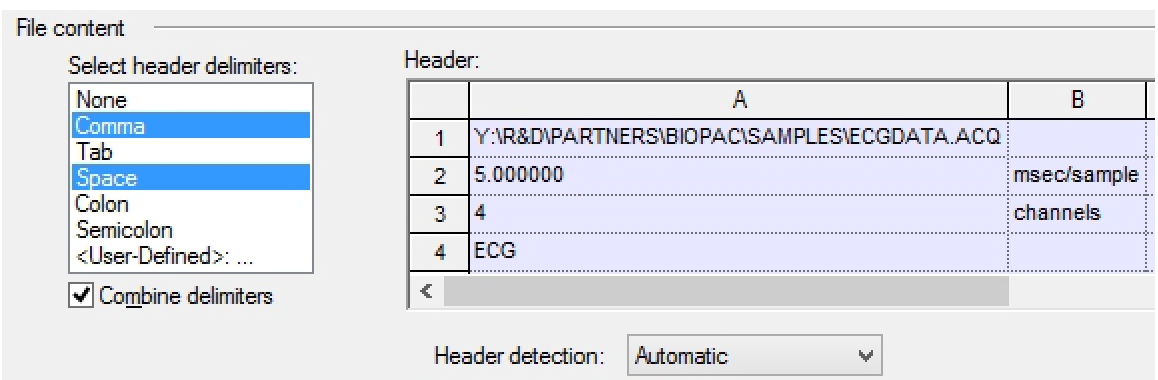
  Example - The header always ends with a line containing the text [Data]. After the line with this text there is always an empty line before the data starts. Enter [Data] in the End tag field and 1 in the Extra rows field.

- **Specify row number** - If the data file always has the same number of rows in the header, select this option and specify the number of header rows.

2 - Delimiters

The Observer XT uses the comma as the default delimiter to separate text in the header and data sets. However, the data file may have other delimiters. If this is the case, select the correct ones from the **Select header delimiters** and **Select data delimiters** lists. You can also select multiple delimiters.

Some DAQ software enables you to select the type of delimiter when saving the DAQ data to an ASCII export-file. In that case you select the same delimiter in the **File content section** of the Profile Definition window. A comma or semicolon are advised as delimiters.

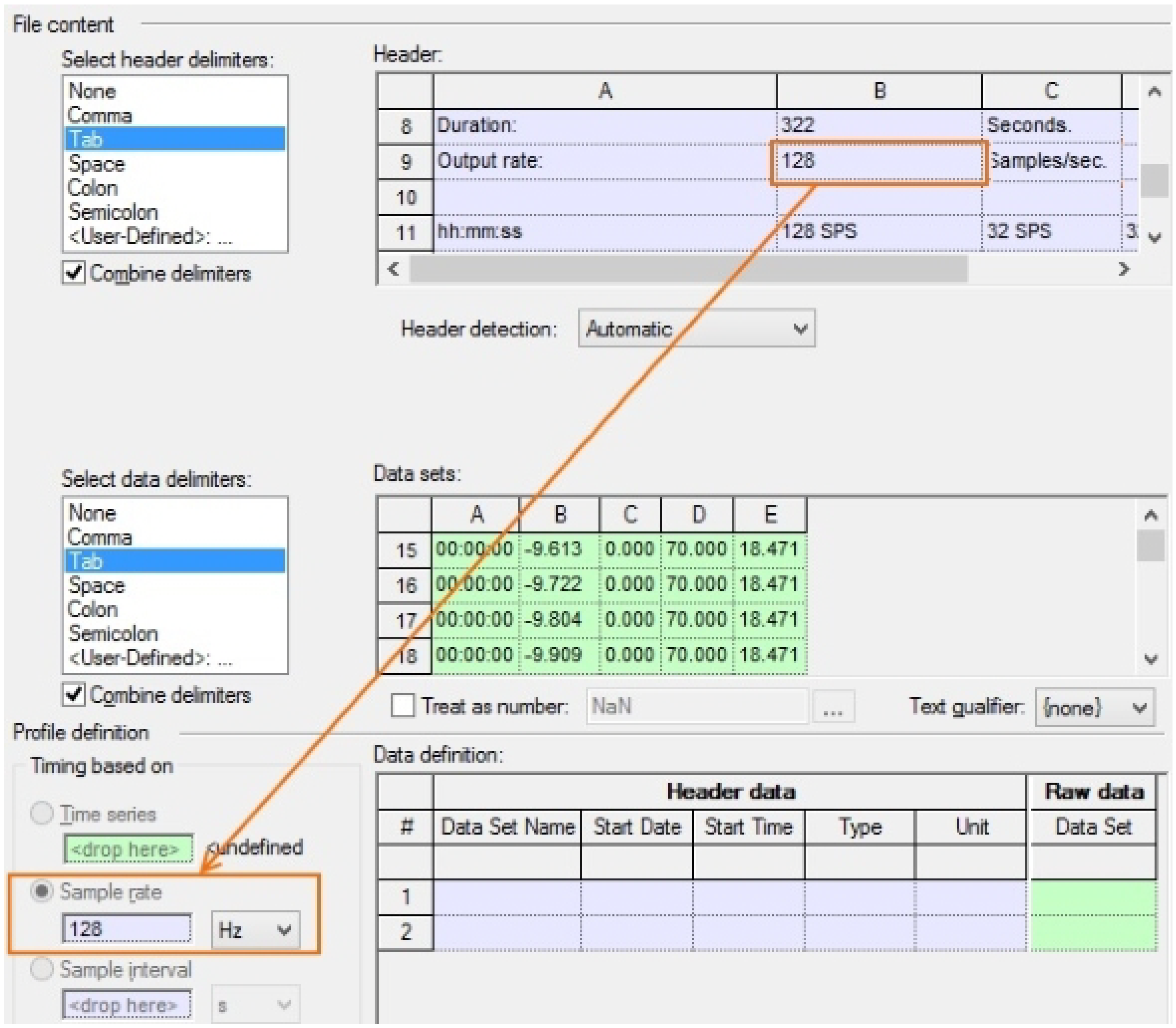


3 - Time information

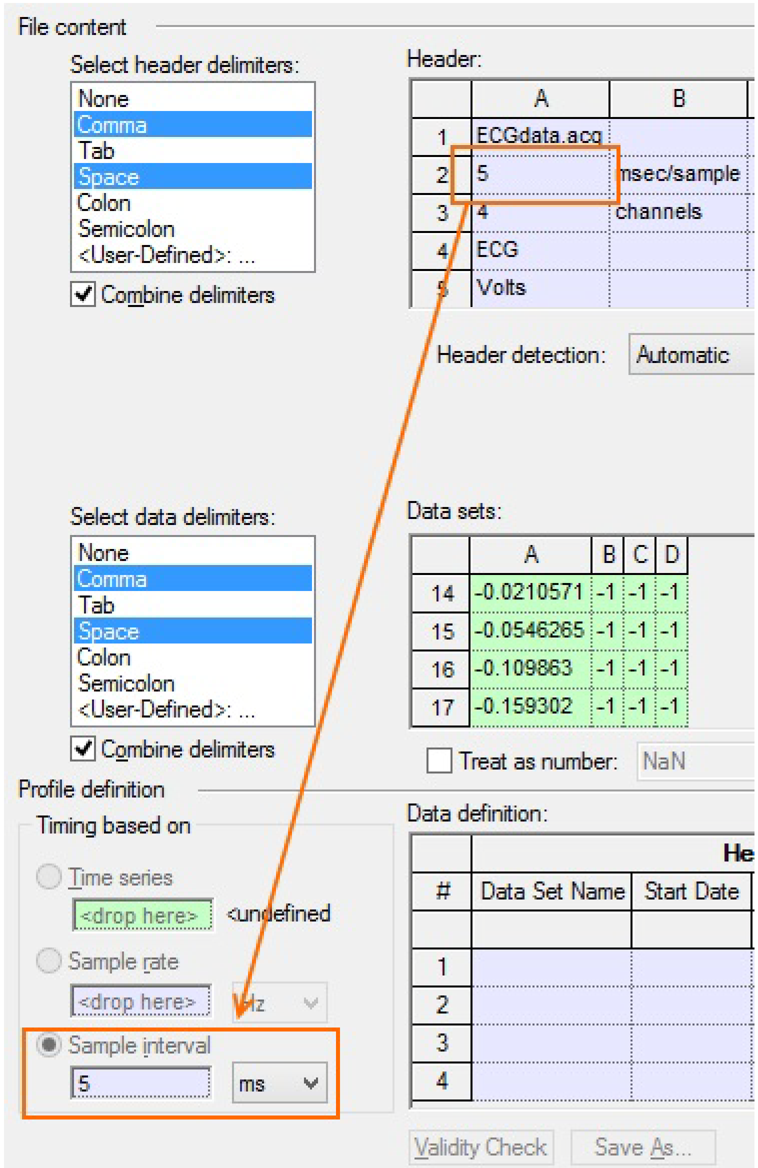
Specify which cell or column contains the time information. This can be a column with time stamps, a cell with the sample rate, or a cell with the sample interval, which is the time between samples. Drag and drop the cell or column with time information to the appropriate field in the **Profile definition** section.

1. **Sample rate** – If the header contains a cell with the sample rate, select the **Sample rate** button under **Timing based on** in the **Profile definition**

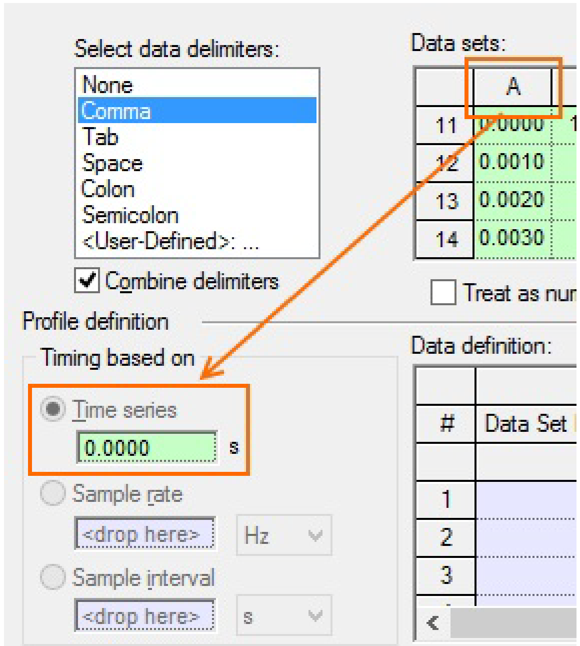
section. Drag the cell with the sample rate to the **Sample rate** box and select the appropriate unit (Hz or kHz) from the list.



2. **Sample interval** - If the header contains a cell with the sample interval, select the **Sample interval** button in the **Profile definition** section. Drag the cell with the sample interval to the **Sample interval** box. Select the unit of time from the list.

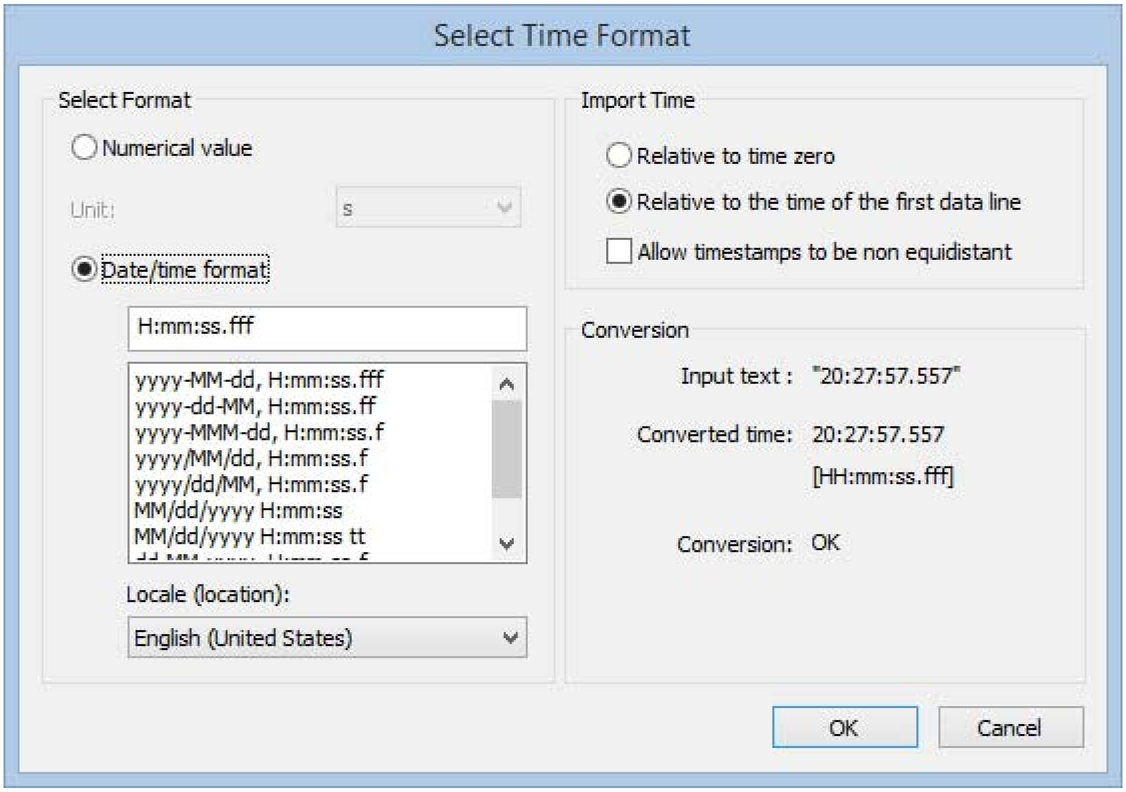


3. **Time series** - If the header does not contain information on sample rate, select the **Time series** button under **Timing based on**. Under **Data sets** in the **File content** section, select the column with time stamps and drag this to the **Time series** box. The column with time stamps now appears grayed.



The **Select Time Format** window opens. If the time matches one of the predefined formats, The Observer automatically selects one. **Converted time** shows the conversion of the text to time and **Conversion** is **OK**.

You can also define your own format by typing an **H** for each number representing 'hour', an m for 'minute', an **s** for second and a **f** for each decimal of a second (see the next picture).



Under **Import Time**, select one of the options.

Relative to time zero - Suppose the first row in the imported external data set has time 00:00:05. When the option Relative to time zero is selected, the time stamp of the first row of the imported data set will remain 00:00:05.

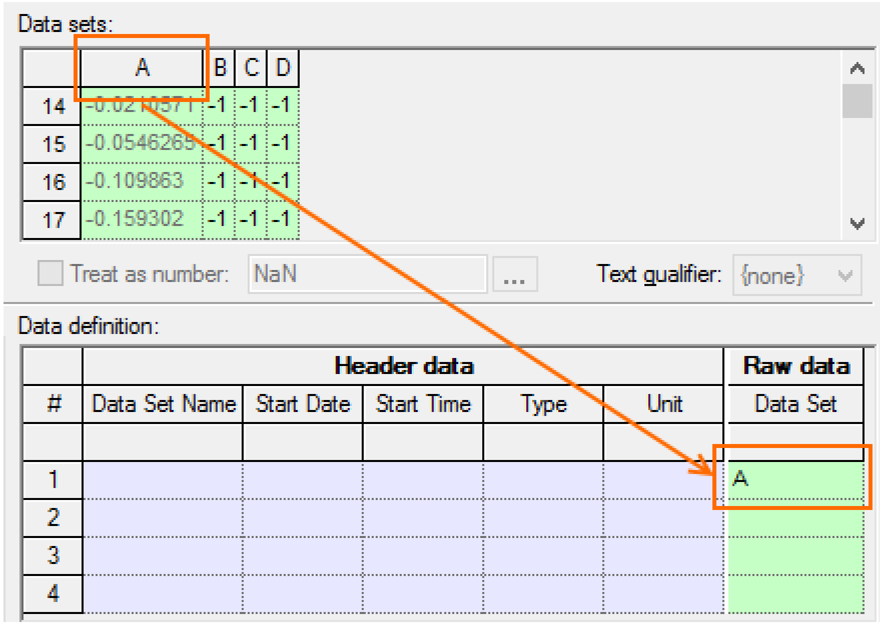
Relative to the time of the first data line - Suppose the data set you want to import starts at 14:28:00 and has samples every 5 seconds. With the option Relative to the time of the first data line, the first row of the imported data will get the time stamp 00:00:00. The second row will have time stamp 00:00:05. The options under Import Time are grayed out when your time stamps contain the date the file was created. In this case the option Relative to time zero is used.

Select the option **Allow timestamps to be non equidistant** when the time stamps do not represent regular intervals. For example, 0, 490, 572, etc...

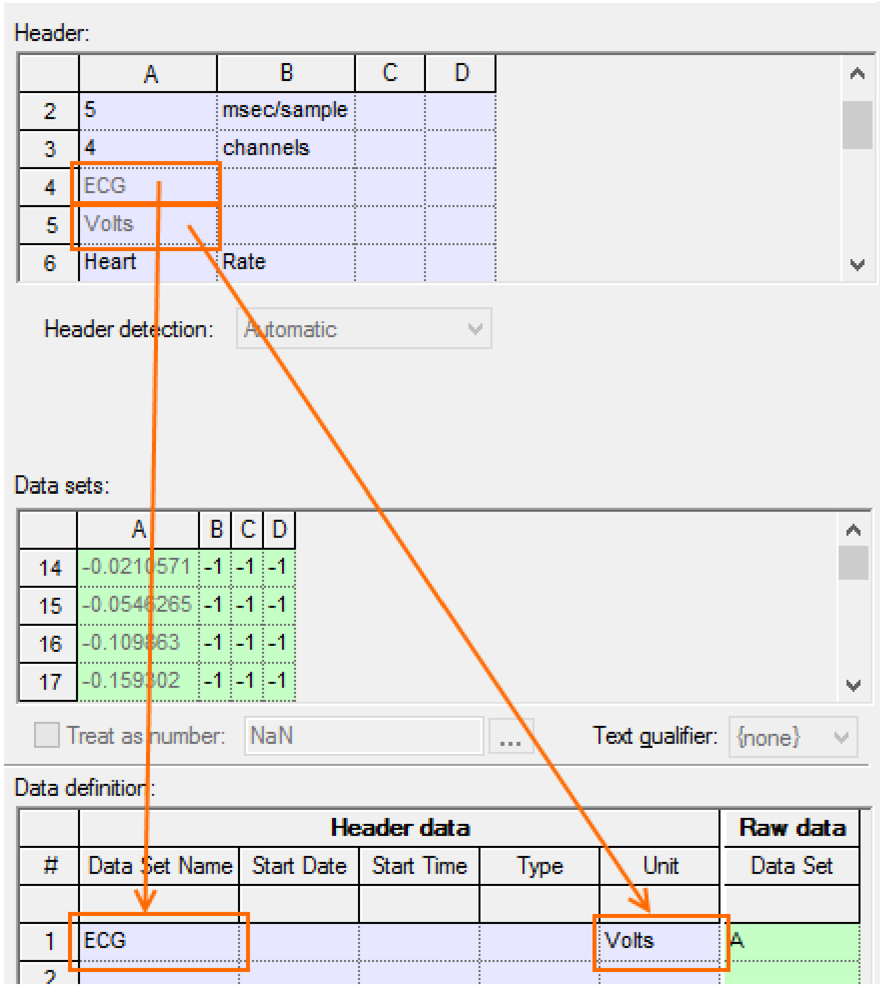
4 - Data

Under Data definition in the Profile definition section there are two parts. The lilac part is labeled **Header Data** where you drag cells to from the lilac **Header** section. The green part is labeled **Raw data** where you drag Data sets to from the green cells in the **Data sets** section.

1. Drag the first column under **Data Sets** to the first empty cell in the **Raw data** - **Data Set** column. As a result, the letter of the original column appears in the cell and the column in the **Data Sets** section is grayed.



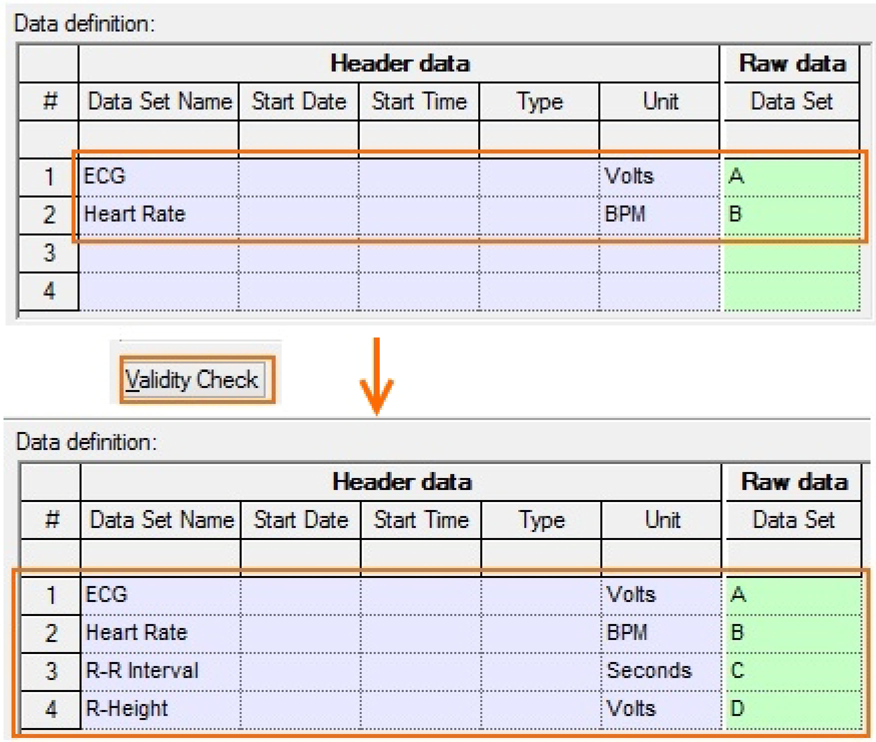
2. Now locate the data set name, the unit and, optionally, other information in the header and drag those cells to the **Header data** cells in the same row.



If you drag and drop the **Start Date** and/or **Start Time** a window opens in which you can define the format. Accept the default format, or see step 3 of 3 - Time information for the procedure to change it.

Multiple data sets

1. Follow the procedure above to define the next dataset. Once two datasets are defined, the **Validity Check** button becomes active.
2. Click this button. The Observer XT now automatically fills the other rows in the **Data definition** field.



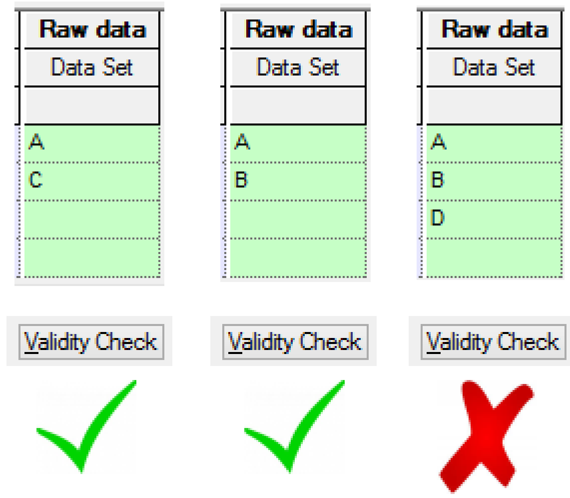
3. Check that the correct columns are selected.

How the Validity check is applied

The Observer XT assumes that your header and data set info are ordered in a regular way in your external data file (e.g., left-right, with/without empty cells in between).

> Example - your external data file contains four Data Sets in columns A, C, E and G. Columns B, D, F are empty. When you drag columns A and C to the first two rows in the **Raw Data column** and next click the **Validity Check** button, The Observer XT automatically assigns columns E and G to rows 3 and 4, thereby taking into account the empty columns between Data Sets.

The distance between the columns should be the same. For example, dropping columns A and C and clicking **Validity Check** works. The columns E, G, I, K etc are automatically added to the other rows. Dropping columns A and B, and clicking **Validity Check** also works. All other columns are then automatically added to the other rows. However, dropping A, B, and D and clicking Validity Check does not work, because there is an empty column between B en D, but not between A and B.



Save the import profile

When all the information is in the **Import Profile Definition** sheet, click the **Save As** button and give the profile a name.

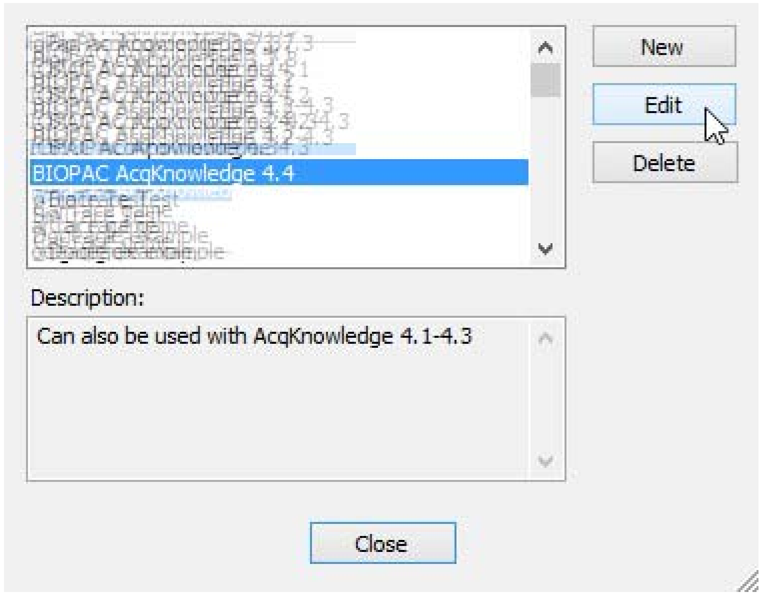
Import a text file with the new import profile

The newly created import profiles is now in the **Files of Type** list.

1. Locate the external data file and select the filename.
2. Click **Open**.

Edit an import profile

1. Choose **File** > **Import** > **External Data**.
2. Click the **Custom Import Profiles** button, choose the profile and click the **Edit** button.



3. Browse to the external data file you want to base the profile on. Now change the profile. To change cells that were dragged and dropped, click the cell you dropped information into and press the **Delete** key on your keyboard.
4. When done, save the profile.

Import External Data Files with Missing Samples

Aim

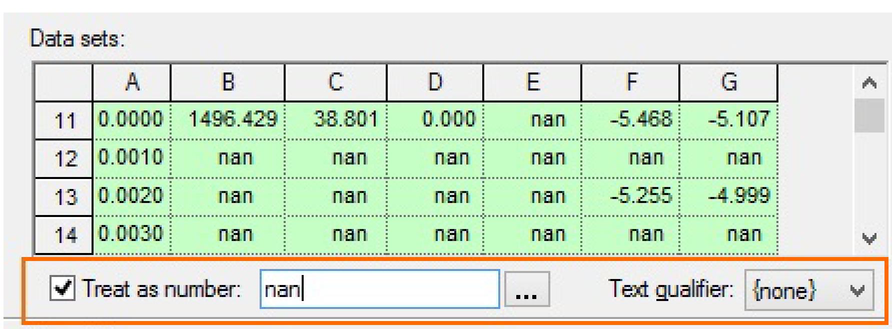
To import external data files that contain gaps.

Prerequisites

- Your license for The Observer XT includes the External Data Module.
- The time series has a resolution of at least one decimal more than the resolution of the sample rate. So with a sample rate of 1 Hz, the time stamps are in seconds with at least one decimal.
- The file contains no entire empty rows.
- The file contains a column with time stamps.
- The file is exported as text file.

Create an import profile for a data set with missing samples

1. Follow the general procedure in Create an Import Profile
2. In the **Import profile definition** window, drop the column with the time information in the **Time series** cell (see 3 - Time information). Do not use the **Sample rate**, or **Sample interval option**.
3. If your data set contains missing samples indicated by non-numeric symbols, specify this symbol and select the **Treat as number** checkbox.



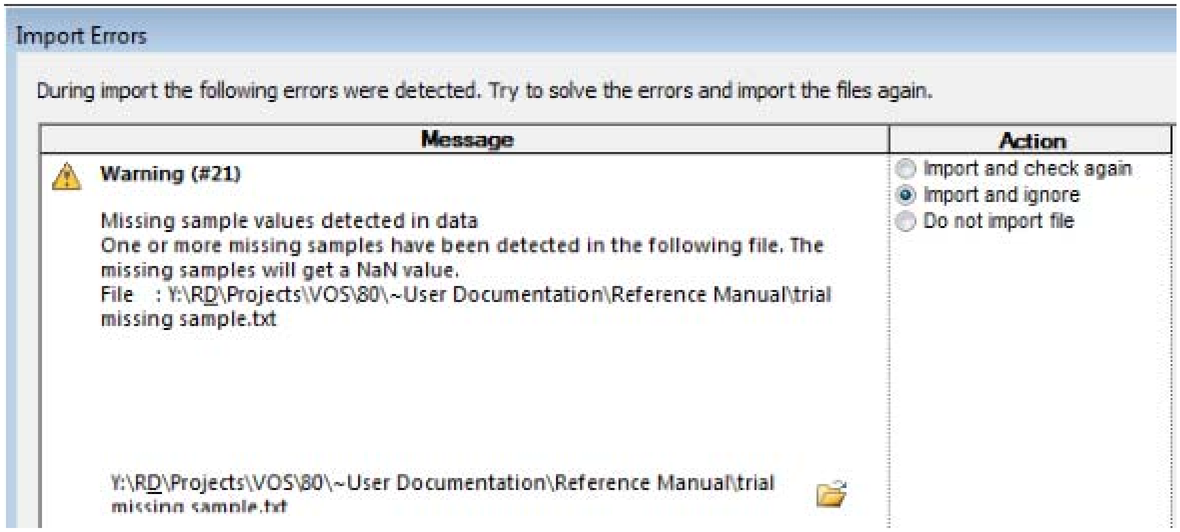
Alternatively, click the button next to the **Treat at number** field to select one or more predefined symbols. To select a specific text, click **<User Defined>**, click **OK** and enter this text after a comma (,).

If text is identified by a character, select this from the **Text qualifier list**.

Import a data set with missing samples

1. Follow the procedure in Import External Data as Text Files to import the dataset.
2. Choose the import profile you created for the dataset with missing samples.

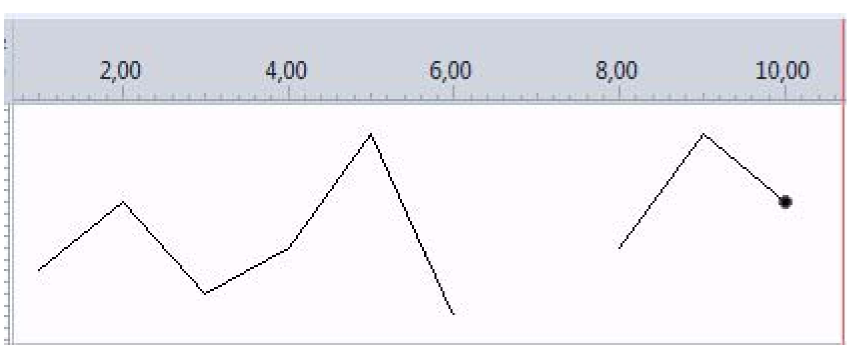
   The following warning appears.



3. Choose **Import and ignore** and click **OK**.

Notes

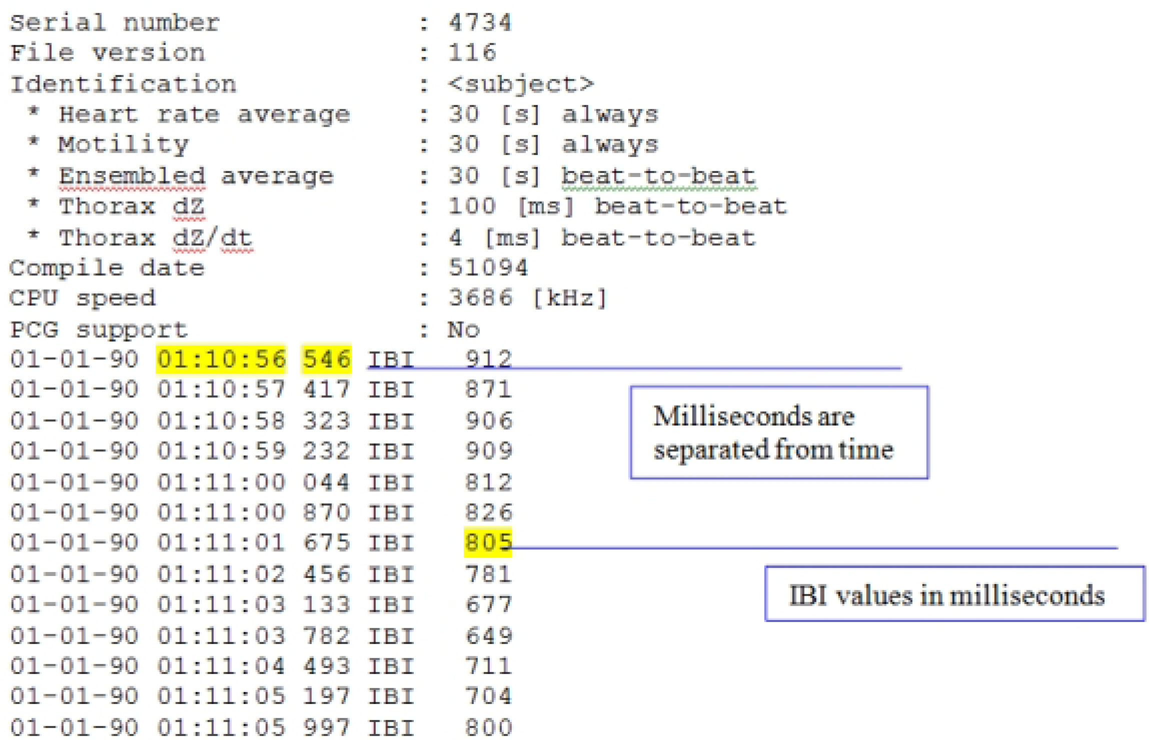
- Missing samples may indicate that something is wrong with the setup of your DAQ system.
- The missing samples are converted into a NaN value, which are not present in the visualization and are ignored in the analysis. In this example, the sample at timestamp 7 is missing.



Import Heartbeat Intervals

Introduction

Heartrate interval data by definition have a variable sample rate and do not meet the specification to import them as text file. Some examples:



```
Serial number              : 4734
File version               : 116
Identification             : <subject>
 * Heart rate average      : 30 [s] always
 * Motility                : 30 [s] always
 * Ensembled average       : 30 [s] beat-to-beat
 * Thorax dZ               : 100 [ms] beat-to-beat
 * Thorax dZ/dt            : 4 [ms] beat-to-beat
Compile date               : 51094
CPU speed                  : 3686 [kHz]
PCG support                : No
01-01-90 01:10:56 546 IBI   912
01-01-90 01:10:57 417 IBI   871
01-01-90 01:10:58 323 IBI   906
01-01-90 01:10:59 232 IBI   909
01-01-90 01:11:00 044 IBI   812
01-01-90 01:11:00 870 IBI   826
01-01-90 01:11:01 675 IBI   805
01-01-90 01:11:02 456 IBI   781
01-01-90 01:11:03 133 IBI   677
01-01-90 01:11:03 782 IBI   649
01-01-90 01:11:04 493 IBI   711
01-01-90 01:11:05 197 IBI   704
01-01-90 01:11:05 997 IBI   800
```

```
[HRData]
2894
1576
1539
1465
1381
1192
1143
1100
1075
1061
1040
1003
1011
983
1019
1060
1090
1181
1193
1205
1208
1225
1293
1286
1382
1447
1403
1437
```

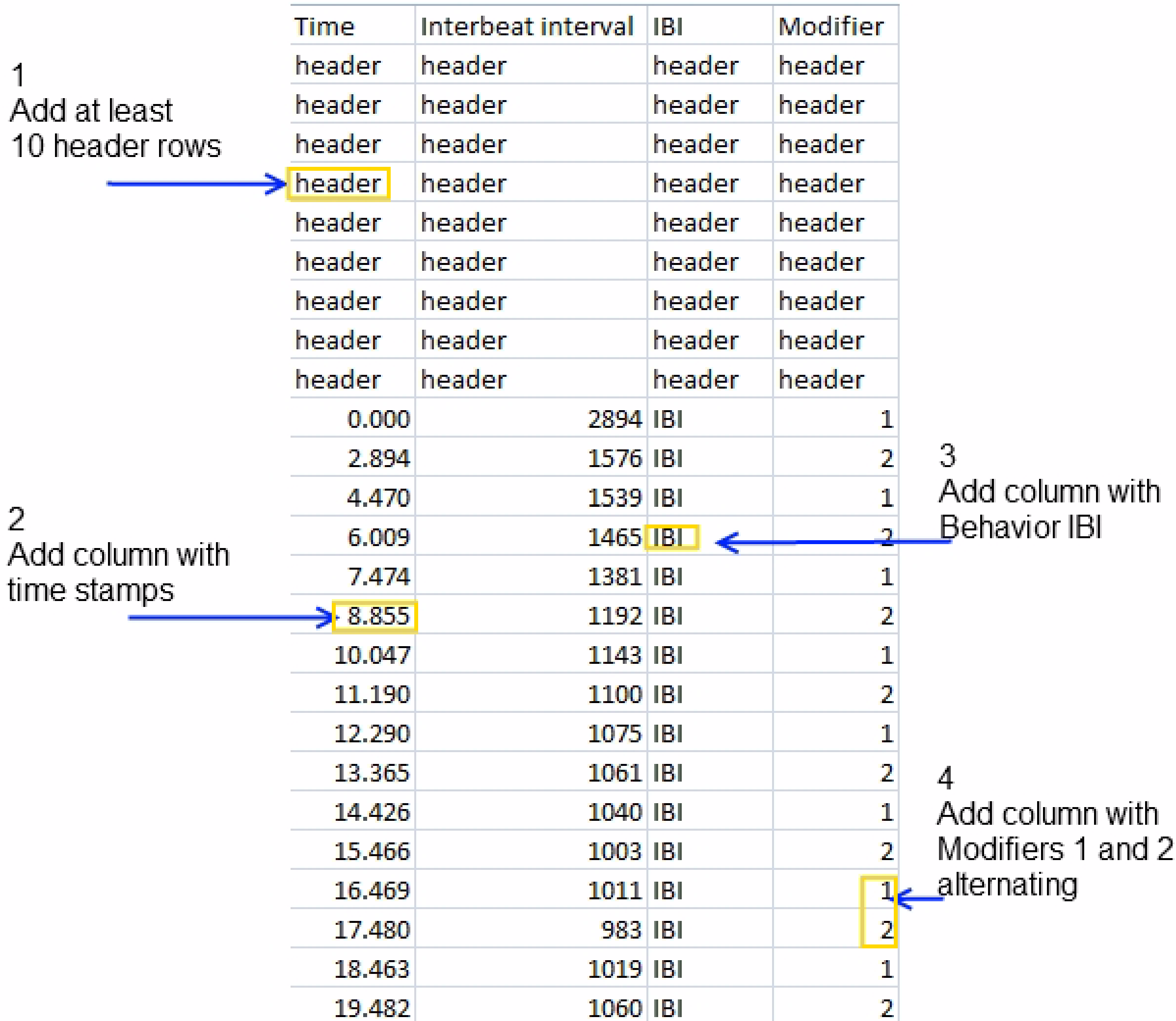
Heartbeat interval data can be imported as numerical modifiers.

NOTE You can follow this procedure to import other data as well that do not meet the requirements to import them as external data.

Procedure

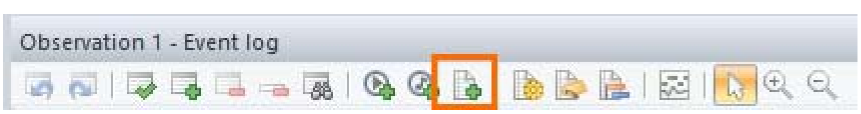
You need to edit the data file, following the procedure below.

1. Open the heartbeat file in Excel.
2. Depending on the format of your Interbeat interval data file, either merge the time and millisecond columns, or create a time column and calculate the time stamps from the interbeat intervals. If not present already, add a column with the behavior IBI. Add a column with a sequence 1-2-1-2-1-2-1-2 etc. The figure below show a example of what the edited file should look like.



Time	Interbeat interval	IBI	Modifier
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
header	header	header	header
0.000	2894	IBI	1
2.894	1576	IBI	2
4.470	1539	IBI	1
6.009	1465	IBI	2
7.474	1381	IBI	1
8.855	1192	IBI	2
10.047	1143	IBI	1
11.190	1100	IBI	2
12.290	1075	IBI	1
13.365	1061	IBI	2
14.426	1040	IBI	1
15.466	1003	IBI	2
16.469	1011	IBI	1
17.480	983	IBI	2
18.463	1019	IBI	1
19.482	1060	IBI	2

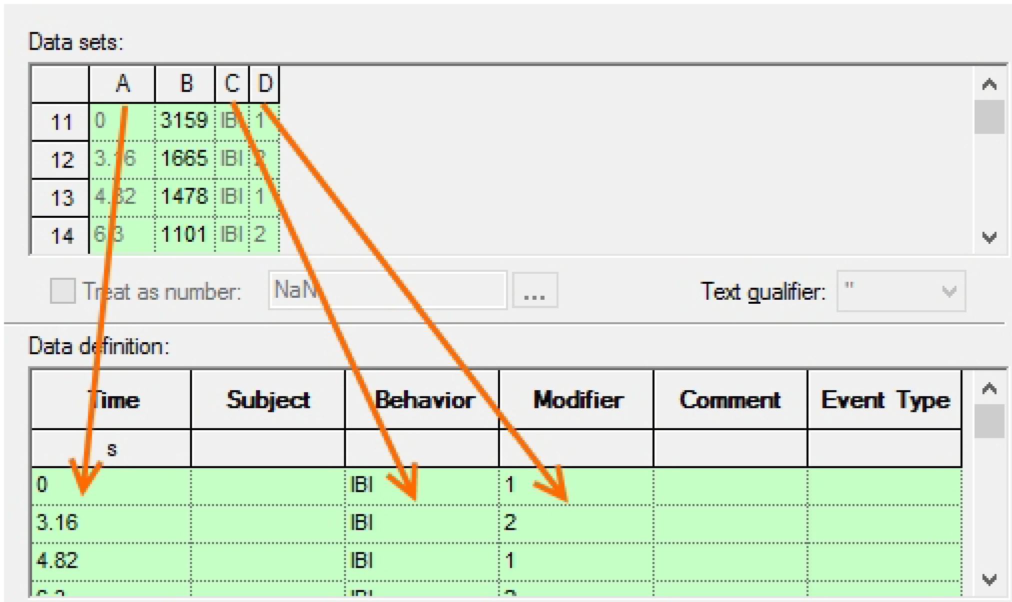
3. Save the new file as a text file.
4. Close the text file before you proceed with the next steps.
5. In The Observer XT, open the observation in which you want to import the IBI file.
6. Click the **Import data** button on the toolbar, then select **Import Observational Data**.



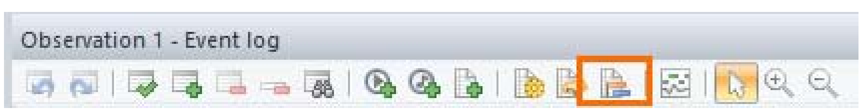
7. Click **Custom Import Profiles** > **Create New**.
8. Click **Browse** and open the file with interbeat intervals that you have edited in Excel. The file appears in the **Import Profile Definition** window. Select

Tab and Space under **Select Data Delimiters** and drag-and-drop the correct columns under Data Sets to the Time, Behavior, and Behavior Modifier columns.

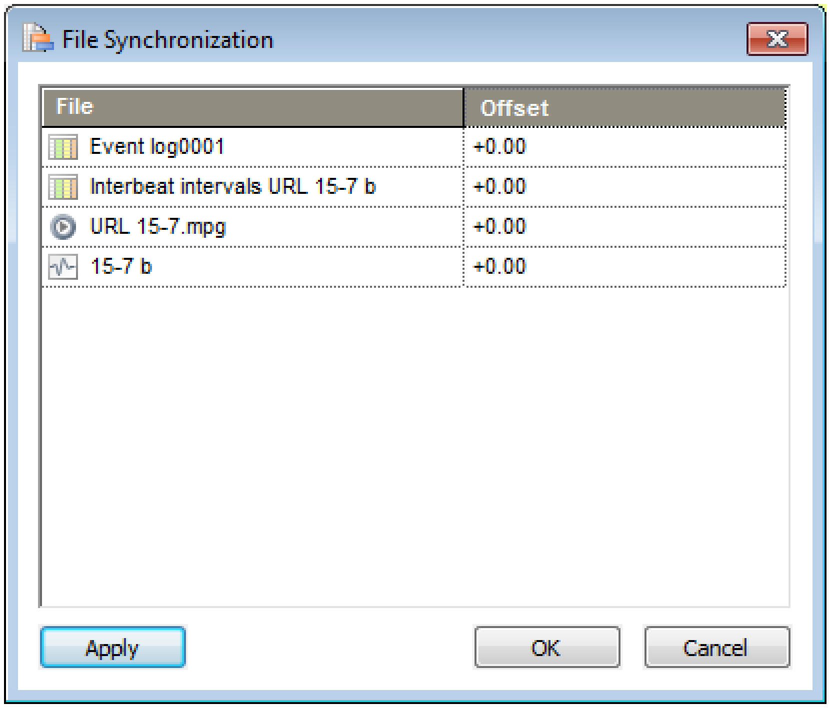
IMPORTANT Do not drag the column with the actual interbeat interval data.



9. Click **Save As**, give the import profile a name and click **OK** and then **Close**.
10. In the **Import Observational Data** window, select the IBI file (*.txt) that you have edited in Excel.
11. Select **State Events** under **Treat new Behaviors** as, and make sure that the correct import profile is selected under **Files of type**. Click **Open**.
12. The new event log opens. Click the **Offset** button on the toolbar and choose **Numerical offset**.



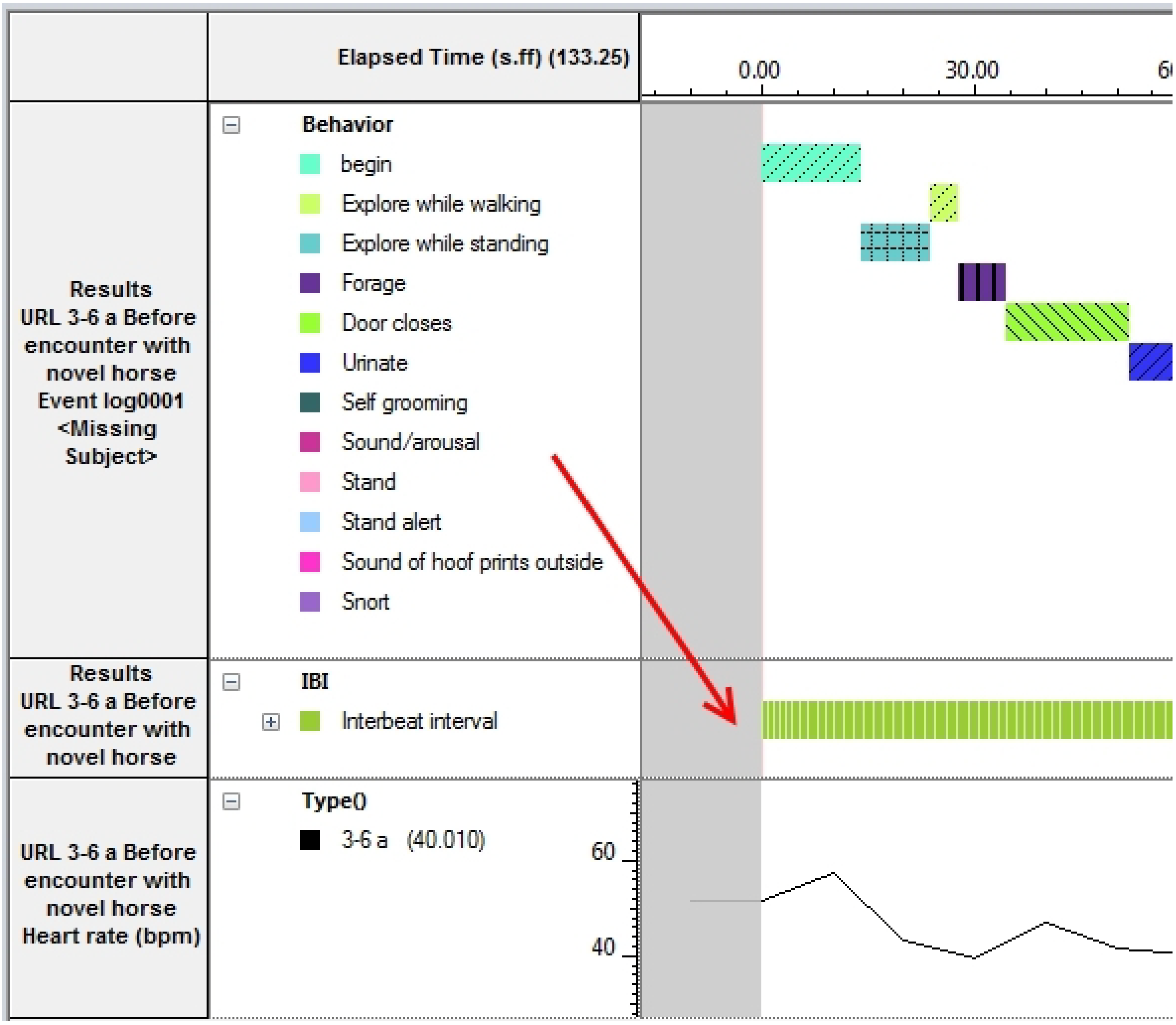
13. Change the offset of the imported event log to 0:00:00.000 or the same time as the others. Click **OK**.



14. Open the visualization and check that all files are displayed (manual events, IBI and HRA).
15. If necessary, synchronize the imported data relative to the video. To do so, look at the video and find out when the physiological data recording device started recording. Adjust the time in the File Synchronization window.

Notes

- If HR recording started before starting video capture, the time shift for the IBI data is negative (e.g. if it started 10 s earlier, -0:00:10.000).
- If part of the data are not shown (for example, the first part of the IBI data that have been shifted before the start of the video), like in the example in the following picture:



Data were collected before you started video capture, so they may not be that important. However if you want to show them from the very start, change the Start of the Observation in the Independent Variables window.

See Independent Variables in Set up your Project

How IBI data are shown

In the coding scheme

When you import the first IBI data file, the coding scheme shows a behavior IBI under a group named *Behavior 1*. The modifiers 1 and 2 are shown in the Modifiers view. They refer to the right-most column in the imported file (see the picture at step 2). You do no use these modifiers in analysis.

In the Visualization

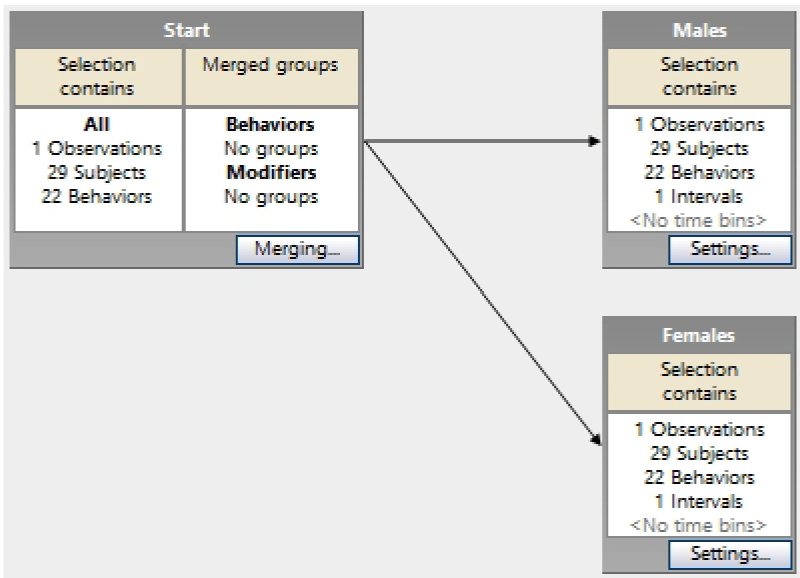
The IBI are state events. The vertical bars inside the colored bar represent starts of the states (heart beats). The bar is single colored as the behavior is just one (IBI).

In the Statistics

To calculate statistics on the duration of IBIs:

1. Choose **Analyze** > **Behavior Analysis** > **New** > **Calculate**.
2. Click **Layout** and de-select **Modifiers**.
3. Double-click **Behaviors** and de-select the behaviors you are not interested in.
4. Click **OK**. Under the behavior *IBI* you find the corresponding statistics.

Select Data for Analysis



Main topics

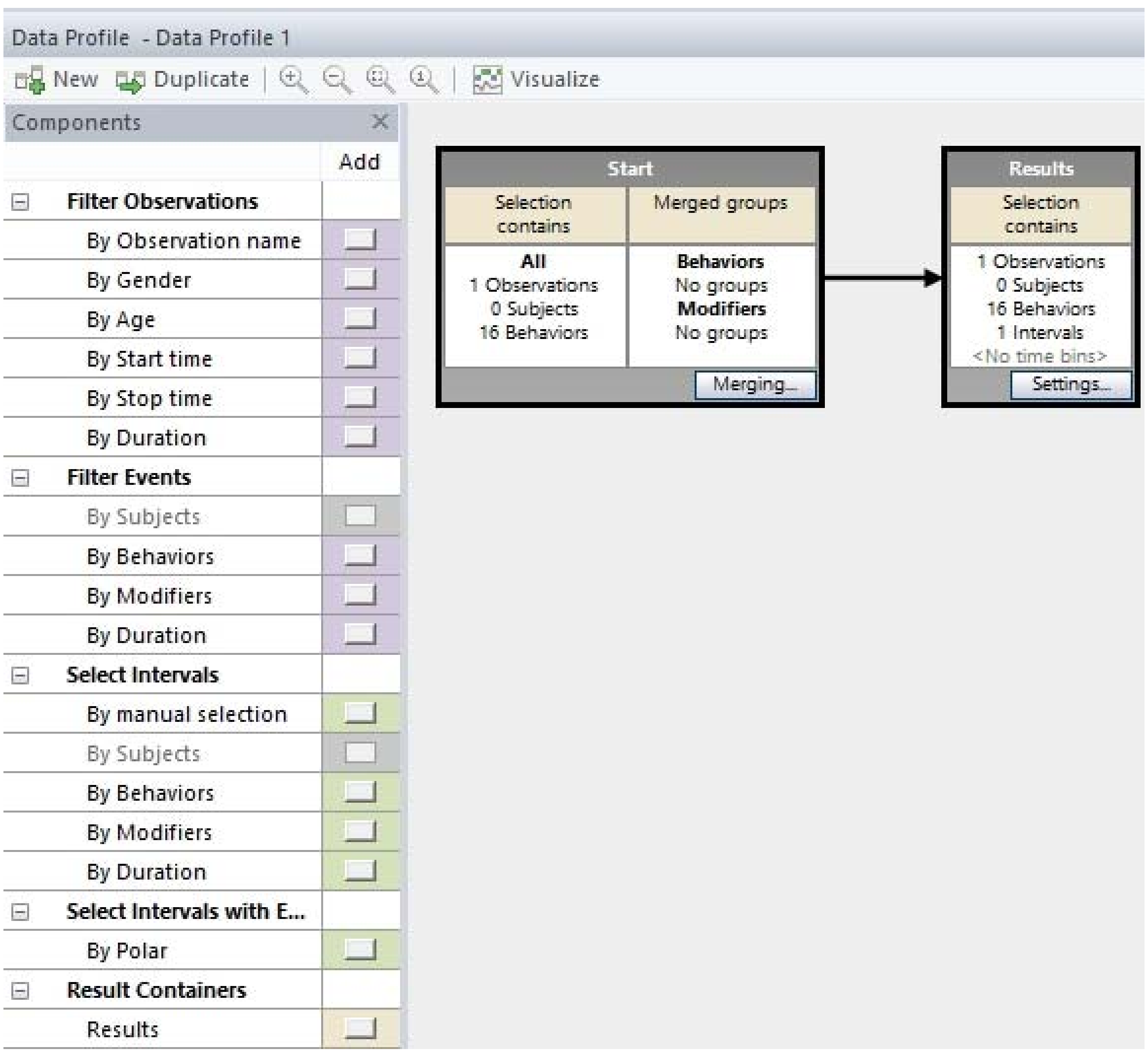
- Why select Data?
- The Data Selection Screen explained
- Data Selection: General Procedure
- Merge data
- Filter Data
- Select Intervals
- Select Regular Intervals
- Advanced Data Selections
- Manage Data Profiles

Why select Data?

When do you want to select data?

In many cases you may want to visualize or analyze your entire dataset and obtain complete descriptive statistics for all your events in all your observations. If this is the case, do not select data, but continue with Visualize Data, or Calculate Statistics.

If you want to analyze only a subset of your data, or analyze a number of behaviors together, carry out data selection first. To open the Data Selection window, choose **Analyze** > **Select Data** > **New Data Profile**.



There are four ways to analyze a selection of data:

- Analyze several events as if they are one

- Analyze some observations, subjects or events, not others
- Analyze events that occurred in specific time intervals
- Analyze data in regular time intervals

What do you want to do?

Analyze several events as if they are one

- Example 1 – Visualize behaviors of the group *Play type* as one behavior.
- Example 2 – Analyze the behaviors *Left hand moving* and *Right hand moving* together as *Any hand moving*.

Merge the data, then visualize and run the analysis.

See Merge data

Analyze some observations, subjects or events, not others

- Example 1 – Calculate the average duration of speech of the subject *Child*, not of the subject *Mother*.
- Example 2 – Visualize data in observations of female subjects, not of males.
- Example 3 – Calculate the rate of occurrence of events of the group *User Error*, not of others.

Filter the data, then run the analysis.

See Filter Data

Analyze events that occurred in specific time intervals

- Example 1 – Calculate the number of times the child smiled when the mother was present.
- Example 2 – Visualize the data from the moment the mother entered the room until ten minutes later.
- Example 3 – Analyze events when the subject's heart rate was higher than 100 beats per minute. This is possible when your license includes the External Data Module.

Select intervals, then run the analysis.

See Select Intervals

Analyze data in regular time intervals

- Example 1 – Split your observations in 10-minutes intervals and calculate statistics for each of them.

- Example 2 – Split your observations in three equal intervals and calculate statistics for each of them.

Define Time bins, then run the analysis.

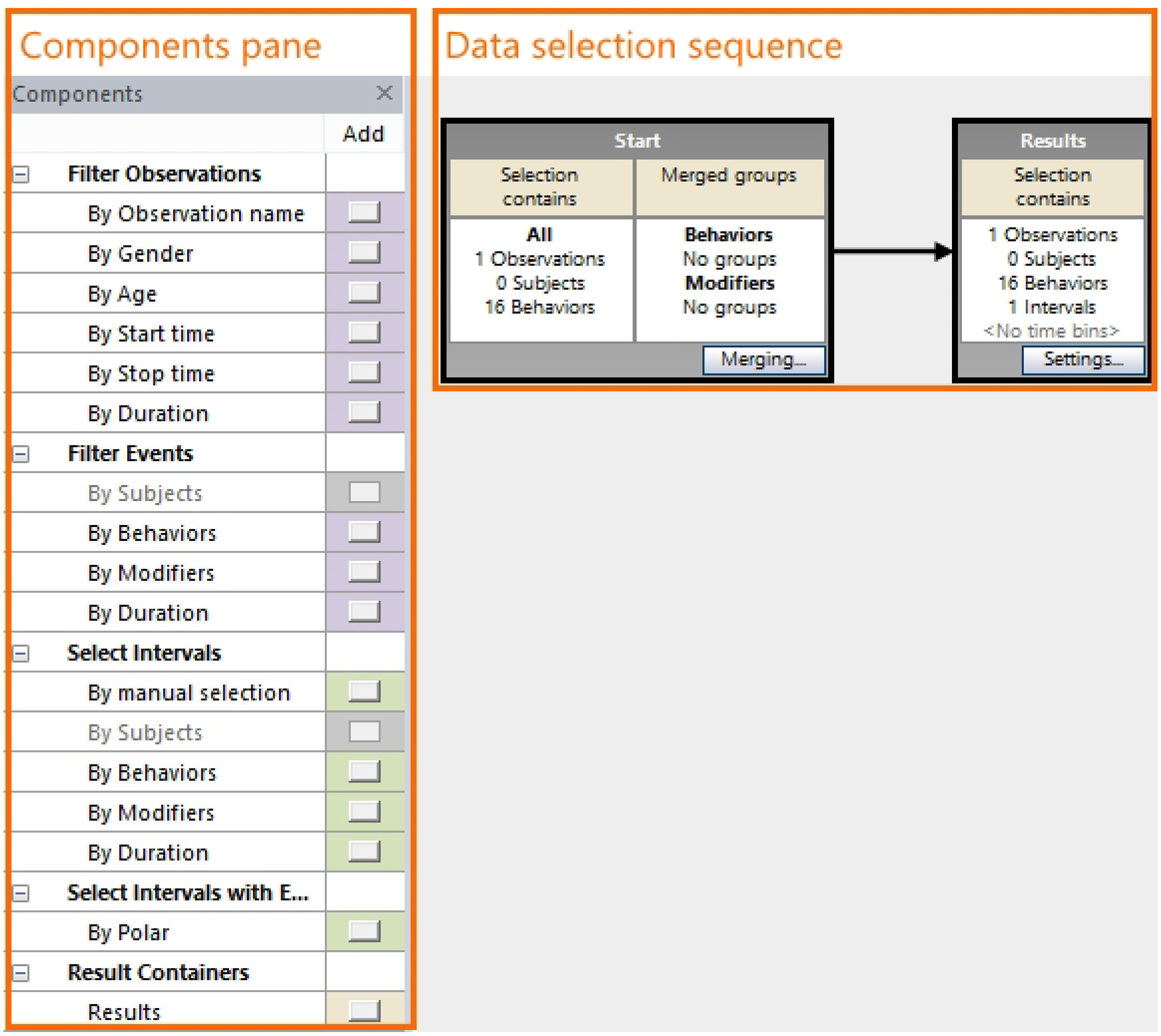
See Select Regular Intervals

The Data Selection Screen explained

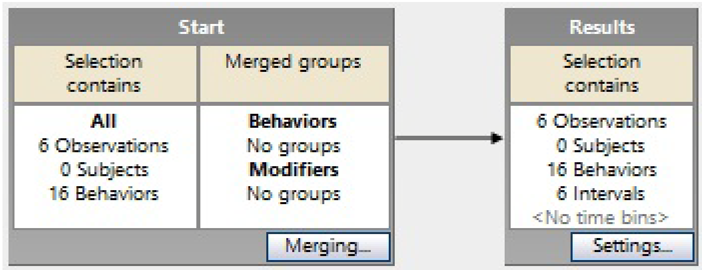
The Data Selection Screen

To open the data selection window choose **Analyze** > **Select Data** > **New Data Profile** and name the data profile. Alternatively, right-click the **Data Profiles** folder under **Analyses** in the Project Explorer and choose **New**.

The window that appears contains the Components pane on the left and a window on the right with the data selection sequence.



The Data Selection sequence in the window on the right contains two boxes connected by an arrow.



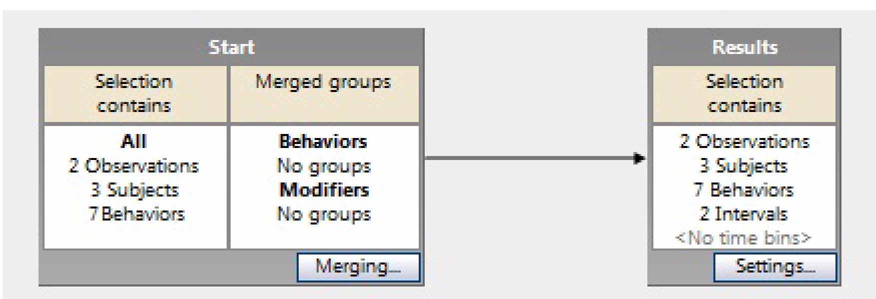
- The Start box (left) contains all the data in all the observations currently stored in your project.
- The Results box (right), contains the data used for analysis.

The Start box is connected with a direct arrow to the Results box. This means that all data are used for analysis. Add boxes in the sequence to define which data to analyze.

See Data Selection: General Procedure

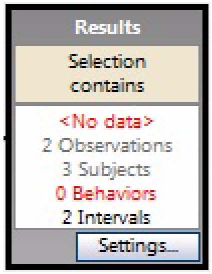
The Results box explained

The Results box shows the result of the data selection. When your project contains two observations and you defined three subjects and seven behaviors in the Coding Scheme, both the Start box and the Results box show three subjects and seven behaviors. The Results box also shows two intervals, one for every observation.



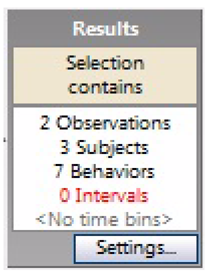
Filtering

When you filter by subjects, behaviors, modifiers, or duration (see Filter Data), the numbers in the Results box match the numbers you have selected in the filter box. Filtering has no effect on the analyzed observation time and no intervals are created. So the number of intervals in the Results box remains the same as in the Start box and represents the number of observations. When your data selection contains no data, this is shown in red on the Results box.



Intervals

When you select intervals by subjects, behaviors, modifiers, or duration (see Select Intervals), you create time intervals based on the selected data. No subjects, behaviors, or modifiers are filtered out, so these numbers remain unchanged in the Results box. The number of intervals changes, it shows the total number of intervals over all observations. If the data selection contains no data because the selected subject, behavior, or modifier has not been scored, the Results box shows 0 intervals in red.



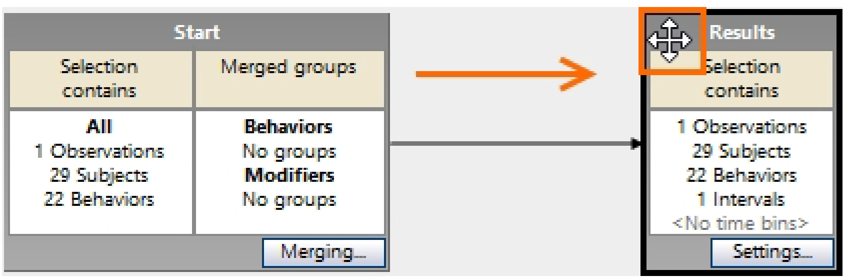
Data Selection: General Procedure

Aim

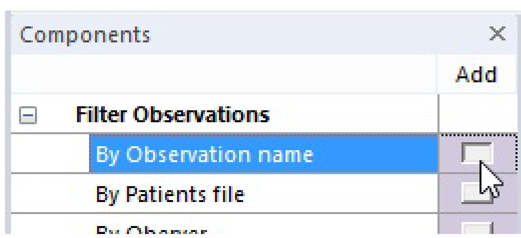
To define your selection of data for visualization or analysis.

Procedure

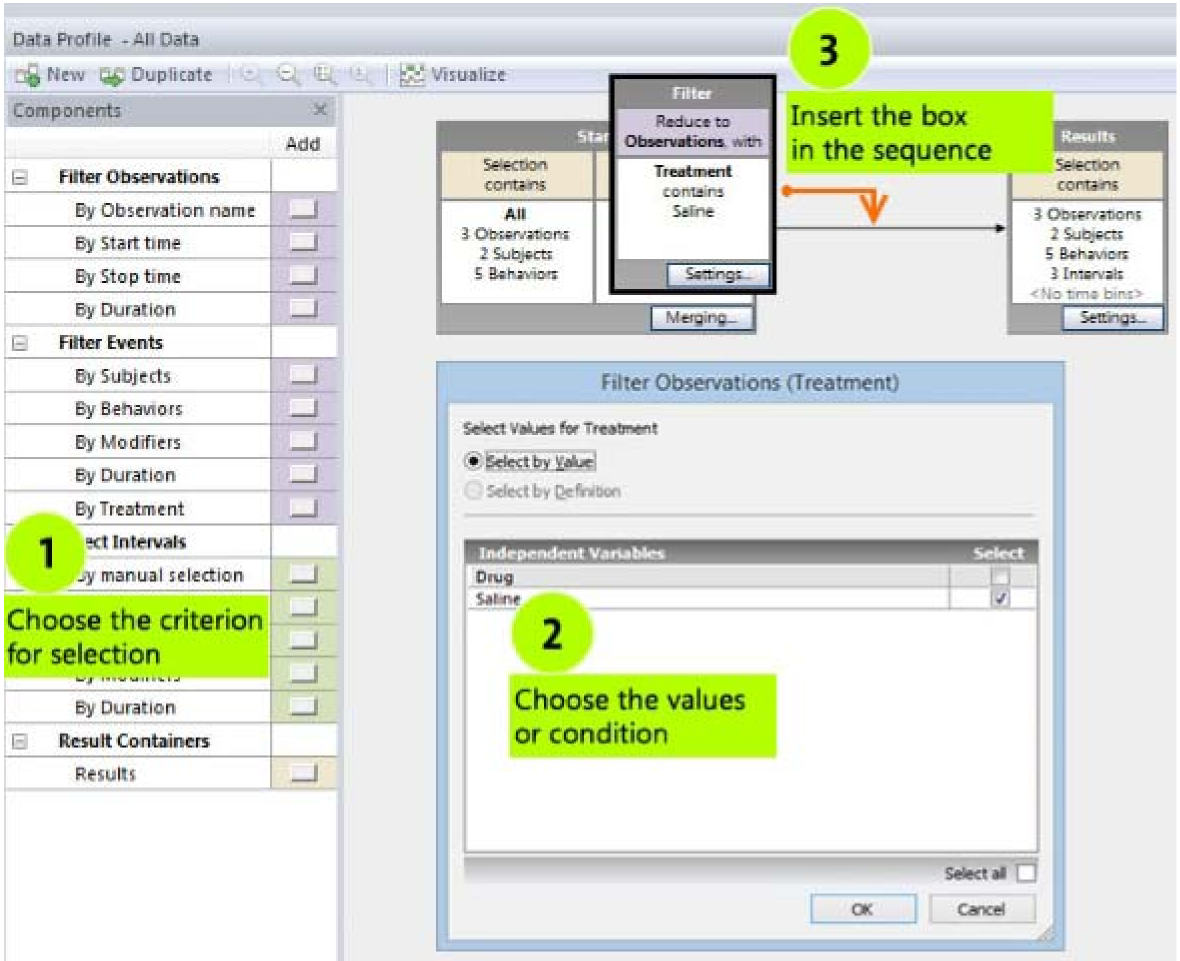
Make space between the Start and Results box by moving the Results box to the right. To do so, click the header of the Results box so that the pointer becomes a four-arrow cross. Drag the box to the right. Then do the following:



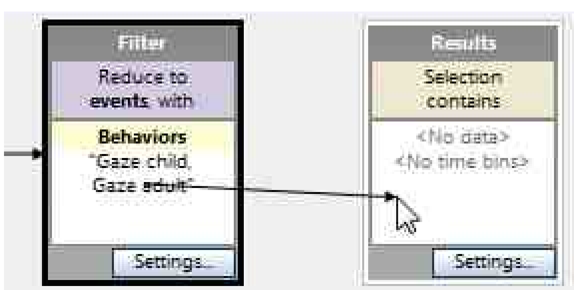
1. Click one of the buttons in the Components pane to select the criteria to add to the data selection sequence. For example, to analyze only a selection of observations, click the button next to **By Observation name**.



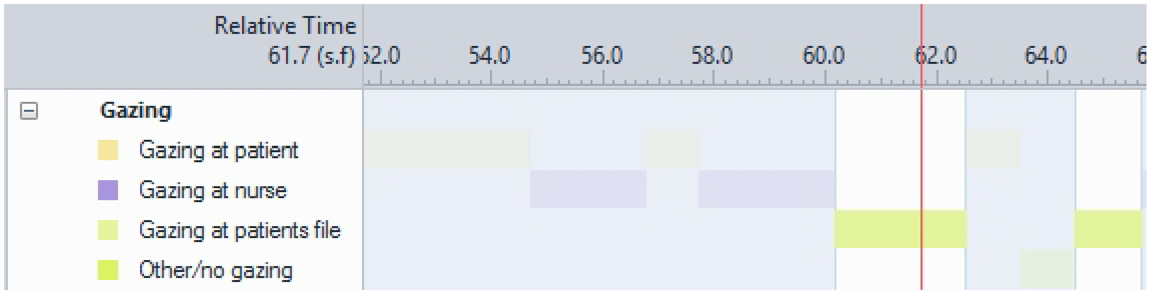
2. Choose the values that specify your selection.
3. Click **OK**. A new box appears in the Data Selection window. Drag the box over the arrow between the Start and Results box. When the arrow turns white, release the mouse button.



4. If necessary, draw extra arrows to connect selection boxes. To do so, point to the center of the first box, press and hold the left mouse button and drag toward the center of the other box. Release the mouse button when the cursor has reached the center of the other box.

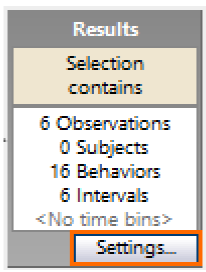


5. Click the **Visualize** button on the toolbar  to check whether your data selection works as expected. The selected data are displayed in the white fields of the Time-Event Plot.

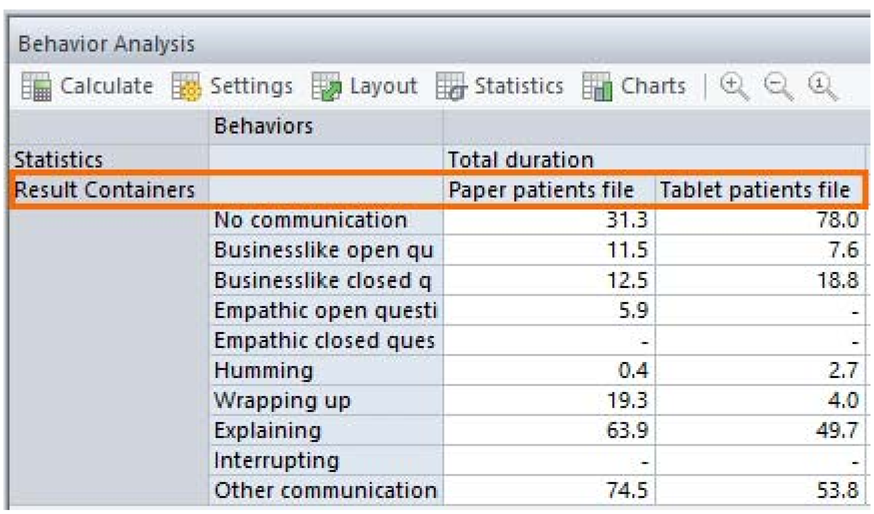


Tip

Click the **Settings** button on the **Results** box to change its name.



This name is shown in the visualization and analysis results, so you always know which data selection the results come from.



	Behaviors		
Statistics		Total duration	
Result Containers		Paper patients file	Tablet patients file
	No communication	31.3	78.0
	Businesslike open qu	11.5	7.6
	Businesslike closed q	12.5	18.8
	Empathic open questi	5.9	-
	Empathic closed ques	-	-
	Humming	0.4	2.7
	Wrapping up	19.3	4.0
	Explaining	63.9	49.7
	Interrupting	-	-
	Other communication	74.5	53.8

Note

You cannot create connections from the **Results** box to any other box, or from a box to the **Start** box.

Merge data

Aim

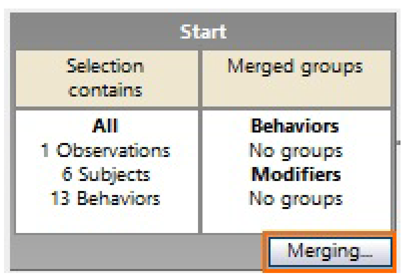
To treat two or more coding scheme elements (behaviors or modifiers) as one. For example, treat the behaviors *Grab antennae*, *Grab mandibles*, *Grab head* as one behavior *Grabbing* and calculate the total frequency or duration.

Prerequisites

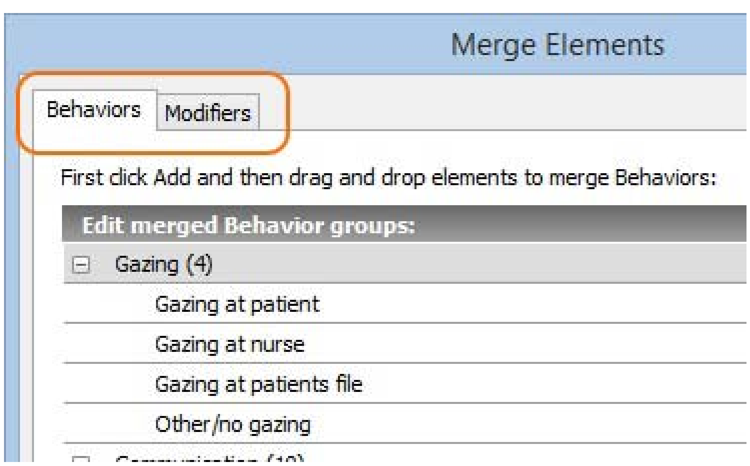
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Click the **Merging** button on the Start box.

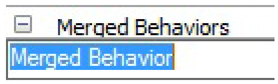


2. Click the tab for the elements you want to merge.



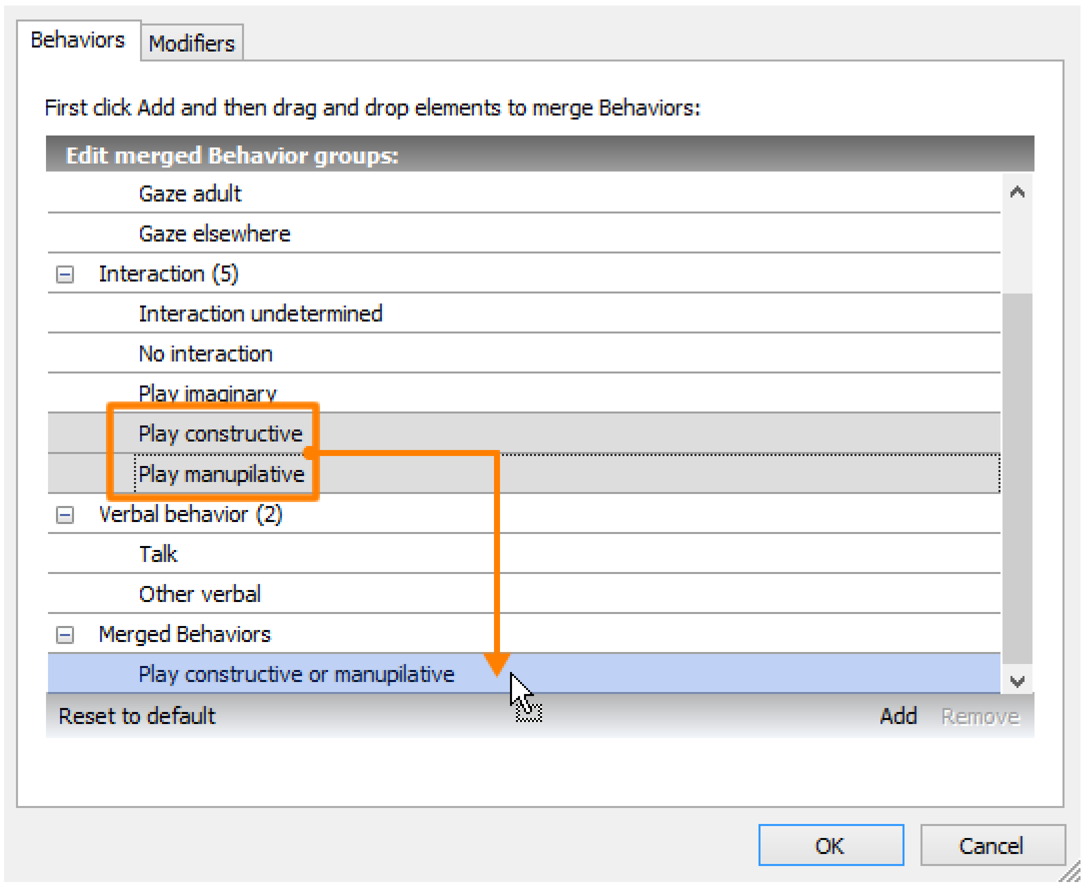
3. To create a merged group:

   Behaviors – Click the **Add button** at the bottom. The merged group appears at the bottom of the list.



Modifiers – Select the Modifier group name in which you want to merge Modifiers (see Notes about Merging). Then click **Add**. The merged group appears in the Modifier group.

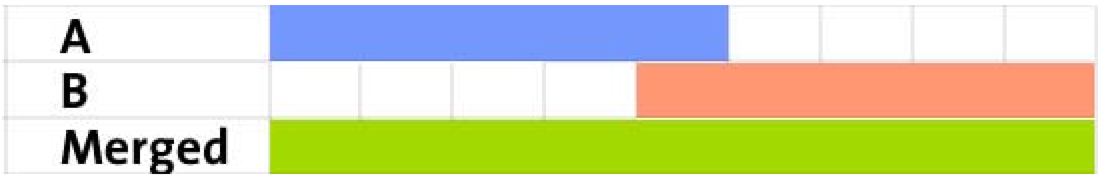
4. Name the group and press **Enter**.
5. Drag and drop elements into the group.



How merged data are analyzed

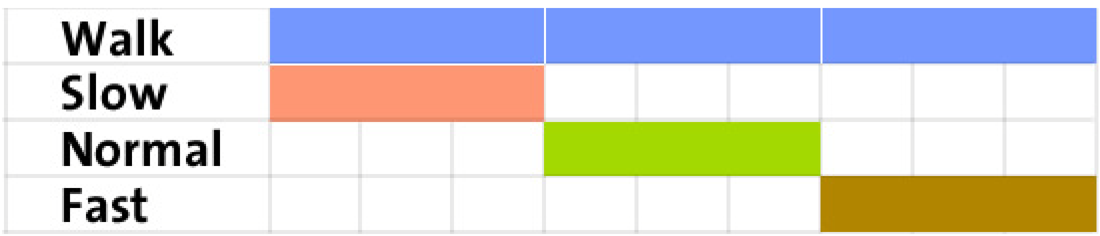
Merged behaviors

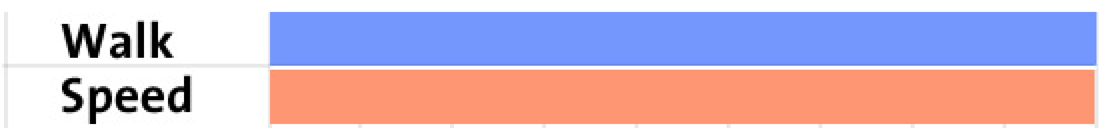
Behaviors A and B both have a duration of 5 seconds and they overlap for 1 second. After merging, the frequency of the merged behavior is 1 and its duration is 9 seconds.



Merged Modifiers

The top part in the picture below shows three occurrences of Behavior *Walk*, each with a duration of 3 sec, scored with associated modifiers *Slow*, *Normal* and *Fast*. Merging the modifiers into one modifier *Speed* results in one occurrence of Behavior Walk with a duration of 9 seconds (bottom picture).





Notes about Merging

Behaviors

- Modifiers are not visualized and analyzed when you merge Behaviors.

Modifiers

- You can only merge Modifiers from the same Modifier group.
- If you create a Merged group of numerical modifiers, this group is considered as nominal. This means you cannot calculate average modifier values, but can calculate statistics like frequency and duration.

To remove a merged group

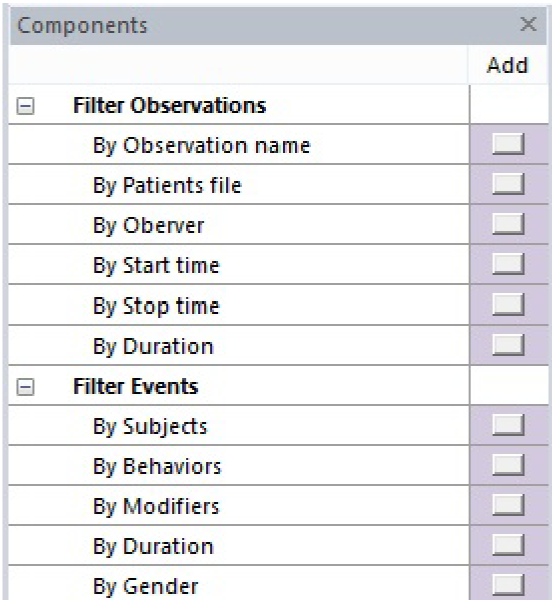
To remove a merged group, select the group name and click the **Remove** button at the bottom. To remove all Merged groups in one of the tabs at once, click the **Reset to default** button.

What happens with merged groups if I change the coding scheme?

- If you add a new element to the coding scheme – If you want to include this element to the merged group, add it manually.

- If you delete an element in the coding scheme – The element is deleted from the merged group as well.

Filter Data



Aim

To choose a subset of data and exclude others from visualization or analysis. You can Filter observations and Filter events. Observations and subjects can be filtered directly, for example by choosing only the first five observations. You can also choose observations or subjects indirectly, by the value of independent variables. For example, to analyze only those observations in which the with subject's age was below 10.

See Filter by Independent Variable Values

Filter observations

- By observation name - to analyze some observations, not others.

  See Filter Observations

- By Independent variable with scope observation - to analyze observations with specific independent variable values.

  See Filter by Independent Variable Values

Filter events

- By Independent variable with scope subject – To analyze events of subjects with a specific independent variable value.

  See Filter by Independent Variable Values

- By Subjects – To analyze events for some subjects, not others.
  See Filter Subjects
- By Behaviors – To analyze some behaviors, not others.
  See Filter Behaviors
- By Modifiers – To analyze some modifiers, not others.
  See Filter Modifiers
- By Duration – To analyze events with a minimum or maximum duration.
  See Filter by Duration

Filter Observations

Aim

To choose some observations for analysis and exclude others.

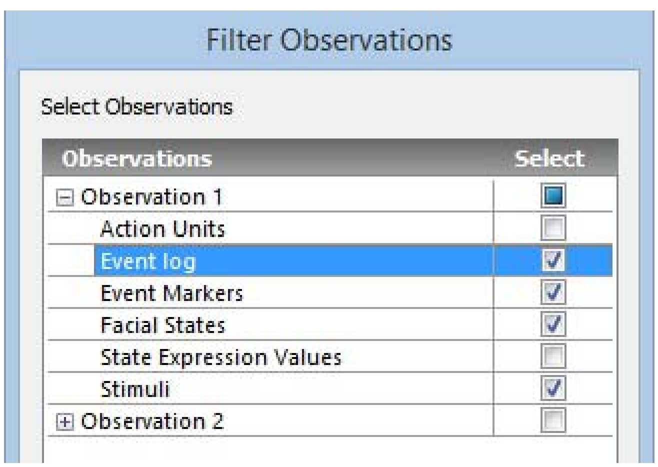
Prerequisites

- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**)

Procedure

1. Click **By Observation** name.
2. Select the observations and event logs to analyze.

   If your observations contain multiple event logs and you want to analyze only a few, unfold the observation item and select the event logs.

3. Insert the box in the sequence between the Start box and the Results box.

Filter by Independent Variable Values

Aim

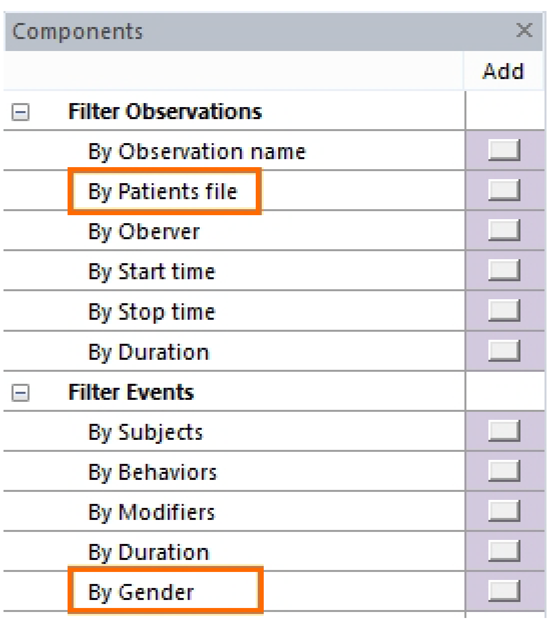
To choose Observations, Event logs or Subjects according to value of an Independent Variable.

Prerequisites

- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**)

Independent Variables and Scope

Each Independent Variable has a Variable scope. System variables, like Start time, always have scope Observation and therefore filters for these variables appear under **Filter Observations**. User-defined Variables can have scope **Observation**, **Event Log**, or **Subject**. Depending on the scope you can filter observations, event logs or subjects according to the variable values. In the picture below, the user-defined independent variable *Patients file* has the scope **Observation**, while *Gender* has the scope **Subject**. Therefore, *By Patients file* appears under **Filter Observations** and *By Gender* under **Filter Events**.



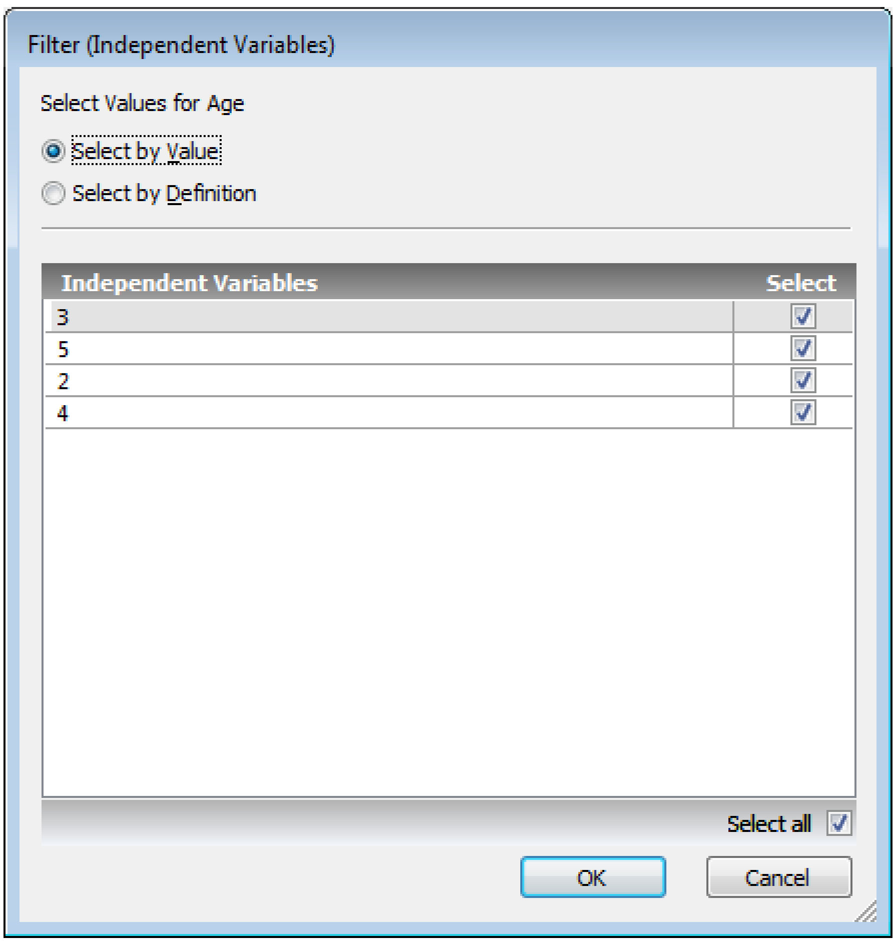
- Example 1 – The scope of the variable Temperature is Observation. Filtering **By Temperature** results in selecting observations with the chosen Temperature values.
- Example 2 – The scope of the variable Subject Experience is Subject. Filtering **By Subject Experience** results in selecting events for subjects with the chosen Subject Experience values.

Procedure

1. Click **By** *[Independent Variable name]*.
2. Choose one of the following:

   - To filter specific variable values, select **Select by Value** and select the values.

   - To filter a range of variable values, select **Select by Definition** and specify the range by entering the To and From values.



3. Insert the box in the sequence between the Start box and the Results box.

Notes

- **IMPORTANT** To filter data by User-defined Variable values, make sure that you enter a value for that Variable for each Subject/Event Log/Observation in the Independent Variable List. If you do not do this, your selection may be wrong.
- You can also use the Independent Variables to split your data. For example, to analyze Male and Female subjects separately.

  See Create Groups of Data to do so.

Filter Subjects

Aim

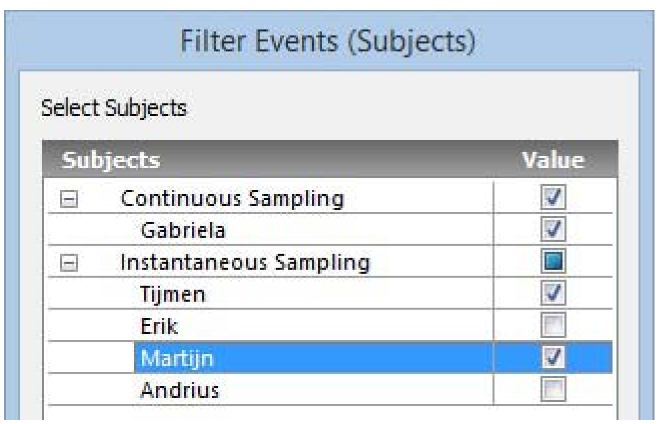
To analyze Events scored for some subjects and not others.

Prerequisites

- You defined Subjects in your Coding Scheme.
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**)

Procedure

1. Click **By Subjects**.
2. Select the subjects you want to analyze.
3. Insert the box in the sequence between the Start box and the Results box.



Filter Behaviors

Aim

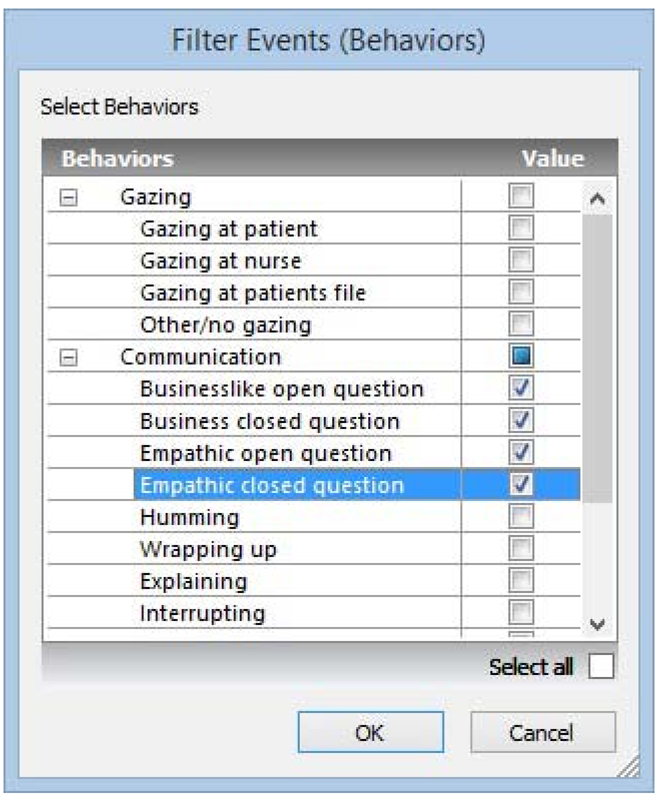
To analyze some behaviors, not others.

Prerequisites

- You carried out your observations.
- You defined Behaviors in your Coding Scheme.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**)

Procedure

1. Click **By Behaviors**.
2. Select the behaviors you want to analyze. By default, all behaviors are selected.
3. Insert the box in the sequence between the Start box and the Results box.



Note

If you filter behaviors, you only analyze those events. All others are excluded. This is different from analyzing what events take place when another event occurs. If that is what you want, Select Intervals by Behaviors instead.

Filter Modifiers

Aim

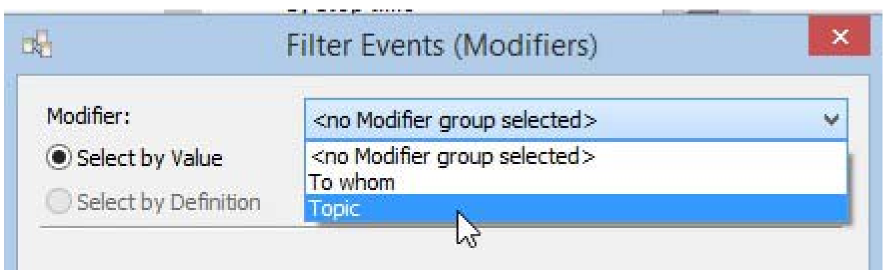
To choose some modifiers, not others.

Prerequisites

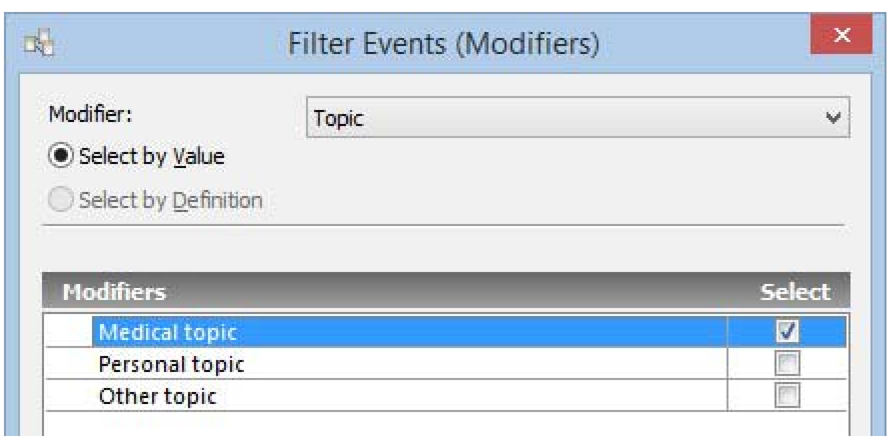
- You defined Modifiers in your Coding Scheme.
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**)

Procedure

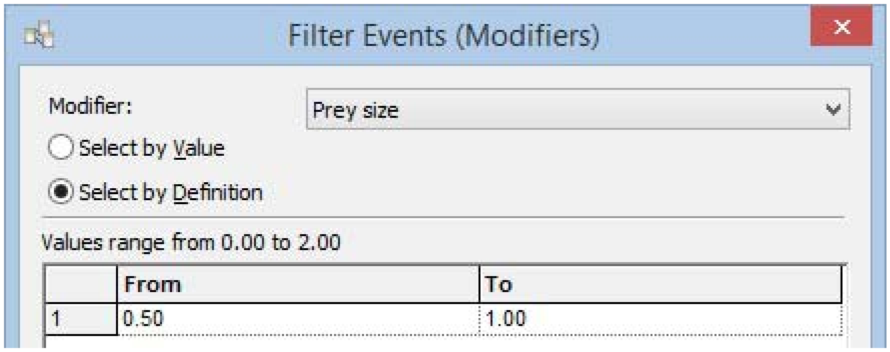
1. Click **By Modifiers**.
2. Select a Modifier group from the Modifier list.



3. Select the Modifiers.



For numerical modifiers, you can also specify a range of values.

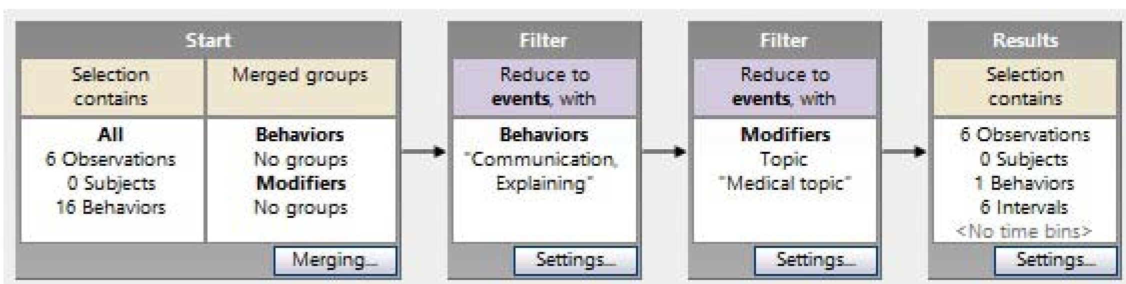


4. Insert the box in the sequence between the Start box and the Results box.

Note

If the selected modifiers are linked to more than one behavior, all these behaviors with the selected modifiers will be analyzed. If you want to analyze only a selection of these behaviors, position a **By behavior** box with the selected behaviors in the data selection sequence as well.

See Advanced Data Selections how to combine selection boxes.



Filter by Duration

Aim

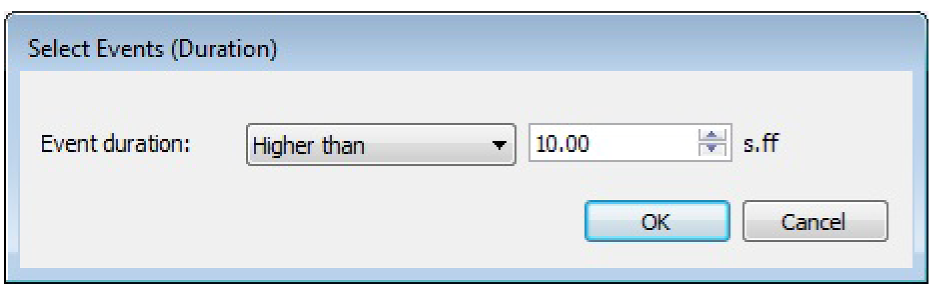
To select events that are longer or shorter than a given duration. For example, if you observe aphids, to select only the feeding events that are longer than 10 seconds. This way you can distinguish the events during which the aphid tests the leaf content from the events during which the aphid is actually eating.

Prerequisites

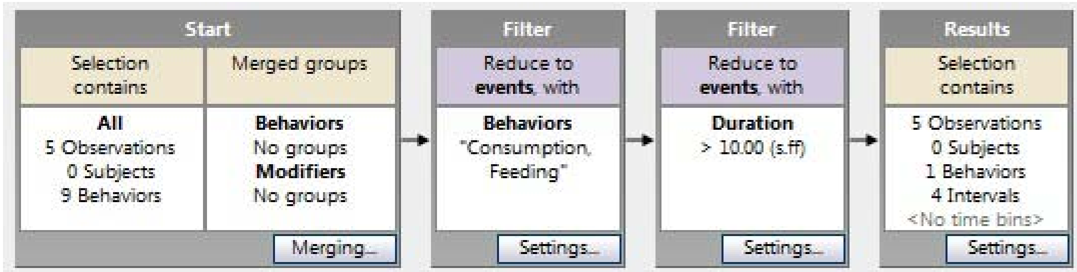
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Insert a **By behaviors** (Filter Behaviors) or **By modifiers** (Filter Modifiers) box with the event of interest in the sequence between the Start box and the Results box.
2. Choose **By Duration**.
3. Specify a duration and choose **Higher than**, **Higher or equal to**, **Lower than**, or **Lower or equal to**. In the example of the aphids above, select Higher than 10 s.



4. Insert the box after the other filter boxes in the sequence between the Start box and the Results box.

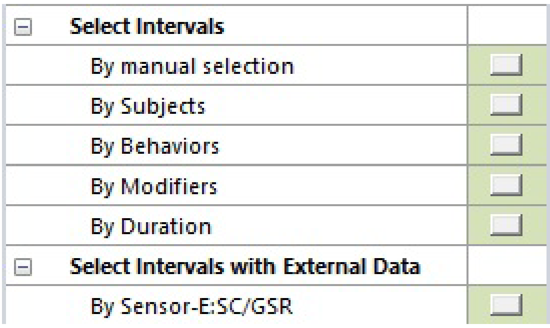


Note

If you do not combine the By duration filter with a Filter by behaviors, or modifiers box, you apply the minimum or maximum duration to all events.

See Advanced Data Selections for more information on combining selection boxes.

Select Intervals



Aim

To analyze events that occur in time periods defined by an event or a combination of events (interval conditions).

Example 1 – You want to analyze the events that occurred when the user was performing Task 3. You select intervals based on behavior *Task 3*. This way analysis is done on all events scored when the state *Task 3* was active.

Example 2 – You want to analyze co-occurrence of two behaviors. For example how often a child was playing at a table. Select intervals based on the behavior *Child Play* and analyze the behavior *At table*.

You can select intervals in the following ways:

- Select Intervals by Manual Selection – To define the start and stop of the intervals manually.
- Select Intervals by Subjects – To analyze the time intervals during which behaviors by certain subjects took place.
- Select Intervals by Behaviors – To analyze time intervals during which certain behaviors took place.
- Select Intervals By Modifiers – To analyze time intervals during which certain modifiers took place.
- Select Intervals by Duration – To analyze time intervals with a minimum or maximum duration.
- Select Intervals by External Data – If your license includes the External Data Module. To analyze time intervals during which your external data had a certain value.

Select Intervals by Manual Selection

Aim

To set the start and end of the intervals manually. Both the start and end of the interval can be determined by:

- Observation time – For example, one minute after the start of the observation.
- Observational data – For example, the start of Task 1.
- External data – If your license includes the External Data Module. For example, when the heart rate becomes higher than 100 bpm.

You can also combine time, events or external data to define the interval. For example: *From 1 minute after the event Start Test* to the event *User error*.

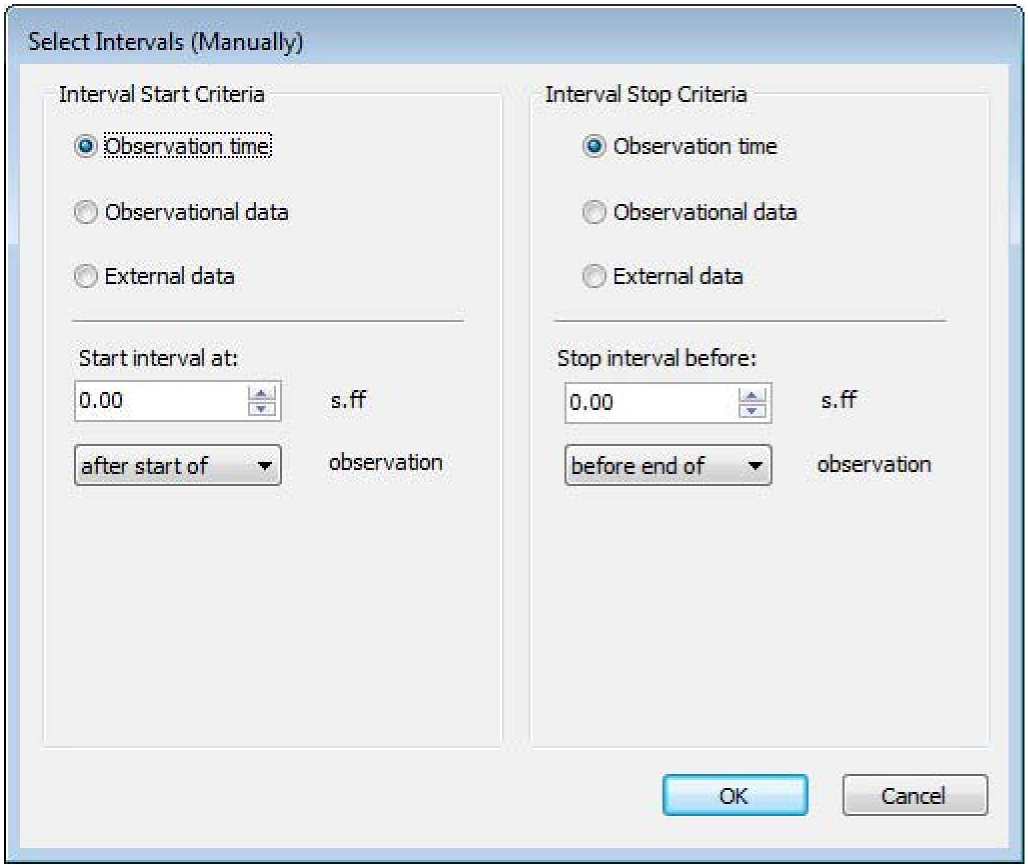
See also How Manual Intervals are Generated

Prerequisites

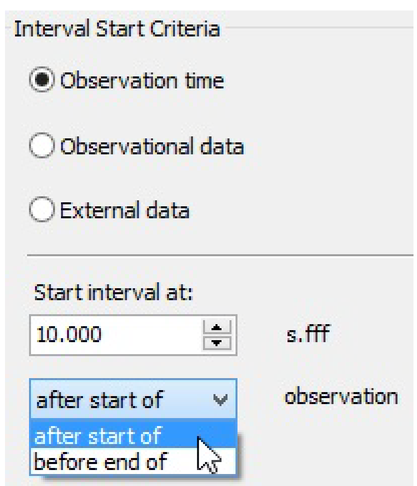
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New**/**Open Data Profile**).

Procedure

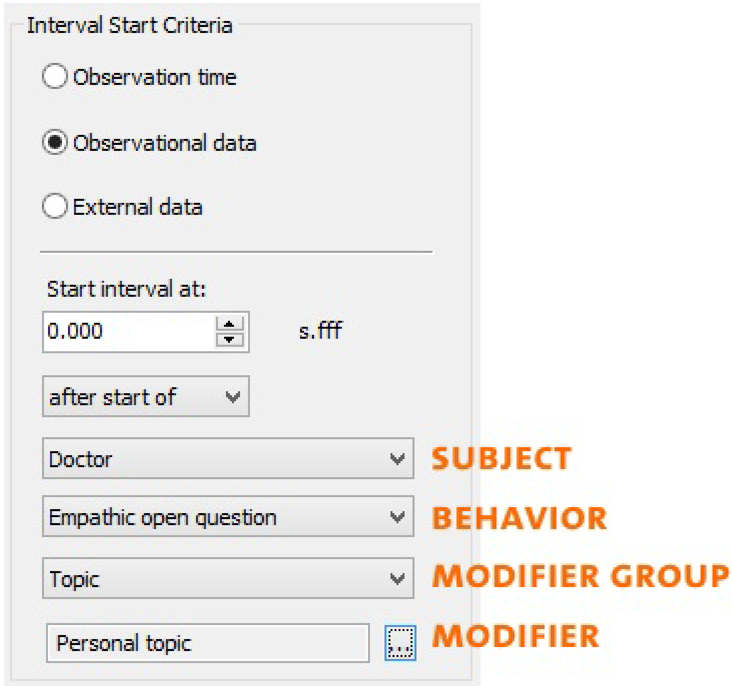
1. Click **By Manual** selection.
2. In the window that opens, specify the criteria for the start and the stop of the interval.



- Observation time – Enter the time in the appropriate field and select after start of or before end of from the list.

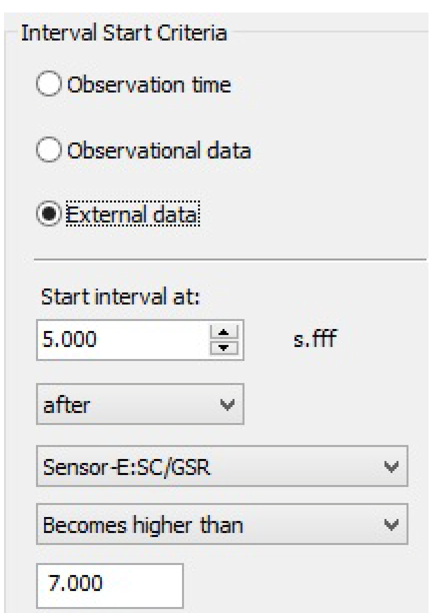


- Observational data – Select the event from the lists. Depending on your Coding Scheme, subjects or modifiers may not be available. Optionally enter a time in the Start interval at/ Stop interval at field and select after end of, after start of, before end of or before start of from the list.



- External data – This option is available if your license includes the External Data Module. Specify the criteria for the external data. The options are **Becomes higher than**/or **equal to**, **Becomes lower than**/or **equal to**. Optionally, set a time in the **Start/Stop interval at** field and select **after** or **before** from the list.

See also The difference between Select Intervals by External Data and Select Intervals by Manual Selection with external data.



3. Insert the Interval box in the selection sequence between the Start box and the Results box.

Select Intervals by Behaviors

Aim

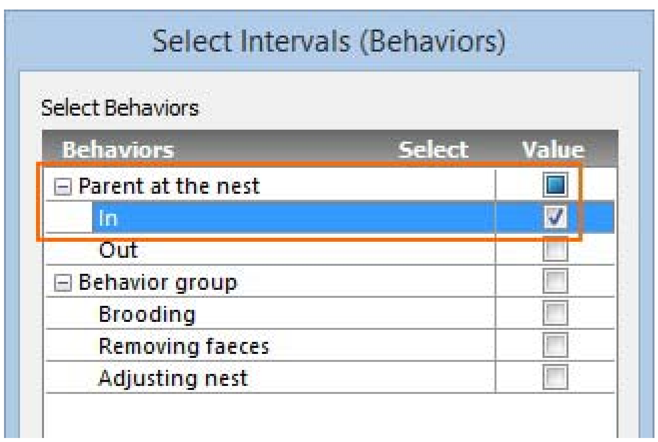
To analyze all time segments when a state event occurred.

Prerequisites

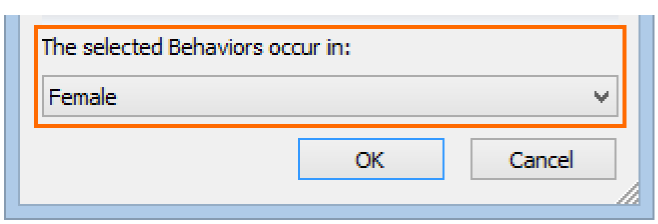
- You carried out your observations.
- You defined Behaviors in your Coding Scheme.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Click **By Behaviors**.
2. Select the behaviors you want to use as interval criteria.



3. If your Coding scheme contains Subjects, specify which ones should perform the behavior.



You have the choice between:

- **<Any Subject>** – To specify the time intervals as long as the behaviors occurred, independent on what subject performed those behaviors.

Example – When either the male or the female bird was in the nest.

- **<All Subjects>** – To specify the time intervals as long as the behaviors occurred for all subjects simultaneously.

Example – When both the male and female bird were simultaneously in the nest.

- **<Missing Subjects>** - To specify the time intervals during which a behavior was scored, but no subject.

- **<Individual Subject>** – To specify the time intervals as long as the behaviors occurred for that subject.

Example – When the specified bird, either the male or the female, was in the nest.

4. Insert the Interval box in the sequence between the Start box and the Results box.

Notes

- To select intervals based on the behaviors performed by a subset of subjects, not just one or all, create multiple selection conditions.

  See Advanced Data Selections

- Selecting a certain combination of subject and behavior in the **Select Intervals (Behaviors)** window is equal to selecting the same combination when you Select Intervals by Subjects

Select Intervals by Subjects

Aim

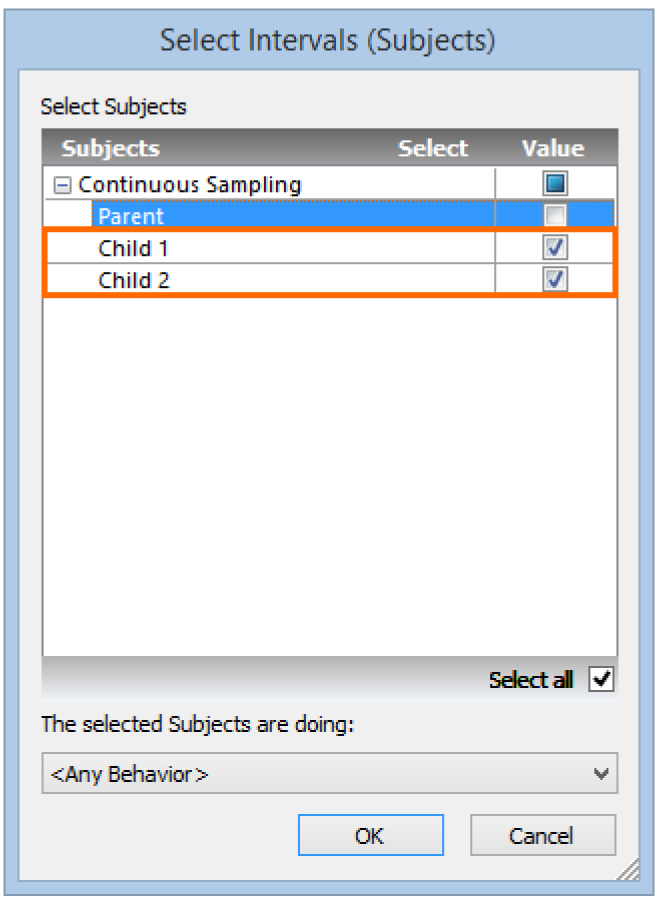
To analyze all time segments when one or more subjects were scored.

Prerequisites

- You defined Subjects in your Coding Scheme.
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Click **By Subjects**.
2. Select the subjects you want to use as interval criteria.



3. Specify what behaviors the selected subjects performed:

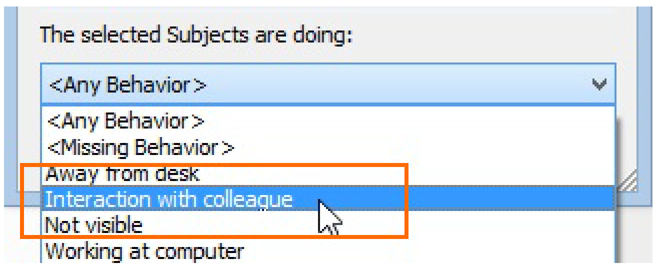
   - <Any Behavior> – To specify the time intervals when the selected subjects were scored, independent on their behavior.

   - <Missing Behavior> - To specify the time intervals when the selected subjects were scored, but no behavior.

   Example - All intervals in which Tijmen and Martijn were scored independent from their behavior.

   - <Individual behavior> – To specify the time intervals the selected subjects performed the selected behavior.

   Example - All intervals in which Tijmen and Martijn were interacting with a colleague.

4. Insert the Interval box in the sequence between the Start box and the Results box.

Notes

- To select intervals by two or more subjects when performing a subset of behaviors, not just one, then you need to create multiple interval conditions.

  See Advanced Data Selections

- Selecting a certain combination of subject and behavior in the **Select Intervals (Subjects)** window is equal to selecting the same combination in the **Select Intervals (Behaviors)** window.

  See Select Intervals by Behaviors

Select Intervals By Modifiers

Aim

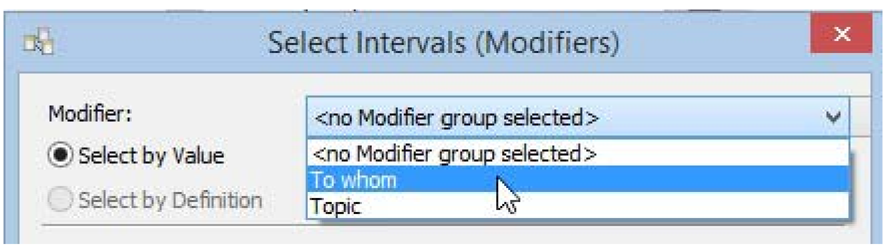
To Analyze data all time intervals when a modifier has a certain value.

Prerequisites

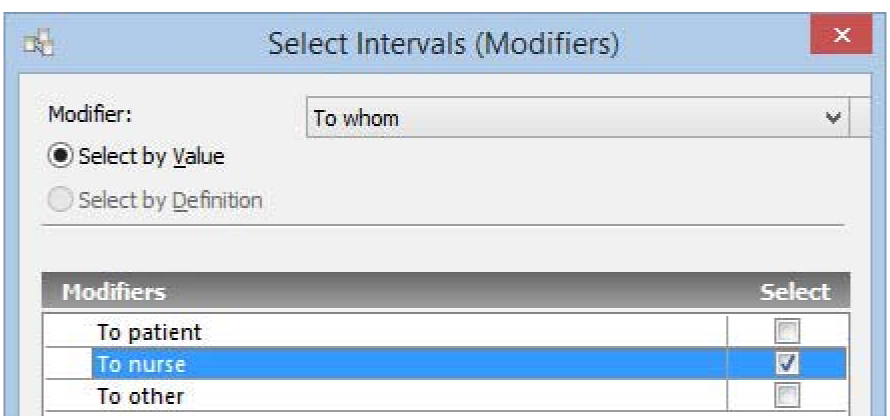
- You defined Modifiers in your Coding Scheme.
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

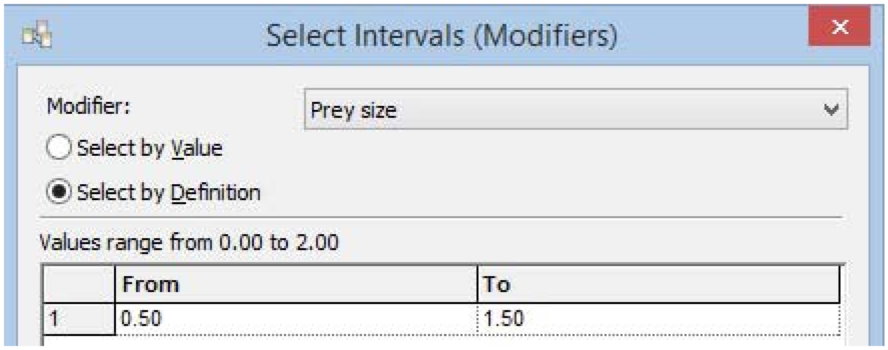
1. Click **By Modifiers**.
2. Select a Modifier group from the Modifier list.



3. Select the Modifiers.



For numerical modifiers, you can also specify a range of values.

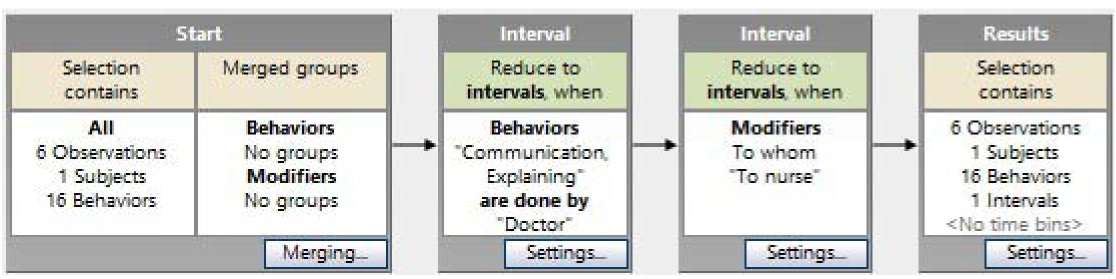


4. Insert the box in the sequence between the Start box and the Results box.

Note

If the selected modifiers are linked to more than one behavior, all intervals in which these behaviors with the selected modifiers were scored will be analyzed. If you want to analyze only time intervals in which a selection of these behaviors took place, position a **By behavior** box with the selected behaviors in the data selection sequence as well.

See Advanced Data Selections how to combine selection boxes.



Select Intervals by Duration

Aim

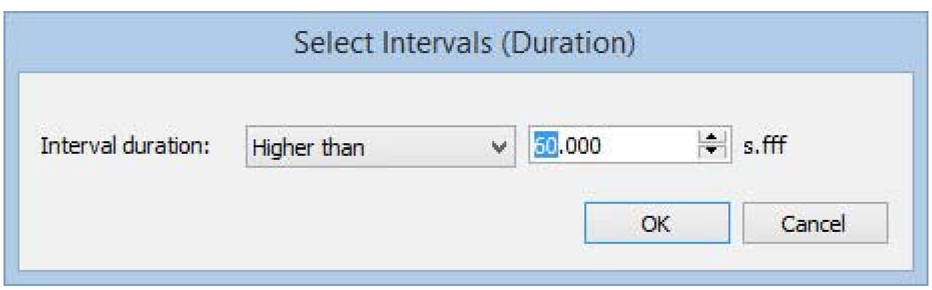
To select intervals that are longer or shorter than a given duration. For example, if you observe a child, to select its behavior when the mother was present for longer than 1 minute.

Prerequisites

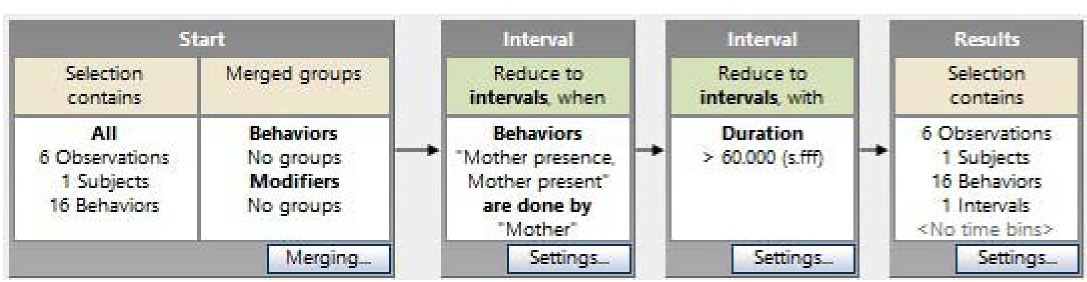
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Insert a **By behaviors** (see Select Intervals by Behaviors) or **By Modifiers** (see Select Intervals By Modifiers) interval box with the event of interest in the sequence between the Start box and the Results box.
2. Choose **Select Intervals By Duration**.
3. Specify a duration and choose **Higher than**, **Higher or equal to**, **Lower than**, or **Lower or equal to**. In the example of the child above, select Higher than 60 s.



4. Insert the box after the other interval boxes in the sequence between the Start box and the Results box.



IMPORTANT Always place the **By duration** interval box after the interval boxes with the other selection criteria.

Note

If you do not combine the By duration interval box with a By Behavior, or Modifier box, you select entire observations that have that minimum or maximum duration.

See Advanced Data Selections for more information on combining selection boxes.

Select Intervals by External Data

Aim

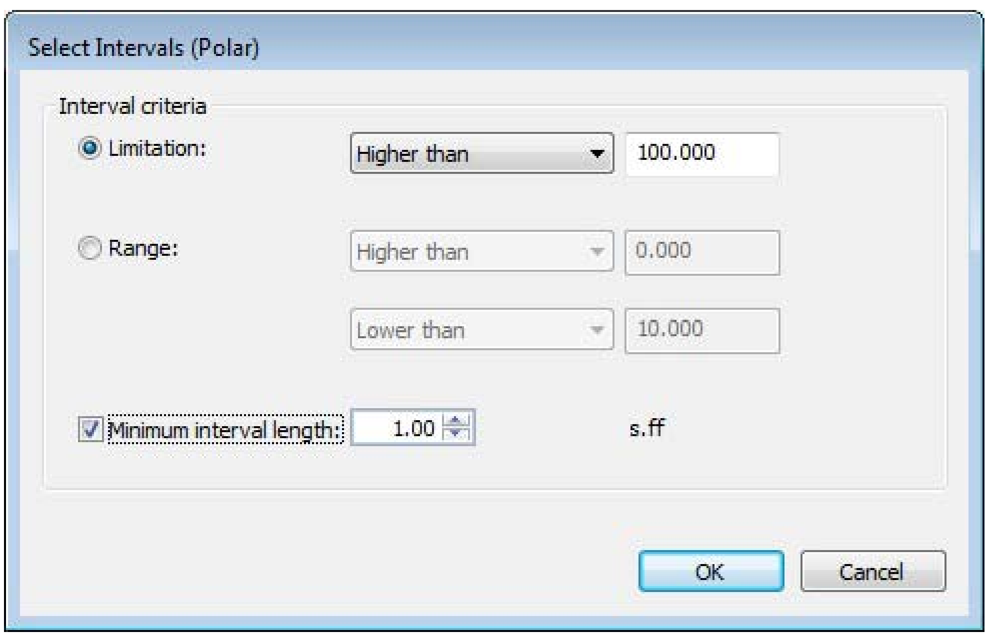
To analyze data when external data values are above/below a specific value.

Prerequisites

- Your license includes the External Data Module.
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

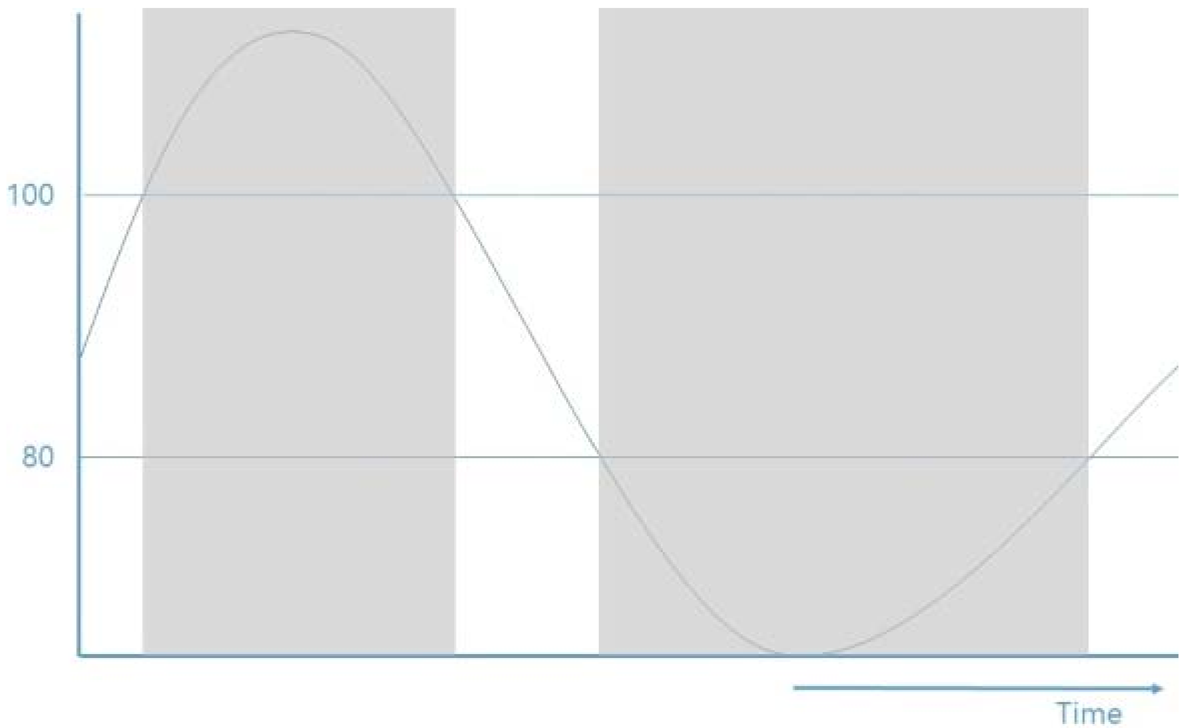
1. Click the button next to the appropriate **By** *<external data signal>*.
2. Specify the criteria for the external data. You can set a **higher than (or equal to)**, or **lower than (or equal to)** limit. It is also possible to define a range.



3. To avoid creating intervals for external data spikes that were the result of noise, specify a **Minimum interval length**.
4. Insert the Interval box in the sequence between the Start box and the Results box.

Result

The upper and lower limits of the interval are fixed and based on the external data values. In the picture below, the intervals are based on a heart rate between 80 and 100 bpm. The selected intervals are shown in the white areas.



See also:

The difference between Select Intervals by External Data and Select Intervals by Manual Selection with external data.

Notes on Intervals

The following notes apply to all intervals, including time bins.

Intervals and suspending a live observation

If you carried out a live observation and suspended it (see Suspend an observation), defining intervals may lead to incorrect selections. This is because suspend/resume creates extra stop and start events for that behavior. For example, if you suspended the observation when Play was active and then select an interval by Play, the resulting interval will be from the start of Play to the suspend time, not the time that you actually score the stop of Play. If this behavior is still active after you resume scoring, you will obtain a second interval from the moment the observation is resumed until the stop of Play.

Intervals and behaviors without duration

It is not possible to select intervals by behaviors without duration (Point events), but you can define intervals starting or ending a defined time before/after them.

See Select Intervals by Manual Selection

Intervals and multiple event logs

If an observation includes two or more event logs, an interval defined in one event log is also applied to other event logs within that observation.

Example – An interval is defined from the start of the observation to the event End of Task. FaceReader states were imported as a second event log. The interval is also applied to the FaceReader states.

If the start and stop criteria are present in more than one event log within one observation, intervals may give unexpected results. We recommend you do not use intervals in this case.

Interval borders

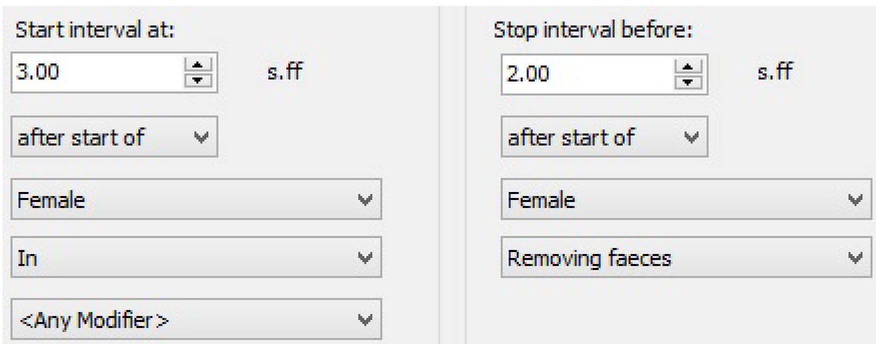
See What happens at the interval borders?

How Manual Intervals are Generated

Manual intervals in detail

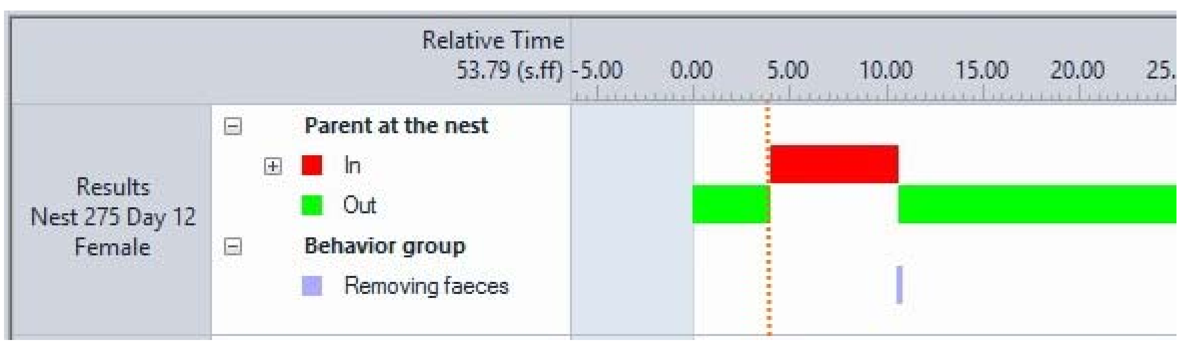
Consider the following example for selection of manual intervals.

From 3 seconds after a blue tit female enters the nest until 2 seconds after the bird starts removing faeces. Set the criteria for the intervals in the following way:

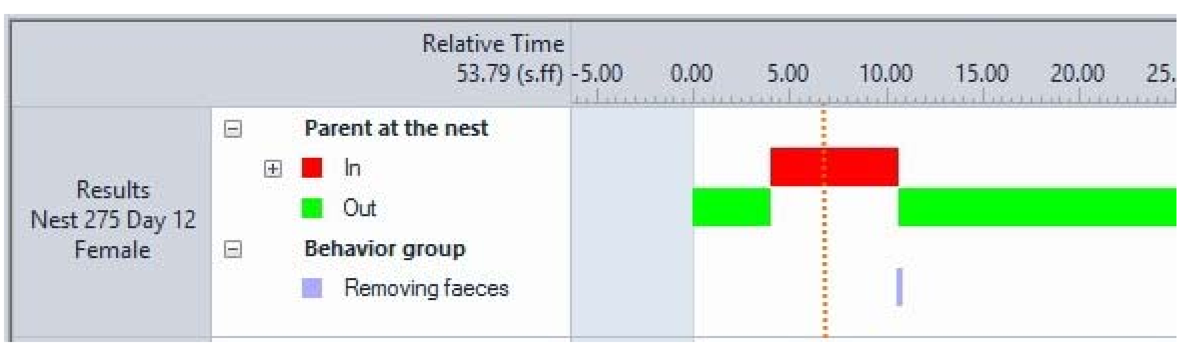


Manual intervals are generated as follows:

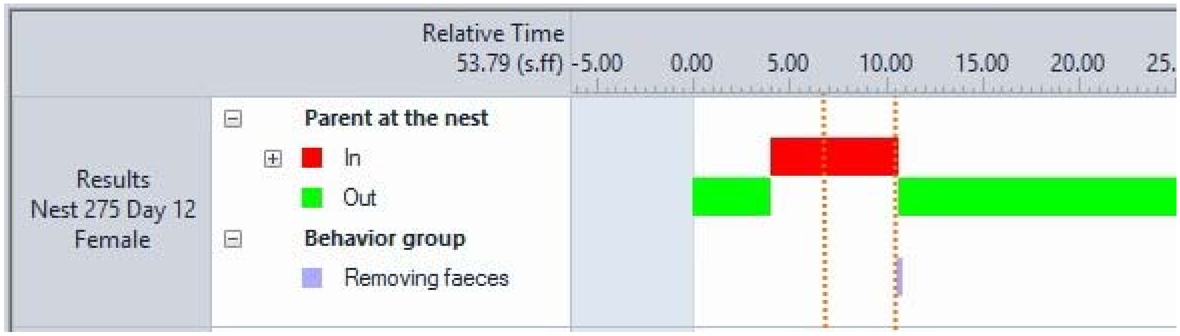
1. The first point that matches the selection criteria for the interval start is determined.



2. The offset (before or after) specified in **Start interval at** field is applied. This sets the start point of the interval.



3. The first point after the point that matches the selection criteria for the interval stop is determined.



4. The offset (before or after) specified in **Stop interval before** field is applied. This sets the end point of the first interval.

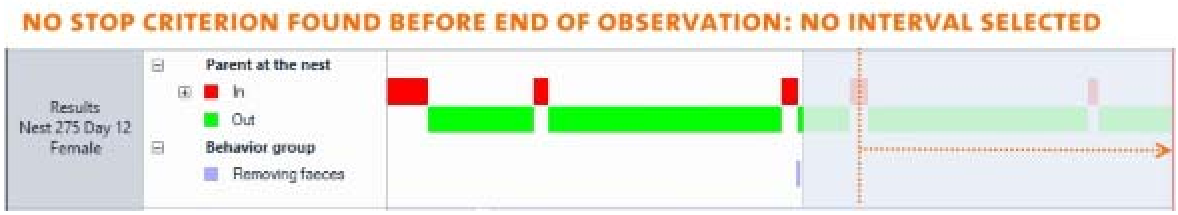
5. Steps 1 to 4 are repeated until the end of the observation. The start of the next interval is always after the stop of the previous one. See the example below. The scale differs from the pictures above.

Note that the four instances of *In* after the one at ca 40 s are not considered for the second interval. An interval is determined by:

- The first instance of the start criteria following the previous interval.
- The first instance of the stop criteria following the start criteria.

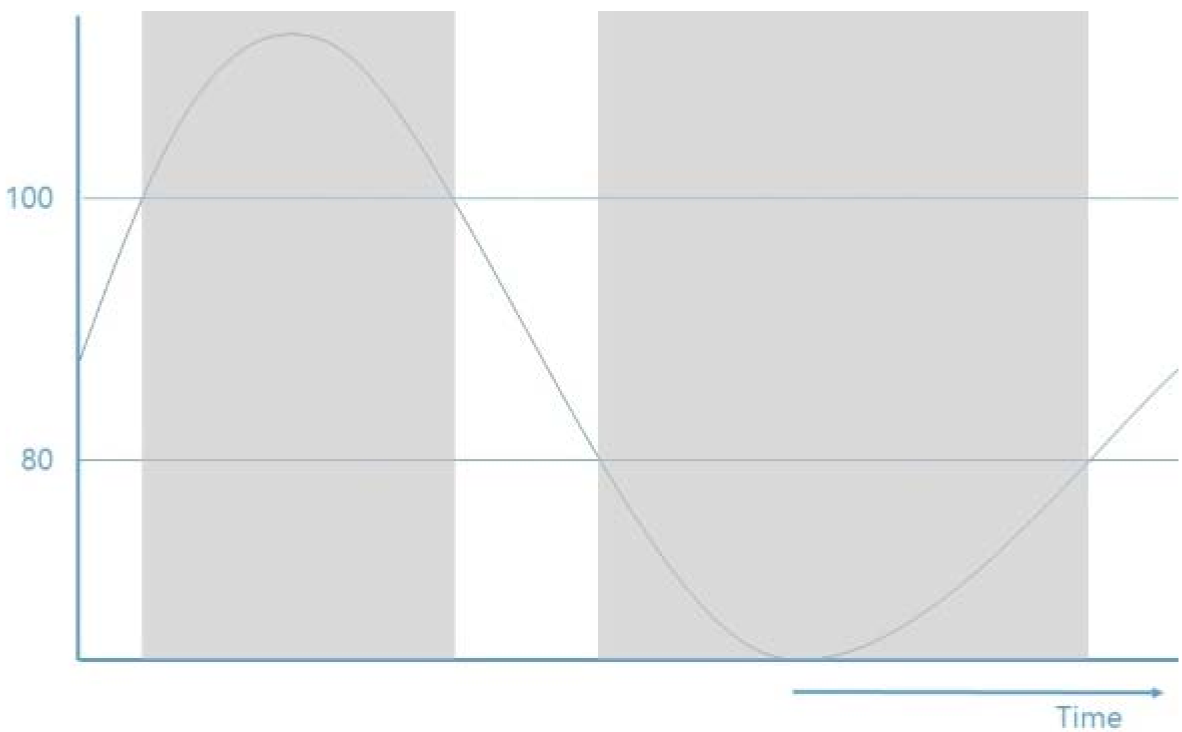
What happens if a start or stop criterion is missing?

If either a start criterion is missing in the observation, or no stop criterion follows the start criterion, no interval is selected.

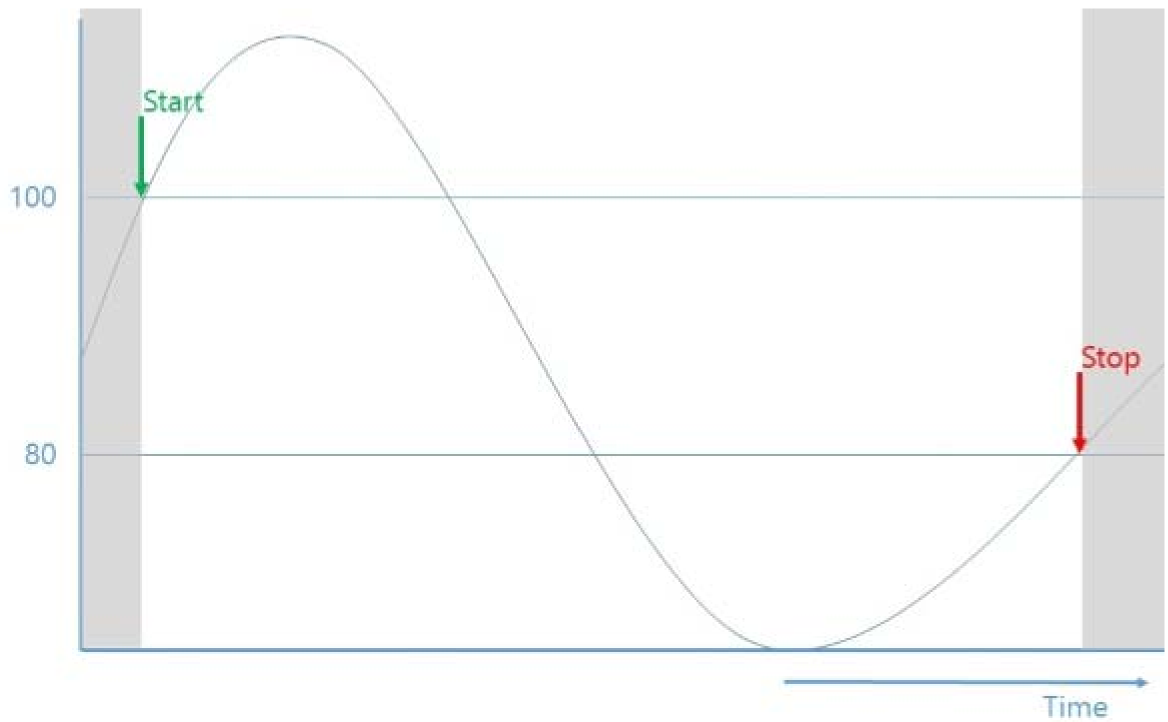


The difference between Select Intervals by External Data and Select Intervals by Manual Selection with external data.

With **Selecting intervals with external data** the upper and lower limits of the interval are fixed and based on the external data only. In the picture below, the intervals are based on a heart rate between 80 and 100 bpm. The selected intervals are shown in the white areas.



With **Selecting intervals by Manual selection** you can include time in the interval start and end criteria, for example 1 minute after the heart rate becomes higher than 100 bpm. Furthermore, there need not be a upper and lower limit, you can use higher than, or lower than for both the start and the end of the interval. In the figure below the interval starts when the heart rate becomes higher than 100 bpm and stops when the heart rate becomes higher than 80 bpm.



Note

Depending on the sample rate of the external data, in the event plot it can sometimes seem as if the interval does not include external data values that should have been included. This is because in the event plot samples are connected by a line as if the external data is continuous, while in fact it consists of discrete samples.

See also Visualize External Data.

Select Regular Intervals

Aim

To divide your data sets in time intervals of equal length. The results of your analyses will be shown for each interval in separate tables or cells.

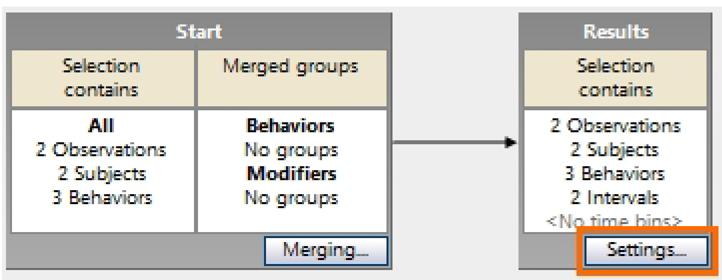
You can specify intervals of a specific length (for example, to split your observations in 10-minutes units) or the fixed number of intervals. In the latter case, the duration of each interval depends on the observation length and the number of intervals.

Prerequisites

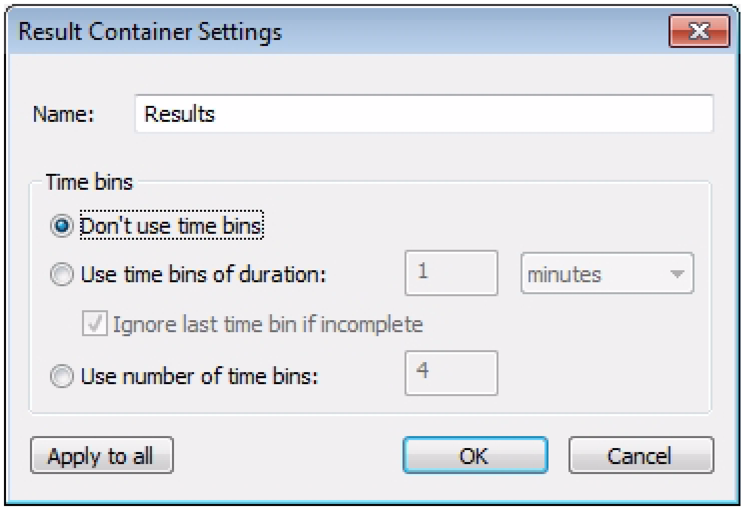
- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New/Open Data Profile**).

Procedure

1. Click the **Settings** button on the **Results** box.



2. Choose either:



Use time bins of duration - To specify a fixed interval length. The number of time bins depends on the observation length. If the duration of the observation/event log is not an exact multiple of the interval length, the last time bins will be incomplete. Select the Ignore last Time Bin if incomplete option if you do not want to analyze this last interval.

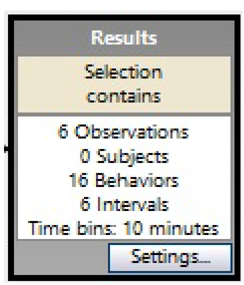
Use number of time bins – To specify a fixed number of intervals to analyze. The duration of the time bins depends on the observation length.

3. If your data profile contains two or more result containers (see examples in Create Groups of Data), optionally click **Apply to all** to set the time bins in all Results boxes.

Notes

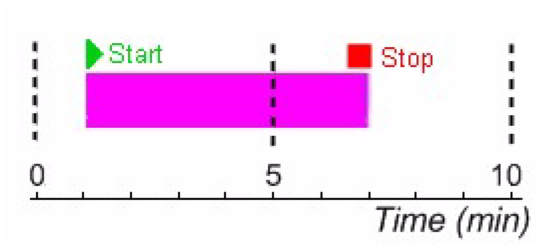
- Time bins and the **Results** box:

  The **Results** shows whether you selected Time bins and their duration.



- If an event falls in two, or more, time bins

  If a behavior occurs across two time bins (marked by dotted lines), it is counted in both time bins. In the example below it duration is four minutes in the first time bin and two minutes in the second time bin.



- Maximum number of time bins

  In theory you can create as many time bins as you want. But time bins increase calculation time. Make sure you do not have very small, and therefore a lot of time bins.

- Time bins and multiple event logs

  Time bins start at the observation start time, which is the start of the earliest event log. For event logs that start later, the time bins at the beginning of the observation contain no data.

- The borders of Time bins

  See What happens at the interval borders?

- Combine intervals with time bins

  You can use intervals and time bins simultaneously. The time bins are then generated per interval. The data outside the intervals are not analyzed. For example, you have two intervals, from 0 - 9 sec and from 20 - 32 sec. If you define Number of Time bins = 3, you get the following Time bins: three 3-sec time bins for the first interval (0 - 9 sec), three 4-sec Time bins for the second interval (20 - 32 sec).

- The difference between Time bins and other intervals

  With Time bins, you analyze data in regular time segments. Intervals are based on values of events or external data and, therefore, vary in time. The only exception is 'by manual selection, based on observation time'. However, this creates one interval per observation, whereas with time bins you create a number of intervals of the same length within one observation.

Advanced Data Selections

What do you want to do?

- Combine Selection Criteria
- Create Groups of Data

Combine Selection Criteria

Aim

To select data based on a combination of selection criteria.

Prerequisites

- You carried out your observations.
- The Data Selection window is open (Choose **Analyze** > **Select Data** > **New**/**Open Data Profile**).

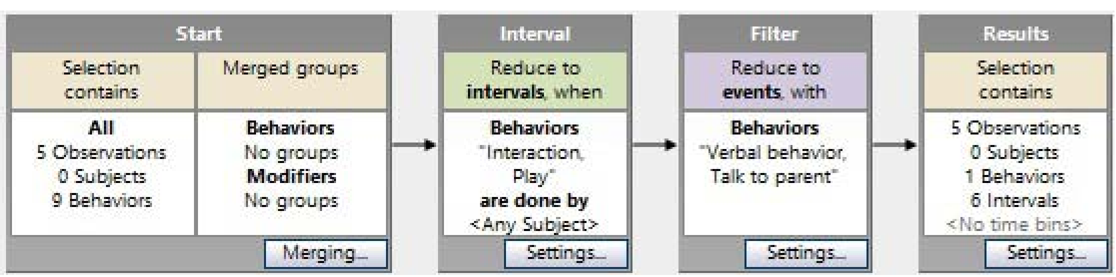
Basic Rules

To create advanced data selections, combine selection boxes. Below you find the basic rules to do so.

And logic

To obtain an And logic, position the boxes after each other in the sequence.

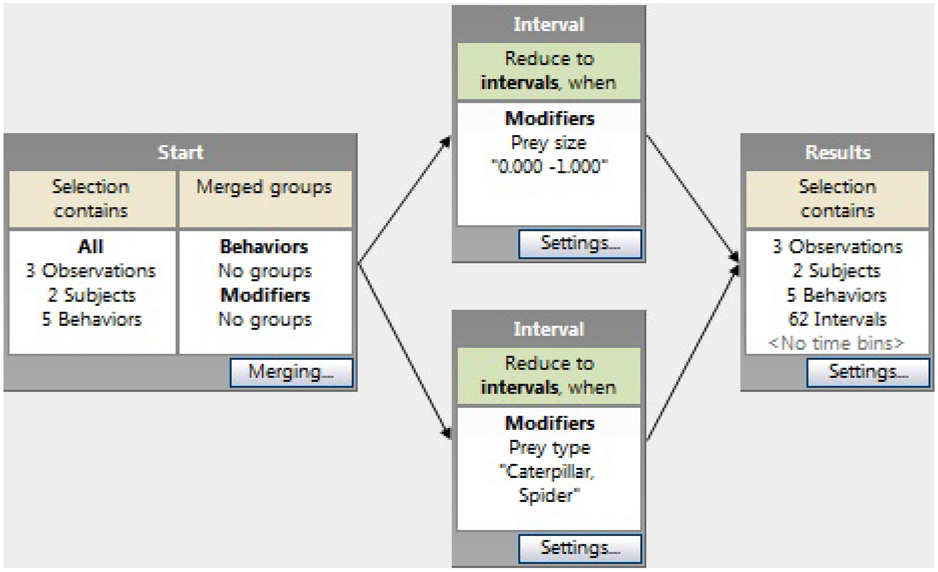
Example – To select intervals by the behavior Playing And filter the behavior Talk to parent. This way you analyze only the behavior Talking to parent during the intervals that the subject was playing.



Or logic

To obtain an Or logic, split the data selection sequence into two branches and place the boxes in parallel.

Example –To analyze those intervals during which a bird either brought a caterpillar, or spider into the nest, or a prey smaller than 1 cm.



Do not use this OR logic if you use multiple selection boxes in each branch. The data selection may give unexpected results. Create a separate Results box for each branch instead.

Order of selection boxes

The order in which you place boxes in a selection sequence is very important. Please read this section carefully.

If your sequence contains Filter boxes only...

- If each Filter box refers to a different type of element...

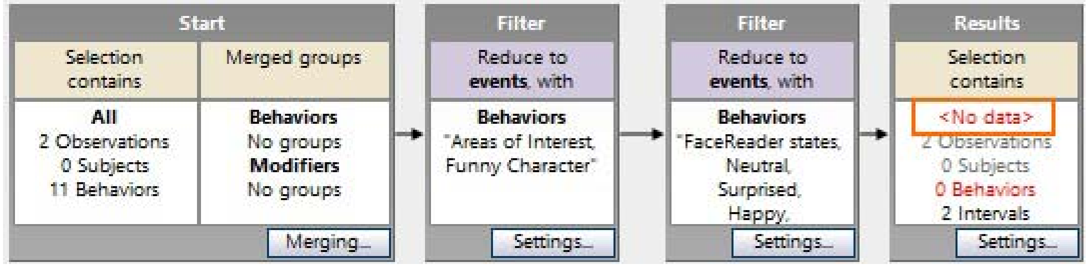
  Example – One Filter box for an independent variable, one for subjects, one for behaviors.

  ...Then the order you place the boxes does not matter.

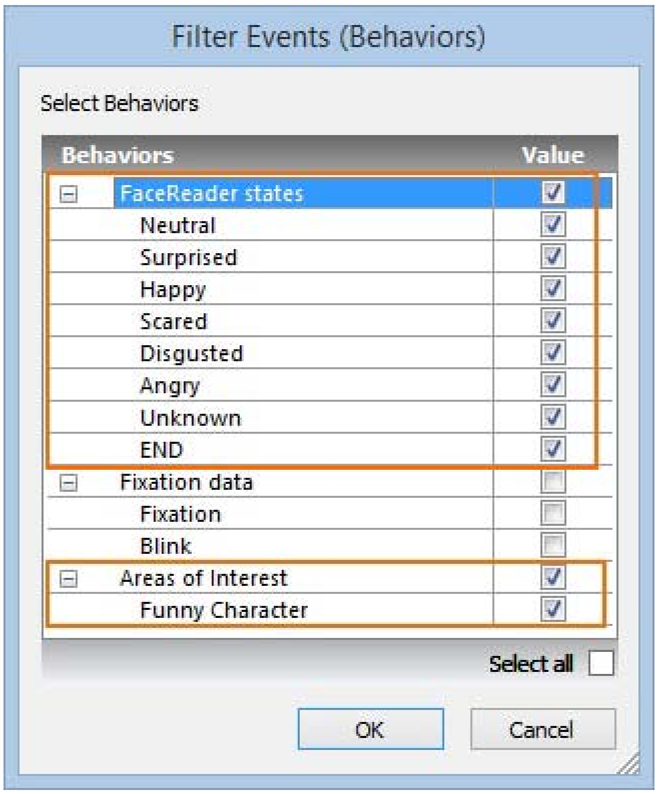
- If Filter boxes refer to the same type of element...

  Example – One Filter (Behaviors) box filtering the behavior group Area of Interest behaviors, and another Filter (Behaviors) box for Facial Expression behaviors.

  ....Then the selection does not work, because the first filter has removed the behaviors in the second filter.



Instead, select both behavior groups in one filter box.



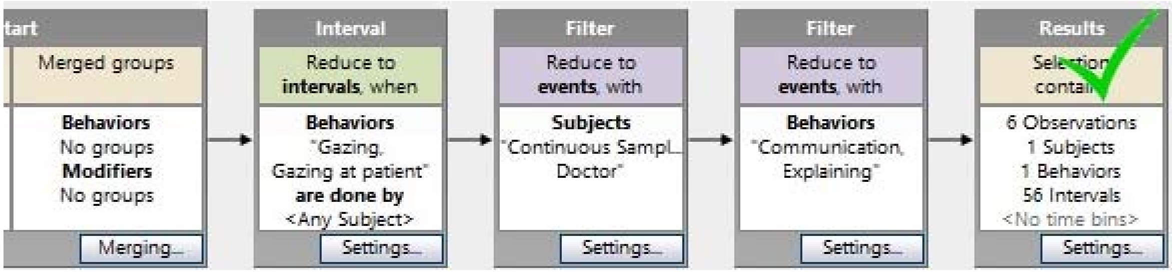
If your sequence contains Interval boxes only...

...Then the order in which you place the boxes does not matter.

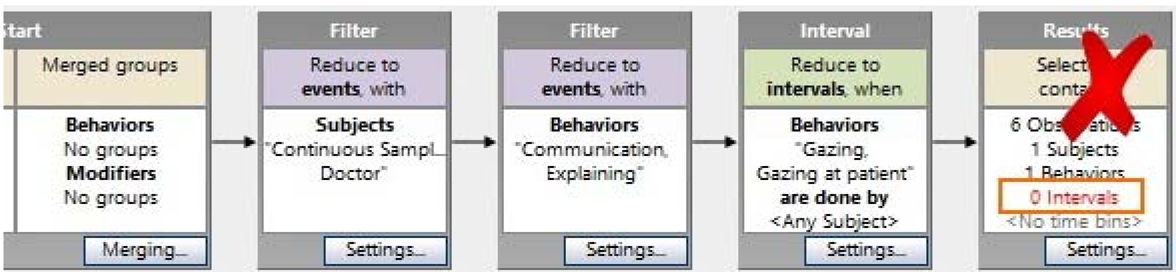
If your sequence contains Interval and Filter boxes together...

Example – One Filter (Subjects) box to filter the subject Doctor, and one Filter (Behaviors) to filter the behavior Instruction, and one Interval box to select the time that the behavior Gazing at patient occurred.

...Then the selection may not work if the Filter boxes are placed before the Interval box. This is because a Filter box may filter out the subjects and behaviors specified in the Interval box.



As a general rule, insert the Filter boxes after the Interval boxes.



Create Groups of Data

Aim

To split your data into groups for analysis.

Example – To analyze the behavior of male subjects and compare that with the behavior of the females.

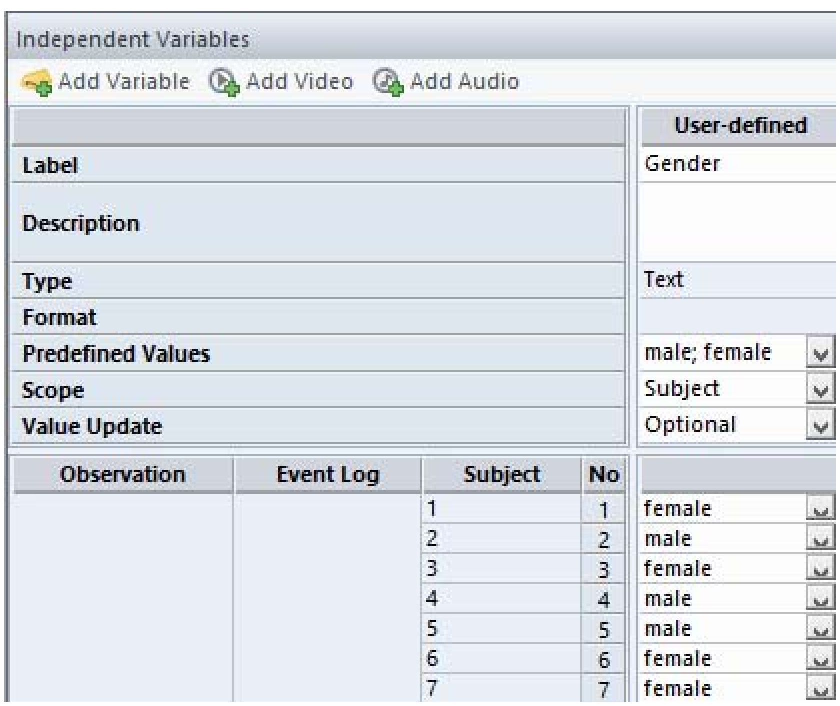
Solution – Create an independent variable *Gender*. In the Data Selection, create two sequences. Insert an extra Results box to do so. Select female subjects in one sequence and male subjects in the other.

Prerequisite

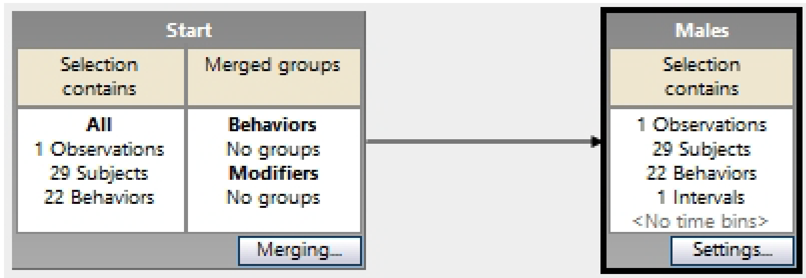
- You carried out your observations.

Procedure

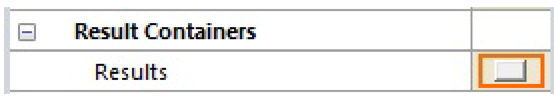
1. Create an independent variable and enter a value for all subjects (see Create User-Defined Variables). In this example, create an independent variable *Gender* with the values *female* and *male*.



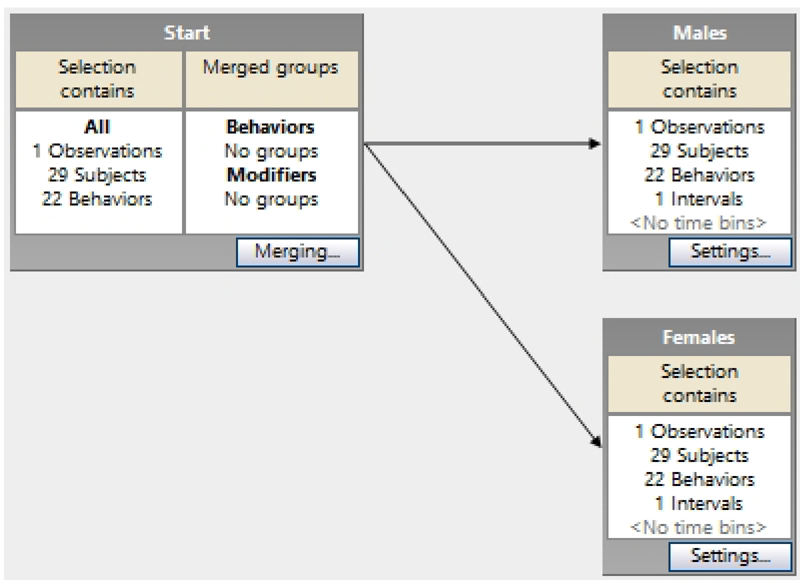
1. In the data selection sequence, click the **Settings** button on the existing Results box and name it *Males*.



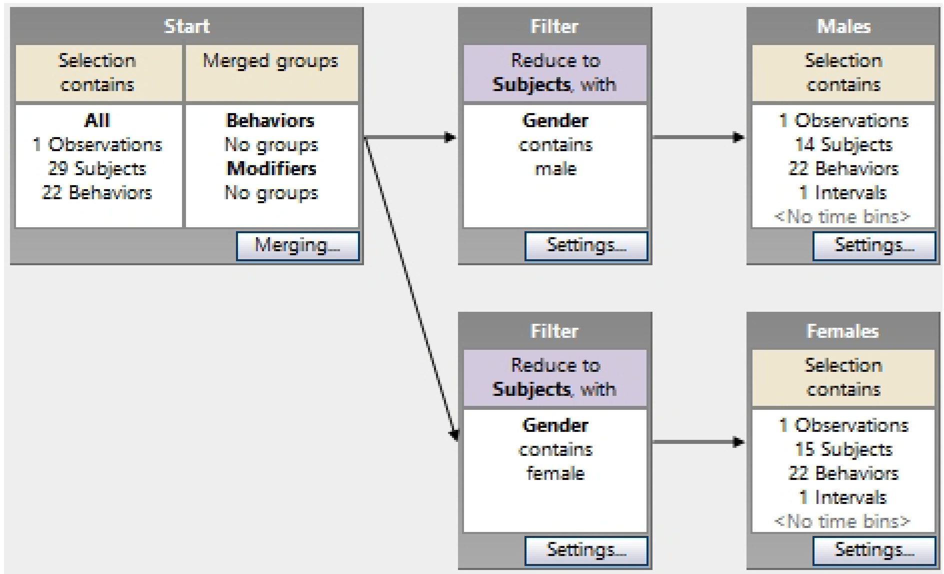
2. Click **Results** to create an extra Results box.



3. Name the extra Result box *Females*.
4. Connect the Results box with an arrow to the Start box.



5. Click **By Gender** under Filter Events and make your selection. Insert a selection box in both sequences.



6. Analyze the data with the data profile you just created active. The data for males and females are now calculated separately. In the example below, the choice of male and female consumers at a buffet was analyzed.

	Result Containers				
Behaviors		chicken - welfare friendly	chicken - new	French fries	vegetable mix
	Males	8	5	13	12
	Females	10	2	15	15

Note

If the scope of the Independent variable *Gender* is **Observation** instead of **Subject** (see Variable scope), **By Gender** is present under Filter Observations instead of under Filter Events.

Create groups of data based on a behavior

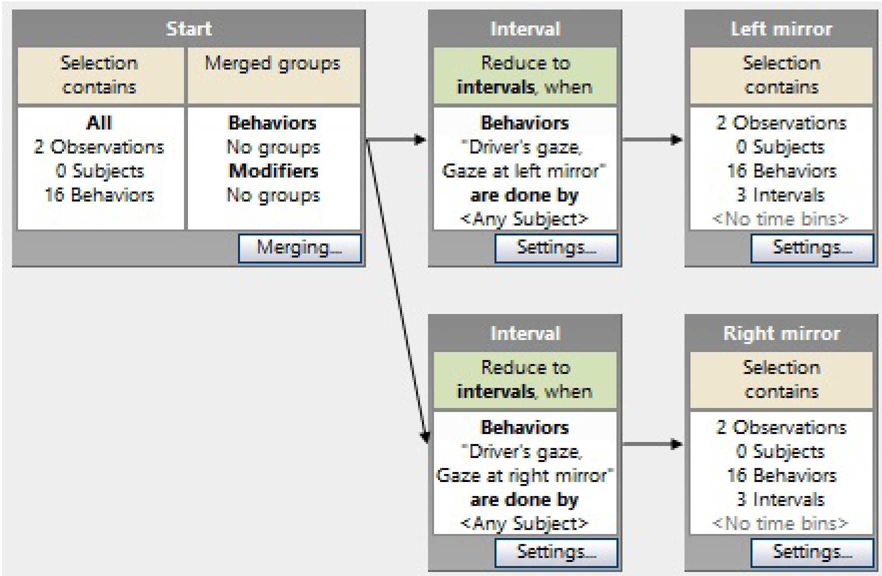
Following the procedure above, you can also divide the data in time intervals during which a behavior takes place.

Example –To analyze the behavior of a driver when it was either watching the left mirror or the right mirror.

Procedure:

1. Add an extra Results box and click the **Settings** button on each box to give them a logical name.
2. Click **By Behaviors** under **Select Intervals** and define your selection. Then insert the box in the correct branch of the data selection sequence.

3. Repeat the procedure for each branch.



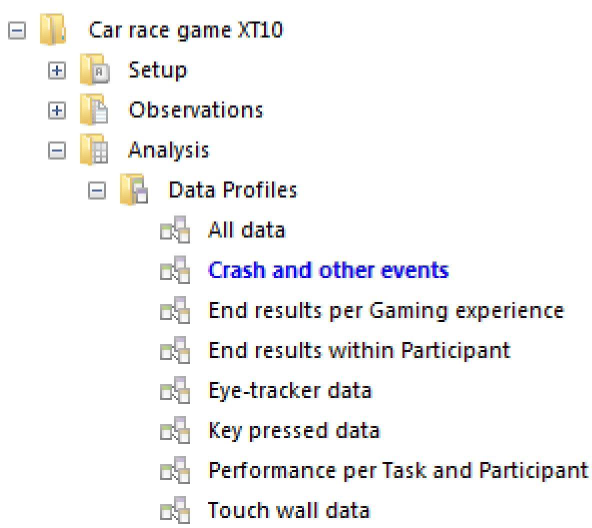
Manage Data Profiles

What do you want to do?

- View and open data profiles
- Edit a data profile
- Arrange data selection boxes
- Reset a data profile
- Rename a data profile
- Create a copy of a data profile
- Delete a data profile
- Zoom in and out
- Create a screenshot of the data selection

View and open data profiles

All data profiles are listed in the Project Explorer in the **Data Profiles** folder in the **Analyses** folder. Click a data profile to activate it. It is now highlighted in blue and used in the Visualization and all analyses.



Edit a data profile

Delete a selection box

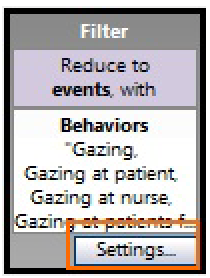
To delete selection boxes, select them and press **Delete**. You cannot delete the Start box. You can delete a Results box if there are more than one. If you delete in a box within a sequence, the arrows connecting the adjacent boxes are lost. You must then re-connect the adjacent boxes (see step 4 in Data Selection: General Procedure).

Delete a connecting arrow

To delete an arrow, click it and press **Delete**.

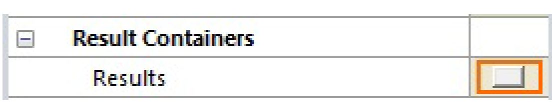
Edit selection criteria in a selection box

To edit selection criteria in a box, click the **Settings** button in the bottom-right corner of the box. Select the new criteria.



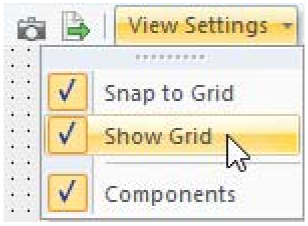
Create a new Results box

Create multiple Results boxes if you want to split your data for analysis. For example to analyze male and female participants separately. See Create Groups of Data for an example. Click the box next to **Results**. Change the name of the Results box, for example to Males, or Females. This name is shown in the analysis results.



Arrange data selection boxes

Choose **View Settings** > **Snap to Grid** to automatically align the boxes to a grid. Choose **Show Grid** to show the grid in the Data Selection window.



Reset a data profile

If you reset a data profile, all your selection criteria in that profile are deleted. As a result, the data profile contains all observations of your project and all data within them. To do so, choose **Analyze** > **Select Data** > **Reset Current Data Profile**.

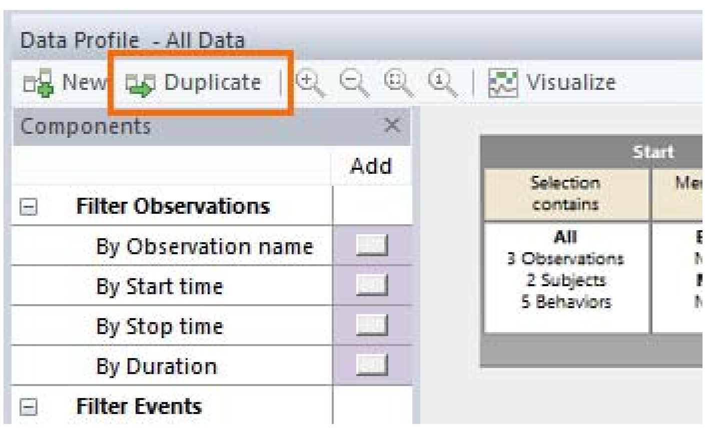
IMPORTANT You cannot undo a data profile reset.

Rename a data profile

To rename a data profile, right-click the name of the data profile in the Project Explorer, and select **Rename**. Then, enter the new name.

Create a copy of a data profile

To copy an existing data profile, right-click a Data Profile and select **Duplicate**, or click the **Duplicate** button on the toolbar.



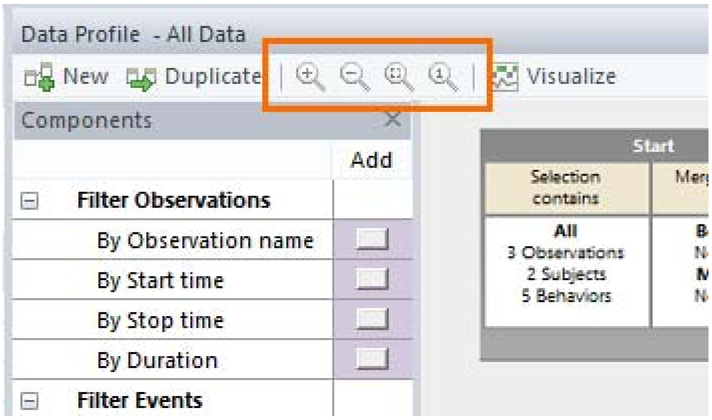
Delete a data profile

To delete a data profile, right-click it in the Project Explorer under **Data Profiles** and select **Delete**. Deleting a data profile does not result in deleting your data. It removes the data selection settings.

IMPORTANT You cannot restore a deleted data profile.

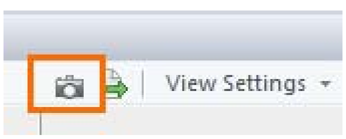
Zoom in and out

Use the Zoom in, Zoom out, Zoom to fit, and Reset zoom icons on the toolbar. to customize your Data Selection window You can also use Ctrl+scrollwheel to zoom in and out.

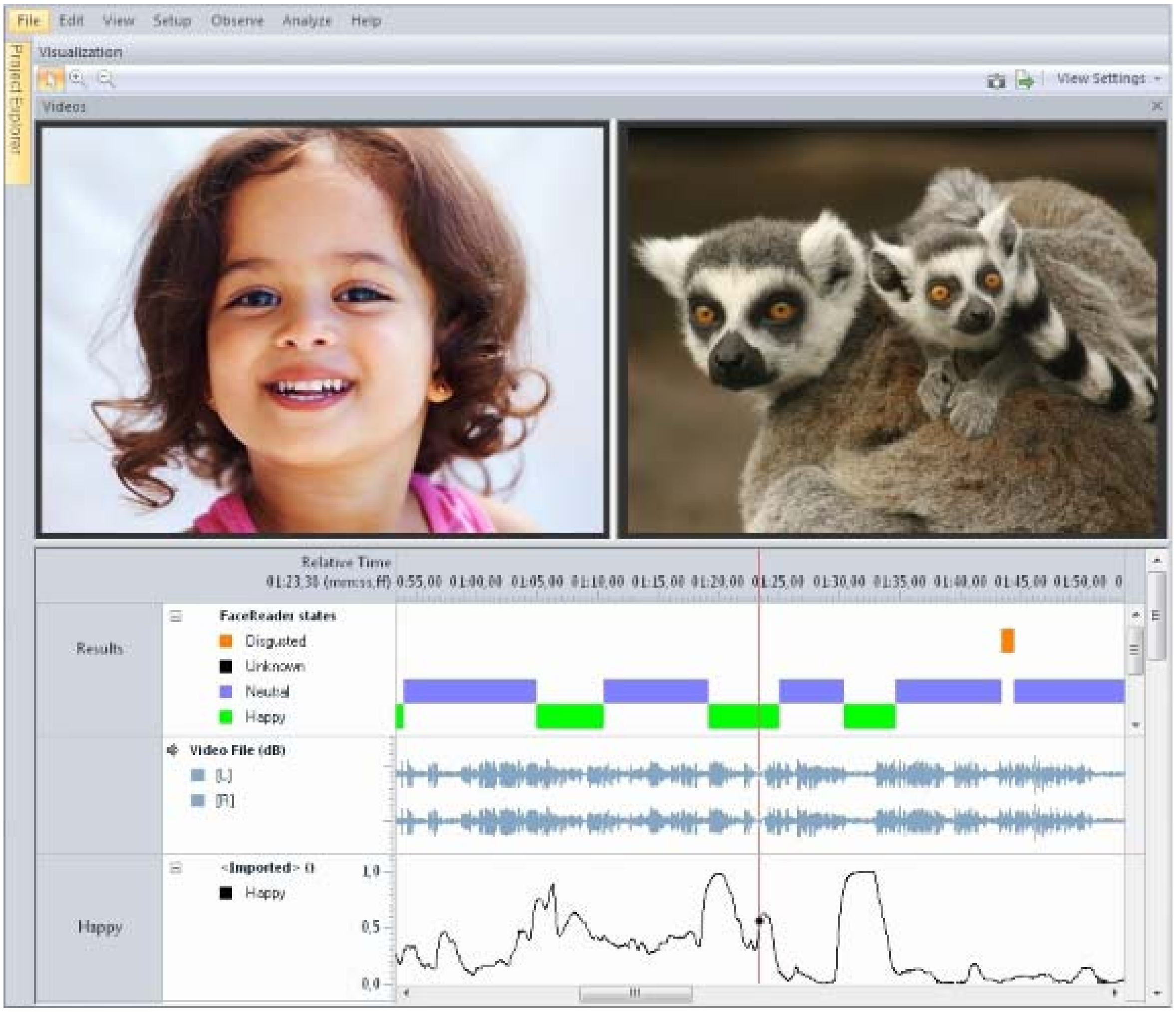


Create a screenshot of the data selection

Click the camera icon at the right-hand side of the toolbar, to save the data selection to an image file (*.png, *.emf, *.jpg, *.bmp, *.gif).



Visualize Data



When you visualize data, The Observer XT produces plots in which events are displayed against time. Video files and, optionally, visualized audio from video, and imported external data, are also displayed and synchronized with the observational data.

To open the visualization choose **Analyze** > **Visualize data**. You can play the videos together with the plots. The red hairline represents the current position in the video files.

Main topics

- Make a Visualization
- The Visualization Explained in Detail
- Customize and Manage the Visualization

Make a Visualization

Aim

To visually inspect your observation and play back the video with the annotations.

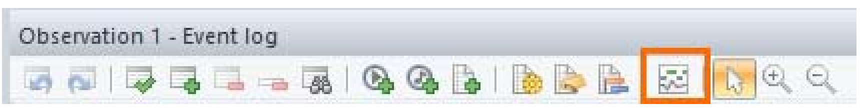
Prerequisite

- You carried out at least one observation.
- Your observations contain scored behaviors.

Procedure

1. If you created data profiles (see Select Data for Analysis), make sure the correct one is highlighted in the Project Explorer.
2. Choose **Analyze** > **Visualize Data**.

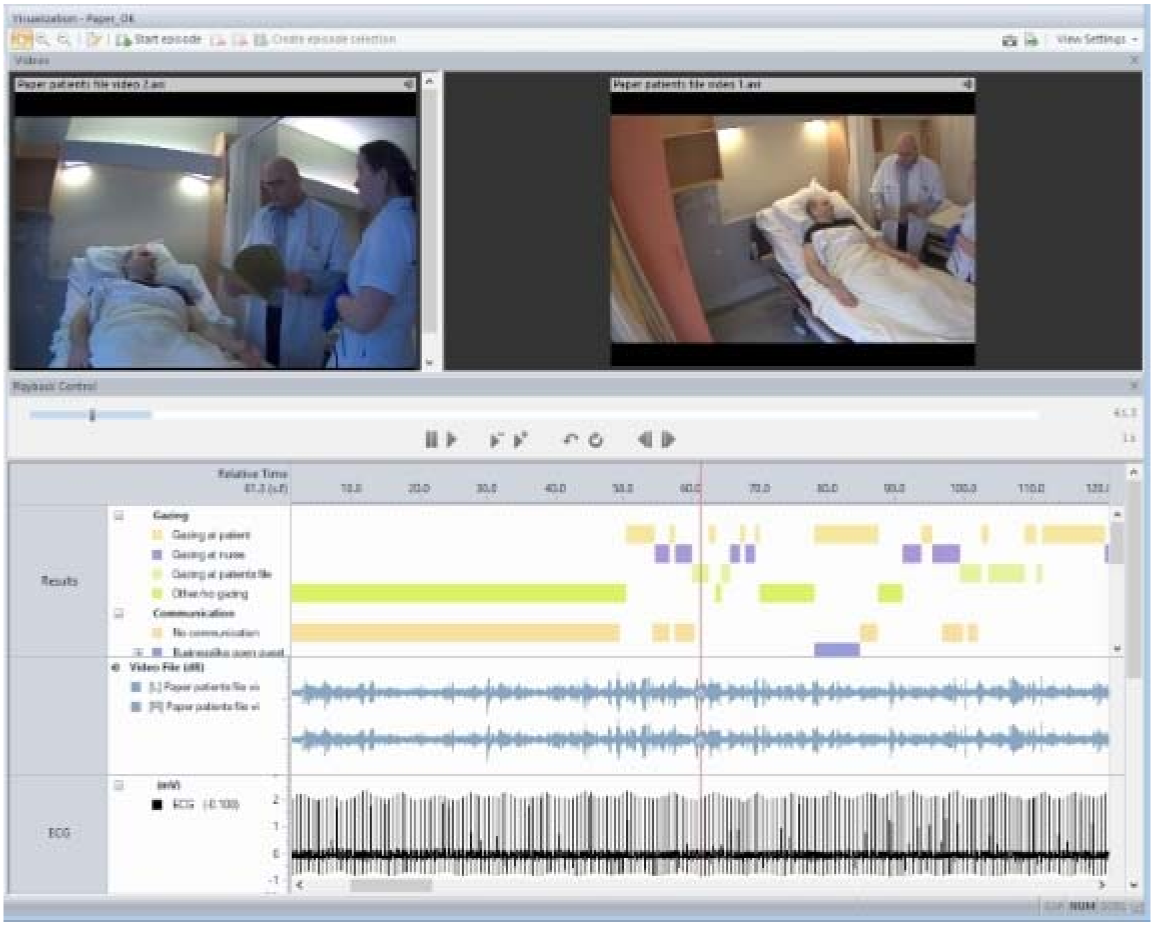
   Alternatively, when you want to visualize only the observation that is open, click the **Visualize current observation** icon in the toolbar. The video in the visualization then opens at the timestamp that was selected in the Event log.

Result

The Visualization window opens.

See The Visualization Explained in Detail



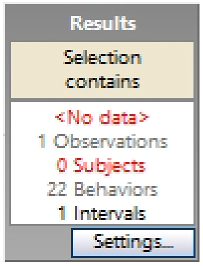
Notes

- If your coding scheme contains no behaviors, you cannot make an event plot. In that case you can only visualize video, audio and external data.
- If you cannot visualize an observation, possibly the observation contains errors. Your observation is marked with an error symbol in the Project Explorer.

  See Correct Event log errors manually in Carry out an Observation

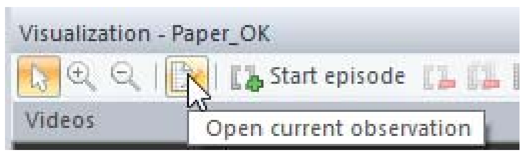
  

  Alternatively, the active data profile does not contain data for that observation. Check the Results box in your data profile whether your selection contains data.



- If you see you need to synchronize the different data files, click the **Open current observation** button to re-open the observation and change the offset.

  See Synchronize data sets



The Visualization Explained in Detail

Aim

To explain what is shown in each visualization window.

Prerequisite

You opened a visualization (**Analyze** > **Visualize data**).

The visualization windows

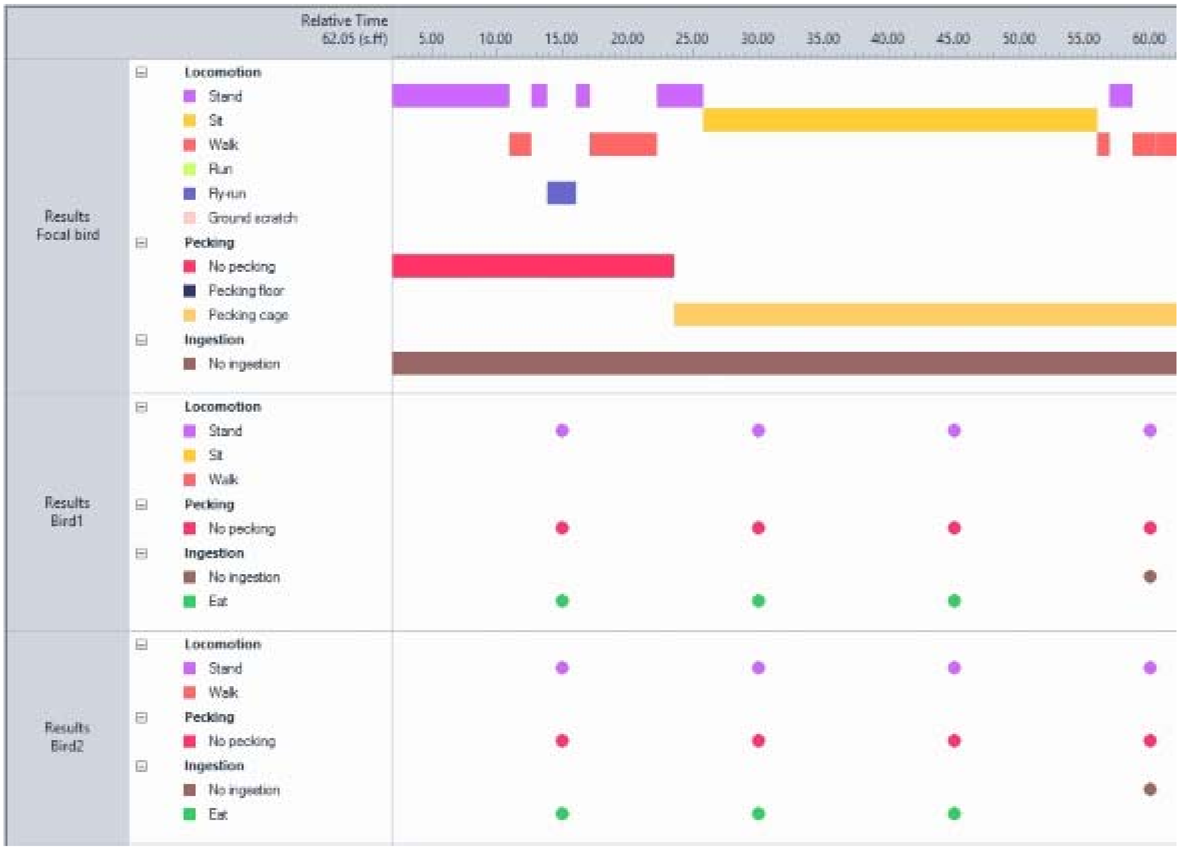
The visualization has the following windows:

- Event plots
- Videos
- External data and audio plots
- Playback control window

See also General notes on visualization

Event plots

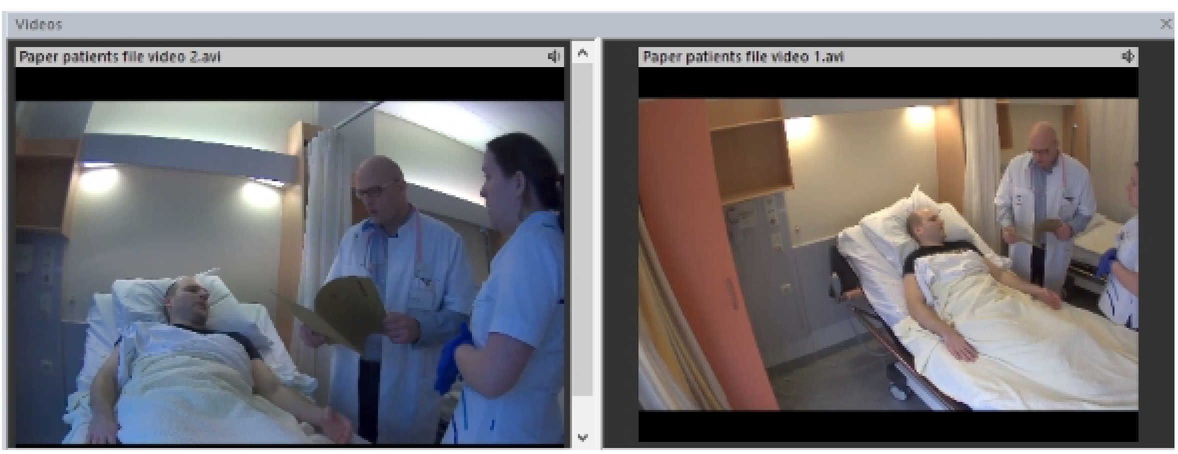
The visualization displays event plots for each event log, subject and observation. These plots contain colored bars for state events, narrow vertical bars for point events and colored dots for Instantaneous Sampling data.



See also:

- Visualize Events
- Visualize Comments

Videos



Videos are shown if you observed offline from video, or if you imported videos into your observation.

See also:

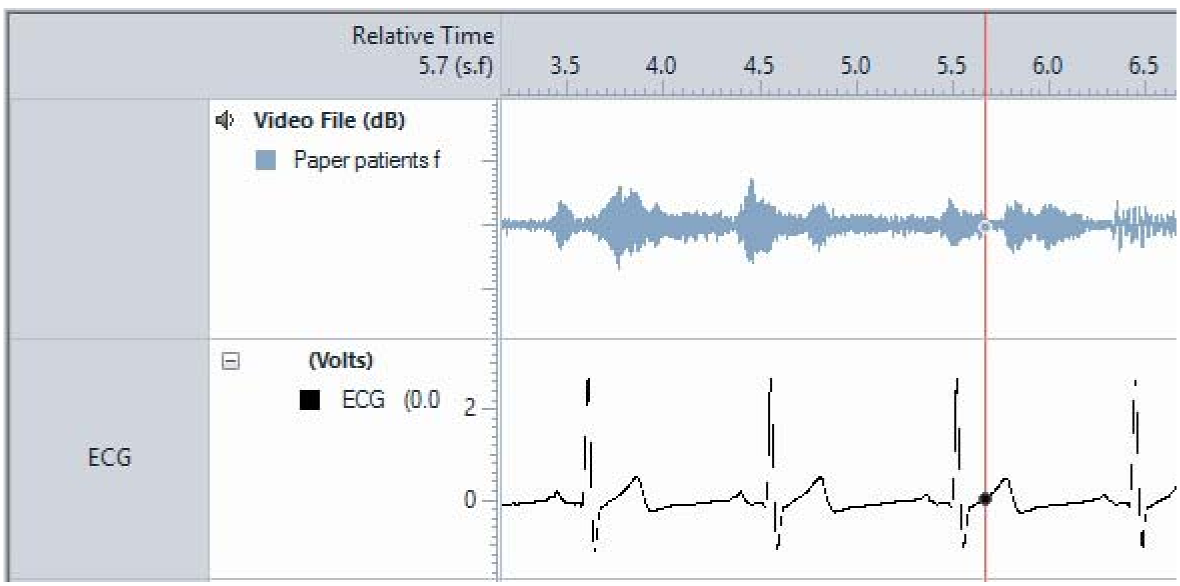
- Observation source in Set up your Project
- Import Media Files in File Management

Note

The number of videos you can display simultaneously in the Visualization is limited to eight, unless your license allows more than four videos per observation. To select other videos than shown by default, choose **View Settings** > **Videos** > **Show video** and specify which videos to display.

External data and audio plots

Each audio stream and external data file is displayed in a line plot. An observation can only contain external data if your license includes the External Data Module.



If you do not see such a plot type, choose **View Settings** > **Show Audio** or **Show External Data**.

See also:

- Visualize Audio
- Visualize External Data

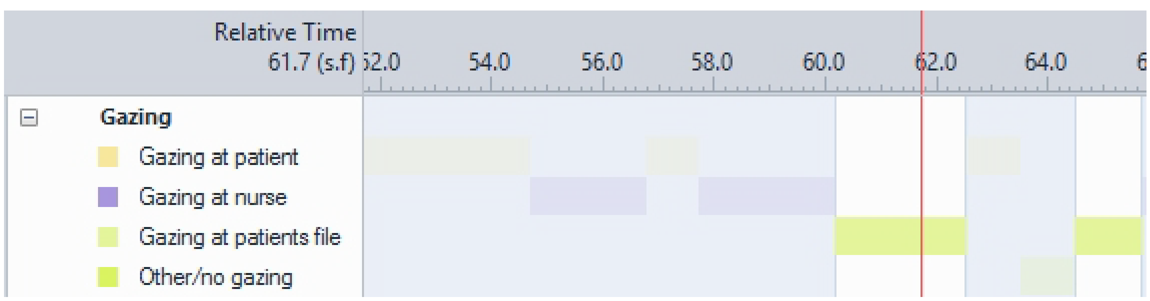
Playback control window

See The Playback control window for an explanation of all playback control buttons. If you do not see the Playback control window, choose **View Settings** > **Playback Control**.

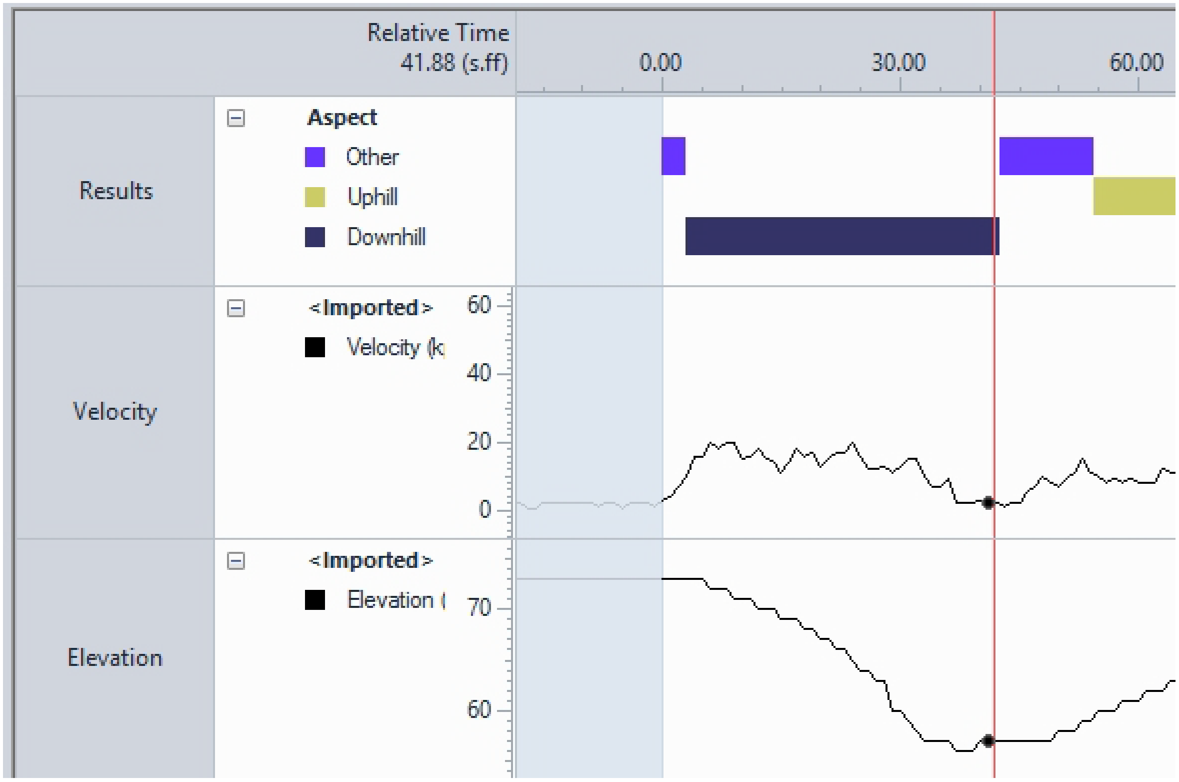
When you play the video, the hairline in the event plot moves synchronous with it. Also imported external data or audio streams play back synchronous.

General notes on visualization

- The visualization shows the data selected in the active data profile.
- The hairline in the plot corresponds to the current position of event log. The hairline is fixed in the middle of the plot area.
- When you select intervals, these are shown on a white background. The non-selected intervals are shown semi-transparent, enabling you to see the excluded data in these intervals.



- Transparent gray areas indicate the time that is not part of the observation. This is also the case for the time that a live observation was suspended.
- When there is an offset between the start of an observation and, for instance, external data, the excluded data are shown in the transparent area.

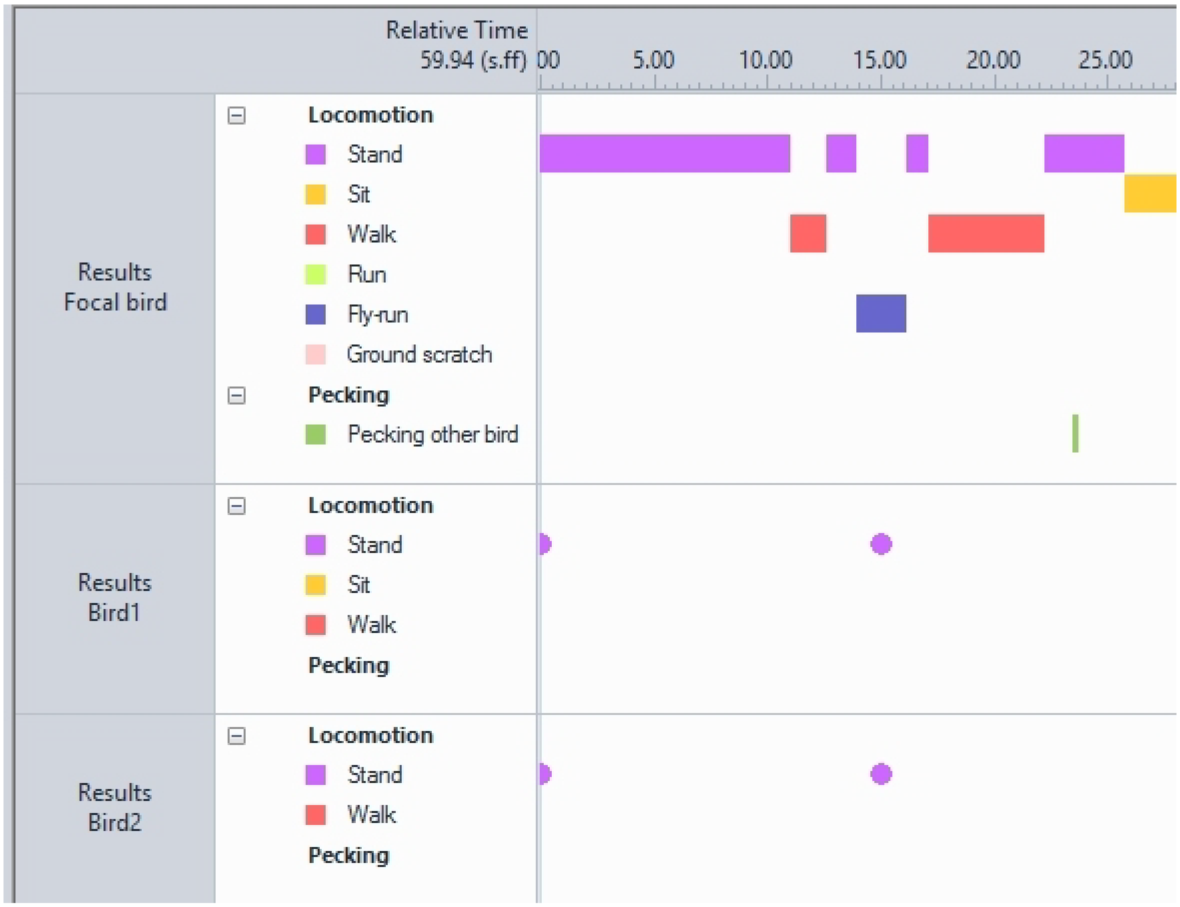


Relative Time
41.88 (s.ff)
0.00
30.00
60.00
Results
Aspect
Other
Uphill
Downhill
Velocity
<Imported>
Velocity (k
60
40
20
0
Elevation
<Imported>
Elevation (
70
60

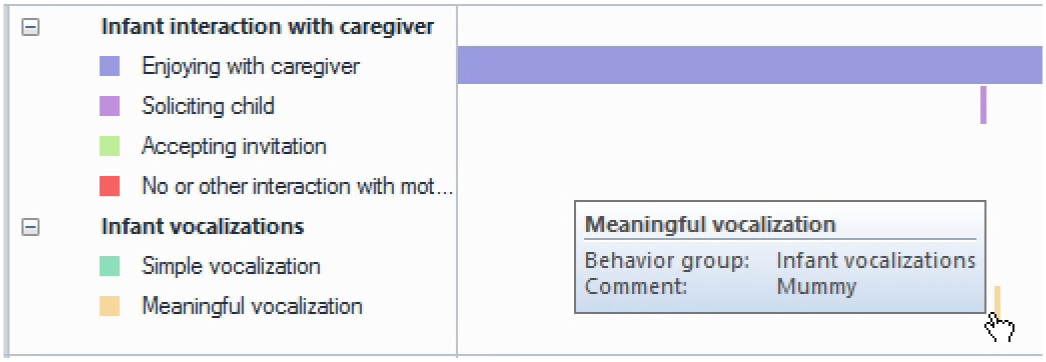
Visualize Events

General

The visualization displays event plots for each event log, subject and observation. These plots contain colored bars for state events, narrow vertical bars for point events and colored dots for Instantaneous Sampling data.

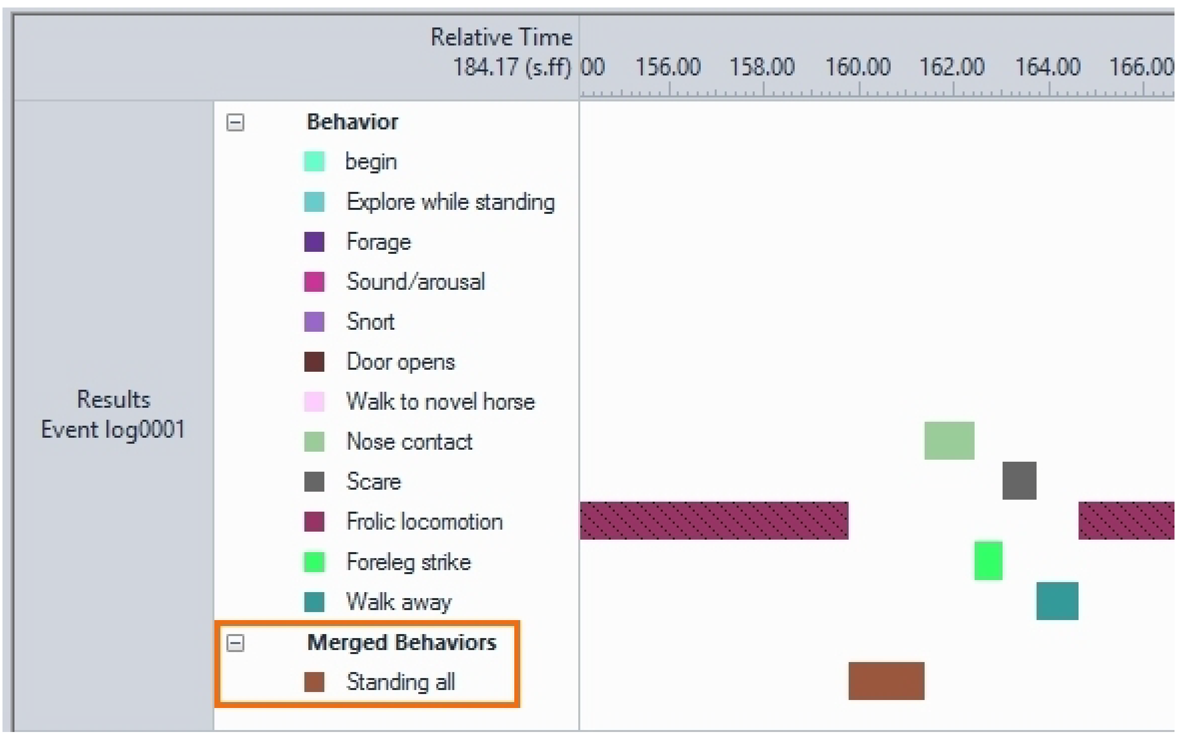


When you hover with your cursor over a colored bar, a tool tip shows the behavior name, the modifiers scored (if applicable), the comment (if free text was entered for that event line) and the duration (for state events).



Merged events

Merged behaviors are visualized under a new group **Merged Behaviors**. The modifiers of merged behaviors are not visualized.

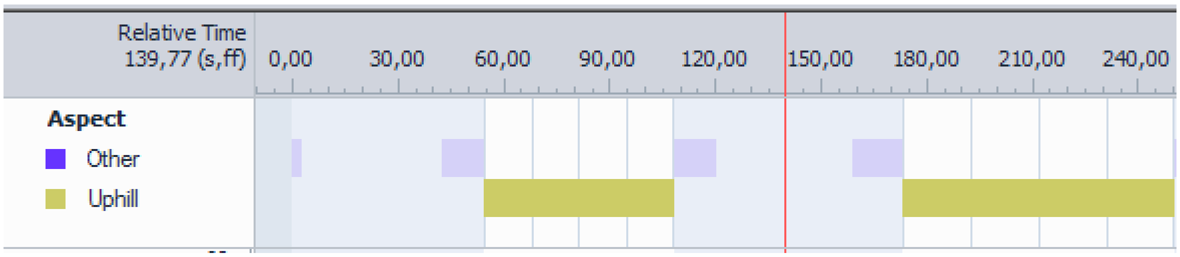


Merged modifiers are visualized under the behavior, with the name of the merged group.

See also Merge data

Time bins

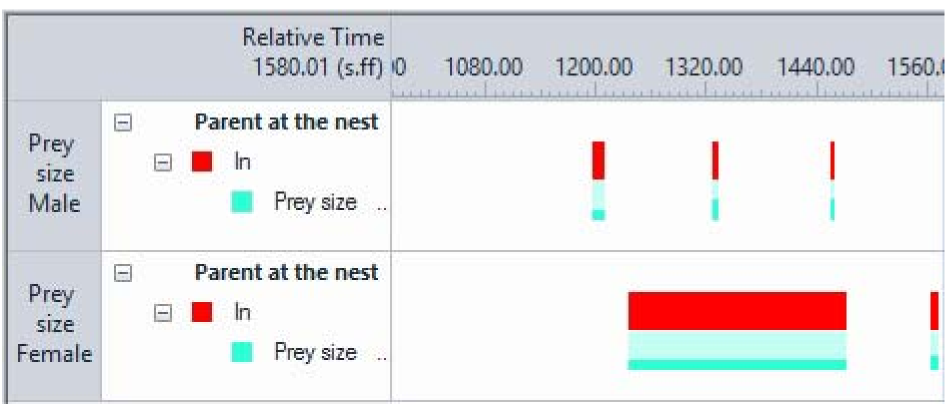
If you defined intervals and time bins, then time bins are visualized per interval.



See also Select Regular Intervals

Numerical modifiers

Numerical modifiers are shown as one colored bar with the name of the modifier group. The height of this bar is 20 pixels. The numerical modifier values are indicated by the height of the darker-colored area within the bar (see the picture below). By moving the hairline over a bar you can see the exact value of a numerical modifier after the modifier name on the Y axis.

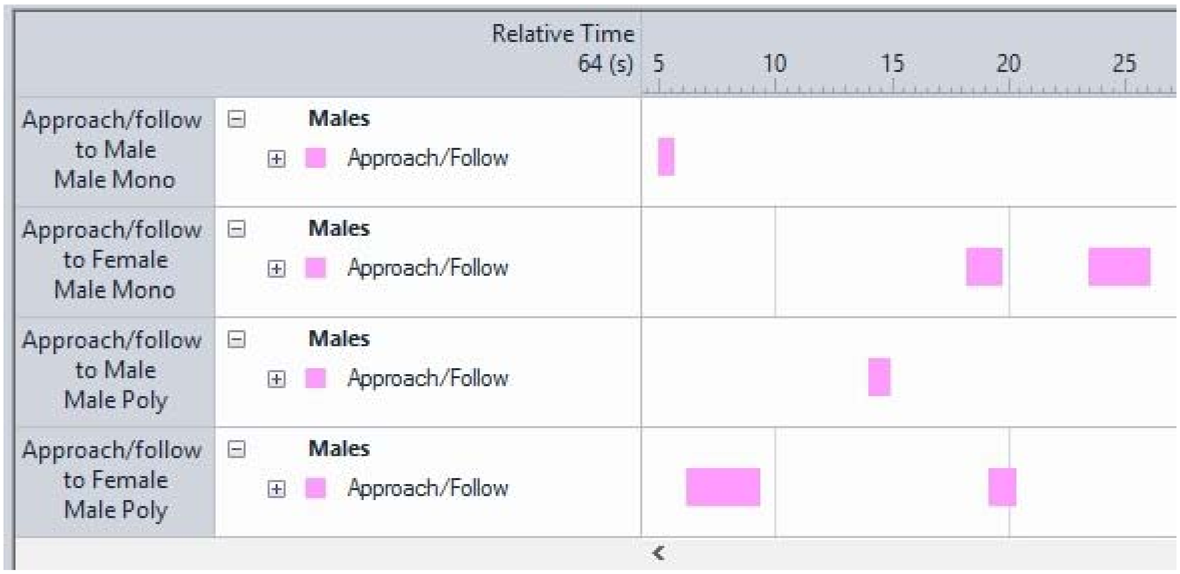


The values that are scored are categorized. For instance, you defined a range from -50 to 50 and coded the following 10 values: -50, -35, -20, -15, -5, 5, 10, 15, 25, 40. Each category gets a height of 2 pixels. So, for the value of -35, a bar height of 4 pixels is used. If you have more than 20 categories, some categories will get the same bar height.

See also Modifiers

Multiple Result containers

If your Data Profile contains more than one Result container, intervals and time bins are shown in the corresponding plot.

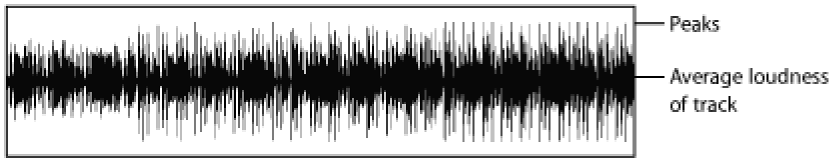


See also Create Groups of Data

Visualize Audio

How audio files are displayed

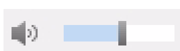
Audio files are visualized as waveforms:



By default, the waveforms are shown as a line plot. To view the audio data points, choose **View Settings** > **Data Points**.

Audio level

With the volume control in the Playback Control window you can adjust the volume for all media files, and mute/unmute all audio streams.

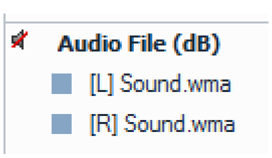


This volume control works independent from the Windows volume control. By default, the volume control is hidden. To show it, choose **Setup** > **Project Settings** > **Playback control options**. Select **Show volume control**.

Audio channels

The audio plot shows two channels (left and right) for stereo signals, and one channel for mono signals. If an audio/video file contains more channels, only the first two are visualized.

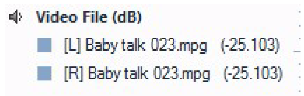
The first audio signal you add to an observation is not muted, additional audio files are muted. This is indicated by the red line through the speaker icon  . Click the speaker icon to unmute it.



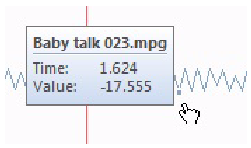
Audio values

You can see the value of a data point in the audio plot in one of the following ways:

- Drag the audio plot to the point you require (also using the Playback control) and check the value next to the video/audio file name. This is the value corresponding to the red hairline.



- With the mouse, hover on a data point. This point becomes bigger and its value appears in a tool tip.



Values are shown in dB (deciBel). These are dBFS, Decibel Full Scale, which is commonly used for digital signals. The average loudness generally determines its overall perceived volume. In the waveform above, the level of average loudness appears as the densest, darkest part around the middle. dBFS is calculated as follows:

dBFS = 20 * Log10 (A_{cur}/A_{max})

where

A_{cur} = the absolute value at the current time point

A_{max} = the maximum possible absolute value. For instance, for 16-bit audio: 215 - 1 = 32767

$dBFS_{min}$ = 20 * Log10 (0/32767) = - ? dB (infinite)

$dBFS_{max}$ = 20 * Log10 (32767/32767) = 0 dB

0 dB represents the highest possible value. All values below the maximum are negative numbers. For instance, for 16-bit audio the lowest possible value is -96 dBFS.

Notes

- Synchronization between audio from video files and the corresponding and video images is within 2 frames (80 ms for PAL, 67 ms for NTSC).
- See Supported audio formats for visualization for the audio formats that can be visualized.
- Audio data are plotted once, even if your Data Profile contains more than one Result container.

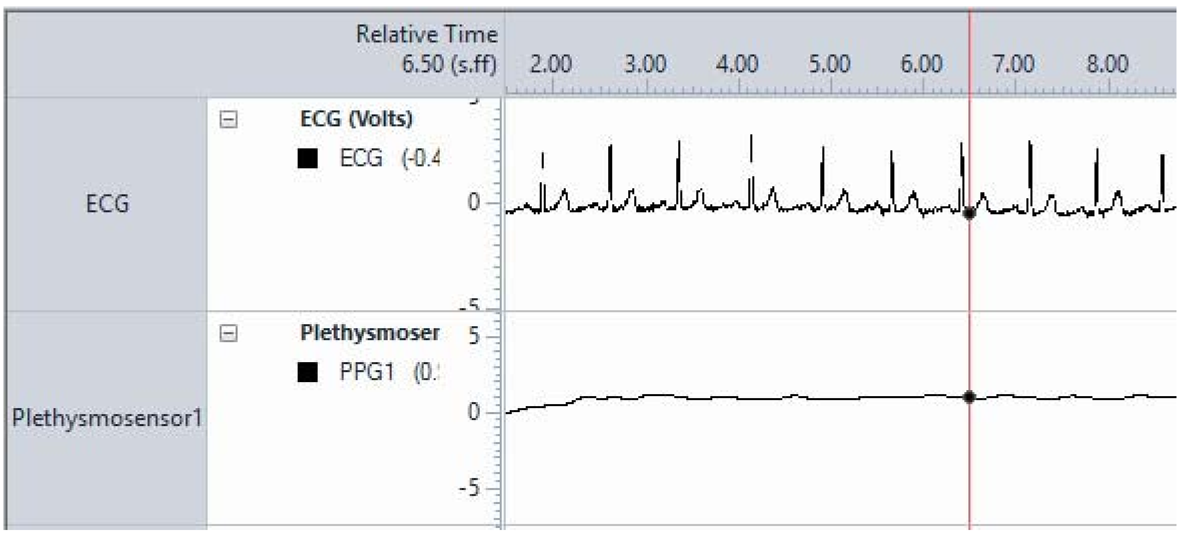
Visualize External Data

Prerequisite

Your license includes the External Data Module.

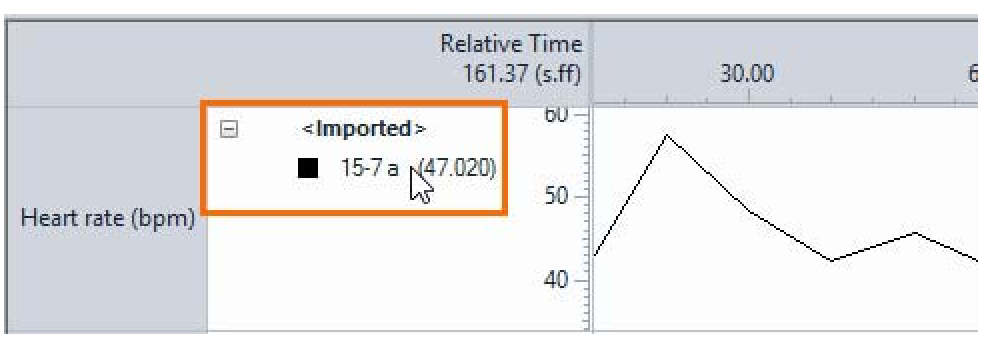
The external data plot

External data imported into The Observer XT are shown in line or waveform-like plots. The imported data consist of discrete samples. In the visualization in The Observer XT, the samples are connected by a line, but this does not mean that the data are interpolated and become continuous. To show the individual data points, choose **View Settings** > **Data Points**.

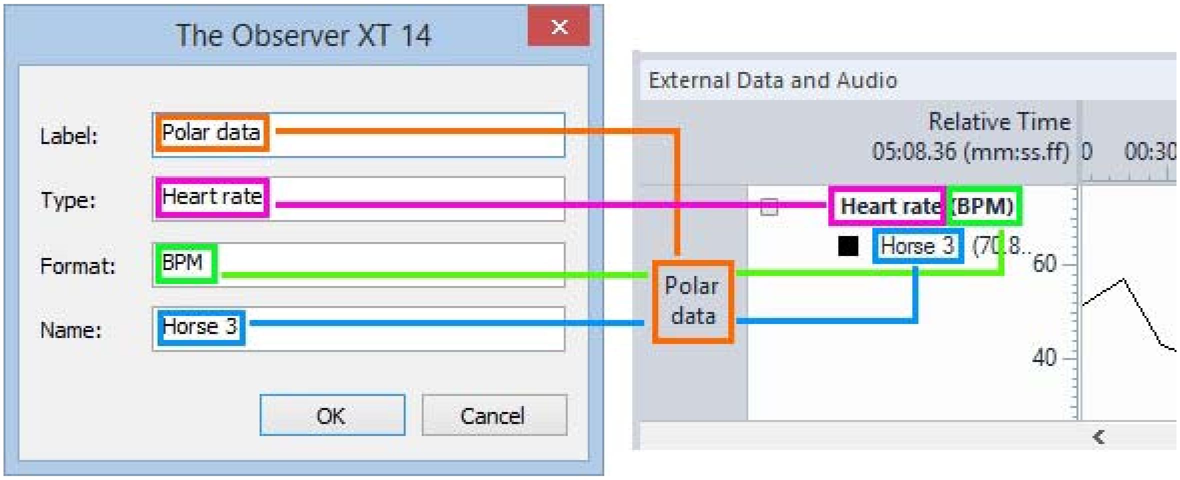


External data labels

Dependent on the device that collects data, the dataset may not display units or other details on the external data stream. To edit these labels in the visualization, click the label in the external data plot.

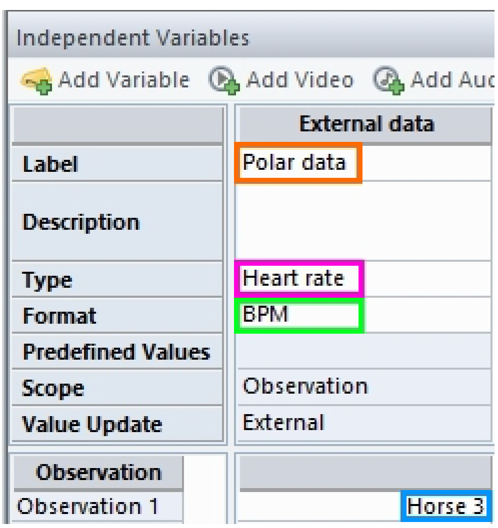


Enter the details in the window that opens. The fields are shown in the Visualization in the following way.



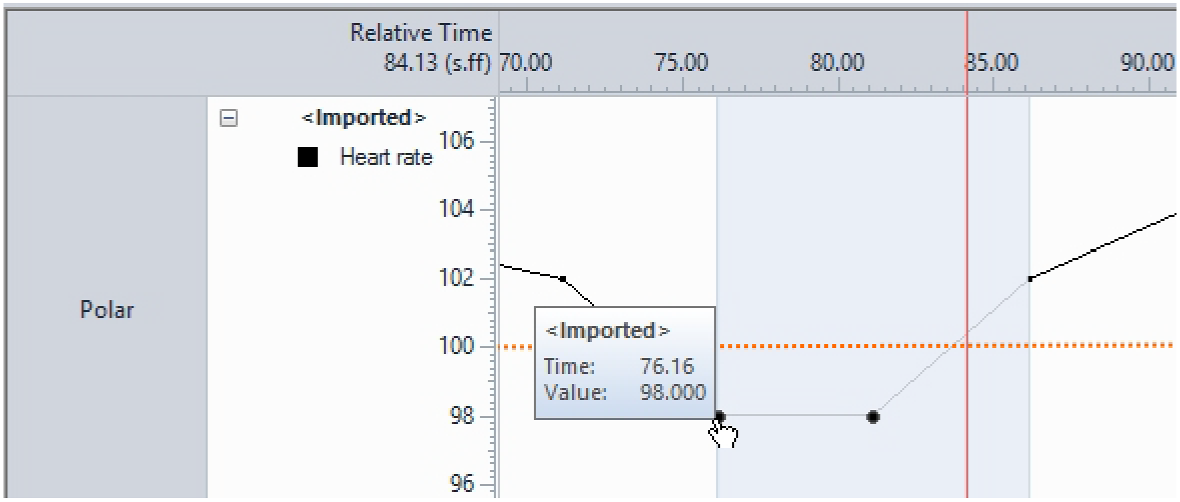
External data labels in Independent Variables list

The fields are also entered in the Independent Variables list. The other way around, if you fill out fields in the Independent Variables list for external data, these are shown in the External Data and Audio plot.



External data plots and data selection

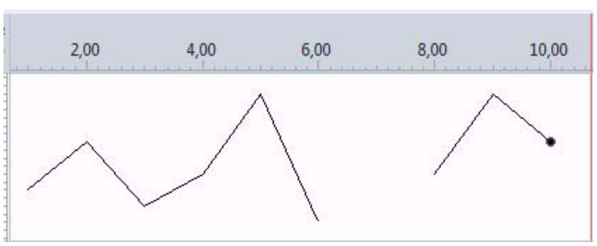
In the example below, the heart rate of the child was acquired using Polar equipment (sample rate: 0.2 Hz). In a data profile, you select intervals by Polar heart rate Higher or equal to 100 bpm. The Figure below shows part of the visualization based on the above-mentioned data profile.



The sample at time stamp 76.16 s is the first one that is below 100 bpm and therefore the first interval ends at that time. Similarly, the sample at time 87 s is the first one above 100 bpm and therefore the second interval starts at that time. A sample at the exact end of an interval is not included in any statistical analysis.

External data plots with missing samples

If your imported data contain missing values, these appear as gaps in the visualization.

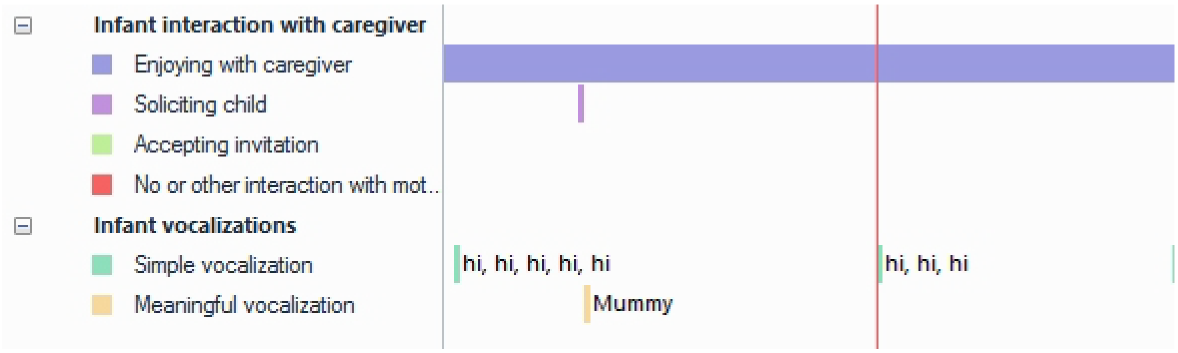


Notes

External data streams are plotted once, even if your Data Profile contains more than one Result container.

Visualize Comments

By default, comments are not shown in the event plot. To visualize them, choose **View Settings** > **Show Comments**. The comments are now shown in the bars of state events, or next to the point events. If a comment is longer than the bar of the state event, or the space between two point events, only part of the comment is shown. Zoom in to show the full comment.



You can visualize observations when it either contains events (or when the active data profile contains events) or when the observation contains external or audio data. So, when your observation only contains comments but also external data, the observation can be visualized. However, the comments themselves are only visualized when they are scored together with an event.

Customize and Manage the Visualization

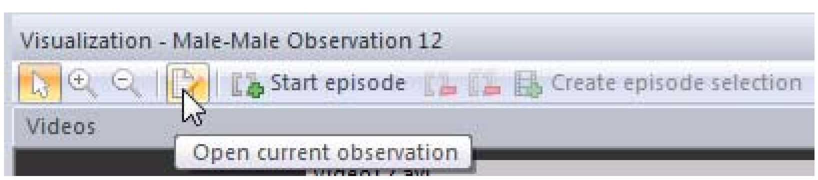
What do you want to do?

- Edit the event data
- Zoom in/out
- Change the time format
- Show and hide events
- Sort plots within a visualization
- Show and hide plots, video, audio, and comments
- Change the colors
- Customize the audio plot
- Export visualization as picture
- Export the visualization as table

Edit the event data

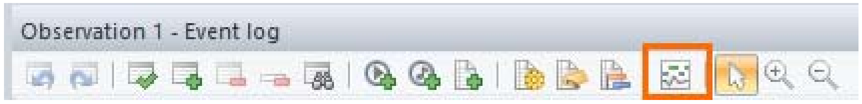
To edit the event data, for example to add events or correct a scoring error, do the following:

1. If you have only one observation visualized, click the **Open current observation** button on the toolbar.

   If you visualized more observations, choose **Observe** > **Observation** > **Open**.

2. Edit the data as explained in Correct Event log errors manually in Carry out an Observation. You can only edit observational data, not external data or audio.
3. To return to the visualization, click the **Visualize current observation** button on the toolbar.



Alternatively choose **Analyze** > **Visualize**.

Zoom in/out

To zoom the plots relative to time, click the Zoom in or Zoom out button on the toolbar.

Click the plot multiple times to reach the desired time zoom level. Every time you click, the plot is enlarged/reduced by a factor of 2. To zoom in/out relative to amplitude (only for external data and audio), click the Y-axis with one of the zoom buttons.

To return to the normal mouse pointer, click the mouse pointer on the toolbar.

To set a specific time span, choose **View Settings** > **Time span** and set the desired length of the X-axis.

Change the time format

To change the Time format for example from absolute to relative, or to change the number of decimals, do the following:

Choose **Setup** > **Project Settings** > **Time formats** in the left pane.

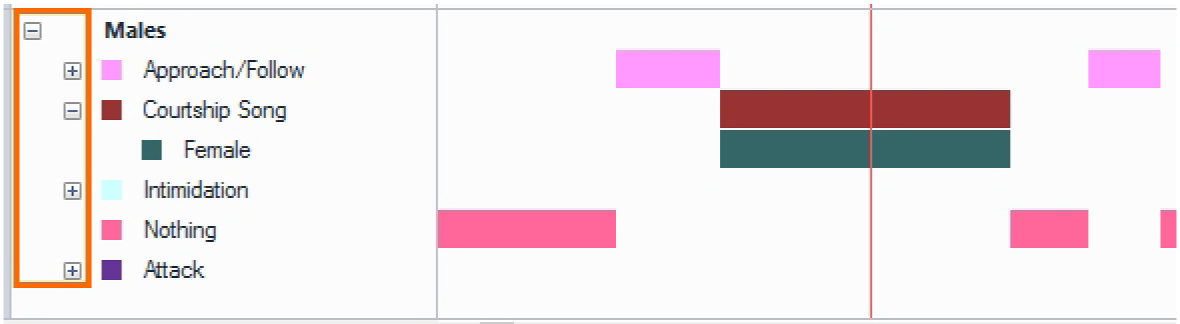
Select the preferred options.

See Time formats

Show and hide events

Events are shown according to the hierarchical structure in the coding scheme. Behavior groups are listed in the left-most column of a plot. By default, all events are shown.

To collapse a behavior group, a behavior or modifiers attached to a behavior, click the – sign in front of the behavior group name, behavior name or modifier name. To expand again, click the + sign.



To remove behaviors from a plot, create a data profile (see Select Data for Analysis) and re-create an event plot.

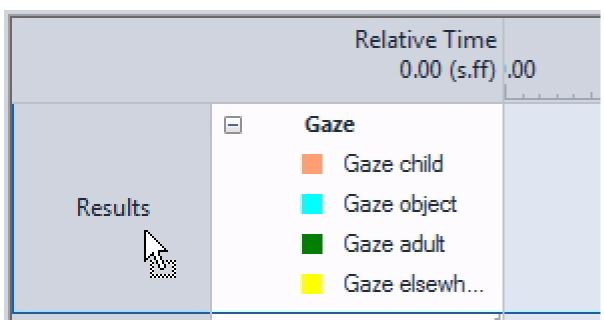
Sort plots

To change the order in which plots are displayed, move them up and down in the visualization.

1. Click the header (left-most cell) of the plot you want to move.

   Result – The border of the plot is highlighted in blue.

2. Drag the plot to the desired position. Release the mouse button to confirm the position.



Show and hide plots, video, audio, and comments

Choose which plots to display with View Settings on the far-right side of the toolbar.

Event plots —Choose **View Settings** > **Events** or double-click the header (the left-most cell of the plot). Choose which event logs to display.

Video — Choose **View Settings** and select or deselect **Videos**.

Audio — Choose **View Settings** and select or deselect **Show Audio**.

Comments — Choose **View Settings** and select or deselect **Show Comments**.

Change the colors

To change the color of events or imported data, click the colored square in front of the appropriate event or data stream. Choose a new color.

Customize the audio plot

To show or hide specific audio streams, choose **View Settings** > **Show audio** and choose the audio streams. To display data points in the plot, choose **View Settings** > **Data Points**. To change the color of the audio plot, click colored square in front of the file name or the audio waveform and choose another color.

Export visualization as picture

Create a screenshot of the visualization.

1. Make sure the part of the visualization you want to export is visible on your screen.
2. Click the camera button on the component toolbar.

3. Choose the location and picture format.
4. Accept the default file name or enter another one and click **OK**.

TIP You can also copy the visualization and paste it into another program.

Export the visualization as table

1. Click the **Export visualization data** button on the Component toolbar.

2. Choose the file format (Excel or text).
3. Choose the observations to export.
4. Select the destination folder and enter the export file name, and click **OK**.

Notes

- If you selected data before creating the visualization, only the time intervals specified in the Data Profiles are exported.

  See Export Observational Data

- It is not possible to export the Event Plot of multiple observations with the **Export visualization data** option if the observations contain external data. Instead, choose **File** > **Export** > **Observational data**.

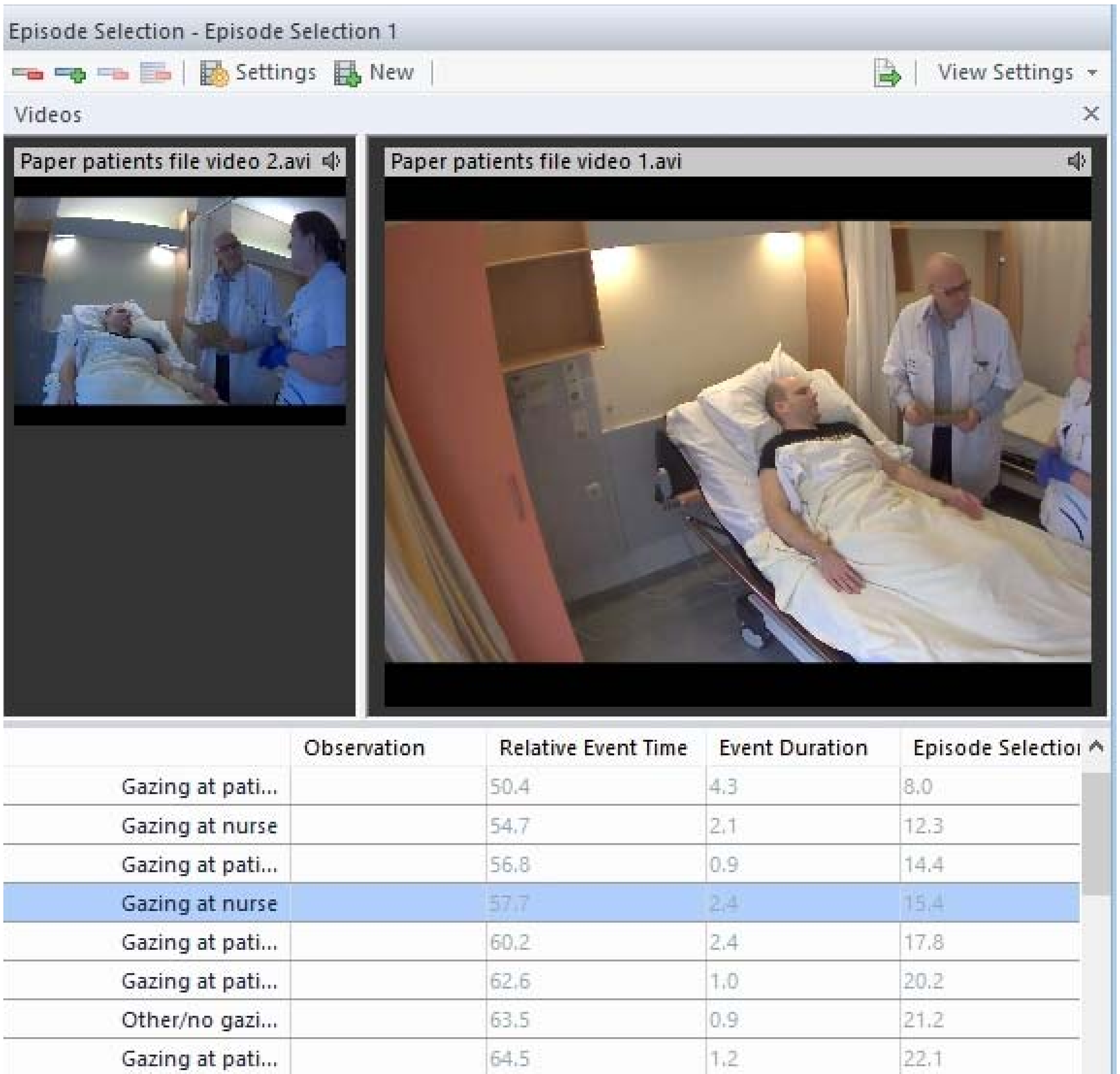
  See Export Observational Data

- It is not possible to edit an event plot if the project is read-only, for example if:

  - The project is stored on a CD/DVD.

  - The project is already open in another Observer XT window (that is, two or more instances of The Observer XT are active at the same time, and one shows the same event plot).

Episode Selection



Main topics

- Four ways to select Episodes
- Subtitles

- Episode Selection Options
- Edit the Episode Selection
- The Episode Selection Columns

Four ways to select Episodes

Aim

To select events or video fragments.

Procedure

Select episodes in one of the following ways:

- Method 1 – Select Events Manually. Create an empty Episode Selection and then select events manually by dragging and dropping them from the Event Log to the Episode Selection.
- Method 2 – Select the entire Event Log.
- Method 3 – Select all Events from a Data Profile in an Episode Selection.
- Method 4 – Select Events in the Visualization.

Notes

- If the observation contains video files, these open when you select events or episodes.
- Audio files associated with an observation are not visualized.
- If you do not see the videos, choose **View Settings** > **Videos** > **Video window**.

  If this does not solve the problem, it may be that The Observer XT does not find the videos. To solve this:

  1. Click the observation name in the Project Explorer.

  2. Select the video file and click **Open**.

  3. Re-open the Episode Selection (click the Episode Selection in the Project Explorer).

- Events within one episode must be from the same observation.

Method 1 – Select Events Manually

Aim

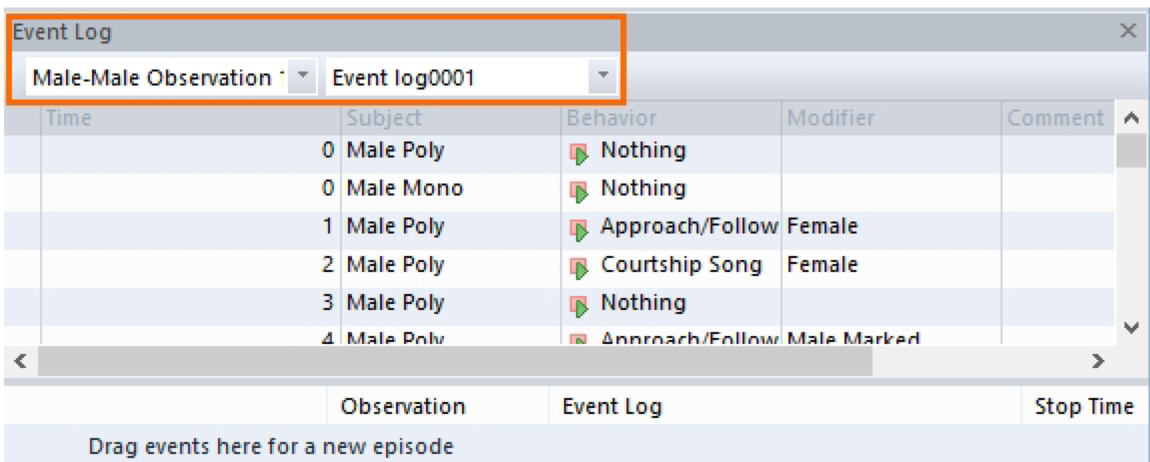
To select events manually in the Event log.

Procedure

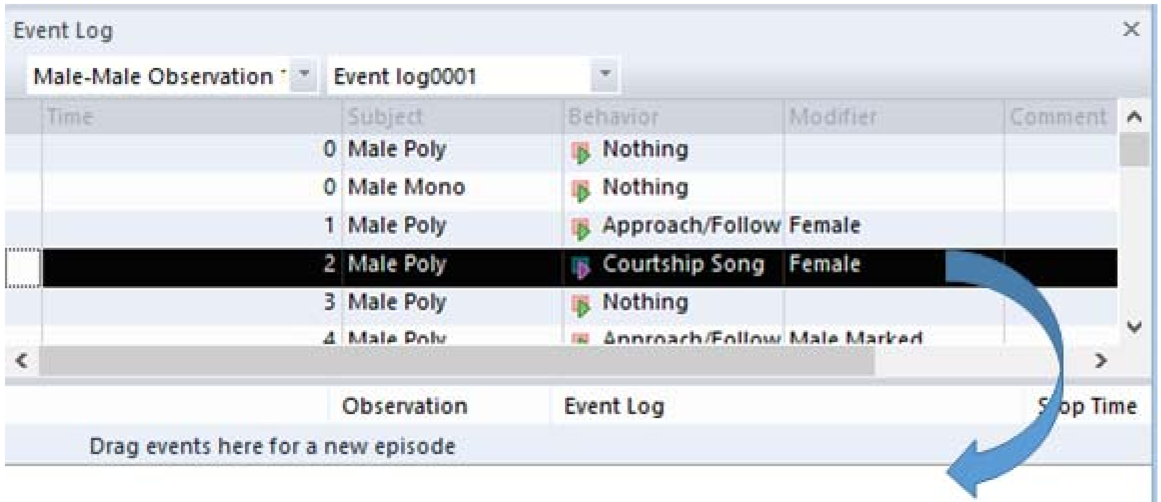
1. Choose **Analyze** > **Episode Selection** > **New**.

   Result – The Event Log pane appears with the empty Episode Selection at the bottom.

2. The Event Log pane has two lists from which you can select an observation and an event log within an observation. Select the correct observation and event log.



3. Select events by dragging and dropping them from the Event Log to the Episode Selection.


Event Log
Male-Male Observation
Event log0001
Time
Subject
Behavior
Modifier
Comment
0 Male Poly Nothing
0 Male Mono Nothing
1 Male Poly Approach/Follow Female
2 Male Poly Courtship Song Female
3 Male Poly Nothing
Observation
Event Log
Drag events here for a new episode

Method 2 – Select the entire Event Log

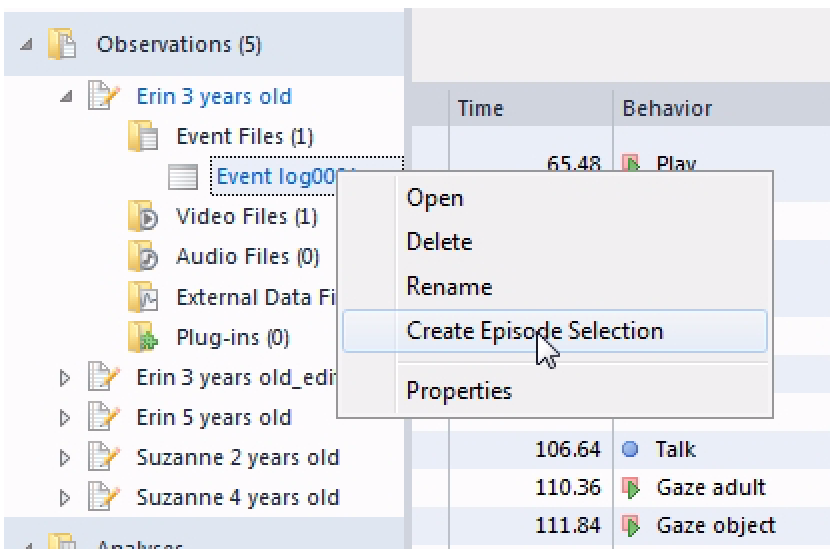
Aim

To select all events from an event log.

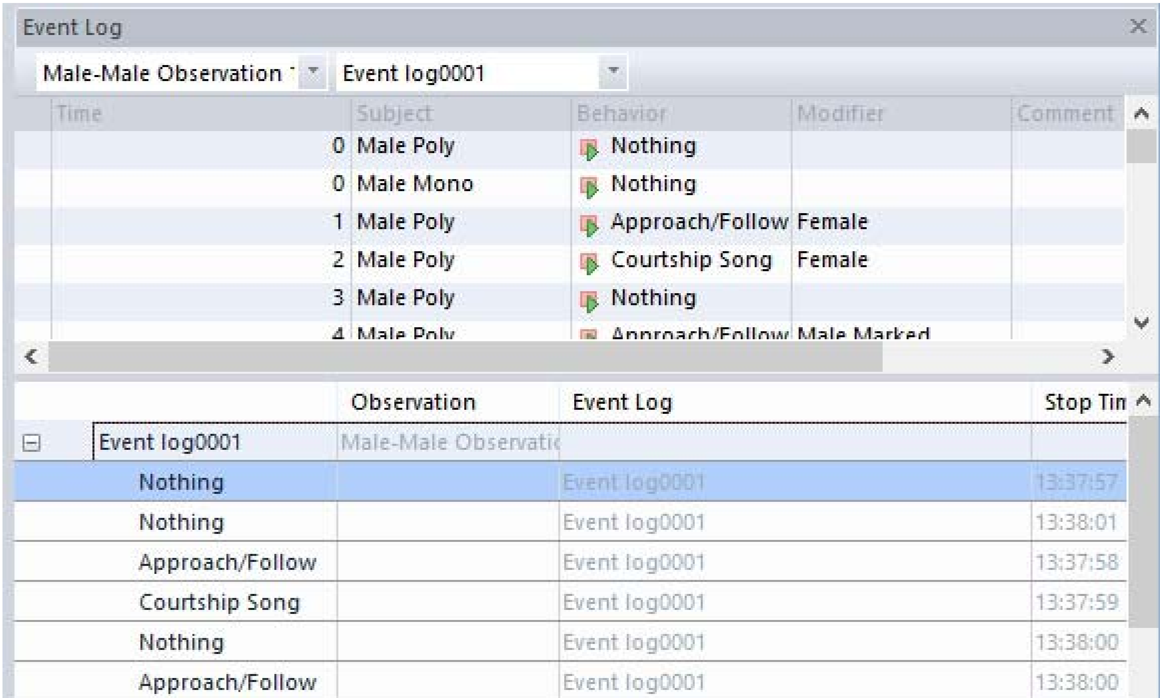
Procedure

In the Project Explorer, right-click the Event Log file you want to create an Episode Selection from, and select **Create Episode Selection**.

You must right-click an event log, not an observation. To find an event log, first open the **Observations** folder in the Project Explorer, then the Observation containing the event log, and finally the **Event Files** folder.



The Episode Selection contains all events in the event log, grouped in an episode. The light blue line is the title of the episode, and is named after the event log.


Event Log
Male-Male Observation
Event log0001
Time
Subject
Behavior
Modifier
Comment
0 Male Poly Nothing
0 Male Mono Nothing
1 Male Poly Approach/Follow Female
2 Male Poly Courtship Song Female
3 Male Poly Nothing
Observation
Event Log
Event log0001
Nothing Event log0001 13:37:57
Nothing Event log0001 13:38:01
Approach/Follow Event log0001 13:37:58
Courtship Song Event log0001 13:37:59
Nothing Event log0001 13:38:00
Approach/Follow Event log0001 13:38:00

Method 3 – Select all Events from a Data Profile in an Episode Selection

Aim

To select events with a Data Profile.

Procedure

1. Click the Data Profile you want to use in the Project Explorer. For more information on data profiles.

   See Select Data for Analysis

2. Choose **Analyze** > **Episode Selection** > **New From Current Data Profile**.

Notes

The events that took place during the Roll-on and Roll-off Time are also included in the Episode Selection.

Episode 1	Male-Male Observati		
Nothing		Event log0001	13:38:12
Attack		Event log0001	13:38:12
Episode 2	Male-Male Observati		
Approach/Follow		Event log0001	13:38:27
Attack		Event log0001	13:38:27
Nothing		Event log0001	13:38:27
Episode 3	Male-Male Observati		
Nothing		Event log0001	13:39:45
Attack		Event log0001	13:39:45
Episode 4	Male-Male Observati		
Nothing		Event log0001	13:39:34
Attack		Event log0001	13:39:34
Episode 5	Male-Male Observati		
Nothing		Event log0001	13:38:15
Attack		Event log0001	13:38:15

Data from different observations are placed in separate episodes (indicated by light-blue title rows). Data from different intervals (see Select Intervals) are also placed in separate episodes. If the same event is included in two or more intervals, the event is repeated in each episode.

Method 4 – Select Events in the Visualization

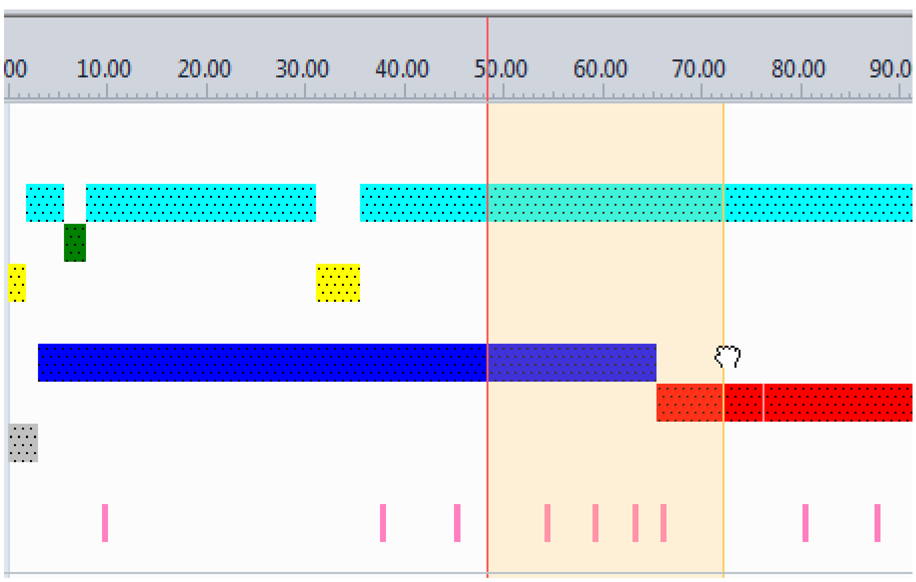
Aim

To select episodes in the videos or Time-Event plots. Each episode selected with this method represents one video segment from one observation. Episodes defined with this method cannot overlap.

Procedure

1. In the visualization (**Analyze** > **Visualize Data**), scroll the video to the start of the Episode. Then click the **Start episode** button on the toolbar.

2. Move the slider, or click and drag the Event plot. The selected area is shown in orange in the Event plot.



3. When you made your selection, click the **Stop episode** button on the toolbar.

4. Optionally select more areas of interest. When done, click the **Create episode selection** button on the toolbar.

The **Episode Selection** window now contains the events or event fragments in the selected time intervals.

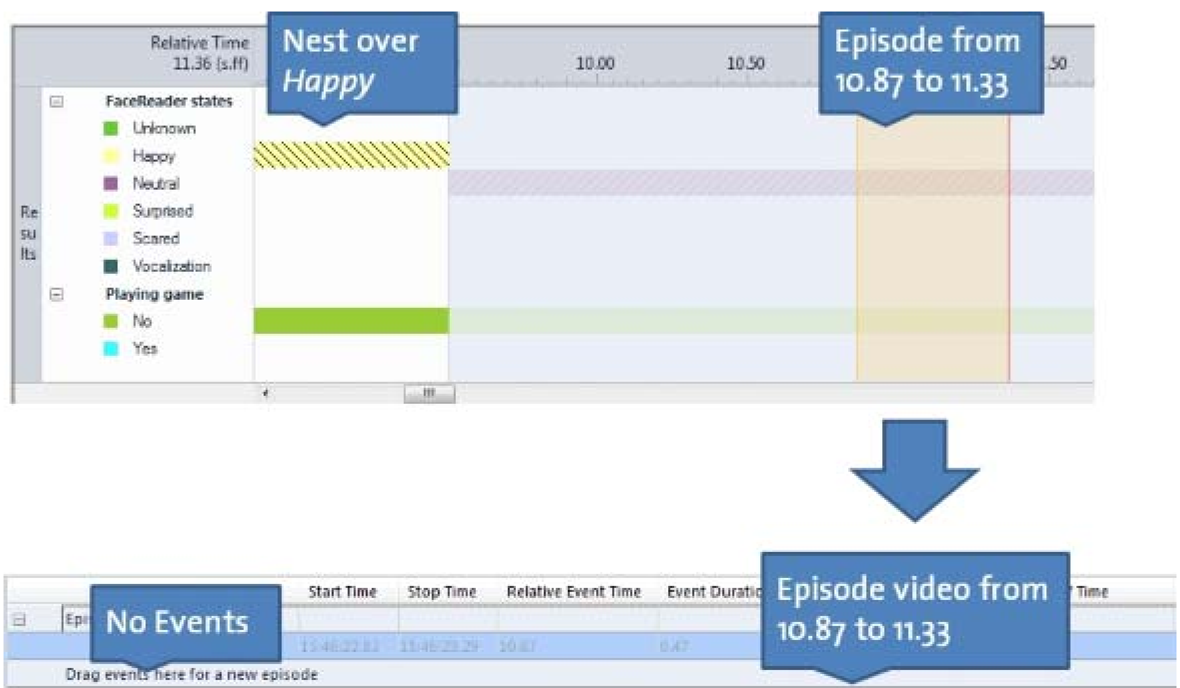
Notes

Partial events

A big difference between this method and the three other methods is that with this method you do not necessarily select entire events. You can also select episodes that start or stop halfway an event. With the other three methods it is only possible to select entire events.

Selecting episodes outside data selection criteria

If you created a data profile, the data that fall outside the selection criteria are displayed in gray in the visualization. If you select Episodes that fall (partly) within the area in gray and create an Episode Selection, the video of the entire interval is selected. However, the events that do not meet the selection criteria are not included in the Episode Selection. See also the figure below.



Removing Episodes in Visualization

To remove the latest selected episode click the **Remove episode** button on the toolbar.

To remove all selected, click the **Remove all episodes** button on the toolbar.

IMPORTANT All selected episodes are removed when you exit the Visualization.

Subtitles

Aim

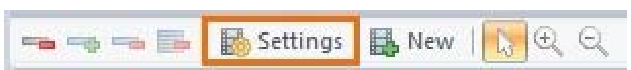
To change the default subtitles for the Episode. By default, each event is shown as a subtitle.

Prerequisites

You created an Episode Selection.

Procedure

1. Choose **Analyze** > **Episode Selection** > **Settings**, or click the **Settings** button on the toolbar.

2. Select what to display as subtitles on the Subtitles tab:

   Behavior name – The content of the **Behavior** column.

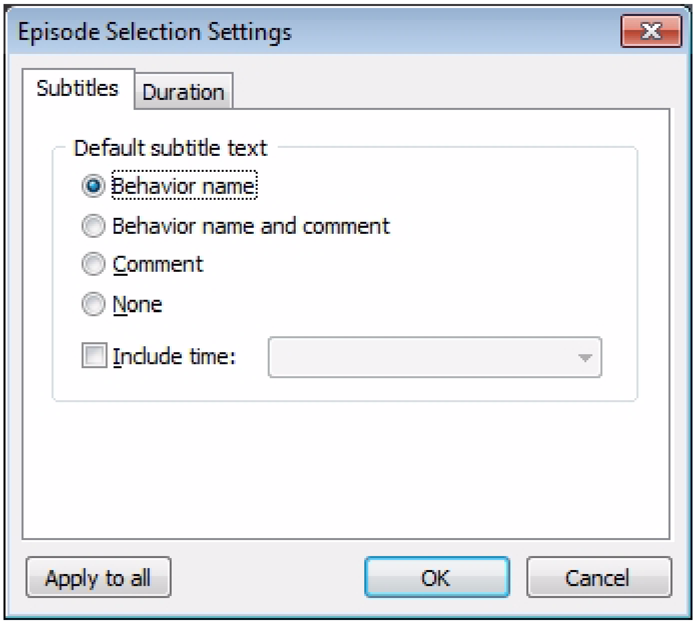
   Behavior name and comment – The content of both the **Behavior** and **Comment** columns.

   Comment – The text in the **Comment** column for each event.

   None – To not display subtitles.

   Include time – To display the time of the event/transition. Either select the Absolute time, or the Relative time, which is the time from the start of the event log.

   TIP To change the time format, do so in the Project Settings. See Time formats



Apply to all – Click this button to select the changes for all events in the Episode Selection. If you do not click **Apply to all**, the changes will only apply to events you later add to the Episode Selection.

Subtitle duration

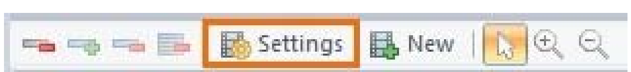
Aim

To change the subtitle duration.

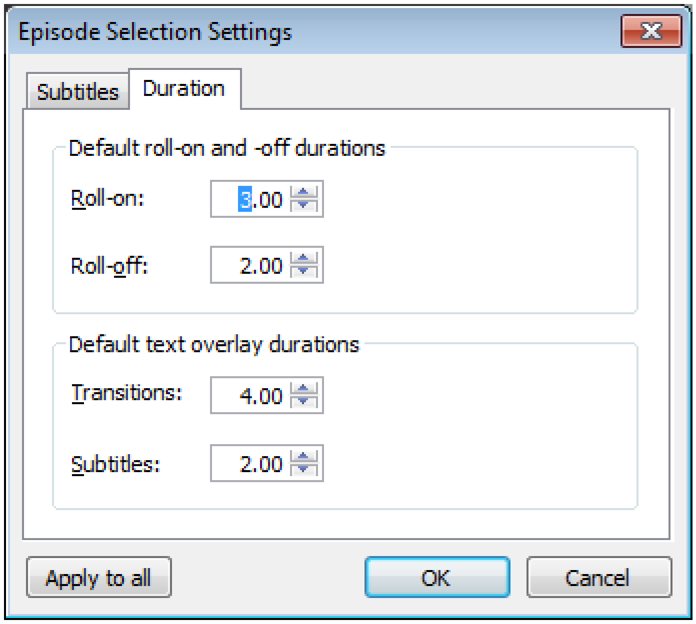
Subtitles are by default shown for 5 seconds, or less if the event is shorter, with a 3 s Roll-on time and 2 s Roll-off time.

Procedure

1. Choose **Analyze** > **Episode Selection** > **Settings**, or click the **Settings** button on the toolbar.



2. Open the **Duration** tab.



3. Set the duration in the **Subtitles** field. The default value is 5.0 s.

   Please note that the duration of a subtitle cannot exceed the duration of the event plus Roll-off time.

   See Roll-on and Roll-off Time

   Example 1 – a state event has a duration of 5 seconds, and a Roll-off time of 2 seconds. The subtitle will be shown for maximally 7 seconds.

   Example 2 – a state event has a duration of 20 seconds. If you set the Subtitles duration to 10 seconds, it will be shown for 10 seconds, independent of the duration of the Roll-off time.

   Example 3 – a point event has a Roll-off time of 2 seconds. The subtitle will be shown for 2 seconds. Increase the Roll-off time to increase the subtitle duration.

4. Click **Apply to all** to select the changes for all events in the Episode Selection. If you do not click **Apply to all**, the changes will only apply to events you later add to the Episode Selection.

Transitions

Aim

Transitions separate episodes. Transitions are shown as a blue row in the Episode Selection. There is also a transition at the start of the Episode Selection. In the example below, the Episode Selection contains five transitions.

⊟	Episode 1	Male-Male Observati		
	Nothing		Event log0001	13:38:12
	Attack		Event log0001	13:38:12
⊟	Episode 2	Male-Male Observati		
	Approach/Follow		Event log0001	13:38:27
	Attack		Event log0001	13:38:27
	Nothing		Event log0001	13:38:27
⊟	Episode 3	Male-Male Observati		
	Nothing		Event log0001	13:39:45
	Attack		Event log0001	13:39:45
⊟	Episode 4	Male-Male Observati		
	Nothing		Event log0001	13:39:34
	Attack		Event log0001	13:39:34
⊟	Episode 5	Male-Male Observati		
	Nothing		Event log0001	13:38:15
	Attack		Event log0001	13:38:15

Prerequisite

You created an Episode Selection.

Procedure

1. Click the first event line in the Episode Selection that you want to have in the episode.
2. Click the **Insert transition** button on the toolbar.

Result – A light-blue transition row is added immediately before the selected event.

Transition duration

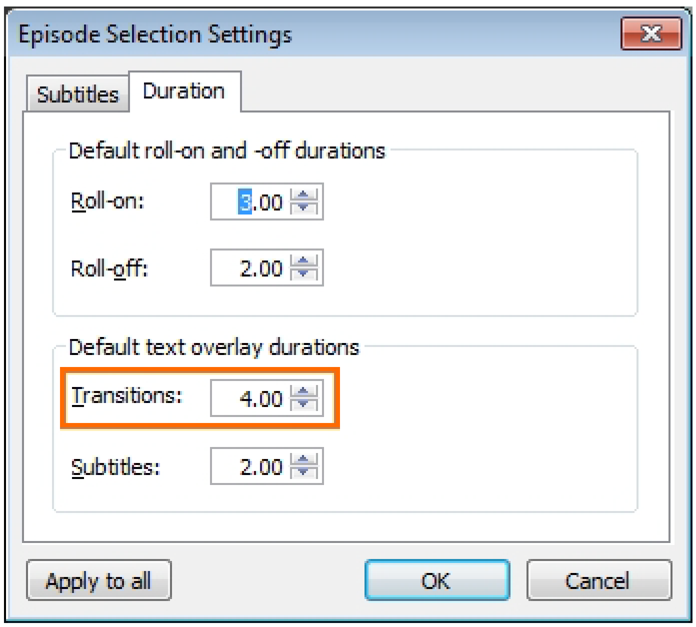
Aim

To change default transition duration of 4 seconds.

Procedure

1. Click the **Settings** button on the toolbar, or choose **Analyze** > **Episode Selection** > **Settings**.

2. Open the **Duration** tab.



3. Change the time in the **Transitions** field.
4. Optionally, change the Roll-on and Roll-off Time
5. Click **Apply to all** to select the changes for all events in the Episode Selection. If you do not click **Apply to all**, the changes will only apply to events you later add to the Episode Selection.

Roll-on and Roll-off Time

Aim

Roll-on and Roll-off times add some time before and after the events in an Episode Selection.

Prerequisite

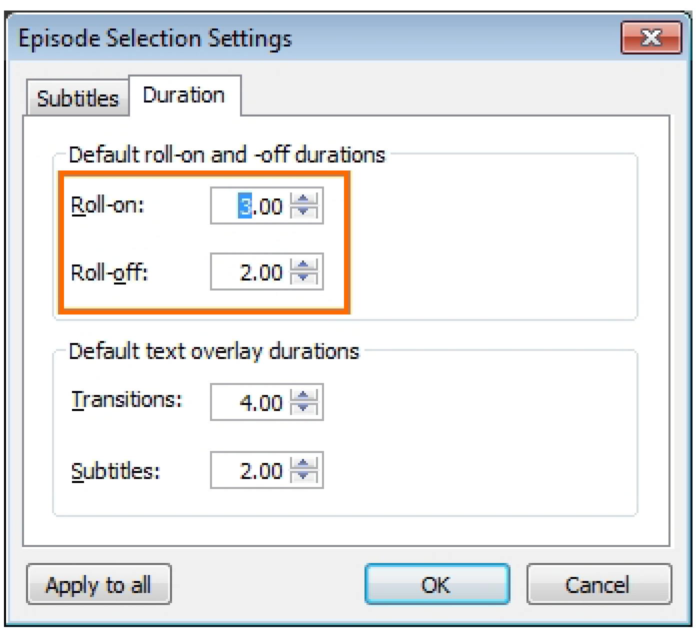
You created an Episode Selection

Procedure for a single event

You can set the times for each event individually in the **Roll-on** and **Roll-off** columns in the Episode Selection.

Procedure for all events

1. Click the **Settings** button on the toolbar, or choose **Analyze** > **Episode Selection** > **Settings**.
2. Click the **Duration** tab.
3. Change the time in the **Roll-on**, or **Roll-off** field.



4. Click **Apply to all** to select the changes for all events in the Episode Selection. If you do not click **Apply to all**, the changes will only apply to events you later add to the Episode Selection.

Episode Selection Options

What do you want to do?

- Select the video
- Play the episodes
- Play a Point event
- Save an Episode Selection
- Export the Episode Selection

Select the video

If the observation is associated with a video file, this video is shown in the Videos window of the Episode Selection view. If the observation contains multiple video files, the ones that are associated with the selected episodes are all shown in the Videos window.

Play the episodes

1. Make sure that with **View Settings** on the Component toolbar, the option, **Videos** > **Video Window** is selected. Also select **Playback Control** and (if applicable) **External Data**.
2. Right-click the line of the event where you want to start, and select **Play**. Segments of video and external data are played, synchronized with the events highlighted in the Episode Selection.
3. Optionally, jump to the next/previous event in the Episode Selection with the step forward/backward buttons.

   For information about other Playback Control buttons, see The Playback control window

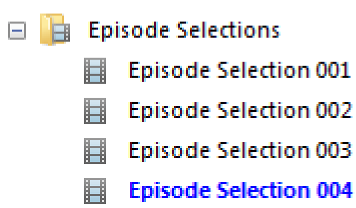
Play a Point event

By definition, events scored with Instantaneous Sampling have no duration (see Observation method). By default, each event has a Roll-On Time of 3.0 seconds and Roll-Off Time of 2.0 seconds. This means that three seconds of video are played before the event and two seconds after it. When you want to play a point event, make sure that its Roll-On Time or Roll-Off Time is > 0 (if both are zero, they are shown in red).

See Roll-on and Roll-off Time

Save an Episode Selection

The Episode Selection is saved as soon as it is created. It is named as Episode Selection N where N is an incremental number. The Episode Selections are shown in the Episode Selections folder in the Project Explorer.



To rename or delete an Episode Selection

To rename an Episode Selection, right-click it and select **Rename**. To delete an Episode Selection, right-click the Episode Selections folder and select **Delete**. Select the episode selection and click **OK**.

When you save your project, each Episode Selection is saved to a file with extension *.esr, within your project's Episode Selections folder.

Export the Episode Selection

You can export Episode Selections to (text) files. If your observation includes external data, these are exported together with the Episode Selection in separate files.

To export the currently active Episode Selection, click the **Export Selected Data** button on the toolbar.

To export all Episode Selections, choose **Analyze** > **Episode Selection** > **Export**.

Enter a File base name, choose where to save the file, the file type and list separator and click **Export**. Episode Selections are saved as <base name> - Episode Selection 1.txt, <base name> - Episode Selection 2.txt, etc. Associated physiological data are saved as <base name> - Episode Selection 1 - physiological data 001.txt, etc.

If you have set Roll-on and Roll-off Times, the external data samples within these intervals are also exported.

Edit the Episode Selection

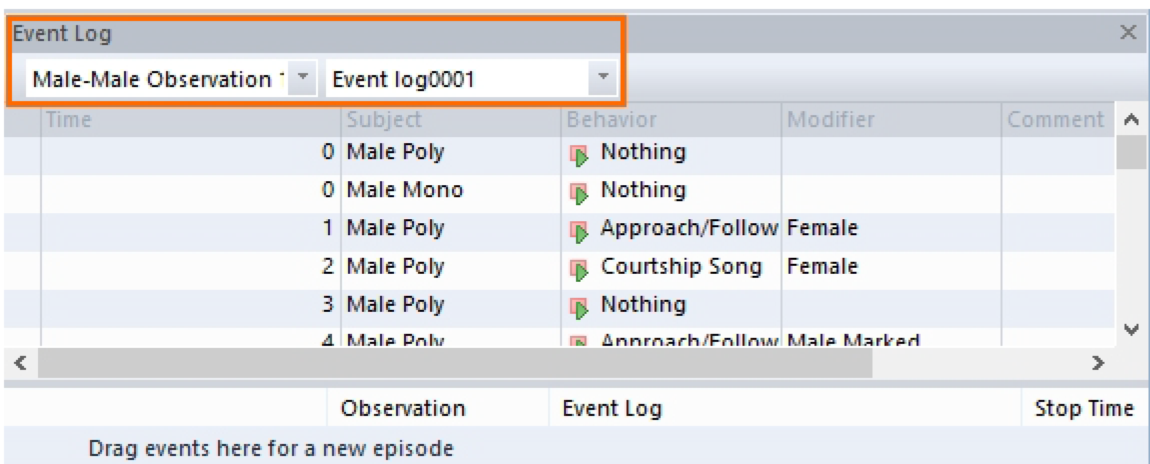
What do you want to edit?

- Events within Episode
- Episode Selection
- Episodes
- Transitions

Events within Episode

Add events to an episode

1. In the Event Log pane of the Episode Selection window, select an observation from the first list and an event log from the second (if the selected observation contains more than one event log).



2. Drag events to the Episode Selection pane.

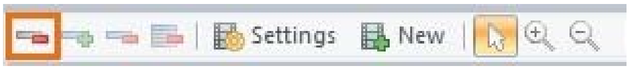
   For state events with start and stop lines, you do not need to drag and drop the stop line. Just drag the start line (with the green triangle next to the behavior name). The information about the duration of that state is copied anyway.

Move an event to another episode

To move an event to another episode, select it and drag it to the required position. You cannot move an event to a new position within the same episode, because events in an episode are ordered chronologically.

Remove events from an episode

To remove events, select them and click the **Delete event** button on the toolbar.



Removing events from the Episode Selection does not affect events in the Event Log pane.

Edit the cell contents

1. Double-click the cell you want to edit.
2. Enter text, or, for time/duration cells, click one of the numbers (s.dd) and use the arrow keys to change the value.

Note

Only columns that are not grayed out can be edited.

Episode Selection

Sort Episode Selection columns

To sort the columns of the Episode Selection, click a column header and drag the column to another position.

Episodes

Rename an episode

To rename the Episode title row, double-click the name and enter the new text.

Split episodes

To split an episode, Insert a transition.

See Transitions

Move an episode

To move an entire episode, select the transition title and drag it to the required position. To move an episode to the beginning of the Episode Selection, drag its title row to the header row of the Episode Selection. To move an episode to the end of the Episode Selection, drag its title row to the last transition title row in the Episode Selection.

Transitions

Delete a transition

To delete a transition, select the transition row and click the **Delete transition** button on the toolbar. The events in the episode are moved to the previous episode.

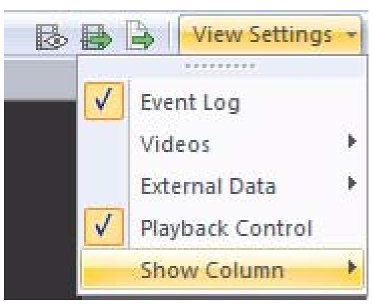
Delete an episode

To delete an entire episode, select the transition row and click the **Delete episode** button on the toolbar.

Customize the Episode Selection window

Optionally, customize the Episode Selection window by choosing the panes or columns to display. To do so:

1. Choose **View Settings** at the far-right side of your screen.



2. Select what to display:

   Event Log – The Event Log pane.

   Videos – The Videos window. If your Episode Selection contains multiple videos, click **Videos** and select one the following options:

   - **Show all videos per Episode** – To display all videos that are associated with the events in the episode. The video that is selected in the **Video** column for that episode is shown in the middle of the **Videos** window. The other videos are shown on the left side of the Videos window.

- **Show videos selected for Episode video only** – Only the video that is selected in the **Video** column for that episode is shown in the **Videos** window.

External Data – This option is only available if you have the External Data Module. To display the External Data window, choose **External Data** > **External Data Window**. To choose some external data streams, choose **External Data** > **Show External data** and select which streams to display.

The areas in the External Data window with a white background show the data which are included in the Episode Selection. The blue areas show the data which are excluded.

You cannot display different external data sets in separate windows.

Playback Control – To display the The Playback control window

Show column – Select which columns you want to show in the Event Log or Episode Selection. Alternatively, right-click a column header and select Show column.

For more information on each column, see The Episode Selection Columns

The Episode Selection Columns

The Episode Selection contains the following columns. Dependent on your license, some columns may not be available.

- **Observation** – The name of the observation the event was scored in.
- **Event Log** – The name of the event log data file in which the event was stored.
- **Episode Selection Time** – The start time of the event relative to the start of the Episode Selection. This includes the duration of the first transition at the start of the Episode Selection (see the time in the subtitle duration column in the transition row).
- **Start Time** – The start time of the event.
- **Stop Time** – The stop time of the event.
- **Relative Event Time** – The start time of the event relative to the start of the Event log.
- **Event Duration** – The duration of the event. For point events and events scored with Instantaneous Sampling, the duration is zero.
- **Subject** – The Subject in the event line.
- **Behavior** – The Behavior in the event line.
- **Modifier** – The Modifier in the event line.
- **Comment** – The comment in the event line.
- **Video** (editable) – The name of the video file associated with the observation. If the episode is associated with more videos, the **Video** cell in the episode title row contains a list with the available videos. You can only select one video per episode.
- **Roll-On Time** (editable) – The time that playback starts before the actual start of the event.
- **Roll-Off Time** (editable) – The time that playback continues after the stop of the event.
- **Subtitle Text** (editable) – The text that will be used as subtitle. You can specify a text for each event or transition. By default, it shows the name of the Behavior.
- **Subtitle Duration** (editable) – The duration of the subtitle text of events and transitions.

Calculate Statistics

Calculate | Settings | Layout | Statistics

	Behaviors				
Statistics		Mean duration		Total duration	
Result Co		Paper patients file	Tablet patients file	Paper patients file	Tablet patients file
	Businesslike open question	3.827	7.564	11.481	7.564
	Business closed question	4.150	9.380	12.450	18.760
	Empathic open question	2.966	-	5.933	-
	Humming	0.400	0.685	0.400	2.739
	Wrapping up	9.649	3.965	19.299	3.965
	Explaining	7.985	6.212	63.880	49.694
	Other communication	2.759	2.340	74.492	53.817
	No communication	1.959	2.689	31.342	77.968

Main topics

- Introduction
- General Procedure
- The Statistics Result
- Group Elements
- Analyze Modifiers
- Customize the Results
- Statistics in Detail
- Analyze Observations Containing Multiple Event Logs

Introduction

Descriptive statistics

The Observer XT has a large number of descriptive statistics that give a full numerical overview of your data.

For any analysis, you can restrict the data to analyze in a data profile (see Select Data for Analysis). If you use the default data profile with all data, The Observer XT calculates statistics on all observations in your project. It is therefore important to select the correct data profile before you carry out any analysis.

The Observer XT has the following descriptive analysis types:

Behavior Analysis

To calculate statistics for events scored in the observations, like the duration or number of occurrences of an event.

See Statistics for Behavior Analysis in Detail for a detailed description.

> Example 1 – The average duration and standard deviation of the behavior *Play* for the subject *Child*.
>
> Example 2 – The number or times the subject *Test participant 1* requested help.

Numerical Analysis

To calculate statistics for numerical modifiers and external data in the observation, like the average value.

See Statistics for Numerical Analysis in Detail for a detailed description.

- Example 1 – Calculate the average value of the numerical modifier *Speed*.
- Example 2 – Calculate the average heart rate of the test participant.

To analyze numerical modifiers as events, for example to calculate their duration or frequency, carry out a Behavior analysis, instead of a Numerical analysis.

See To analyze numerical modifiers

See also Analyze Modifiers

General Procedure

Aim

To calculate descriptive statistics for your observations.

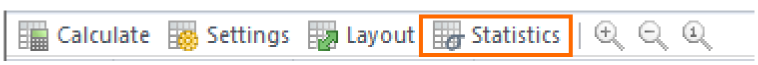
Prerequisite

You carried out at least one observation.

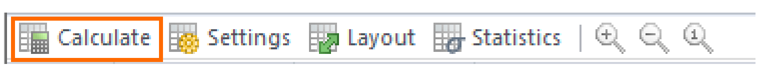
Procedure

1. Select the data profile specifying the data you want to analyze. To do so, click it in the Project Explorer.
2. Choose **Analyze** > **Behavior Analysis** or **Numerical Analysis** > **New**.

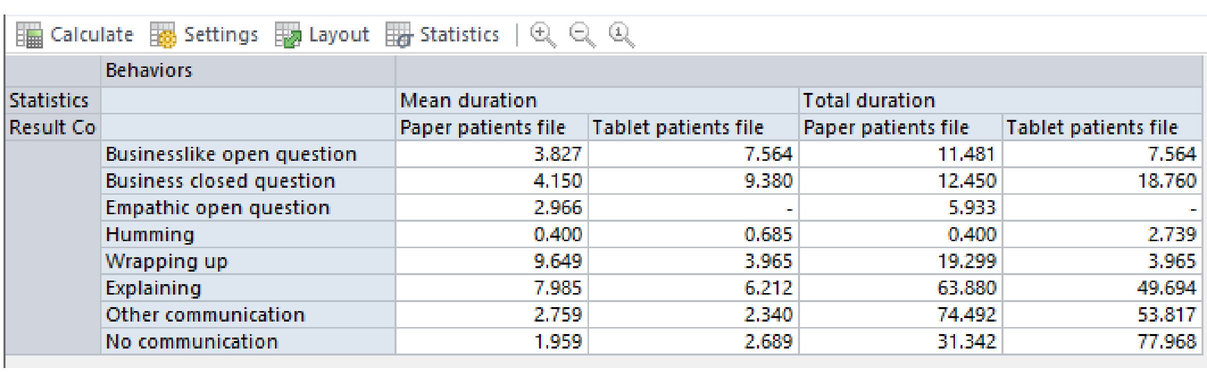
   A table appears with question marks.
3. Click the **Statistics** button on the toolbar and select the statistics.



4. Click the **Calculate** button on the toolbar.



The Statistics Result table appears.



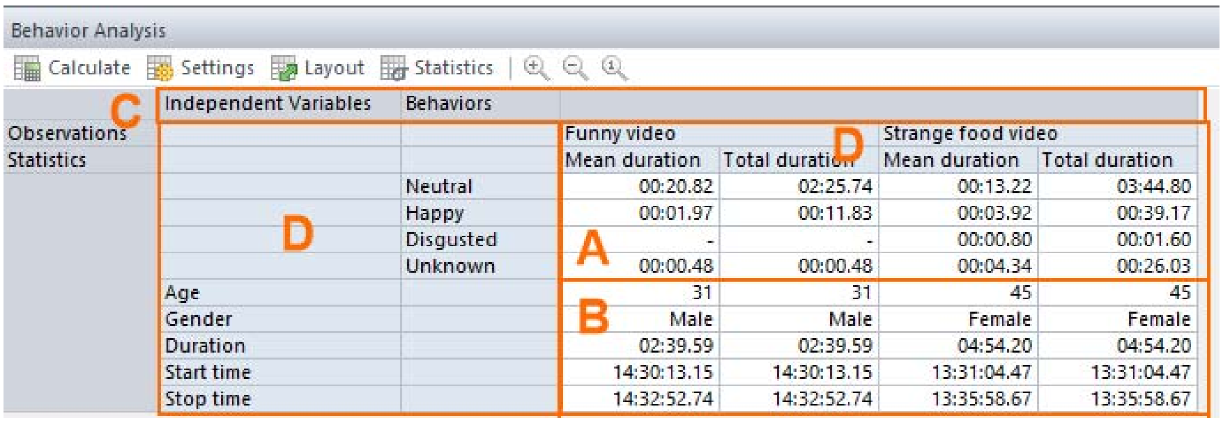
	Behaviors				
Statistics		Mean duration		Total duration	
Result Co		Paper patients file	Tablet patients file	Paper patients file	Tablet patients file
	Businesslike open question	3.827	7.564	11.481	7.564
	Business closed question	4.150	9.380	12.450	18.760
	Empathic open question	2.966	-	5.933	-
	Humming	0.400	0.685	0.400	2.739
	Wrapping up	9.649	3.965	19.299	3.965
	Explaining	7.985	6.212	63.880	49.694
	Other communication	2.759	2.340	74.492	53.817
	No communication	1.959	2.689	31.342	77.968

The Statistics Result

What is shown in the statistics results?

In the statistic result table, you can distinguish the following groups of cells. The exact position depends on the choices you made in the **Layout** window.

See Customize the Results



	Independent Variables	Behaviors				
Observations			Funny video		Strange food video	
Statistics			Mean duration	Total duration	Mean duration	Total duration
		Neutral	00:20.82	02:25.74	00:13.22	03:44.80
		Happy	00:01.97	00:11.83	00:03.92	00:39.17
		Disgusted	-	-	00:00.80	00:01.60
		Unknown	00:00.48	00:00.48	00:04.34	00:26.03
	Age		31	31	45	45
	Gender		Male	Male	Female	Female
	Duration		02:39.59	02:39.59	04:54.20	04:54.20
	Start time		14:30:13.15	14:30:13.15	13:31:04.47	13:31:04.47
	Stop time		14:32:52.74	14:32:52.74	13:35:58.67	13:35:58.67

- **A** Statistics – Cells containing a statistic for a combination of Results container, Observation, Event log, Subject, Behavior and Modifier.
- **B** Independent Variables (optional, if you have selected Independent Variables on the Layout page) – Cells containing the value of an independent variable linked to a certain observation, event log or subject.
- **C** Main headers (in dark gray area) – The names of the main categories (Data selection Result Containers, Intervals, Observations, Event Logs, Subjects, Behaviors and their Modifiers, and Variables.
- **D** Secondary headers (in light gray area) – Show the single element values, for example the name of the behaviors or independent variables.

Modifiers

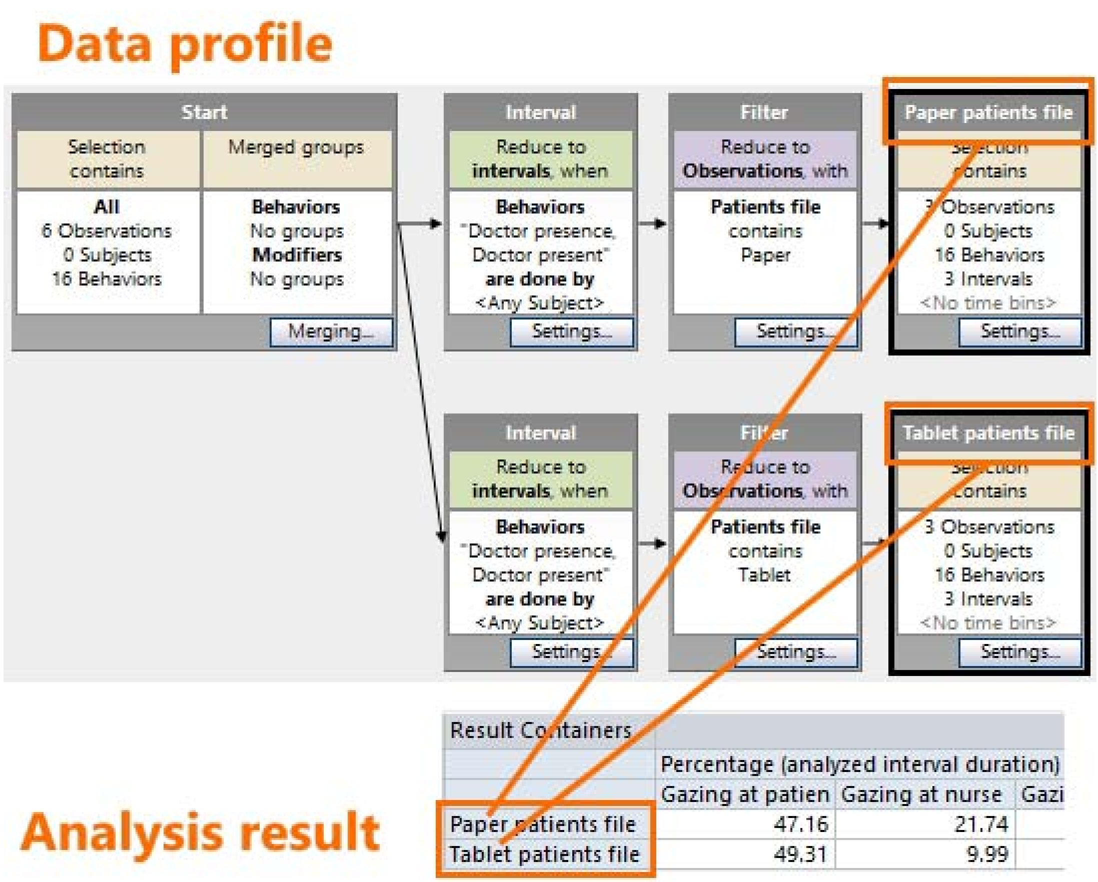
A behavior may be associated with several modifier values. In the picture below, statistics are shown for the modifiers attached to a number of communication types:

Statistics		Total duration			
Behaviors		Businesslike open question		Businesslike closed question	
Modifiers		To patient	Medical topic	To patient	Medical topic
	Paper_OK	6.6	6.6	-	-
	Tablet_OK	7.6	7.6	-	-
	Paper_LL	0.9	0.9	9.7	9.7
	Tablet_LL	-	-	9.6	9.6
	Paper_PZ	4.0	4.0	2.8	2.8
	Tablet_PZ	-	-	9.2	9.2

Result Containers

The Result Containers column or row shows the name of the Results boxes specified in the currently active data profile (see Select Data for Analysis). If you have specified more than one Results box as shown in the picture below, their names are shown in the Result Containers row or column. Statistics are calculated for each Results box separately, if you selected Result containers in the Layout window.

See Group Elements



Intervals

The Intervals row or column shows the start and end time of the time segments analyzed if you have specified intervals or time bins in your data profile. To display intervals, make sure that **Result Containers** and **Intervals** are selected in the Layout window.

See Group Elements

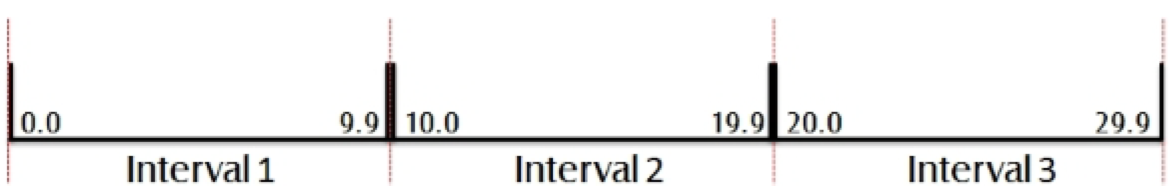
The format of the intervals depends on what you chose as time format.

See Time formats

	Observations	Result Containers	Intervals	Behaviors		
Statistics					Rate per minute	Total number
	Funny video	During "Happy"	01:22.68-01:23.68	Fixation	1.13	3
			01:26.98-01:28.82	Fixation	2.25	6
			01:42.22-01:45.02	Fixation	2.25	6
				Blink	0.38	1
			01:46.45-01:48.32	Fixation	2.25	6
				Blink	0.38	1
			02:16.95-02:19.65	Fixation	1.88	5
			02:32.05-02:33.68	Fixation	1.88	5
		During other states	00:00.48-01:22.68	Fixation	69.86	186
				Blink	1.50	4
			01:23.68-01:26.98	Fixation	3.38	9
				Blink	0.38	1
			01:28.82-01:42.22	Fixation	14.27	38
				Blink	0.75	2
			01:45.02-01:46.45	Fixation	1.88	5
			01:48.32-02:16.95	Fixation	24.41	65
				Blink	1.50	4
			02:19.65-02:32.05	Fixation	14.27	38
				Blink	0.38	1
			02:33.68-02:38.05	Fixation	5.63	15
				Blink	0.38	1

What happens at the interval borders?

The border of two connecting time intervals can only be used for analysis in one of the two time intervals. Otherwise the data for this data point would be duplicated. The Observer XT uses the left borders (start) of the time intervals for analysis, while the right borders (end) are used in the analysis of the next interval. In the example below the exact data point 0.0 is used in the first interval, 10.0 in the second, 20.0 in the third, and 30.0 is not used in any interval. If your project contains external data, the sample at the exact end of an interval is also not included in the analysis.



Events scored at the observation stop time

Events scored at the exact stop of the observation are not included in the analysis. Instantaneous samples cannot be scored at the exact stop of the observation.

<Missing Subject> and <Missing Behavior>

The <Missing Subject> and <Missing Behavior> rows/columns show the statistics for records you have scored with no subject or no behavior. For example, when you score an behavior with no subject, or when you scored comments only.

Time	Subject	Behavior
0.00	**Start**	
2.04	Child 1	Fussy noise
6.64		Negative
9.84	Child 3	Negative
13.00	Child 1	Negative
16.16	Child 2	Fussy noise
18.84	Child 2	Emotion
25.40	Child 2	Negative
28.60		Fussy noise
34.44		Negative
35.20	Child 1	Emotion
36.68	Child 2	Emotion
41.21	**Stop**	

	Subjects	Behaviors			
Statistics			Mean duration	Total duration	Total number
	<Missing Subject>	Fussy noise	5.84	5.84	1
		Negative	14.36	28.73	2
	Child 1	Fussy noise	10.96	10.96	1
		Negative	22.20	22.20	1
		Emotion	6.01	6.01	1
	Child 2	Fussy noise	2.68	2.68	1
		Negative	11.28	11.28	1
		Emotion	5.54	11.09	2
	Child 3	Negative	31.37	31.37	1

You can only calculate the frequency, rate per minute and latency of Missing Behaviors and no durations. Durations are only calculated for State behaviors that are defined in the Coding Scheme.

To hide <Missing Subject> or <Missing Behaviors>, choose **View Settings** > **Subjects** or **Behaviors**. Deselect **<Missing Subject/Behaviors>**.

Group Elements

Aim

To group all elements in one category and obtain average or total values for that category. For example, obtain the mean value of the duration of a behavior for all subjects, or for all observations.

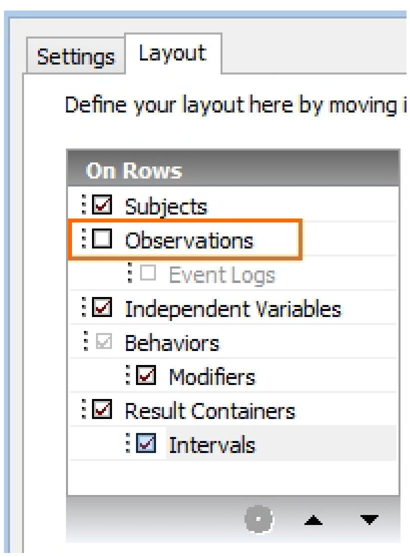
Prerequisite

You carried out at least one observation.

Procedure

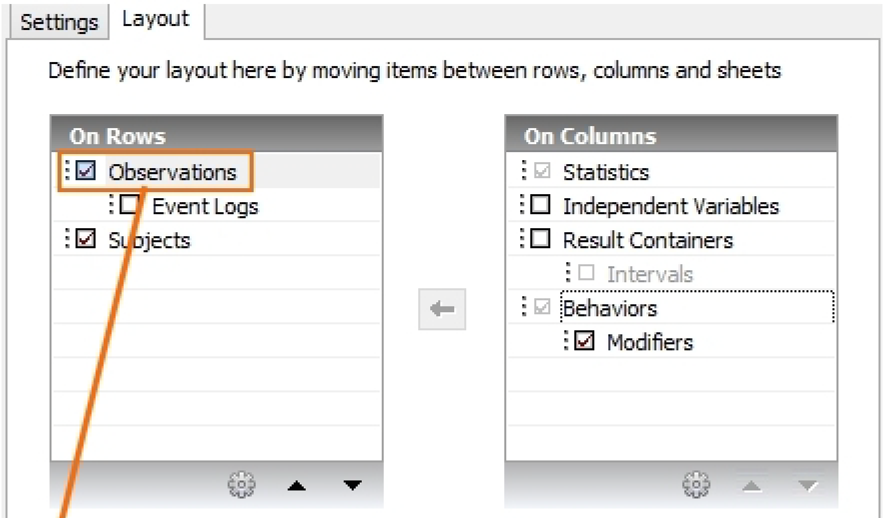
1. Follow the General Procedure to obtain a statistics results table.
2. Click the **Layout** button on the toolbar.

3. Deselect the element you want to group. For example, deselect **Observations** to calculate the total number of times an event was scored across all observations.

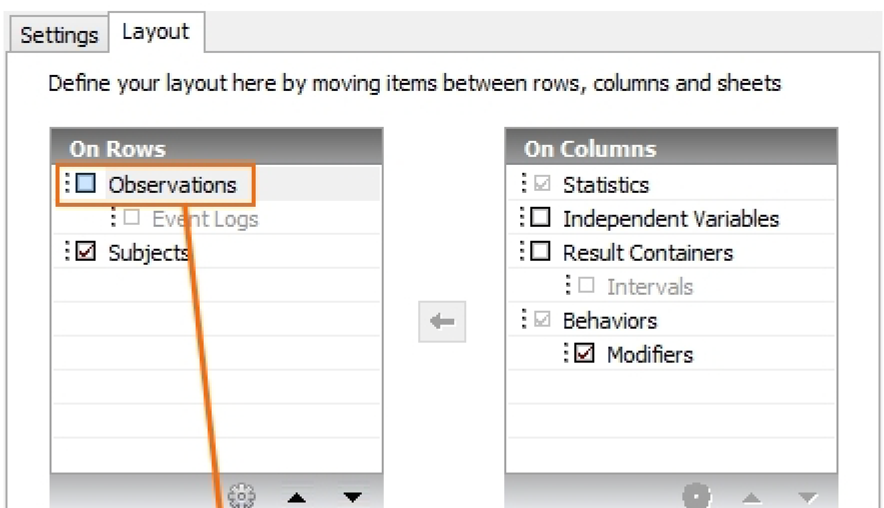


Examples

Example 1 – Grouping observations. In upper example in the figure below, **Observations** is selected in the Layout window. Statistics are displayed per observation. In the lower example **Observations** is deselected and the statistics are given for all observations grouped.

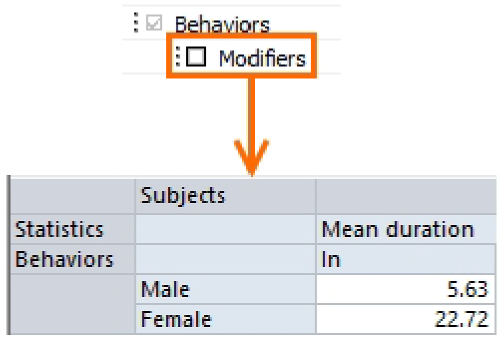


	Observations	Subjects				
Statistics			Mean duration			
Behaviors			In			
Modifiers			Caterpillar	No feed	Other Arthropod	Spider
	Nest 235 Day 6	Male	6.36	-	-	-
		Female	74.93	-	9.58	-
	Nest 275 Day 12	Male	4.52	6.27	-	5.41
		Female	7.13	2.26	-	-



	Subjects				
Statistics					
Behaviors					
Modifiers		No feed	Other Arthropod	Spider	Undetermined
	Male	6.27	-	5.41	7.11
	Female	2.26	9.58	-	27.50

Example 2 - Grouping modifiers. Deselect **Modifiers** to calculate statistics for the behaviors, independent of which modifiers were scored. Compare the figure below with the previous one.



Notes

- **IMPORTANT** Do not group categories if you want to calculate statistics for the external data. Doing so may give unexpected results.
- You cannot group Result Containers and Behaviors. To analyze behaviors as a group, merge them first in the data profile.

  See Merge data

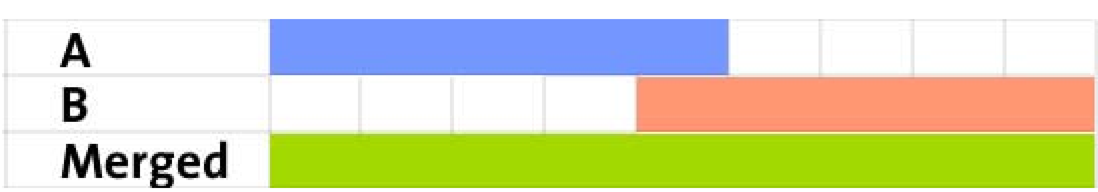
To group some elements, not others

- If you want to group some elements in one category and others not, use Merging (see Merge data) in a Data profile and carry out an analysis while this profile is active.

Statistics with merged or grouped data

Merged data

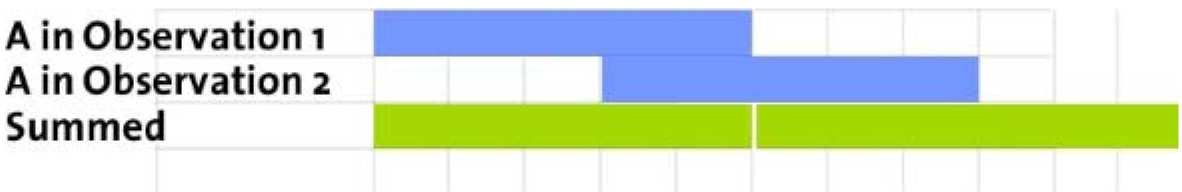
If you have merged data in the data profile (see Merge data), the analysis results show the merged results. Consider the following example for the way The Observer XT calculates statistics with merged behaviors. Behaviors A and B both have a duration of 5 seconds and they overlap for 1 second. After merging, the frequency of the merged behavior is 1 and its duration is 9 seconds. The percentage of time the merged behavior occurs in the figure below is 100%.



Grouped data

If you have grouped data by deselecting a category in the **Layout** window (see Group Elements), the Number and Duration to calculate the statistics are summed across all elements in that category.

Example – In two observations of 10 minutes each, the behavior A is scored for 5 minutes in the first and 5 minutes in the second. When deselecting **Observations** in the **Layout** window, The frequency of behavior A is 2. The total duration is 10 + 10 = 20 minutes. The percentage of time behavior A occurred is ((5+5) /(10+10))*100 = 50%.



Analyze Modifiers

To analyze numerical modifiers

Numerical modifiers can be analyzed in two ways:

- Numerical analysis – This gives numerical statistics on numerical modifiers, like the mean value, minimum or maximum value or the Median.
- Behavior analysis – This analyzes numerical modifiers as events. Do this, for example, to analyze the number of times that the modifier 0.1 was scored, or the average duration of the numerical modifier 0.5.

  Do not carry out behavior analysis if you defined a modifier range instead of predefined values and scored many values. Also do not carry out behavior analysis on external data values.

To analyze merged numerical modifiers

Merging numerical modifiers in a Data profile makes a nominal group, which means you cannot carry out a numerical analysis on the group to calculate for example mean, maximum and minimum values. You can analyze the group as an event, for example to calculate the frequency or duration.

You get separate results for the group and for the modifiers outside the group. As an example, you have a numerical modifier Speed, with predefined values 1,2,3,4,5,6,7,8. You created a group *Slow*, which contains the modifiers 1,2,3. In a Behavior Analysis, you get the results for the group *Slow* and the modifiers 4,5,6,7,5.

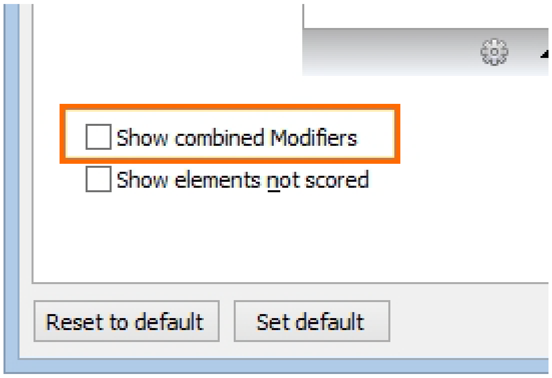
To analyze nominal modifiers

Nominal modifiers are analyzed in the same way as behaviors.

To analyze multiple nominal modifiers

If you have attached more than one modifier to a specific behavior, there are two options to analyze them in behavior analysis:

- In specific combinations as they were scored - For example: calculate the number of times this combination occurred: *Play* (behavior) *Duet* (modifier 1) *Constructive* (modifier 2) etc. To do so, select **Show combined modifiers**.
- Independently of other modifiers scored in the same event - For example: calculate the number of times that *Duet* occurred independent of other modifiers. To do so, clear the **Show combined modifiers** option.



Example – In a study of interactions among children, the type of play is coded with two modifier groups, *Play 1* to specify whether the subjects play as a *Duet* or *In parallel*, and *Play 2* to specify whether play is *Manipulative*, *With rules* etc. A typical event scored is for example *Play - Duet - With rules*.

If you select **Show combined Modifiers**, the statistics are calculated for each combination of modifiers scored. For example: *Play-Duet-With rules* Frequency=4.

If you do not select **Show combined Modifiers**, the statistics are calculated for each modifier separately, regardless of which other modifiers were scored with it. For example: *Play-Duet* Frequency=3; *Play-With rules* Frequency=2.

Notes

- The results obtained with **Show combined Modifiers** are not necessarily the sum of the separate results. In the example above, *Play-With rules* may also refer to an event where *With rules* was scored with a modifier other than *Duet* of the *Play 1* group.
- The **Show combined Modifiers** option is only available in Behavior Analysis.

Customize the Results

What do you want to do?

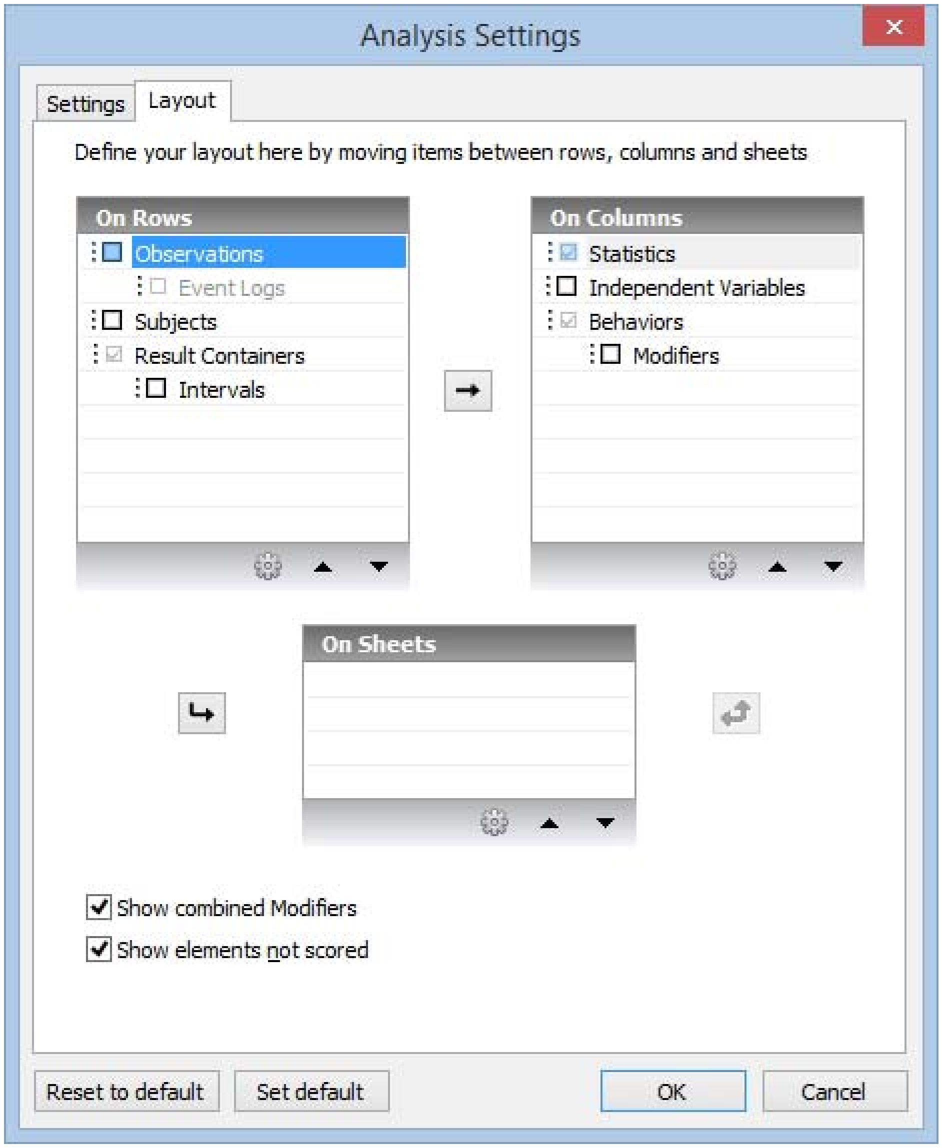
- Customize the table layout
- Show missing values as
- Show/hide Elements not scored
- Choose number of decimals
- Sort the table
- Select elements
- Set default analysis settings
- Edit statistics
- Save statistics
- Hide rows and columns

Customize the table layout

1. Follow the General Procedure to obtain a statistics results table.
2. Click the **Layout** button on the toolbar.

3. Select the element you want to view on rows, columns and separate sheets.
4. Clear the selection for the elements you do not want to include in the table.

   See also Group Elements

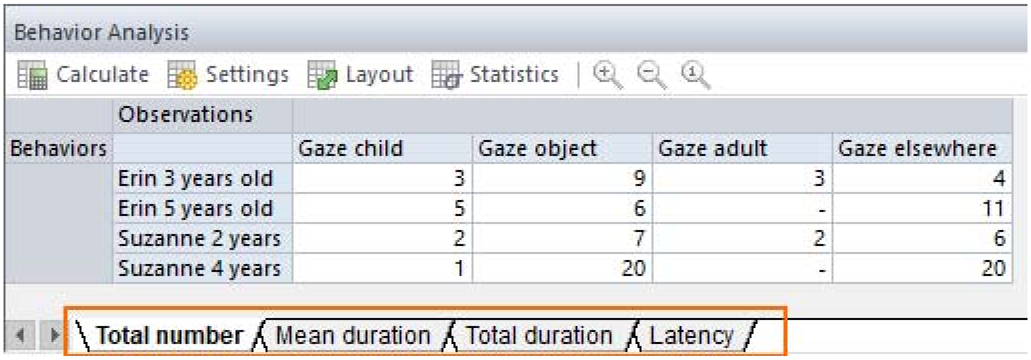


5. To move a category to a different box, click its name and then click the appropriate arrow button, or drag it to the destination box.

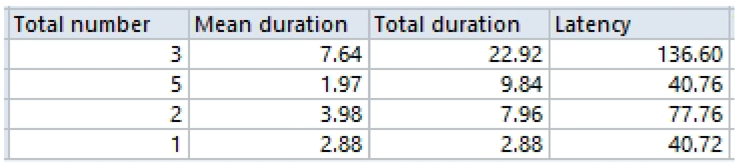
   You cannot move Behaviors without the attached Modifiers.

   Example – If you select **Statistics** under **On Sheets**, each statistic will be shown in its own sheet.



Behaviors	Observations	Gaze child	Gaze object	Gaze adult	Gaze elsewhere
	Erin 3 years old	3	9	3	4
	Erin 5 years old	5	6	-	11
	Suzanne 2 years	2	7	2	6
	Suzanne 4 years	1	20	-	20

To place each statistic on columns of same table, move **Statistics** to the **On Columns** box.



Total number	Mean duration	Total duration	Latency
3	7.64	22.92	136.60
5	1.97	9.84	40.76
2	3.98	7.96	77.76
1	2.88	2.88	40.72

Show missing values as

Aim

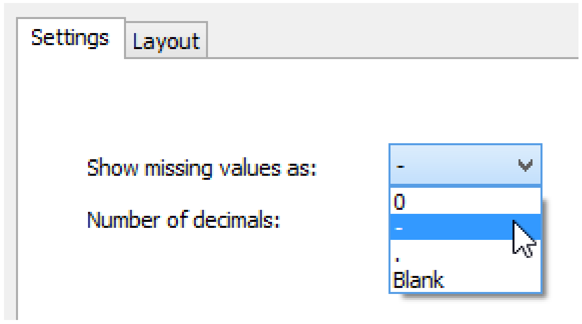
To choose how to display missing values. Missing values are given for:

- Events that did not occur in the selected data.
- Events that have no duration (see Behavior types) while the statistic describes a duration, like Mean duration or Total duration.

Procedure

1. Click the **Settings** button on the toolbar of the statistics results table.

2. Choose the character you want to have displayed for missing values in the statistics result.



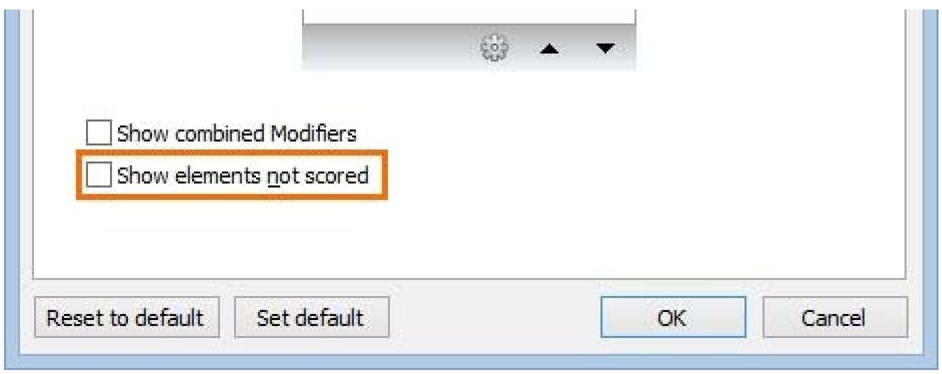
Show/hide Elements not scored

Aim

To display elements, for example behaviors, that were not scored in the project in the statistics results table.

Procedure

1. Click the **Layout** button on the toolbar.
2. Select the option **Show elements not scored**.



3. The elements will then be displayed in the table, with the symbol that you chose to display Show missing values as

Choose number of decimals

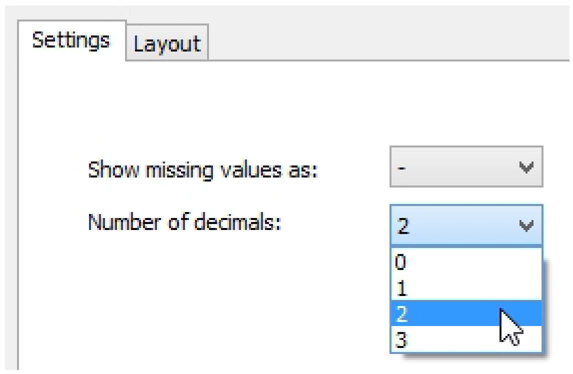
Aim

To choose the number of decimals of non-time values in the statistics results table.

Procedure

1. Click the **Settings** button on the toolbar of the statistics results table.

2. Choose the number of decimals.

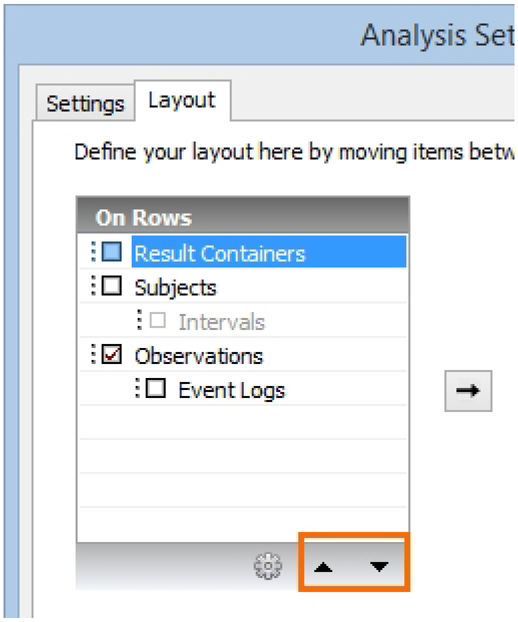


Note

- To change the decimals of time values, see Time formats
- To change the decimal symbol, from e.g. point to comma, do so in the Windows Regional Settings. In the Control Panel, choose Region > Formats. Select a language or click **Customize** and change the decimal symbol. Changing your regional settings takes effect after restarting The Observer XT.

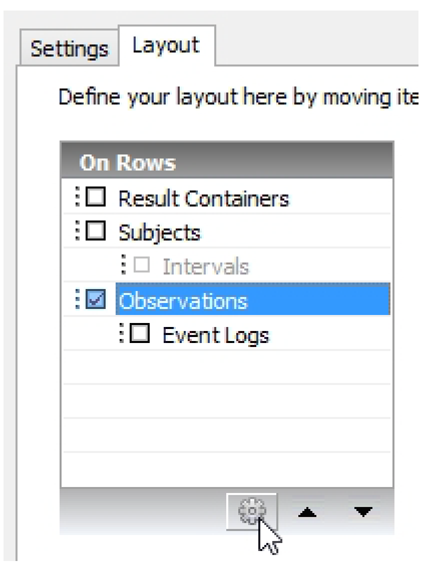
Sort the table

To sort the table by the main categories, change their position within each box (top= highest hierarchical level) with the arrows at the bottom of the box.



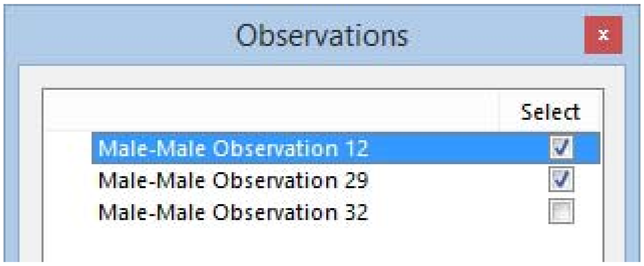
Select elements

To select the elements to view in the table, click the category name and click the **Settings** button.



Then select the elements.

For example, to show two observations out of three, select **Observations**, click the **Settings** button and then select the observations.



See also Group Elements

Set default analysis settings

To save the settings specified in the steps above, click the **Set Default** button in the **Analysis Settings** window. The new settings are applied in future analyses. To return to these settings after you made new changes, click the **Reset to Default** button in the **Analysis Settings** window.

Edit statistics

You cannot edit the content of the statistics result. If you want to make any changes to the result, export it to another program like Excel and then edit it in that program.

See Export analysis results

Save statistics

To save a result, click the **Archive** button on the toolbar of the **Analysis result** window.

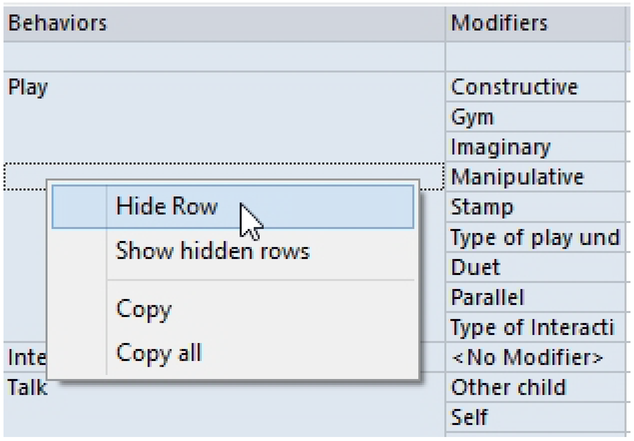
To re-open a saved result, click its name under the analysis item in the Project Explorer.

For more information on saving, opening and exporting results, see Manage Analysis Results

Hide rows and columns

To hide rows and columns of your statistics result, right-click a header and choose **Hide row** or **Hide column**.

When you hide rows or columns, the row/column deleted is always the one at the lowest level selected, independent of which cell you right-click. In the example below, right-clicking the cell *Play* under **Behaviors** results in hiding the row corresponding to the modifier *Manipulative*, not the group of rows corresponding to *Play*, because the mouse pointed the row of the modifier Manipulative.



To show hidden rows and columns, right-click the header of one of the remaining rows/columns and select **Show hidden rows** or **Show hidden columns**.

Statistics in Detail

Behavior analysis

The following statistics are available for Behavior Analysis.

See also Statistics for Behavior Analysis in Detail

For Continuous sampling

- Minimum duration
- Maximum duration
- Mean duration
- Total duration
- Standard deviation
- Standard error
- Rate per minute
- Total number
- Percentage
- Latency
- 25th percentile
- Median
- 75th percentile

For Instantaneous sampling

- Proportion
- Scored Samples
- Total number

For intervals

- Minimum interval
- Maximum interval
- Number of intervals
- Interval duration
- Total interval duration

- Analyzed interval duration
- Analyzed duration

Numerical analysis

The following statistics are available for Numerical Analysis.

See also Statistics for Numerical Analysis in Detail

For numerical modifiers only

- Total duration
- Total value
- Mean (per minute)

For numerical modifiers and external data

- Minimum value
- Maximum value
- Mean value
- 25th percentile
- Median
- 75th percentile

For external data only

- Number of samples
- Number of valid samples

Note

To calculate the frequency with which each value of numerical modifiers was scored, or the duration of the corresponding event scored, carry out Behavior Analysis instead.

Normal distribution

Statistics like the mean and the standard deviation are meaningful when your data are normally distributed. However, behavioral data are often not normally distributed. We therefore recommend to check whether your data are normally distributed with a statistical package. If the data are not normally distributed, you should first transform your data before analysis, or use statistics suited for non-normally distributed data, like the median. If you have defined intervals in your data selection, this can result in only a small number of samples (both in observational and external data), which often are not normally distributed. For instance, a mean of values ‘1’, ‘10’ and ‘10’ is not meaningful.

Statistics in detail

For an extensive description of the statistics, see, for example, Zar, J.H., Biostatistical Analysis, Pearson Education, 2007. The statistics available in The Observer XT depend on the type of analysis and the type of events.

Statistics for Behavior Analysis in Detail

For Continuous sampling

For behaviors with duration only

- **Minimum duration** – The shortest duration of a behavior.
- **Maximum duration** – The longest duration of a behavior.
- **Mean duration** – The total duration divided by the number of times the event occurred: *D* is the duration of the individual behavior, and *N* is the number of times the behavior occurs.

  $$\overline{D} = \frac{\sum D}{N}$$

- **Total Duration** – The sum of the duration of all events of a specific behavior.
- **Standard deviation** – The sample standard deviation of the duration of a behavior.

  $$s = \sqrt{\frac{\sum \left(D - \overline{D}\right)^2}{N-1}}$$

  Where *D* is the duration of the individual behavior, $\overline{D}$ the mean duration, *N* the number of occurrences of the behavior.

- **Standard error** – The standard error of the mean (s.e.m.).

  $$s.e.m. = \frac{s}{\sqrt{N}}$$

  Where *s* is the standard deviation of a sample, and *N* is the number of occurrences (sample size).

- **Percentage** – The general formula of Percentage is:

  *Percentage = Duration of event * 100 / Duration in seconds*.

  For *Duration*, you can choose between:

Observation duration – The total duration of the observation.

Interval duration – The duration of the interval specified in the data profile.

Analyzed observation duration – The total duration of the intervals specified in the data profile, excluding the time the observation was suspended.

Analyzed interval duration – The duration of the interval specified in the data profile. This excludes the time the observation was suspended.

- **25th percentile** – Twenty-five percent of the events of this type has this duration or lower. The 25th percentile is also called the first quartile.

  See Percentiles in detail

- **Median** – Fifty percent of the events of this type have this duration or lower. The Median is the same as the 50th percentile or 2nd quartile.

  See Percentiles in detail

- **75th percentile** – Seventy-five percent of the events of this type have this duration or lower. The 75th percentile is also called the 3rd quartile.

  See Percentiles in detail

For all behaviors

- **Rate per minute (RPM)** – The general formula of Rate per minute is:

  Rate per minute = (*Total number of occurrences / Duration in seconds*) * 60.

  For *Duration*, you can choose between:

  Observation duration – The total duration of the observation.

  Interval duration – The duration of the interval specified in the data profile.

  Analyzed observation duration – The total duration of the intervals specified in the data profile, excluding the time the observation was suspended.

  Analyzed interval duration – The duration of the interval specified in the data profile. This excludes the time the observation was suspended.

  Total number – The number of times the selected event occurs in the observation or event log.

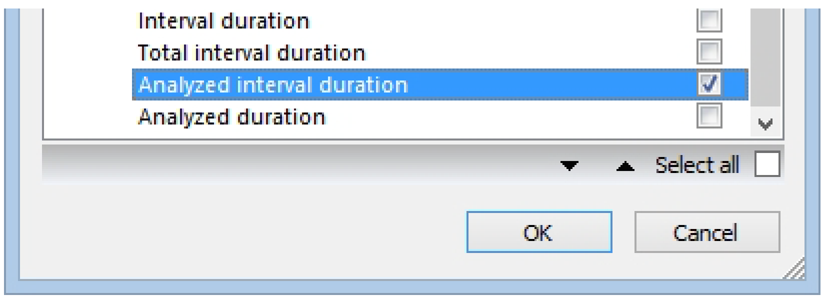
- **Latency** – The time from the start of the observation to the first occurrence of a behavior.

When you have created intervals based on data selection, the latency is only calculated for the behavior within one of the intervals.

Note

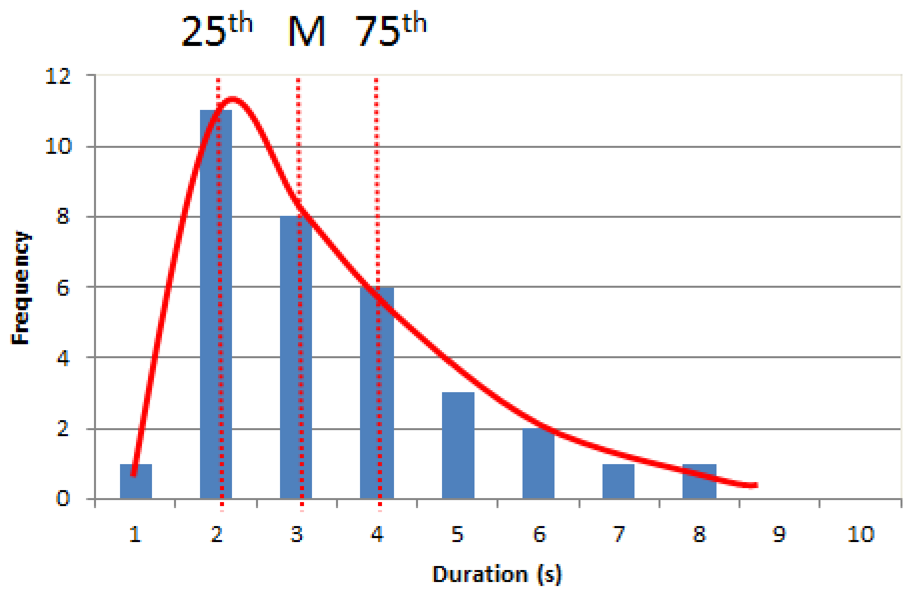
To calculate the time between a behavior and the moment another behavior starts, do not use latency. Latency is always calculated from the start of the observation. Instead, Select Intervals by Manual Selection and calculate the interval duration. For example, you want to know the time between the moment the mother leaves the room and the baby first starts crying. Create an interval by manual selection with the start and stop criteria both based on observational data. Carry out a behavior analysis and from the statistics select **Analyzed Interval Duration**. In the Layout window, select the checkbox in front of Intervals.

See Group Elements



Percentiles in detail

The concept of percentiles is explained in the figure below. In this example, 25% of the events scored has a duration of 2 s or lower. 50% of the events has a duration of 3 s or lower. The 50th percentile is the Median, which is represented by an M in the figure below. 75% Of the events has a duration of 4 s or lower.



The figure below explains the calculation of percentiles in more detail. For clarity, a small number of events is used in the example. In reality, the percentiles are not meaningful when they are based on such a small number of events.

The event *Play* was scored eight times with durations:

1 9 7 2 5 4 10 3

In consecutive order:

1 2 3 4 5 7 9 10

1 2 | 3 4 | 5 7 | 9 10

25th percentile *Median* *75th percentile*

25th percentile =	*(2+3)/2=2.5*
Median =	*(4+5)/2=4.5*
75th percentile =	*(7+9)/2=8*

The event *Play* was scored eight times. When the duration of the events is sorted, the Median (50th percentile) divides the scored events equally. In this example it lies halfway between 4 and 5 s, which is 4.5. Fifty percent of the events, which is four events, has a duration lower than 4.5. In the same way, 25% has a duration lower than 2.5 and 75% has a duration lower than 8.

For Instantaneous sampling

- **Proportion (all samples)** – The number of times a behavior has been scored divided by the total number of samples in the observation.
- **Proportion (scored samples)** – The number of times a behavior has been scored divided by the number of scored samples.
- **Scored Samples** – The number of times a behavior has been scored in an observation.
- **Total number (all samples)** – The total number of samples in an observation.
- **Total number (scored samples)** – The total number of scored samples.

  Example – A group of 10 animals is observed during an hour with a sample interval length of 5 minutes. The **Total number (all samples)** is 12. For a specific animal, 4 samples are missing. **Total number (scored samples)** for this animal is 8. For this animal behavior 'Sit' has been scored '4' times. Scored samples for *Sit* is 4. **Proportion (all samples)** = 4/12=0.33. **Proportion (scored samples)** = 4/8=0.50.

For intervals

- **Minimum interval** – The shortest interval duration.
- **Maximum interval** – The longest interval duration.
- **Number of intervals** – The total number of intervals.
- **Interval duration** – The duration of each interval.
- **Total interval duration** – The duration of all intervals together.
- **Analyzed interval duration** – The interval duration minus the time that the observation was suspended within this interval. Make sure Intervals is selected in the layout window.

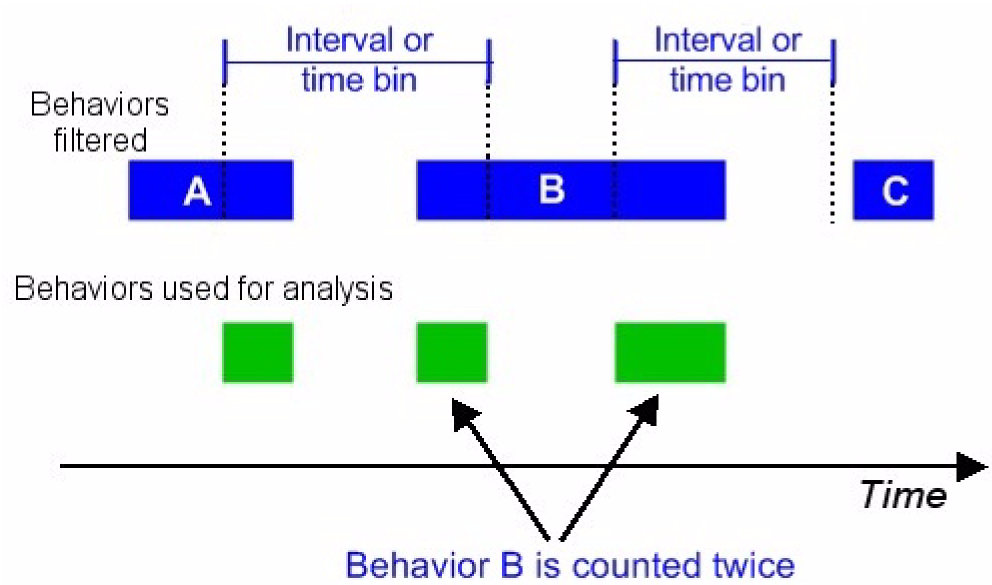
  See Group Elements

- **Analyzed duration** – The sum of the intervals minus the time that the observation was suspended within the intervals.

Notes on Intervals or time bins

When one event overlaps two or more intervals, it counted one time in each interval. The **Total number** statistic is the number of times an event occurs within an interval or time bin. This means that when you define intervals or time bins the

Total number statistic may be larger than the 'true' number of occurrences of that event.



Statistics for Numerical Analysis in Detail

For numerical modifiers only

- **Total duration** – The sum of the durations of a scored modifier.
- **Total value** – The sum of the values of a scored modifier.
- **Mean (per minute)** – The mean value of a scored modifier weighed for the duration they lasted.

  For example, modifier 3 lasted 5 seconds and modifier 2 lasted 2 seconds. The **Mean (per minute)** is ((3 x 5) + (2 x 2)) / (5 + 2) = 19 / 7 = 2.71.

  The Mean (per minute) is calculated for events with duration only, not for events without duration. If a numerical modifier is associated with an event without duration, the Mean (per minute) is zero.

For numerical modifiers and external data

- **Minimum value**– The lowest value of a scored numerical modifier or external data.
- **Maximum value** – The highest value a scored numerical modifier or external data.
- **Mean value** – The arithmetic mean of a scored numerical modifier or external data.
- **25th Percentile** – Twenty-five percent of the modifiers or external data samples of this type has this value or lower. For more details see Percentiles in detail, with the difference that the percentiles in numerical analysis represent values instead of durations. The 25th percentile is also called the first quartile.
- **Median** – Fifty percent of the modifiers or external data samples of this type has this value or lower. For more details see Percentiles in detail, with the difference that the percentiles in numerical analysis represent values instead of durations. The Median is the same as the 50th percentile or 2nd quartile.
- **75th Percentile** – Seventy-five percent of the modifiers or external data samples of this type has this value or lower. For more details see Percentiles in detail, with the difference that the percentiles in numerical analysis represent values instead of durations. The 75th percentile is also called the 3rd quartile.

For external data only

- **Number of samples** – The number external data samples that are included in an interval. This number includes the samples that have a NaN value (missing samples).
- **Number of valid samples** – The number external data samples that are included in an interval and have a valid value. The number of valid samples is the Number of samples minus the number of samples with a NaN value (missing samples).

Notes

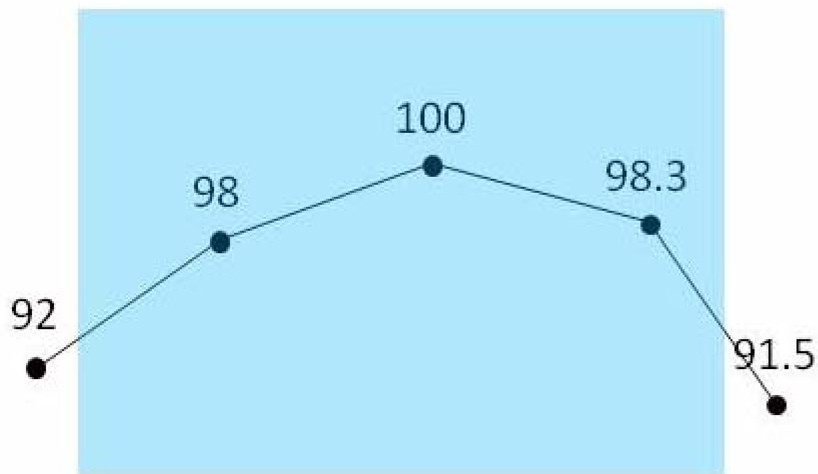
- For external data, all statistics, except for the Number of samples, are based on the Number of valid samples. Hence, missing samples do not influence them.
- Do not group categories (see Group Elements) if you want to calculate statistics for the external data. Doing so may give unexpected results.

Examples of calculation of External data statistics

The calculation of statistics for external data is based on the actual sample points; the external data is not interpolated.

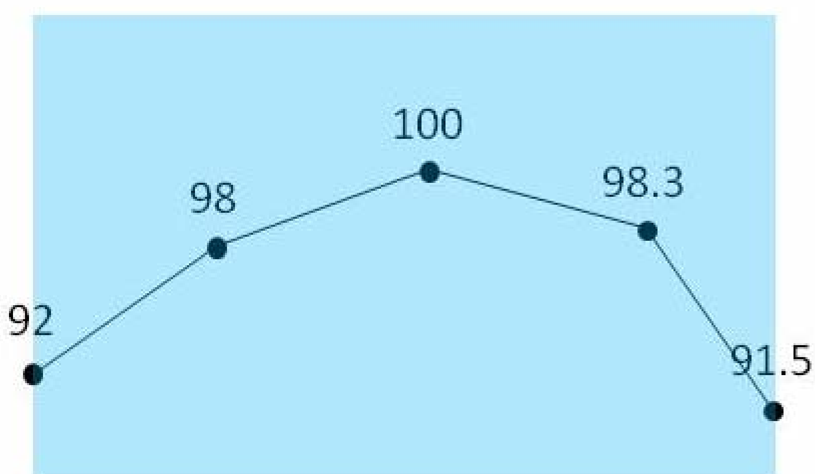
Example 1 – You have an observation with external data. In a data profile, you created intervals based on observation time / event log data (see the picture below). For this interval, the numerical statistics values of the external data are:

Minimum = ‘98’, Maximum = ‘100’, Mean = ‘98.77’ (the mean of 98, 100, and 98.3), Number of samples = ‘3’.



Example 2 – You have the same observation with external data as in the previous example. In a data profile, you created an **Interval by Manual selection** with External data values **Higher or equal to** *92*. For this interval, the numerical statistics values for the external data are:

Minimum = ‘92’, Maximum = ‘100’, Mean = ‘97.07’ (the mean of 92, 98, 100, and 98.3), Number of samples = ‘4’.



Analyze Observations Containing Multiple Event Logs

Aim

To explain how statistics are calculated when your observation contains multiple event logs.

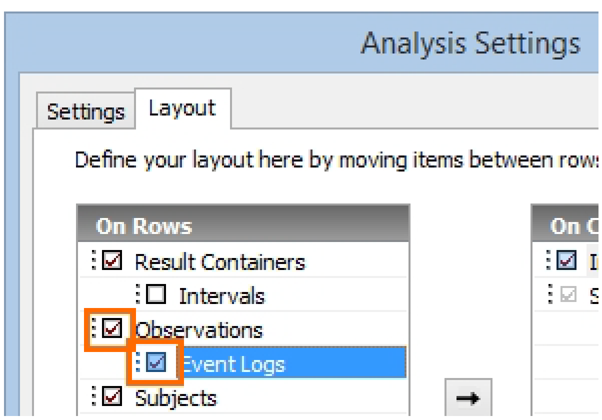
An observation can have multiple event logs, if you imported observational data into it. For example, you imported FaceReader states into the observation. Choose how to analyze the event logs:

- Event logs as separate data sets, so each event log produces one result.
- Event logs as one data set, so all event logs within an observation are collapsed in one result.

Event logs as separate data sets

1. Click the **Layout** button on the Analysis toolbar.

2. Make sure that both **Observations** and **Event Logs** are selected.



The statistics are calculated as follows:

- If you have not defined intervals and time bins in your data profile:

  Analyzed duration – The duration of each event log. If the imported event log has an offset compared to The Observer XT event log, it will be shorter, since the stop of the observation determines the end of both event logs.

Total number and duration statistics – These are calculated per event log.

Rate per minute (observation duration), Percentage (observation duration) – These are based on the duration of the corresponding event log.

Rate per minute, (analyzed observation duration), Percentage (analyzed observation duration) – These are based on the event log duration, excluding the suspend time.

- If you have defined intervals or time bins in your data profile:

  Total number and duration statistics – They are calculated per interval and event log.

  Rate per minute (interval duration), Percentage (interval duration) – These are based on the duration of the interval.

  Rate per minute, (analyzed observation duration), Percentage (analyzed observation duration) – These are based on the duration of the event log, excluding the time that the observation was suspended.

  Rate per minute (analyzed interval duration), Percentage (analyzed interval duration) – These are based on the time line set by data selection, excluding the time that the observation was suspended. The duration of the interval is not necessarily the same as analyzed duration, for example when more than two or more separate intervals split the event log in different sections.

  To analyze each interval separately, select the check box in front of **Intervals** in the Layout window.

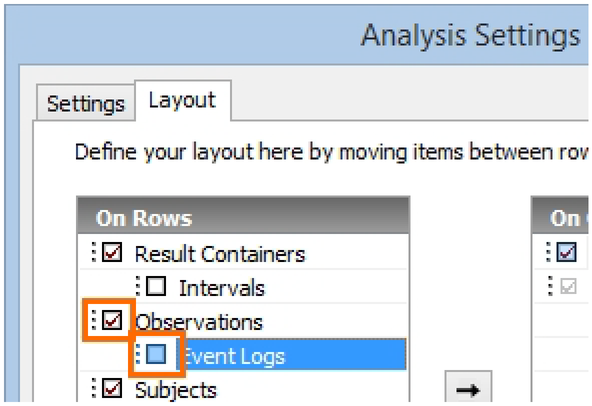
  See Group Elements

  Percentage (interval duration) – This is calculated over the entire duration of the interval, not the part of the event log falling within the interval. This may give unexpected results when the event log does not cover the entire interval duration. If you want to calculate the percentage relative to the event log only, select a different type of interval (for example with Selecting intervals by behavior) or use Percentage (observation duration).

Event logs as one data set

1. Click the **Layout** button on the Analysis toolbar.

2. Make sure that (1) Observations is selected, and (2) Event Logs is NOT selected.



- If you have not defined intervals and time bins in your data profile:

  Analyzed duration – The duration of The Observer XT event log.

  Total number and duration statistics – They are calculated per event log, then summed up.

  Rate per minute (observation duration), Percentage (observation duration) – These are based on the time from the earliest start of any event log to the latest stop of any event log.

  Rate per minute (analyzed observation duration), Percentage (analyzed observation duration) – These are based on the time from the earliest start of any event log to the latest stop of any event log, excluding the time the observation was suspended.

- If you have defined intervals or time bins in your data profile:

  Total number and duration statistics – They are calculated per interval and event log, then summed up.

  Rate per minute (interval duration), Percentage (interval duration) – These are based on the summed duration of the intervals. To analyze each interval separately, keep **Intervals** selected in the Layout page of your Analysis settings.

  See Group Elements

  Percentage (interval duration) – This is calculated over the entire duration of the interval, not the part of the event log falling within the interval. This may give unexpected results when the event log does not cover the entire interval duration. If you want to calculate the percentage relative to the event log only, define an interval that only includes the event log.

Rate per minute (analyzed observation duration), Percentage (analyzed observation duration) – These are based on the time from the earliest start of any event log to the latest stop of any event log, excluding the time the observation was suspended.

Rate per minute (analyzed interval duration), Percentage (analyzed interval duration) – These are based on the time from the earliest start of any event log to the latest stop of any event log, excluding the time the observation was suspended and the time excluded by data selection. If overlapping event logs generate overlapping intervals, these are merged along the time line to calculate the analyzed duration.

To analyze each interval separately, select the check box in front of Intervals in the Layout page of your Analysis settings.

See Group Elements

Lag Sequential Analysis

Parent initiates play

Child plays?

Main topics

- What is Lag Sequential Analysis?
- Important Terms in Lag Sequential Analysis
- General Procedure
- The Lag Sequential Analysis Result
- Lag Sequential Analysis Options
- Customize the Analysis Results
- Lag Sequential Analysis in Detail

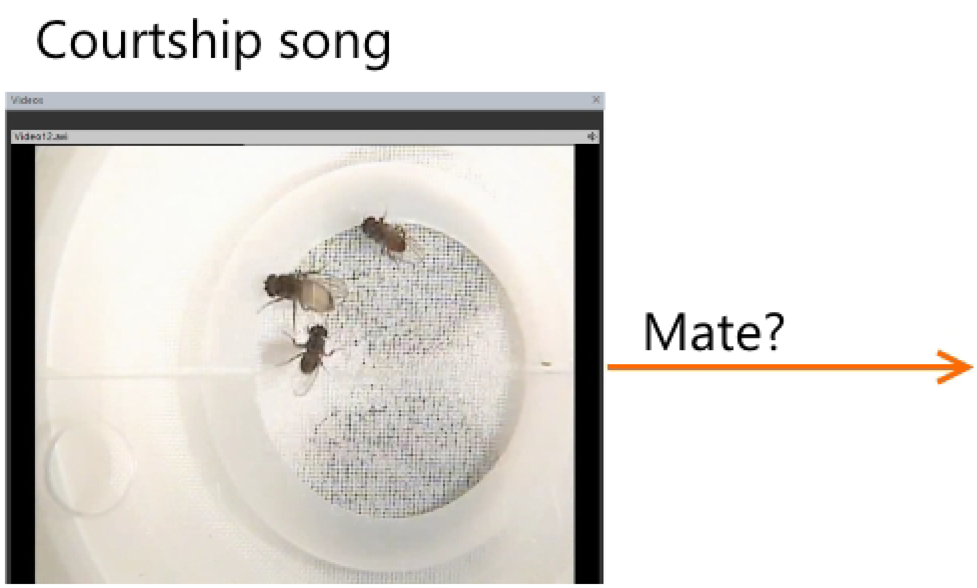
What is Lag Sequential Analysis?

Transitions between events

In The Observer XT, Lag Sequential Analysis calculates the frequency of transitions between pairs of events within a certain lag.

Lag Sequential Analysis allows you to answer questions like:

- How many times is the event *Mother Smiles* followed by the event *Baby Smiles*?
- How likely is the dog's behavior *Ignores Trainer* preceded by each type of command by the trainer?
- How often is *Courtship song* by a fruit fly male followed by *Mating*?



See also Lag Sequential Analysis in Detail

Important Terms in Lag Sequential Analysis

Criterion

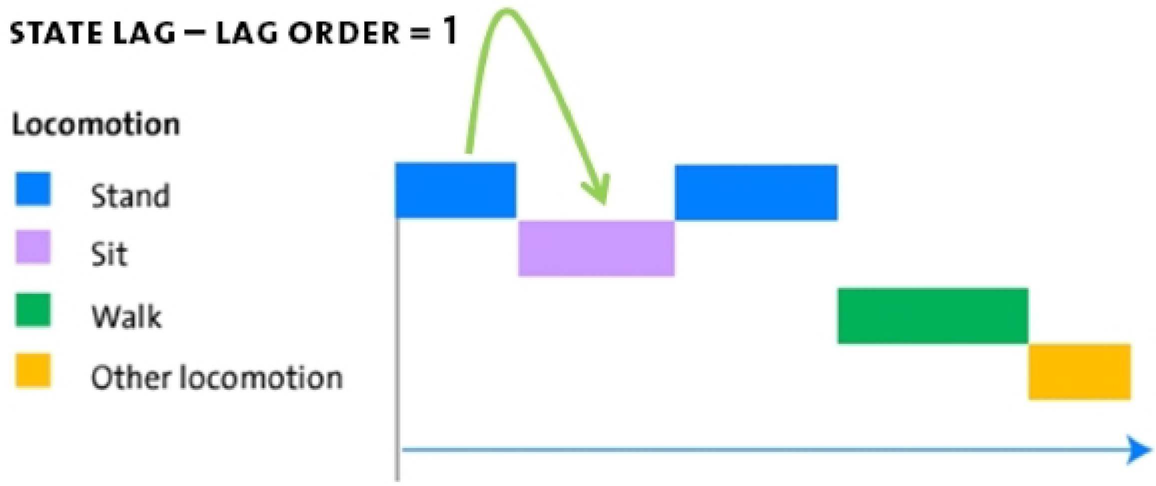
Of a pair of behaviors, the first one is called Criterion.

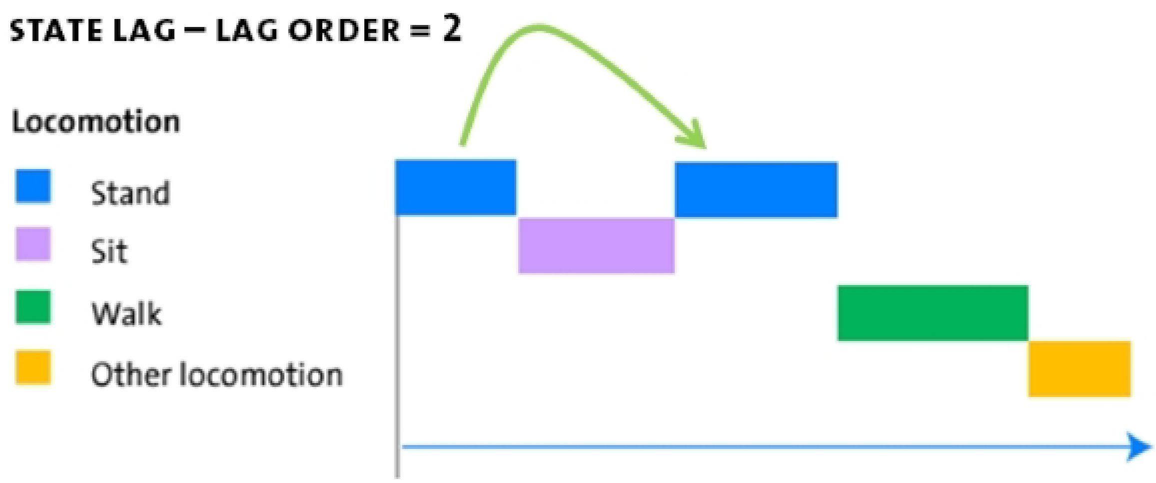
Target

Of a pair of behaviors, the second one is called Target.

State Lag

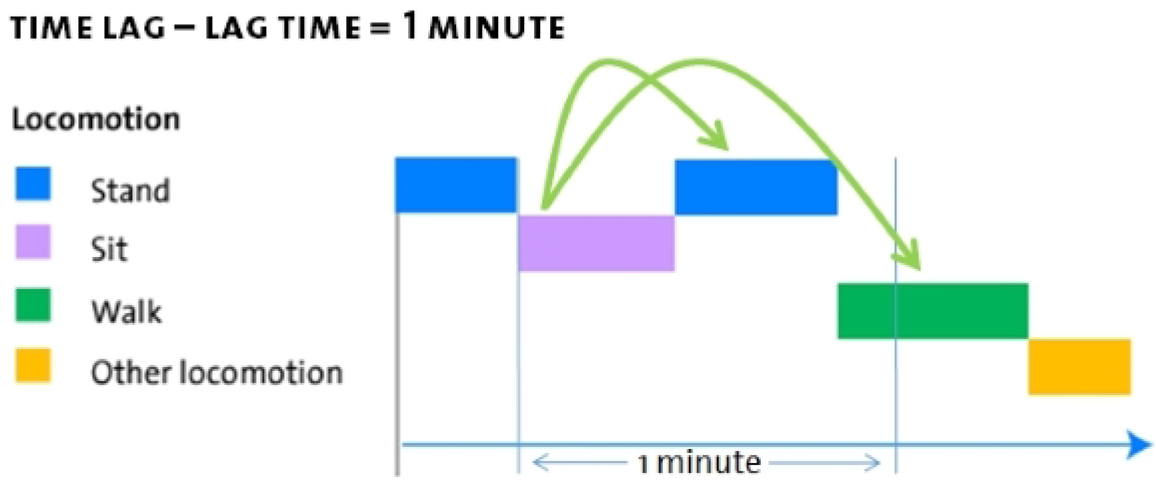
State lags are transitions between events that directly follow each other or are separated by a specific number (lag order) of other events. For example, from an event to the next one (lag order +1), or to the second next (lag order +2), the third next etc. You can calculate transitions with a lag order from -9 to +9. The time between the Criterion and the Target does not influence your results.





Time lag

Time lags are transitions between events within a specific time window, independent of how many events are between them. You can calculate transitions, for example, from an event to those events occurring in the next 1 minute. Since there may be more than one Target event in that 1 minute window, Time lag analysis generates multiple transitions from the same Criterion.



See also Lag Sequential Analysis in Detail

General Procedure

Aim

To analyze how often or how likely an event is followed or preceded by other events.

Prerequisites

- Your license for The Observer XT includes the Advanced Analysis Module.
- You carried out at least one observation.

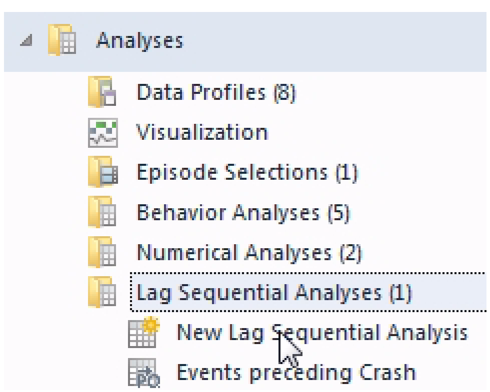
Procedure

1. Make sure that the data profile specifying the data you want to analyze is active, that is, highlighted in blue in the Project Explorer.
2. Do one of the following:

   - Choose **Analyze** > **Lag Sequential Analysis** > **New**

   - In the Project Explorer, click the **Analyses** folder. In the window that appears, choose **Analyze data** > **Lag Sequential Analysis**.

   - In the Project Explorer under **Analyses**, click **Lag Sequential Analyses** and then **New Lag Sequential Analysis**.

3. A table with question marks appears. Click the **Calculate** button on the toolbar to perform the analysis.

Note

By default, the table contains a State lag - order 1 analysis with frequencies.

Lag Sequential Analysis Options

Aim

To choose the type of lag sequential analysis and other settings.

Prerequisites

- Your license for The Observer XT includes the Advanced Analysis Module.
- You carried out at least one observation.
- You opened the Lag Sequential Analysis window (**Analyze** > **Lag Sequential Analysis**).

Procedure

Click the **Settings** button on the toolbar.

Select the following options:

- Lag Type
- Restrict lag to Subject-Behavior group
- Frequency or Probability
- Missing values and number of decimals

Lag Type

Select one of the following (see Important Terms in Lag Sequential Analysis for information on lag type):

- State Lag.

  Enter the lag order you want analysis to be based on. For example, to analyze transitions from each event to the next one enter 1. If you want to calculate transitions from each event to the second next, enter 2. If you want to calculate transitions from each event to the previous third event, enter -3. By default, 1 is selected.

- Time Lag.

Enter the limits of the time window (see an example in the figure in Time lag). This time window will be applied to each Criterion event. By default, From 0 to 1 sec is selected, that is, transitions are counted from each event to any event occurring up to 1 second later.

You have the following additional options:

Ignore recurring criteria – Select this option if you want to exclude instances of a criterion event that occur in the same time lag.

See To ignore recurring criteria

Ignore recurring targets – Select this option if you want to exclude second, third etc. instances of a target event that occur within the same time lag.

See To ignore recurring targets

Restrict lag to Subject-Behavior group

Select this option to calculate the transitions within subject and behavior groups.

Example – Select this option to calculate transitions within the behavior groups *Locomotion* and *Social behavior*, that is, from an event of *Locomotion* to another event of *Locomotion*, and from an event of *Social behavior* to another event of *Social behavior*, not from an event of *Locomotion* to an event of *Social behavior* (or vice versa).

If you leave this option cleared, transitions are calculated regardless of which group events belong to. Leave the option deselected to calculate transitions between the behavior of one subject (for example Mother) and another subject (for example Child).

Frequency or Probability

Frequency – To calculate the number of transitions from the criterion to the target.

Probability – To calculate the number of transitions for a particular combination of criterion and target divided by the total number of transitions from that criterion. The sum of the transition probabilities for each criterion event equals 1.

Select the **Only show when greater than option** if you want to display only the transition probabilities that are greater than a specific threshold.

Missing values and number of decimals

- Show missing values as – Choose the character you want to have displayed for missing values, that is, cells in which transitions are not calculated. For example, transitions between behaviors of different groups when you have selected the **Restrict lag to Subject-Behavior** group option.

- Number of decimals – Choose the number of decimals in the matrix cells. This option is only available if you have chosen to display lag probabilities (see Frequency or Probability).

Note

If you defined a range of numerical modifiers instead of predefined values, many different values may have been scored. If you subsequently carry out a Lag Sequential Analysis, this may result in many cells in the analysis result. This may especially happen if you have numerical modifiers with several decimals, or if you have imported external data as numerical modifiers. Deselect **Modifiers** in the **Layout** window, or create a Data Selection to reduce the data to analyze.

The Lag Sequential Analysis Result

Results table

The Lag Sequential Analysis results table contains the following:

A - Cells containing the values of independent variables.

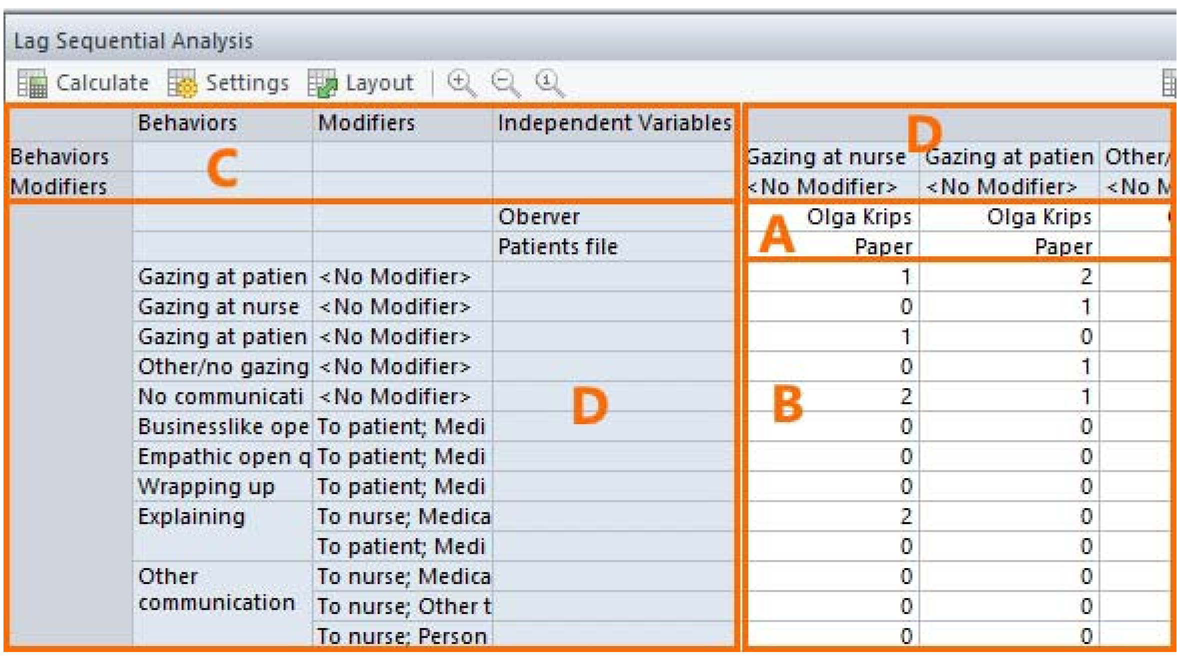
B - Cells containing counts or probabilities of transition. Each row represents a criterion event and each column a target event. Each cell contains, depending on what you have chosen in your analysis settings (see Frequency or Probability):

- If you have chosen **Frequency**, the number of transitions from the criterion (on the row) to the target event (on the column).
- If you have chosen **Probability**, the probability of transition from the criterion event to the target event.

C - Main headers for categories (for example, Observations, Subjects, Behaviors, etc.

D - Secondary headers for the elements within a category.

Dependent on your choices for the layout, some of the options may not be shown.



Understanding X0 and Y0

Transitions are also counted when there no criterion can be found for a target or vice versa. Such transitions can be found in the cells of the matrix indicated by X0 (last row) or Y0 (last column).

X0 refers to transitions where a target has been identified but the criterion is not found. This happens in the following cases:

- If the lag is positive – At the start of an observation (or interval defined within an observation). If the first event is 2.00 Sit, this event is considered to be the target of no event. A transition is counted from X0 to 2.00 Sit.
- If the lag is negative – At the end of an observation or interval, where the last event is considered to be the target of no event.
- Special case – In Time lag analysis, when an event is preceded by a gap longer than the time lag of the previous event. For example, the event Answer occurs after a gap. If the time lag is shorter than the time between Answer and any preceding event, then Answer is considered to be the target of no event. A transition is counted from X0 to Answer.

Y0 refers to transitions where no target is found. This happens:

- If the lag is positive – At the end of an observation or interval, where the last event is considered to be the criterion of no event.
- If the lag is negative – At the start of an observation or interval, where the first event is considered to be the criterion of no event.
- Special case – In Time lag analysis, when there is no event within a time lag. For example, the event Play music is not followed by any other event in the next 10 seconds. With a time lag of 5 seconds, the time lag of Play music does not cover any target event. A transition is counted from Play music to Y0. Note: when at least one event is found within a time lag, the gap is not considered, so the transition from Play music to Y0 is not counted. Instead, the transition from Play music to that event is counted.

Notes

- X0 and Y0 transitions are included in the probability calculations to quantify the probability that an event is not preceded nor followed by any events.
- For instantaneous sampling – X0 and Y0 do not indicate transitions from/to samples not scored. In lag sequential analysis, samples not scored are ignored.

  See also Instantaneous Sampling in Carry out an Observation

Save a result

To save a lag sequential analysis result, click the **Archive** button on the toolbar of the result window.

To re-open a saved result, choose **Analyze** > **Lag Sequential Analysis** > **Open Archive**.

For more information on saving, opening and exporting results, see Manage Analysis Results in File Management

Notes

- You cannot edit the content of the statistics result.
- To print a result table, choose **File** > **Print**. We advise you to select the Landscape mode prior to printing.

Customize the Analysis Results

Aim

To change the layout of the analysis results table.

Prerequisites

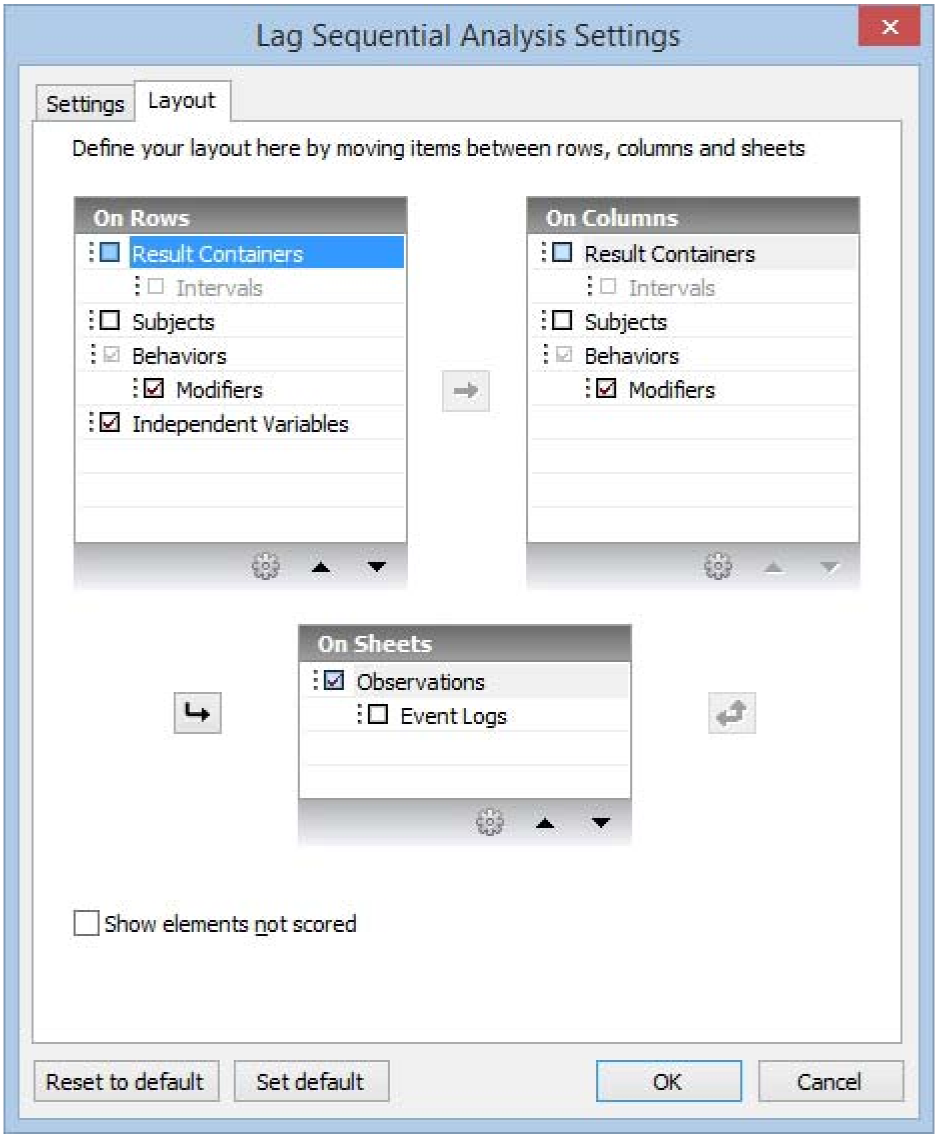
- Your license for The Observer XT includes the Advanced Analysis Module.
- You carried out at least one observation.
- You opened the Lag Sequential Analysis window (**Analyze** > **Lag Sequential Analysis**).

Procedure

Click the **Layout** button on the toolbar.

Specify what the resulting transition matrix will look like. Select the type of elements you want to view on rows, columns and separate sheets. Clear the selection for any element type you do not want included in the matrix.

- Criteria - Are displayed on rows. Select the element types to include.
- Targets - Are displayed on columns. Select the element types to include.
- On Sheets - Select the element types you want to view in separate sheets.



See Group Elements and Customize the Results in Calculate Statistics how to manage the table layout.

Show elements not scored

Select this option if you want to have all elements of your coding scheme shown in the matrix, including those you have not scored in any observation. For not scored elements, cells will contain zeros or the missing value symbol (see Missing values and number of decimals). If you keep this option cleared, the matrix lists the elements scored in at least one observation.

Time formats

When you, for example, have selected to show Intervals or Independent Variables, some of the cells contain time values. To specify the format of time, choose **Setup** > **Project Settings** >**Time formats**.

See Time formats in Set up your Project

Decimal symbol

Change your decimal symbol in Windows regional setting. Then restart The Observer and re-run the analysis.

Save your analysis settings

To save the settings specified in your analysis by clicking the **Set to Default** button in the Lag Sequential Analysis Settings window. If this window is gone, click **Settings** on top of the result window and click **Set as Default** in the window that appears.

Apply settings to a new analysis

If you are about to run a new Lag Sequential Analysis and want to recall default settings specified earlier, click the **Reset to Default** button in the Lag Sequential Analysis Settings window.

Notes

- If you select **Observations** under **On Sheets** and keep **Intervals** selected, each sheet includes the layout for all observations, but only the results for the corresponding observation (You have to scroll down the result to find them). To reduce the size of the sheets, de-select Intervals.
- It is not possible to:

  - De-select behaviors.

  - Move subjects, behaviors, modifiers or Independent Variables to **On sheets**.

Lag Sequential Analysis in Detail

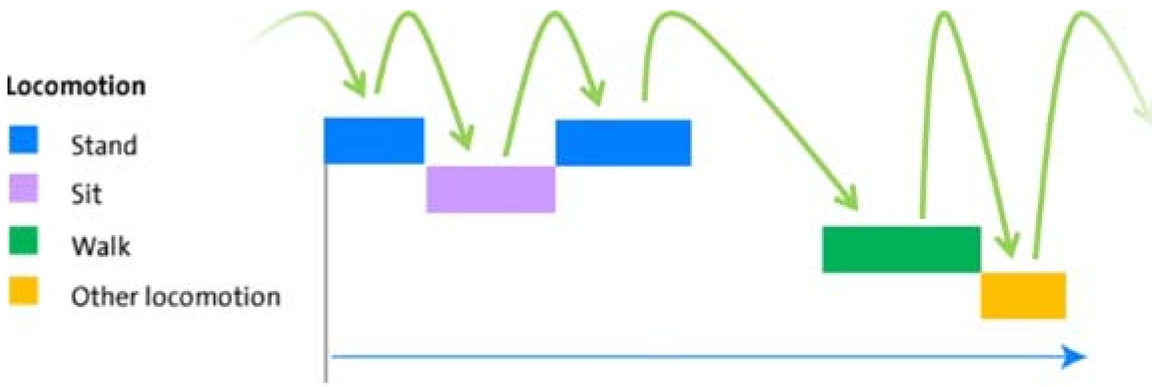
What information are you looking for?

- State lag in detail
- Time lag in detail
- Transitions with events with duration
- Transitions and Instantaneous sampling
- Transitions and multiple event logs

State lag in detail

A positive value of lag order N means that the program counts N events forward in time from the Criterion event. The transition is established from the criterion to the Nth event. A negative value for N means that the programs counts events back in time.

Example – The picture below shows events plotted along the time line. The example is general, including the case of a 'gap' between events - this occurs when events are filtered out in the data profile, or with event in a behavior group in which behaviors can overlap (start-stop).



A State lag with order +1 results in the following transitions (see the arrows in the picture above):

- X0 > *Stand*
- *Stand* > *Sit*
- *Sit* > *Stand* (2nd)
- *Stand* (2nd) > *Walk*
- *Walk*> *Other locomotion*

- *Other locomotion* > Y0

There are also transitions when a criterion is found but no the target, or the other way round. In the example above, from no event (X0) to 0.0 Stand, and from Other locomotion to no event (Y0).

See Understanding X0 and Y0

A State lag with order -3 results in the following transitions:

- *Stand* (2nd) > X0
- *Walk* > *Stand* (1st)
- *Other locomotion* > *Sit*
- Y0 > *Stand* (2nd).

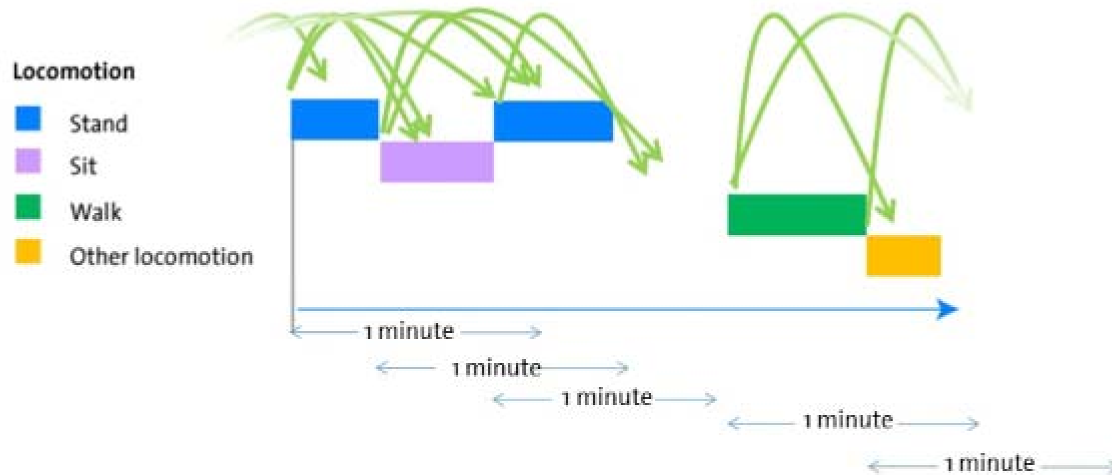
Gaps between events are not taken into account. So there is no transition from or to a gap.

Time lag in detail

The time lag can be negative, positive or partly negative and partly positive (for example, from -2s to +2s around each event). Transitions are counted from an event to another event starting within the time lag.

Example – The picture below shows events are plotted along the time line. The example is general, including the case of a 'gap' between events - this occurs when events are filtered out in the data profile, or with events in a behavior group type in which behaviors can overlap (start-stop).

Entering From 0 sec to 1 minute sec next to **Time lag** results in the following transitions (in the picture, horizontal arrows indicate the 1 minute time lag for each event).



- X0 > Stand
- X0 > Sit
- X0 > Stand (2nd)
- Stand > Sit
- Stand > Stand (2nd)
- Sit > Stand (2nd),
- Sit > Y0
- Stand (2nd) >Y0,
- Walk > Other locomotion
- Walk > Y0
- Other locomotion > Y0

Time lag and gaps

Transitions are also counted when no event is found in the time lag, (in the example above, see the transition from *Stand* (second instance) to [no event], or at the start and end of the observation.

See Understanding X0 and Y0

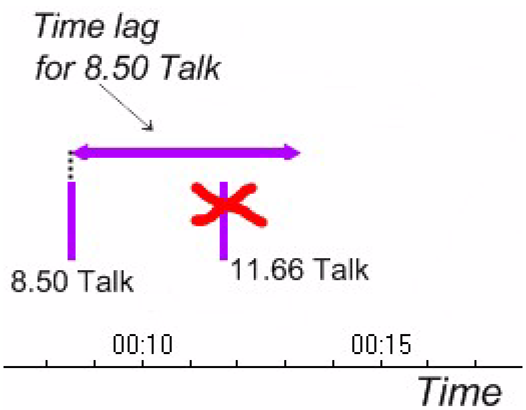
If there is a gap between events, the program does not count transitions from an event to the gap that falls in its time lag, unless there is no event at all in that lag.

When the time lag is partly negative and partly positive, transitions are calculated from the focal event to the events that precede or follow it.

To ignore recurring criteria

If you select the Ignore recurring criteria option, all events of the same type as the criterion that occur within the time lag are ignored as criterion events. Select this option when events of the same type occur next to each other, and you want to make sure that transitions from those events are not counted twice.

Example – In a time lag of 0-5 s of the criterion event 8.50 Talk the program finds another occurrence of Talk at 11.66 s. If you select Ignore recurring criteria, This event is ignored as a criterion. Therefore, the transition from 8.50 Talk and 11.66 Talk is counted, however there will be no transition from 11.66 Talk to any event following it within its time lag.

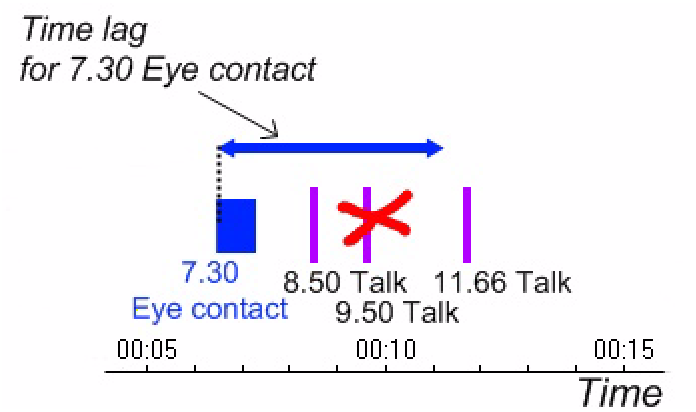


If the time lag is at least partly negative, the recurring criteria are ignored that occur within a time interval around the focal criterion whose length is twice as long as the longest side of the time lag. For example if the time lag is set to from -10 s to +5 s, selecting Ignore recurring criteria removes the recurring criteria from -10 s to +10 s for each focal criterion. If the time lag is set to from -3 s to +5 s, recurring criteria are removed from -5 to +5 s around each focal criterion.

To ignore recurring targets

If you select the Ignore recurring targets option, the second, third etc. instances of the same target within the time lag are ignored. Select this option when events of the same type occur next to each other, and you want to make sure that multiple transitions to those events are not counted.

Example – A 4-seconds time lag of the criterion event 7.30 Eye contact includes two occurrences of Talk, at 8.50 s and 9.50 s. If you select Ignore recurring targets, the second Talk is ignored as a target. Therefore, the transition from 7.30 Eye contact and 8.50 Talk is counted, not from 7.30 Eye contact to 9.50 Talk.



Note that 11.66 Talk is outside Eye contact's time lag, therefore a transition from 7.30 Eye contact to 11.66 Talk is not counted. Rather, a transition from 8.50 Talk to 11.66 Talk is counted when 8.50 Talk is considered as a criterion.

If the time lag is at least partly negative, the recurring targets are also removed in the negative part of the lag.

Transitions with events with duration

Transitions indicate a change from one event (Criterion) to another (Target) in a temporal sequence. In the case of state behaviors, which have a start and a stop event, transitions are always counted using start events only, even if you have coded the end event manually.

Transitions and Instantaneous sampling

If you have collected data with Instantaneous sampling, samples not scored are not taken into account when calculating transitions. For example, the sequence of samples (sample interval = 10 s):

0.0 A

10.0 - (not scored)

20.0 B

Results in a transition from 0.0 A to 20.0 B. This is the same result as if A and B were scored with Continuous sampling.

Transitions and multiple event logs

Lag sequential analysis is performed on each event log separately. If an observation contains multiple event logs, and you de-select Event Logs in the Layout page of the Lag Sequential Analysis window, transitions are counted within each event log, and then summed up in the transition matrix. Transitions across event logs are not calculated.

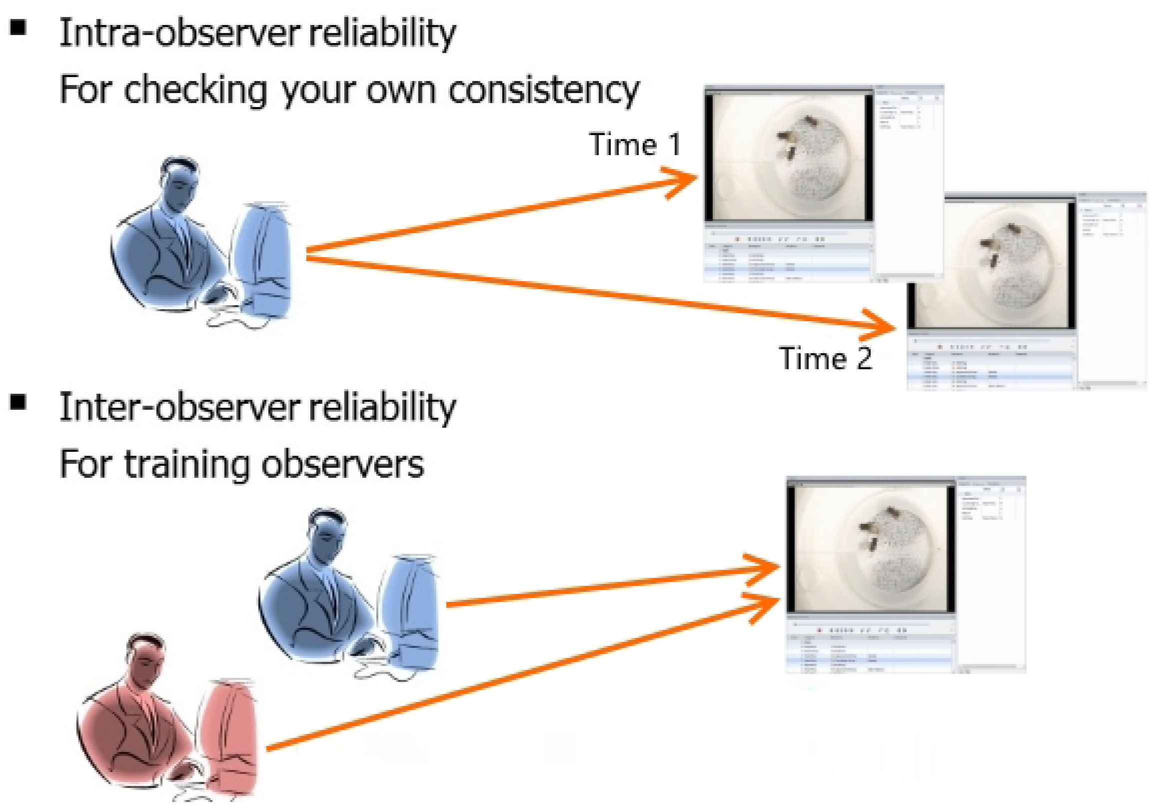
To calculate transitions like for example from event *Game starts*, scored in the event log “Event log 0001”, to event *Happy*, scored in the event log “FaceReader States” imported from FaceReader, follow the procedure below:

1. In your data profile, Select Intervals by Manual Selection
2. Under **Begin Interval**, specify the event you want to use as a criterion (*Game starts*).
3. Under *End Interval* specify the end of the same event (if you want to analyze transitions as long as the event occurs) or a time value (if you want to apply a time lag; do this if *Game starts* is an event without duration).
4. Calculate statistics with this data profile. Make sure that you include the **Total number** as a statistic.

   See Statistics in Detail in Calculate Statistics

The **Total number** column shows the number of times that a behavior occurs in the intervals specified. The *Happy* column/row displays the number of *Happy* occurrences in the specified time after *Game starts* took place. This provides results similar to time lag sequential analysis.

Reliability Analysis



Main topics

- What is Reliability Analysis?
- Reliability Analysis - Four Methods
- Reliability Analysis General Procedure
- Reliability Analysis Settings
- Reliability Analysis Methods in Detail
- The Reliability Analysis Result
- Effect of the Coding Scheme on Reliability Analysis

- Reliability Analysis and Gaps
- Frequently asked questions about Reliability Analysis

What is Reliability Analysis?

Consistency

In The Observer XT, Reliability Analysis assesses the extent to which two observations are in agreement with each other. This indicates how free the observations are is from random errors and to which extent repeated measurements of the same event produce the same results.

Reliability Analysis always works with pairs of observations. If you want to compare three or more observations with each other, you have to specify each combination of observations as the pairs for comparison.

Intra-observer reliability

Check your own consistency. At the beginning of a study, make a video of your study subjects, and code it with The Observer XT. You keep both the video and the observational data file as a reference. Periodically, for example once every six months, you score the same video again and measure the agreement between the new data set and the reference data set.

Inter-observer reliability

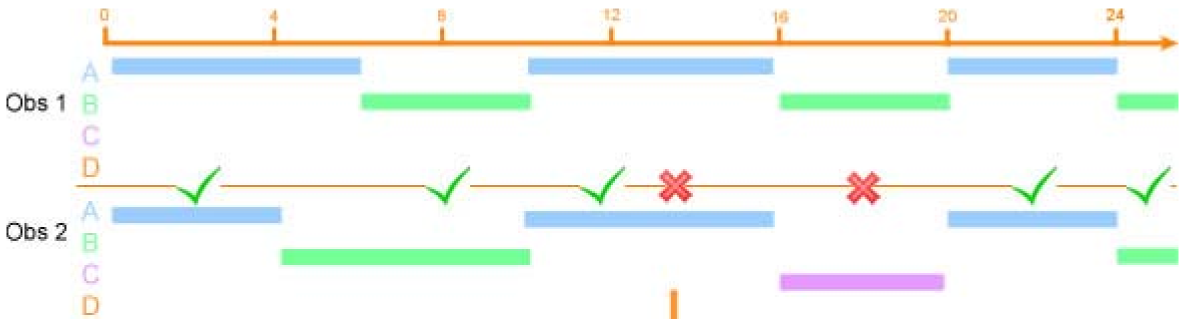
Train observers. If a new student joins your research group, he/she has to adopt the coding scheme used in your research. After, for example, one month of practice, test the trainee's data with a reference data file. Reliability analysis helps determining when the trainee is ready for the real work.

Reliability Analysis - Four Methods

Available methods

Frequency/Sequence

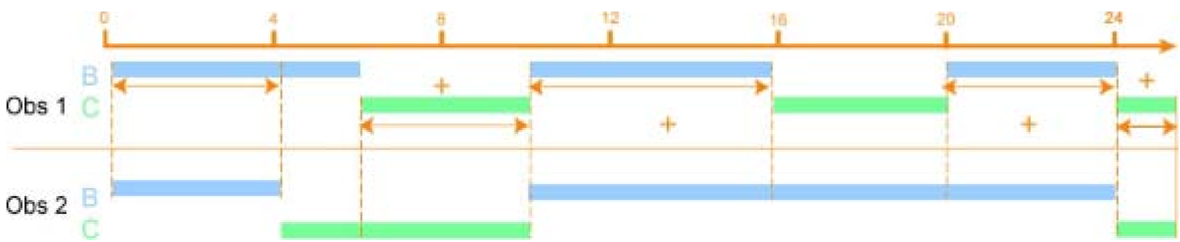
This method compares all event types. It compares the frequency of events and timing and overlap between the two observations.



See The Frequency/Sequence Method in Detail

Duration/Sequence

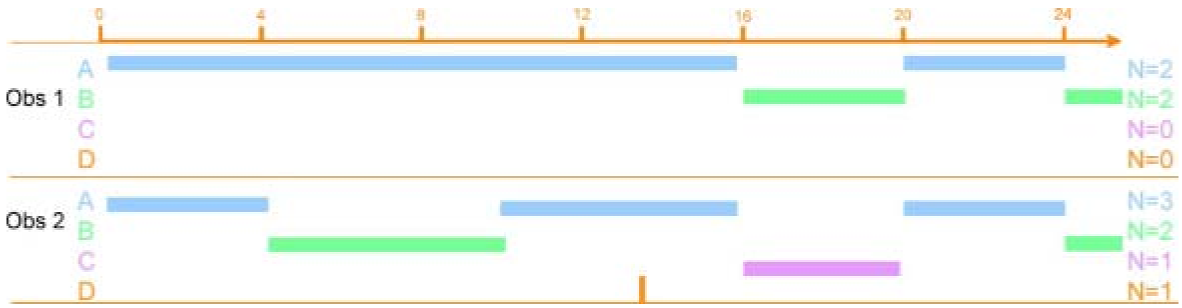
This method compares events with duration. It compares whether events overlap in two observations. It does not take into account events without duration and instantaneous sampling events.



See The Duration/Sequence Method in Detail

Frequency

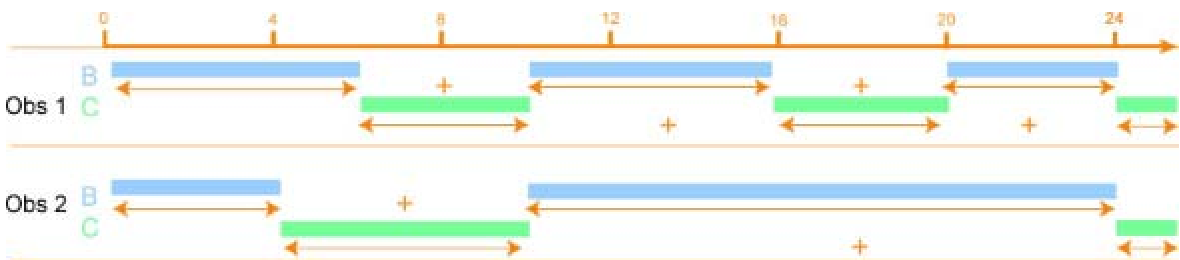
This method compares all event types. It compares the total number of occurrences of each event in the two observations. The duration or timing of events is not taken into account.



See The Frequency method in detail

Duration

This method compares events with duration. It compares the total duration of each event between two observations. The frequency or timing of events is not taken into account. It does not take into account events without duration and instantaneous sampling events.



See The Duration method in detail

Which method should I choose?

Frequency/Sequence

A detailed indicator of the correspondence between two observations when timing of the events is important.

Duration/Sequence

When you want to know to what extent two observers scored the same events with the same durations.

Frequency

When timing and duration of events are not important in your study. This method is suited for observations with a relatively high rate of transitions between events.

Duration

When you want to compare the duration of events but the timing is not important in your study.

Note

Just like in any other analysis, only the events selected in your active data profile will be used. If you run reliability analysis with the default data profile, all events in your observations will be used for comparison.

Reliability Analysis General Procedure

Aim

To determine the reliability of annotations, either between coders or between observations of the same coder.

Prerequisites

- Your license for The Observer XT includes the Advanced Analysis Module.
- You have at least two observations, scored from the same video or live scene.

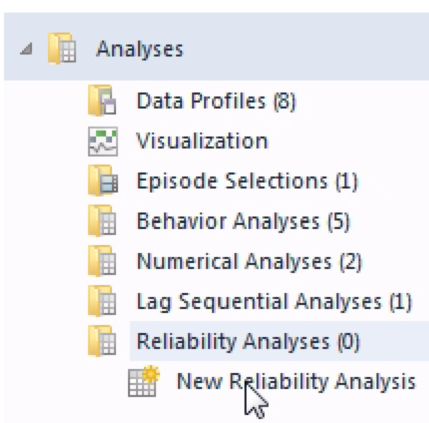
Procedure

1. Make sure that the data profile specifying the data you want to analyze is active, that is, highlighted in blue in the Project Explorer.
2. Do one of the following:

   - Choose **Analyze** > **Reliability Analysis** > **New**.

   - In the Project Explorer, click the **Analyses** folder. Then choose **Analyze data** > **Reliability Analysis**.

   - In the Project Explorer, expand the **Analyses** item. Click **Reliability Analysis** > **New Reliability Analysis**.

   The Reliability Analysis Settings window appears.
3. In the **Pairs** tab, add the pairs of observations you want to compare.

   See Choose the Observations to compare

4. In the **Settings** tab, select the **Comparison method** and additional settings.

   See Choose the Comparison Settings

5. Click **OK** to calculate the reliability statistics.
6. Optionally, edit the table layout.

   See Choose table layout options

The results of the selected Comparison method are shown in the The Reliability Analysis Result. The Statistics, and Confusion Matrix are displayed. If you selected the Frequency/Sequence method, the Results also contains the Comparison List.

Save your analysis settings

To save the settings specified in your analysis, click the **Set default** button. If this window is gone, click **Settings** on top of the result window. The settings for the **Settings** and **Layout** tab are saved.

Apply settings to a new analysis

If you are about to run reliability analysis and want to recall the settings you have specified earlier, click the **Reset to default** button. The settings for the **Settings** and **Layout** tab are restored.

Reliability Analysis Settings

What do you want to do?

- Choose the Observations to compare
- Choose the Comparison Settings
- Choose table layout options

Choose the Observations to compare

Aim

To select which pairs of observations to use for the Reliability Analysis.

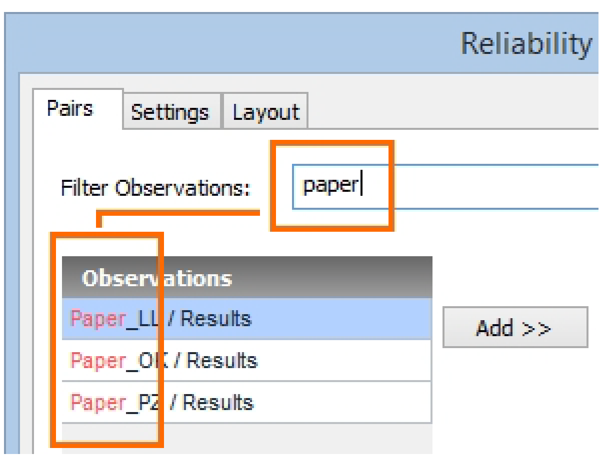
Prerequisites

- You carried out at least one pair of observations.
- The **Settings** tab of the **Reliability Analysis Settings** window is open (Choose **Analyze** > **Reliability Analysis** > **New** > **Settings**).

Procedure

Select an observation in the list with observations and click the **Add>>** button. Add as many pairs as you want.

> **TIP** If you have many observations, type part of the name in the **Filter observations** field. For example, you have a large number of observations with the type of patients file (on paper or on tablet) in the observation name. In the **Filter Observations** field, type the name of patients file type. As a result, the list of observations only shows the observations with that type in the name. To reset the filter, click the 'x' icon at the right of the **Filter Observations** field.



Notes

- If your observations contain two or more event logs, you must select single event logs for comparison. To do so, create a data profile with a filter on the event logs.

See Filter Observations

- If the list does not include an observation, it could be due to that observation containing errors. Open the observation and check for errors.

  See Check the event log for errors

- Reliability analysis is meant to be applied to whole observations. It is recommended not to apply a data profile where data are merged or split in intervals or time bins.
- If your data profile contains more than one result container (see Create Groups of Data), you need to specify one of them for each observation. The lists show all the combinations of observations and result containers.
- You can also add an observation pair in the **Statistics** view of the reliability analysis results by clicking the empty row at the bottom (indicated by **Click to add Observation**).
- Always select the observation that is the 'gold standard' as the first observation in a pair. This because when you view the paired events in the comparison list, you see the video image associated with the first observation, not the second.

Edit the selection

To replace observations

To replace observations in a pair in the **Observation Pairs** list, click on the observation you want to replace. The observation name becomes highlighted in blue. Now add the new observation, this will replace the old one.

To remove pairs

To remove a specific observation pair, click on one of the observations of that pair and click the **Remove pair** button.

To remove the whole list of observation pairs, click the **Remove all pairs** button.

Choose the Comparison Settings

Aim

To choose the way The Observer XT compares the observation pairs.

Prerequisites

- You carried out at least one pair of observations.
- The **Settings** tab of the **Reliability Analysis Settings** window is open (Choose **Analyze** > **Reliability Analysis** > **New** > **Settings**).

  TIP Click on one of the **Quick help** buttons to read more about an option or setting.

Settings

- Comparison method
- Tolerance window
- Analyze gaps between events
- Comparison scope
- Synchronization
- Show extra Kappa statistics
- Combine multiple pairs of observations
- Modifiers

Comparison method

Select a comparison method from the list.

See Reliability Analysis - Four Methods

Tolerance window

The **Tolerance window** setting is only available if you have selected the Frequency/ Sequence comparison method.

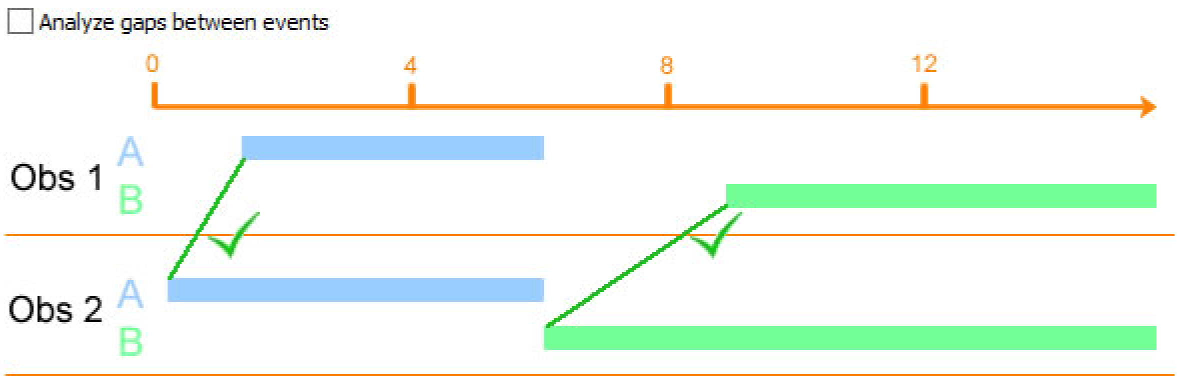
The tolerance window defines how accurate the timing of an event (in the comparison between two observations in Reliability Analysis) must be to be considered an agreement or not. For example, if in Observation 1 the event 'Gaze at screen' occurs at 4.0 s and stops at 6.0 s while in Observation 2 it starts at 6.5 s, that is counted as an agreement when the tolerance window is set to 3 s. However, if the tolerance window is set to 1 s, the two events are counted as a disagreement as the mismatch between their start times (2.5 s) is greater than the tolerance window.

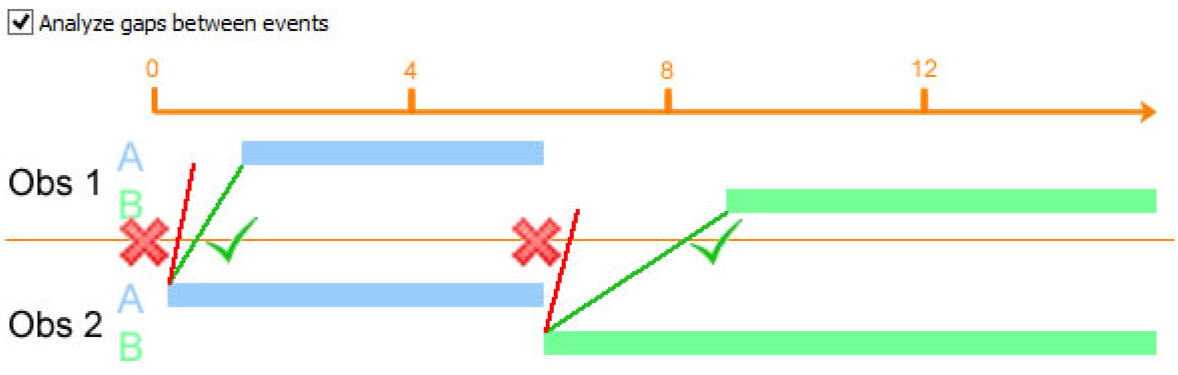
Analyze gaps between events

Analyze gaps between events is only available if you select Frequency/Sequence or Duration/Sequence as a comparison method. With this option, The Observer XT also takes gaps between events into account when comparing two observations. A gap is a time-interval in an observation in which no event was scored for a specific behavior group.

> **IMPORTANT** Analyzing gaps between events may give unexpected results. We advise you to only select it if the stop of events are important for your analysis.

The example in the figure below shows the effect of including gaps in a reliability analysis with the Frequency/Sequence method. The figure shows two observations scored with two events, A and B. Observation 1 contains gaps, Observation 2 does not.





The way gaps are compared differs between the comparison methods and also between behavior group types.

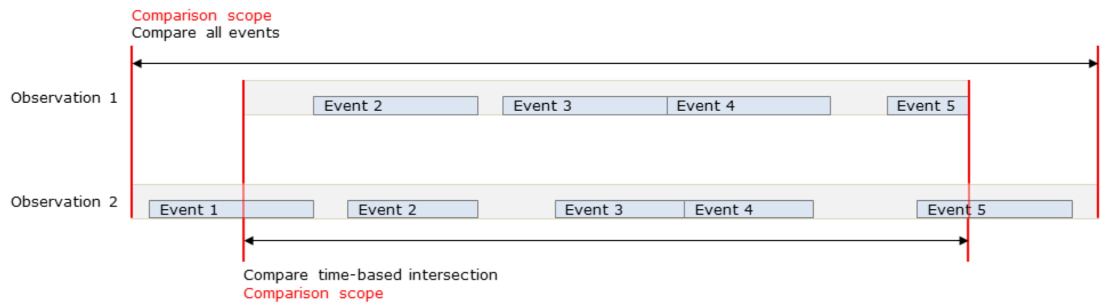
See Reliability Analysis and Gaps

Comparison scope

With comparison scope, you define what section of the observations is compared for analysis. Select the following:

- Compare all events (default) – To compare all the events no matter whether one observation is longer than the other.
- Compare time based intersection – To compare two observations that differ in length, and you want to compare only the events in the time period shared by both observations.

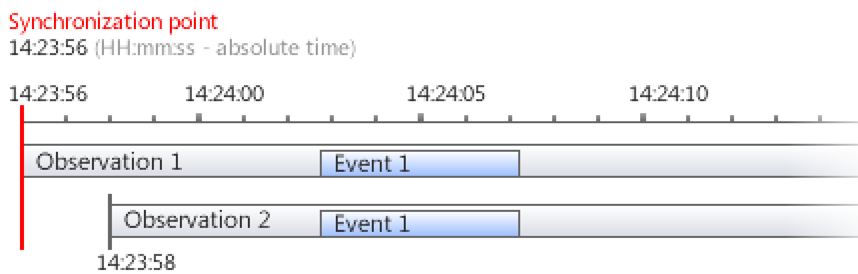
Example – Two observers score data from a video file. One observer starts scoring later and stops earlier in the video than the other observer. The result is that the second observation will be longer then the other. If you select **Compare time based intersection**, The Observer compares the video segments that both observers scored.



Synchronization

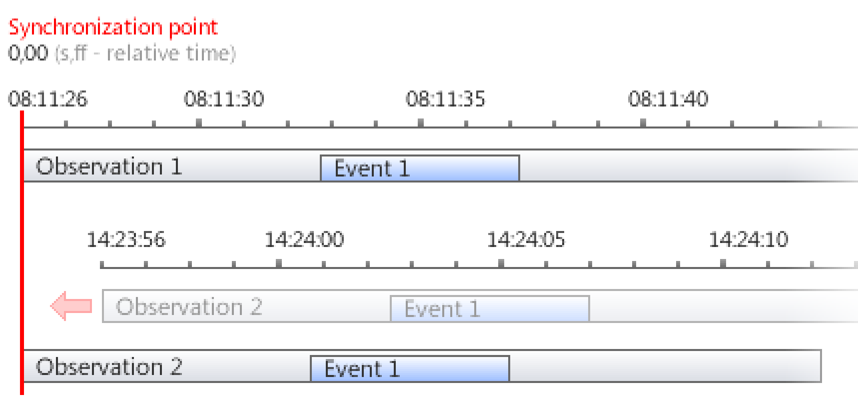
To select the way two observations in a pair are aligned:

- Use absolute start times (clock times) – Select this option if your observations were scored live, and you want to align them according to their 'true' start time (for example, 14h 23min 56s).

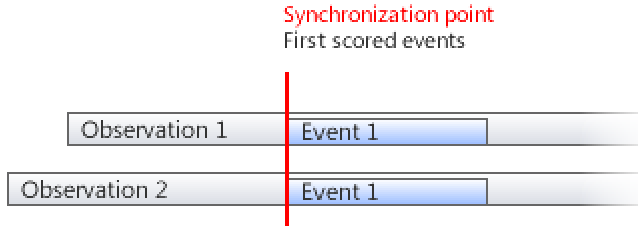


- Align the start of observations – Select this option if you coded from video and started your observations at the same moment in the video.

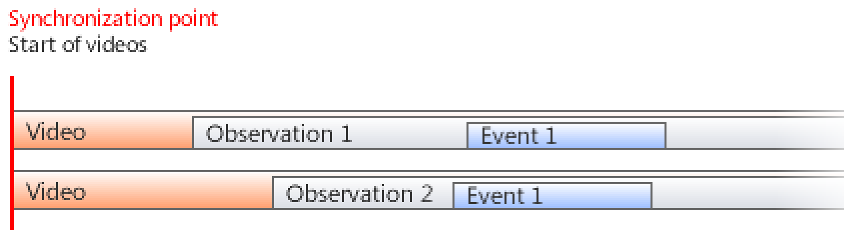
  Do not use this option when you score live and observers do not start scoring at the exact same time.



- Align first scored events – Select this option if you want to take the first event you scored in each observation as a synchronization point. For example, if a classroom carried out live scoring of a projected video, previously scored by an expert.



- Align video start time – Select this option if you score from video, but observer 1 started coding at another moment in the video than observer 2. For example, observer 1 started to code the video at t=0:00:00 and coded an event at t=0:01:00 and observer 2 started at t=0:00:50 and coded the same event about 10 seconds after that start.



Show extra Kappa statistics

Select this option to calculate the minimum, maximum and average Kappa of all the combined observation pairs. This enables you to easily see how much Kappa varies between your observation pairs.

Note that the average Kappa is not the same as the Kappa of the combined results of two or more pairs of observations.

See Why are the Combined kappa and Average kappa not the same?

Combine multiple pairs of observations

Select **Include all results combined** to get an additional row in the Reliability Analysis results sheet that sums up all agreements and disagreements from all pairs of observations.

Statistics | Confusion Matrix | Comparison List

Pair	Observation A	Observation B	Agreement	Disagreement
1	Observation 1A / Results	Observation 1B / Results	5	2
2	Observation 2A / Results	Observation 2B / Results	2	5
3	Observations A combined	Observations B combined	7	7

When you select **Include all results combined**, each observation should occur in only one pair in the list. An overall Kappa or Rho value obtained with many pairs of observations is likely to be affected by bias and prevalence due to the large numbers in some cells of the matrix, not in others. Furthermore, an overall Kappa means losing information on single pairs of observations. In addition, it is always a good idea to export the Kappa values for each pair of observations, and then make a histogram of those values to see how they are distributed. Some observations or observers may be more associated with a lower Kappa than others. There may be observations in which some behaviors which are difficult to observe are prevalent, so they result in low Kappa values.

Modifiers

If you select **Include Modifiers**, these are included in the events to compare.

If some of the modifiers are numerical and you use the Frequency/Sequence comparison method, you can enter a **Margin on numericals** as a tolerance value. Modifiers in two events of the same type that differ by less than the margin result in an agreement.

See also the example in Confusion Matrix

Choose table layout options

Aim

To select the number of decimals in the results table and specify how to display elements that are in the coding scheme, but are not scored in any of the observations.

Prerequisite

You carried out at least one pair of observations.

Number of decimals

1. Open the **Settings** tab of the **Reliability Analysis Settings** window (Choose **Analyze** > **Reliability Analysis** > **New** > **Settings**).
2. Choose a number from the **Number of decimals** list.

Show elements not scored

1. Open the **Layout** tab of the **Reliability Analysis Settings** window (Choose **Analyze** > **Reliability Analysis** > **New** > **Layout**).
2. Select **Show not scored elements** if you want the result to include the event types that were not scored in any observation. If you do so, the matrix of agreements and disagreements (see Confusion Matrix for an example) will be larger. The cells corresponding to not scored events will contain the missing value symbol.

   See Show missing values as

   If the option is not selected (default), only the event types that were scored in at least one observation are included in the result.

Show missing values as

1. Open the **Settings** tab of the **Reliability Analysis Settings** window (Choose **Analyze** > **Reliability Analysis** > **New** > **Setting**).
2. Choose the character you want to have displayed for missing values in the confusion matrix.

Reliability Analysis Methods in Detail

Methods

- The Frequency/Sequence Method in Detail
- The Duration/Sequence Method in Detail
- The Frequency method in detail
- The Duration method in detail

The Frequency/Sequence Method in Detail

Calculation

For each pair of observations selected in the **Pairs** tab of the Reliability Analysis **Settings** window, The Observer XT analyzes the two observations in five runs. The Observer XT searches for matches between state events and matches between point events. State events are never matched to point events.

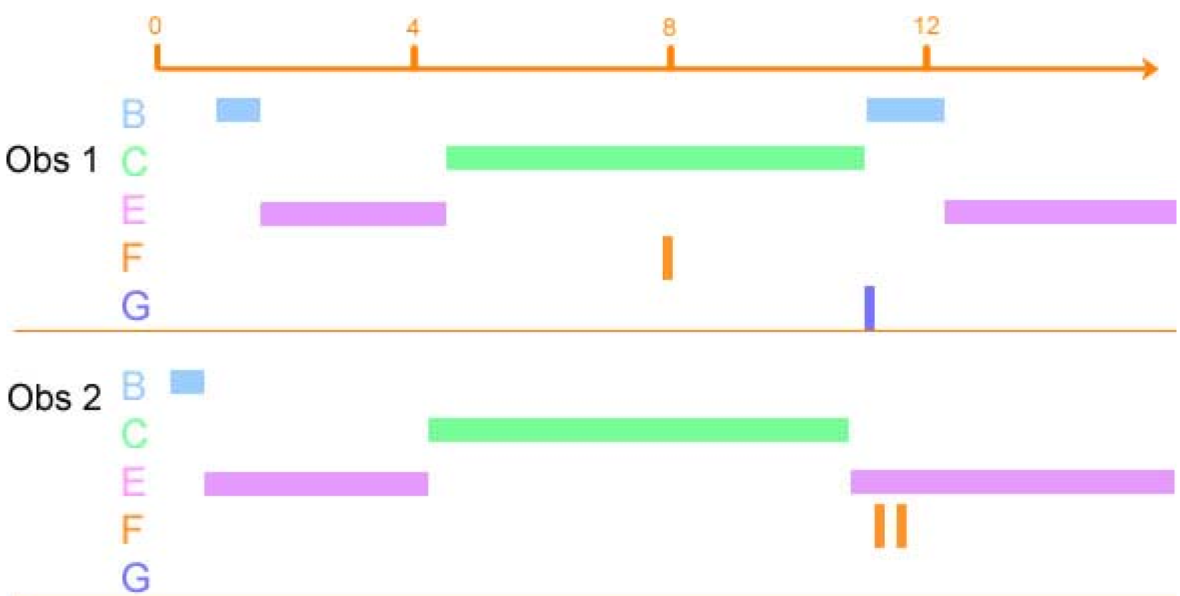
Gaps between events are only included in the calculation, if you select the option Analyze gaps between events

See also:

- Effect of Behavior group - Frequency/Sequence method
- Reliability Analysis and Gaps

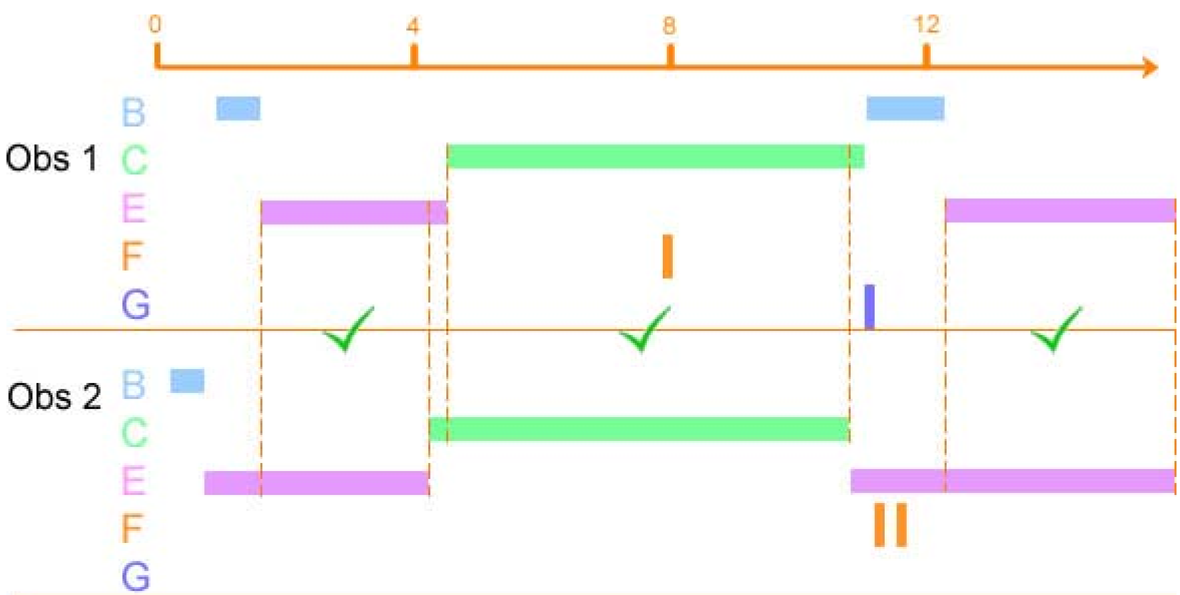
Example

See the example below of two observations. B, C, and E are events with duration. F and G are events without duration. A tolerance window of 1 s was used and gaps between events were not analyzed.



Run 1- Find overlapping events.

The program searches for events of the same type in the two observations that overlap in time at least partially. The onset and offset times of the events needs not be the same.

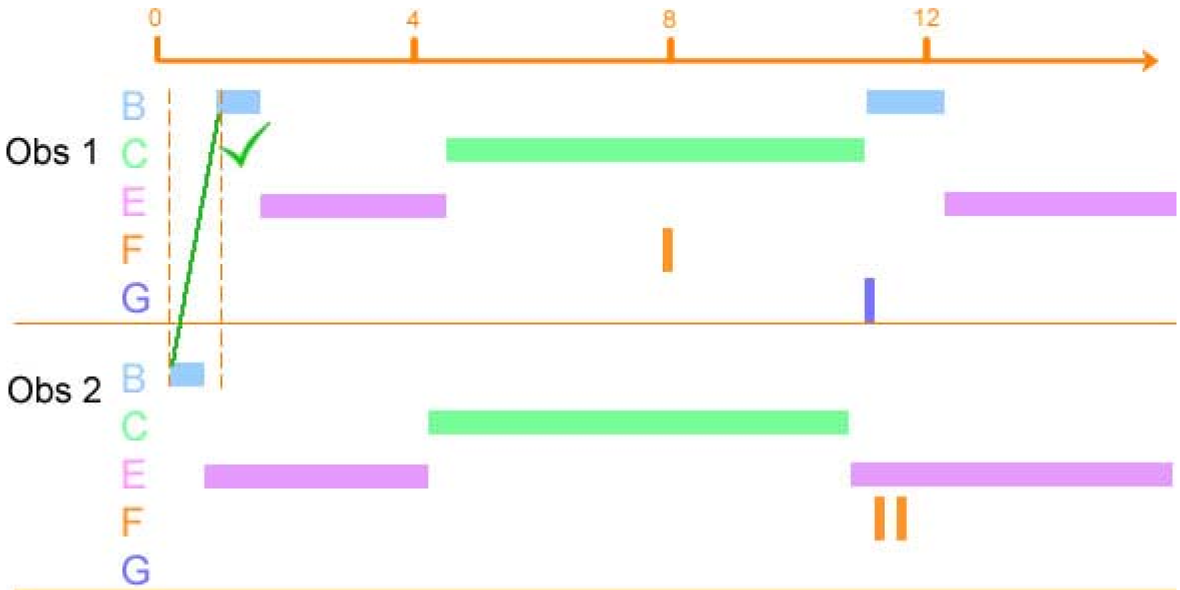


The following agreements are scored:

- 1.6 Event E Obs 1) - 0.8 Event E (Obs 2)
- 4.5 Event C (Obs 1) - 4.1 Event C (Obs 2)
- 12.3 Event E Obs 1) - 10.7 Event E (Obs 2)

Run 2 - Find overlapping events within the tolerance window.

The program searches for events of the same type among all those that have not been considered in the previous run, and scores agreements between those which do not overlap, but their onset time differ less than the Tolerance window (dotted lines).

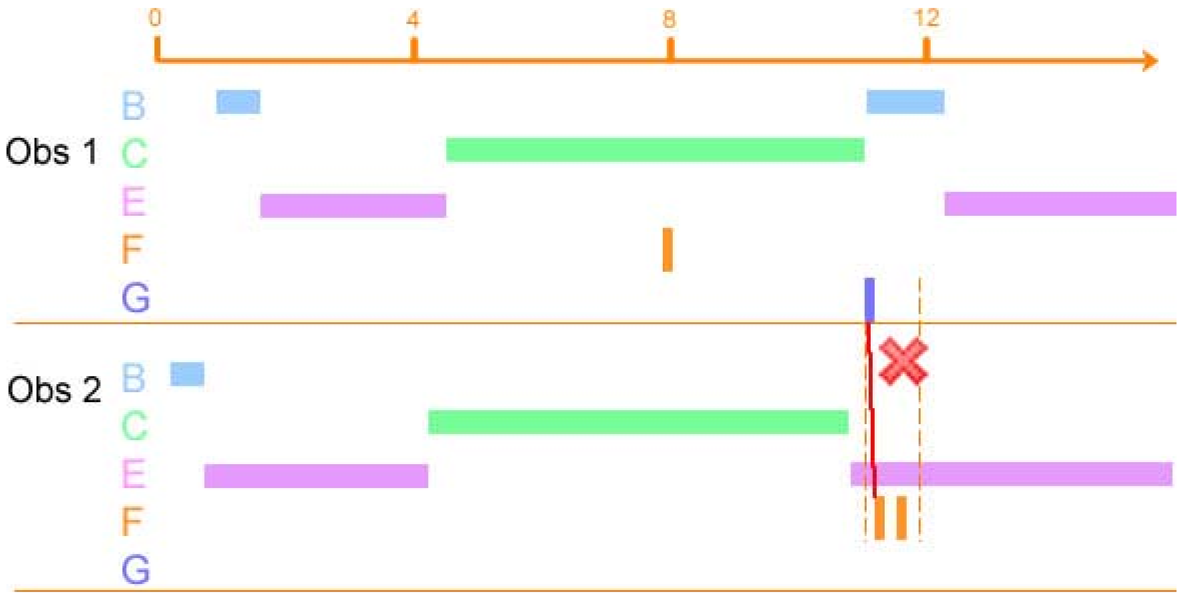


The onset times of Event B differs by less than the tolerance window. The following agreement is scored:

0.9 Event B (Obs 1) - 0.2 Event B (Obs 2)

Run 3 - Find disagreements - first event within tolerance window

The program considers the events left out in the previous runs, and searches for any event in the other observation within the tolerance window (dotted lines) that overlaps the event in the first observation. If multiple events are available in the other observation, then the first event is considered. Pairing in run 3 always results in disagreements, because if the events are of the same type they would have been considered as an agreement in run 1 or 2.

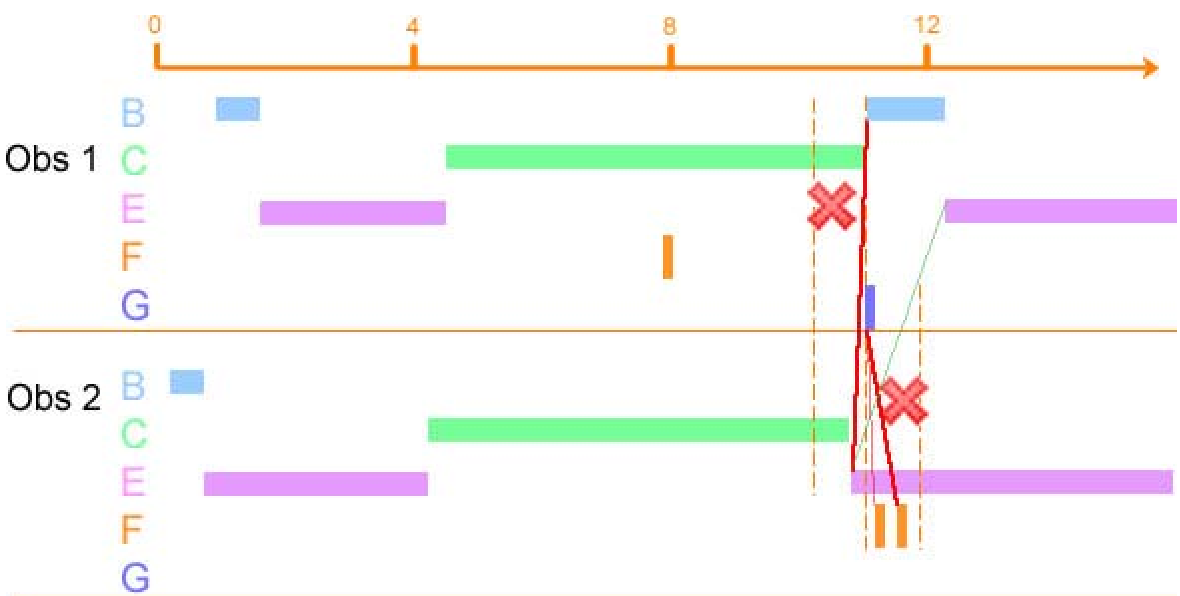


The following disagreement is scored:

11.0 Event G (Obs 1) - 11.2 Event F (Obs 2)

Run 4 - Find disagreements: any event within tolerance window.

The program considers the events left out in the previous runs, however it searches for any event in the other observation within the tolerance window (dotted lines), even if that has been scored as agreement or disagreement in a previous run. If multiple events are available in the other observation, then the last event is considered. Pairing results in disagreements.



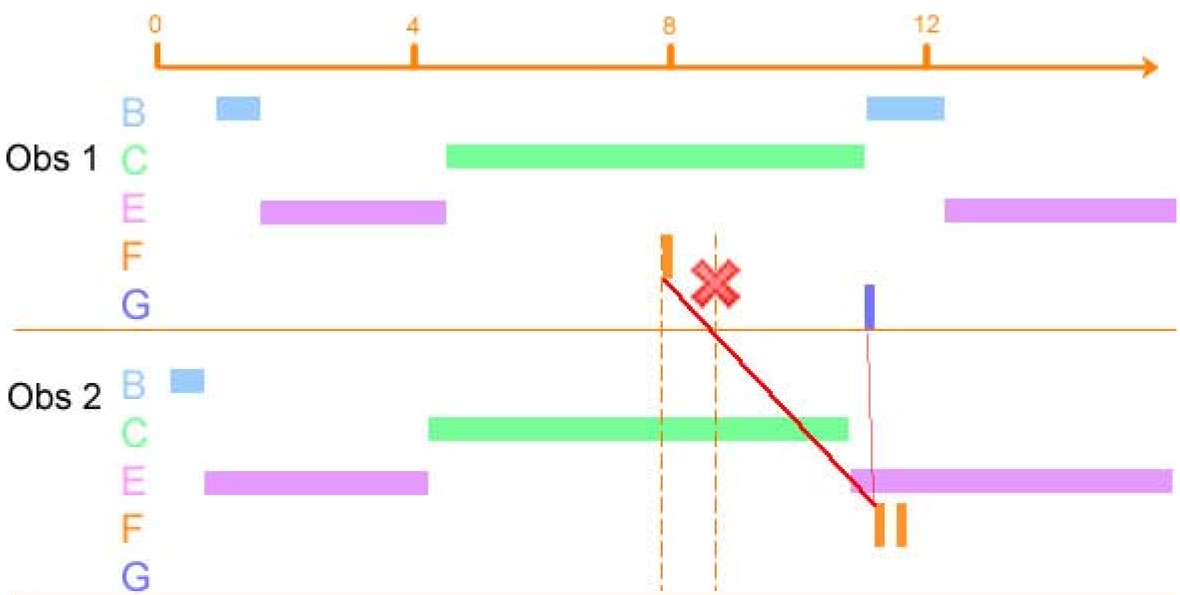
The following disagreement is scored:

- 11.0 Event B (Obs 1) - 10.7 Event E (Obs 2)
- 11.0 Event G (Obs 1) - 11.9 Event F (Obs 2)

Please note that 10.7 Event E (Obs 2) was also paired as agreement in run 1 (transparent green line). This is one of the frequent cases in which an event produces one agreement and one or more disagreements. 11.0 Event G (Obs 1) was also paired as disagreement in run 3 (transparent red line).

Run 5 - Find disagreements: events outside the tolerance window.

The program considers the events that have not been considered in the previous runs, and searches for the most nearby event in the other observation that has yet to be scored as agreement or disagreement. If two events are equally far in time from the focal event, the first of the two is considered. Pairing results in disagreements. If the paired events are of the same type, which is the case in the example below, they are scored as Window Error



The following disagreement is scored:

8.0 Event F (Obs 1) - 11.7 Event F (Obs 2)

Please note that 11.2 Event F (Obs 2) was also paired as disagreement in run 3 (transparent red line).

References

For more information, please see the following paper: Jansen, R. G., Wiertz, L. F., Meyer, E. S., & Noldus, L. P. (2003). Reliability analysis of observational data: Problems, solutions, and software implementation. *Behavior Research Methods, Instruments, & Computers*, **35(3)**, 391-399.

For general information about reliability analysis see Haccou, P., & Meelis, E. (1992). Statistical analysis of behavioural data: An approach based on time-structured models. Oxford University Press.

Notes

Agreements and Disagreements

The number of Agreements (A) and Disagreements (D) are used in calculation of the reliability statistics. Each count represents an event pair.

See Statistics

You find these values by adding up the cells in the Confusion Matrix. The number of Agreements is the sum of the cells in the diagonal (in green). *The number of Disagreements* is the sum of off-diagonal cells (in red), including **Window Error**, **Modifier Error** and **No Records**.

Paper_LL / Results	Paper_OK / Results									
Behaviors	Businesslike open question	Businesslike closed question	Empathic open question	Wrapping up	Explaining	Other communication	No communication	**No Records**	**Window Error**	**Total**
Businesslike open question	-	-	1	-	-	-	-	-	-	1
Businesslike closed question	1	-	-	-	-	1	-	-	-	2
Empathic open question	-	-	-	-	-	-	-	-	-	-
Wrapping up	-	-	-	-	-	-	-	-	-	-
Explaining	-	-	-	1	-	-	-	-	-	1
Other communication	-	-	-	1	3	6	1	-	-	11
No communication	-	-	-	-	-	5	4	-	-	9
No Records	-	-	-	-	-	-	-	-	-	-
Window Error	-	-	-	-	-	2	-	-	-	2
Total	1	-	1	2	3	14	5	-	-	26

Stop times

The stop times are not compared, however they are compared indirectly. When you score the stop of a behavior without starting a new one, there are gaps between events (like in the picture above). If you selected to Analyze gaps between events, The Observer XT treats such gaps as <Gap “Behavior name”> and find matches between them just like events. For more information, see <Gap “Behavior name”>and Reliability Analysis and Gaps

Analyze modifiers

- If behavioral modifiers are not defined in your coding scheme, the Behavior Modifiers options in the settings window is not available.
- If you select the Include Modifiers options, comparison of events is more discriminating, as two events with the same subject or behavior but different modifiers will result in a disagreement. De-selecting this option makes the comparison of events less selective.

Choose specific event logs for comparison

In the Reliability Analysis Settings window, you choose observation for comparison. If your observations include two or more event logs, this window does not distinguish between them. To select a specific event log, open your data profile (or create a new one) and create a Result container for each event log. Next, filter event logs in such a way that the event logs you want to compare end up in different Results boxes. Then, in the Reliability Analysis Settings window, choose the combination Observation*Result container to specify an event log for comparison.

Comments

If you have scored comments without associated behaviors, these rows in the Event log result in <Missing behavior> in the analysis, which are treated as events without duration in the reliability analysis. This affects the outcome of the reliability analysis. To avoid this, create a data profile (see Select Data for Analysis) and use a filter box in which you select all behaviors. This filter box removes the lines in your event log that contain only comments. Then carry out the reliability analysis.

The Duration/Sequence Method in Detail

Calculation

In the Duration/Sequence method, only events with duration are taken into account. For each observation pair, The Observer XT compares the total duration that the events of the same type overlap in both observations. Gaps between events are only included in the calculation, if you select Analyze gaps between events

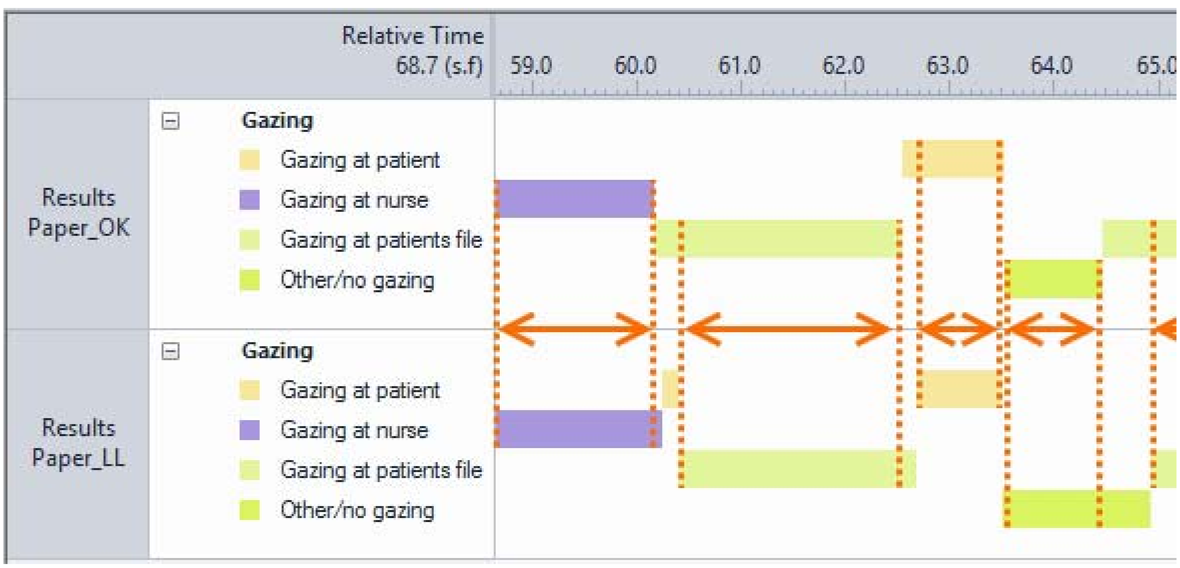
Suppose you observe Event *B* and Event *C* in two observations, *i* and *j*.

The agreements (*A*) are calculated as follows:

$$A = B_i \cap B_j + C_i \cap C_j$$

Where $B_i \cap B_j$ is the duration event B overlaps in Observations i and j and $C_i \cap C_j$ is the duration event C overlaps in Observations i and j.

See the picture below for an example. *A* is the total of all durations indicated by an arrow.



The disagreements (*D*) is the total duration that events of the same type do not overlap. If the observations are compared entirely, the events within the observation do not overlap, and both observations have the same duration, then *D* = the observation duration - *A*.

Note

Agreements and Disagreements

The values *A* and *D* are used in calculation of the reliability statistics.

See Statistics

See also

- Effect of Behavior group - Duration/Sequence method
- Reliability Analysis and Gaps

Example

Four behaviors have the following overlapping duration in two observations.

	Total duration same event overlaps in both observations (s)
Gazing at patient	28.8
Gazing at nurse	14.1
Gazing at patients file	12.3
Other gazing behavior	12.5

Agreements (*A*) = 28.8 +14.1 + 12.3 + 12.5 = 67.7 s

You also find these numbers in the diagonal of the Confusion matrix.

Paper_LL / Results	Paper_OK / Results						
	Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**No Records**	**Total**
	Gazing at patient	28.8	0.5	0.3	0.1	-	29.7
	Gazing at nurse	0.2	14.1	0.1	0.5	-	14.8
	Gazing at patients file	0.4	0.4	12.3	-	-	13.1
	Other/no gazing	1.0	1.2	0.5	12.5	-	15.2
	No Records	-	-	-	1.2	-	1.2
	Total	30.4	16.1	13.1	14.3	-	74.0

The observation duration is 74.0 s.

The Disagreements (*D*) is 74.0 - 67.7 = 6.3 s.

You also find these numbers by adding up the numbers outside the diagonal of the Confusion matrix, including the **No Records**. The sum of these values is 6.4. The small difference with the calculated *D* is because of a rounding effect.

Paper_LL / Results	Paper_OK / Results						
	Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**No Records**	**Total**
	Gazing at patient	28.8	0.5	0.3	0.1	-	29.7
	Gazing at nurse	0.2	14.1	0.1	0.5	-	14.8
	Gazing at patients file	0.4	0.4	12.3	-	-	13.1
	Other/no gazing	1.0	1.2	0.5	12.5	-	15.2
	No Records	-	-	-	1.2	-	1.2
	Total	30.4	16.1	13.1	14.3	-	74.0

Gaps

If you select Analyze gaps between events, a gap is treated as an event, so the time nothing is scored in both observations is treated as agreement. Mind that this may lead to a high agreement between observation if the gaps are large compared to the scored events.

See Reliability Analysis and Gaps

The Frequency method in detail

Calculation

For each observation pair, The Observer XT compares the total number of occurrences of each event. Gaps between events are not included in the calculation.

Suppose you observe Event *B* and Event *C* in two observations *i* and *j*.

The agreements (*A*) are calculated as follows:

$$A = min[B_i, B_j] + min[C_i, C_j]$$

Where B_i and B_j are the total number of occurrences Event *B* in observation i and observation j. C_i and C_j are the total number of occurrences of Event *C* in observation i and observation j.

A (Agreements) is the sum of the minimum occurrences of events *B* and *C*.

The disagreements (*D*) are calculated as follows:

$$D = [max[B_i, B_j] + max[C_i, C_j]] - A$$

The values *A* and *D* are used in calculation of the reliability statistics.

See Statistics

Example

You observe the following total durations of four behaviors in two observations.

	Observation 1 Total number	**Observation 2** Total number
Gazing at patient	10	12
Gazing at nurse	7	7
Gazing at patients file	5	5
Other gazing behavior	5	6

Agreements (*A*) = 10 +7 + 5 + 5 = 27

You also find these numbers in the diagonal of the confusion matrix.

Paper_OK / Results

Paper_LL / Results

Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**Error**	**Total**
Gazing at patient	10	-	-	-	2	12
Gazing at nurse	-	7	-	-	-	7
Gazing at patients file	-	-	5	-	-	5
Other/no gazing	-	-	-	5	1	6
Error	-	-	-	-	-	-
Total	10	7	5	5	3	30

Disagreements (*D*) = (12+7+5+6) - 27 = 3

You also find these numbers when you add up the **Total Error** cells of the confusion matrix.

Paper_OK / Results

Paper_LL / Results

Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**Error**	**Total**
Gazing at patient	10	-	-	-	2	12
Gazing at nurse	-	7	-	-	-	7
Gazing at patients file	-	-	5	-	-	5
Other/no gazing	-	-	-	5	1	6
Error	-	-	-	-	-	-
Total	10	7	5	5	3	30

The Duration method in detail

Calculation

In the Duration method only events with duration are taken into account. For each observation pair, The Observer XT compares the total duration of each event type, which is the sum of the durations of the individual events. Gaps between events are not included in the calculation.

Suppose you observe Event *B* and Event *C* in two observations.

The agreements (*A*) are calculated as follows:

$$A = min[B_i, B_j] + min[C_i, C_j]$$

Where B_i and B_j are the total durations of Event *B* in observation i and observation j. C_i and C_j are the total durations of Event *C* in observation i and observation j.

A (Agreements) is the sum of the minimum durations of events *B* and *C*.

The disagreements (*D*) are calculated as follows:

$$D = [max[B_i, B_j] + max[C_i, C_j]] - A$$

The values *A* and *D* are used in calculation of the percentage and proportion of agreements, Kappa, Rho, and other statistics.

See Statistics

Example

You observe the following total durations of four behaviors in two observations.

	Observation 1 Total duration (s)	**Observation 2** Total duration (s)
Gazing at patient	29.7	30.4
Gazing at nurse	14.8	16.1
Gazing at patients file	13.1	13.1
Other gazing behavior	15.2	14.3

Agreements (*A*) = 29.7 +14.8 + 13.1 + 14.3 = 71.9 s

You also find these numbers in the diagonal of the Confusion matrix.

Paper_LL / Results	Paper_OK / Results					
Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**Error**	**Total**
Gazing at patient	29.7	-	-	-	-	29.7
Gazing at nurse	-	14.8	-	-	-	14.8
Gazing at patients file	-	-	13.1	-	-	13.1
Other/no gazing	-	-	-	14.3	0.9	15.2
Error	0.8	1.3	0.1	-	-	2.1
Total	30.4	16.1	13.1	14.3	0.9	74.9

Disagreements (*D*) = (30.4+16.1+13.1+15.2) -71.9 = 2.9 s.

You also find these numbers when you add up the **Total Error** cells of the confusion matrix. The value 3.0 instead of 2.9 is due to a rounding effect.

Paper_LL / Results	Paper_OK / Results					
Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	**Error**	**Total**
Gazing at patient	29.7	-	-	-	-	29.7
Gazing at nurse	-	14.8	-	-	-	14.8
Gazing at patients file	-	-	13.1	-	-	13.1
Other/no gazing	-	-	-	14.3	0.9	15.2
Error	0.8	1.3	0.1	-	-	2.1
Total	30.4	16.1	13.1	14.3	0.9	74.9

The Reliability Analysis Result

How to display the results

1. Choose **Analyze** > **Reliability Analysis** > **New**.
2. Select the settings and click **OK**.

   See Reliability Analysis General Procedure

The results windows

The Reliability Analysis results consists of the following windows:

- Statistics
- Confusion Matrix
- If you selected the Frequency/Sequence comparison method, the Reliability Analysis Result also contains the Comparison List

To save a result

To save a result, click the **Archive** button on the toolbar of the result window, or from the **Analyze** menu, select **Archive Analysis Results**.

To re-open a saved result, click the **Open Archive** button on the toolbar or choose **Analyze** > **Reliability Analysis** > **Open Archive**.

For more information on saving, opening and exporting results, see Manage Analysis Results in File Management

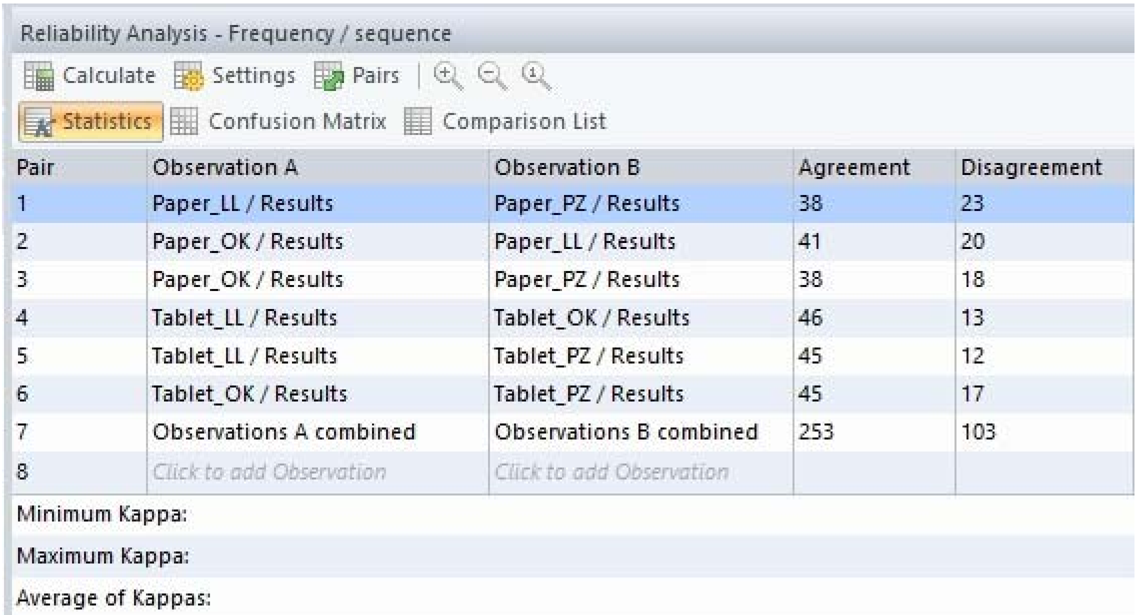
To print a result

To print a result, choose **File** > **Print**.

Note

You cannot edit the content of the Reliability Analysis Results sheet.

Statistics



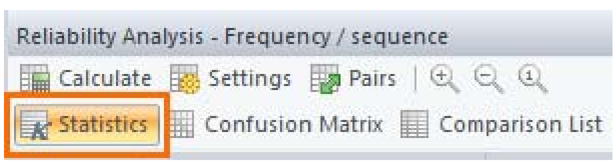
Pair	Observation A	Observation B	Agreement	Disagreement
1	Paper_LL / Results	Paper_PZ / Results	38	23
2	Paper_OK / Results	Paper_LL / Results	41	20
3	Paper_OK / Results	Paper_PZ / Results	38	18
4	Tablet_LL / Results	Tablet_OK / Results	46	13
5	Tablet_LL / Results	Tablet_PZ / Results	45	12
6	Tablet_OK / Results	Tablet_PZ / Results	45	17
7	Observations A combined	Observations B combined	253	103
8	Click to add Observation	Click to add Observation		

Minimum Kappa:
Maximum Kappa:
Average of Kappas:

How to display the statistics

1. Choose **Analyze** > **Reliability Analysis** > **New**.
2. Select the settings and click **OK**.

   See Reliability Analysis General Procedure
3. Click the **Statistics** button on the toolbar of the Reliability Analysis Results.



Statistics

- Agreements
- Disagreements
- Index of concordance
- Percentage of agreements
- Cohen's Kappa (k)
- Significance of Kappa

- Kappa max
- Pearson's Rho (ρ)
- Significance of Rho
- Prevalence index
- Confidence interval
- Extra Kappa statistics

Agreements

The duration of agreement (Duration, or Duration/Sequence method) or the number of agreements (Frequency, or Frequency/Sequence method) in the observation pair. It is the sum of the values in the diagonal of the confusion matrix of the Reliability Analysis.

The way the Agreements are calculated depends on the comparison method.

See

- The Frequency/Sequence Method in Detail
- The Duration/Sequence Method in Detail
- The Frequency method in detail
- The Duration method in detail

Disagreements

The duration of disagreement (Duration, or Duration/Sequence method) or the number of disagreements (Frequency, or Frequency/Sequence method) in the observation pair. It is the total of the values in the off-diagonal cells, including Window Error, Modifier Error and No Records in the Confusion Matrix of the Reliability Analysis.

The way the Disagreements are calculated depends on the comparison method.

See

- The Frequency/Sequence Method in Detail
- The Duration/Sequence Method in Detail
- The Frequency method in detail
- The Duration method in detail

Index of concordance

The proportion of agreements between events in Reliability Analysis, calculated as Agreements/(Agreements+Disagreements). The values range between 0 (no agreements) and 1 (full agreement).

Percentage of agreements

The Percentage of agreements between events in Reliability Analysis, calculated as (Agreements/(Agreements+Disagreements) * 100%). The values range between 0 (no agreements) and 100 (full agreement).

Cohen's Kappa (k)

An overall measure of agreement in Reliability Analysis, from Cohen J. (1960). A coefficient of agreement for nominal scales. Educational and Psychological Measurement 20(1), 37-46.

Formula:

$$\kappa = \frac{p_o - p_c}{1 - p_c}$$

Where:

p_o is the observed proportion of agreements:

$$p_o = \frac{\sum_i a_{ii}}{\sum_i \sum_j a_{ij}}$$

p_c is the proportion of agreements expected by chance:

$$p_c = 1 - \frac{\sum_i \sum_j \left(\sum_n a_{in}\right)\left(\sum_n a_{nj}\right) w_{ij}}{\left(\sum_i \sum_j a_{ij}\right)^2}$$

a_{ij} is the value of the matrix cell at row *i* and column *j*.

a_{in} and a_{nj} are the values of the cells of row *i* and column *j* (n ranges from 1 to the last item of the row/column).

w_{ij} is the weight of the value at row *i* and column *j*. It has two possible values: 0 for agreements (in the diagonal and in the light blue cells, see Confusion Matrix), and 1 for disagreements (the remaining cells).

When the events do not include numerical modifiers or the margin set for comparison is zero, the proportion of expected agreement is equal to:

$$p_c = \frac{\sum_i \left(\sum_j a_{ij}\right)\left(\sum_j a_{ji}\right)}{\left(\sum_i \sum_j a_{ij}\right)}$$

The values of k range between -1 (non-random full disagreement) to +1 (non-random full agreement), but for practical purposes the range from 0 to 1.00 is of interest. A k of zero means that there is no agreement beyond chance, and a k of 1.00 means that there is perfect agreement. Interpretations of intermediate values are subjective.

Kappa is scored as *Invalid* if it is based on one comparison, like one event in each observation. In this case agreement is 100%.

Significance of Kappa

To test the significance of κ, a standard score z is calculated:

$$z = \frac{\kappa}{\sqrt{\frac{p_c}{\left(\sum_i \sum_j a_{ij}\right)(1 - p_c)}}}$$

A one-tailed test on this score is carried out, and the probability is shown next to k. A one-tailed test is considered appropriate when the null hypothesis states a value of zero for kappa because a negative value of kappa does not normally have a meaningful interpretation.

The common statement that kappa is a "chance-corrected measure of agreement" may be misleading. As a test statistic, kappa can verify that agreement exceeds chance levels. But as a measure of the level of agreement, kappa is not "chance-corrected"; indeed, in the absence of some explicit model of rater decision making, one cannot know whether or not a specific agreement was achieved by chance.

For more information:

http://en.wikipedia.org/wiki/Cohen%27s_kappa

Kappa max

Kappa max is the maximum Kappa that can be obtained with your data. It is based on the maximum number of agreements possible in your observation pair.

Suppose, you have event B that is scored by two observers. Observer 1 scores B three times and observer 2 scores it nine times. Then maximum number of agreements in your observation pair is 3.

Kappa max is calculated as follows:

$$\kappa_{max} = \frac{A_{max} - A_e}{1 - A_e}$$

Where:

$$A_{max} = \frac{\sum_i min\left(\sum_j a_{ij}, \sum_j a_{ji}\right)}{n}$$

and

$$A_e = \frac{\sum_i \left(\sum_j a_{ij}\right)\left(\sum_j a_{ji}\right)}{\left(\sum_i \sum_j a_{ij}\right)^2}$$

Where a_{ij} is the matrix cell value at row *i* and column *j* and a_{ji} is the matrix cell value at row *j* and column *i*.

Pearson's Rho (ρ)

A measure of the strength and direction of the linear relationship between the row totals and the column totals in the confusion matrix of a Reliability Analysis. It can be interpreted this way: If there are no disagreements in the confusion matrix, then the total for row 1 is equal to the total for column 1, the total for row 2 is equal to the total for column 2, and so on. This means that there is perfect correlation between the two observations.

Rho values range between -1.0 and +1.0, where -1.0 is the perfect negative (inverse) correlation, 0.0 means no correlation at all and +1.0 is the perfect positive correlation.

Formula:

$$\rho = \frac{\sum_j \left(\sum_i a_{ij} \sum_i a_{ji} \right) - \frac{\left(\sum_j \sum_i a_{ij} \right) \left(\sum_j \sum_i a_{ji} \right)}{N}}{\sqrt{\left(\sum_j \left(\sum_i a_{ij} \right)^2 - \frac{\left(\sum_j \sum_i a_{ij} \right)^2}{N} \right) \left(\sum_j \left(\sum_i a_{ji} \right)^2 - \frac{\left(\sum_j \sum_i a_{ji} \right)^2}{N} \right)}}$$

Where N = the total number of rows (or columns) in the matrix.

$\sum_i a_{ij}$ = the total of column j

$\sum_i a_{ji}$ = the total of row j

When you use numerical modifiers and accept agreements by a margin, such agreements are displayed within light blue cells (see Modifiers). These counts are summed up with the diagonal cell on the same row of the matrix (here below, left), so that the totals of the columns differ from those you see in the confusion matrix (right). The formula of Rho is applied on this new matrix.

	1	2	3	4	5
1	-	-	1	-	-
2	-	2	-	-	-
3	-	2	6	-	-
4	-	-	-	3	1
5	-	-	-	-	3
Totals:		4	7	3	4

	1	2	3	4	5
1	-	-	1	-	-
2	-	2	-	-	-
3	-	-	8	-	-
4	-	-	-	4	-
5	-	-	-	-	3
Totals:		2	9	4	3

The correlation coefficient r represents the linear relationship between two variables. If ρ is squared, the resulting value ρ^2 represents the proportion of common variation in the two variables, that is, the 'strength' or 'magnitude' of the relationship. In order to evaluate the correlation between variables, it is important to know this 'magnitude' as well as the statistical significance of the correlation (see below).

Significance of Rho

To test the significance of ρ, a standard score t is calculated:

$$t = \frac{\rho}{\sqrt{\frac{1-\rho^2}{N-2}}}$$

A one-tailed test is carried out, and the probability is shown next to ρ.

The test of significance of r is based on the assumption that the distribution of the residual values (that is, the deviations of the column totals from the regression over the row totals) follows the normal distribution, and that the variability of the residual values is the same for all values of the independent variable. However, Monte Carlo simulations suggest that meeting those assumptions closely is not absolutely crucial if your sample size is not very small and when the departure from normality is not very large. If the number or rows and columns of your confusion matrix is 50 or more then serious biases are unlikely, and if it is over 100 then you do not need to be concerned with the normality assumptions.

Prevalence index

Prevalence index is the degree to which a particular event occurs more in a group of subjects than another event. For example, when the number of agreements In Reliability Analysis in one behavior group is higher than in another group, the Prevalence index is high but the Kappa is low. The Prevalence index is therefore useful to explain odd Kappa values.

The formula for the Prevalence index is:

$$PI = \frac{\sum\limits_{j,\, a_{jj} \neq a_{max}} \frac{a_{max}}{a_{max} + a_{jj}}}{n_c - 1}$$

where a_{ji} is the value in the agreements (diagonal) and the n_c is the column count.

Please note that special columns in the Confusion Matrix, such as, No Records, Window Error and Total are not taken into account in the calculation of the Prevalence index.

Confidence interval

The 95%-Confidence interval low and high are given in the Confusion Matrix.

First, the standard error of Kappa is calculated:

$$\varepsilon(\kappa) = \sqrt{\frac{A_o(1-A_o)}{n(1-A_e)^2}}$$

where A_o is the observed proportion of agreements, A_e is the proportion of agreements expected by chance and n is the sum of the column totals is the number of columns. Then the Confidence interval is calculated:

$$\upsilon(\kappa) = \kappa - 1.96 \times \varepsilon(\kappa)$$

$$\nu(\kappa) = \kappa - 1.96 \times \varepsilon(\kappa)$$

$$P(\upsilon(\kappa) < \kappa < \nu(\kappa)) = 95\%$$

Extra Kappa statistics

Three extra statistics are available if you selected the option Show extra Kappa statistics in the Reliability Analysis Settings. These are **Minimum Kappa**, **Maximum Kappa** and **Average Kappa** and is the summarization of Cohen's Kappa for all the pairs.

Note that the *Average Kappa* is not the same as the Kappa obtained by summing up the agreements and disagreements from two or more pairs of observations (see Combine multiple pairs of observations), although those two values are often correlated.

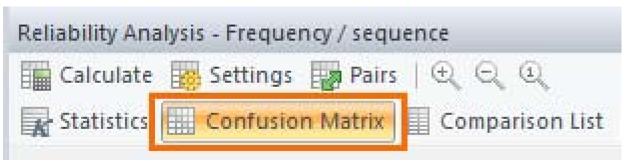
Confusion Matrix

How to display the Confusion matrix

1. Choose **Analyze** > **Reliability Analysis** > **New**.
2. Select the settings and click **OK**.

   See Reliability Analysis General Procedure

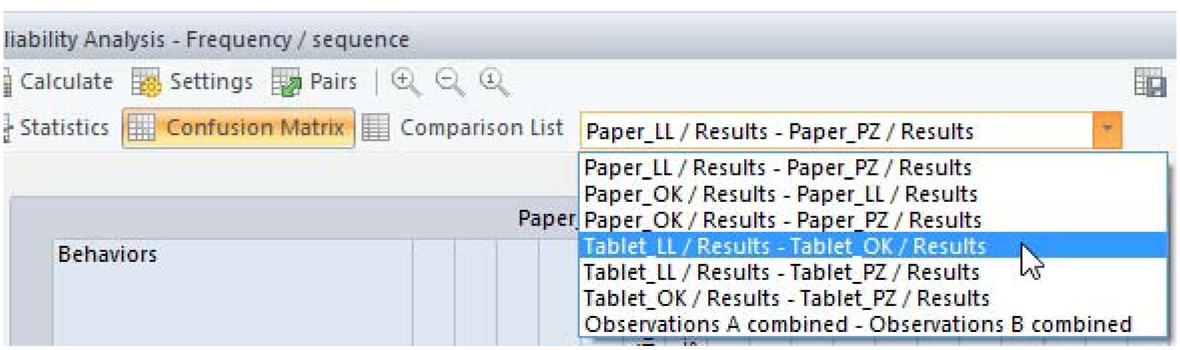
3. Click the **Confusion Matrix** button on the toolbar of the Reliability Analysis Results.



The Confusion Matrix

The Confusion Matrix displays agreements and disagreements of the observation pairs in a matrix. This matrix has one row and one column for each combination of Subject, Behavior, and Modifiers scored in those observations. If you have multiple observation pairs, you can select the pairs from the list on the toolbar.

If you selected the option **Include all results combined** in the Comparison Settings (see Combine multiple pairs of observations), there is an additional pair in the list on the toolbar: **Observations A combined - Observations B combined**.



Tablet_LL / Results	Tablet_OK / Results																	
Behaviors	Gazing at patient	Gazing at nurse	Gazing at patients file	Other/no gazing	No communication	Businesslike open question	Businesslike closed question	Empathic open question	Humming	Wrapping up	Explaining	Other communication	<Gap Doctor presence>	Doctor present	Doctor absent	**No Records**	**Window Error**	**Total**
Gazing at patient	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Gazing at nurse	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Gazing at patients file	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Other/no gazing	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	5
No communication	-	-	-	-	9	-	-	-	-	1	-	-	-	-	-	-	-	10
Businesslike open question	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Businesslike closed question	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	3
Empathic open question	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Humming	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Wrapping up	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explaining	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	4
Other communication	-	-	-	-	3	-	-	-	-	-	-	6	-	-	-	-	-	9
<Gap Doctor presence>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Doctor present	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Doctor absent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
No Records	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Window Error	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
Total	8	5	10	4	13	1	-	-	2	2	2	9	-	1	2	-	-	59

Cell values

The values of the confusion matrix can be understood as follows:

- Dark blue cells are agreements.
- White cells including **Window Error**, **Modifier Error** and **No Records** are disagreements.

Paper_OK / Results

Paper_LL / Results

Behaviors	Businesslike open question	Businesslike closed question	Empathic open question	Wrapping up	Explaining	Other communication	No communication	**No Records**	**Window Error**	**Total**
Businesslike open question	-	-	1	-	-	-	-	-	-	1
Businesslike closed question	1	-	-	-	-	1	-	-	-	2
Empathic open question	-	-	-	-	-	-	-	-	-	-
Wrapping up	-	-	-	-	-	-	-	-	-	-
Explaining	-	-	-	1	-	-	-	-	-	1
Other communication	-	-	-	1	3	6	1	-	-	11
No communication	-	-	-	-	-	5	4	-	-	9
No Records	-	-	-	-	-	-	-	-	-	-
Window Error	-	-	-	-	-	2	-	-	-	2
Total	1	-	1	2	3	14	5	-	-	26

- Light blue cells along the diagonals are displayed when your coding scheme contains numerical modifiers (see Modifier group types in Set up your Project) and you set a margin to the modifiers (see Modifiers in Set up your Project) in the Reliability Analysis Settings. You can select a margin if you choose Frequency/Sequence or Duration/Sequence as Comparison method. The light blue cells contain agreements of events with modifier values that are not exactly the same on both observations but differ less than the margin.

Modifiers				0.00	0.45	0.62	0.65	0.68	0.70	0.75	0.76	0.79	0.81	0.82	0.85	0.86	0.87	1.19
	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.00	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.45	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
0.62	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
0.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.68	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-
0.70	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
0.75	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
0.76	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
0.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.85	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
0.86	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-
0.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
1.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

- Additional rows and columns indicate special cases, See:

  - <Gap “Behavior name”>

  - No Records

  - Error

  - Window Error

<Gap “Behavior name”>

<Gap “Behavior name”> can appear in the table when you chose Frequency/ Sequence or Duration/Sequence as comparison method and you chose to analyze gaps.

See Choose the Comparison Settings and Analyze gaps between events

It appears in the following cases:

- When no behavior is scored at the start of the observation.

  <Gap “Behavior name”> state is added at the start of the observation for each Behavior of a Start-Stop group, ending with the start of the first behavior of that group.

- When a behavior with duration ends, that is, when you press the stop code for a behavior.

  <Gap “Behavior name”> state is added that starts at the end of the event and ends at the start of the next occurrence of that behavior.

- When the behavior group type is set to Behaviors cannot occur at the same time, it contains both events with and without duration, and you only have scored events without duration.

  <Gap “Behavior group name”> state for is added at the start of the observation, ending at the end of the observation.

See also Reliability Analysis and Gaps

No Records

Rows and columns named **No Records** can appear in the table when you chose Frequency/Sequence or Duration/Sequence as comparison method.

It shows the occurrences of events in one observation that cannot be paired with any event in the second observation.

No Records appear in the following cases:

- There is no data from the same behavior group in the other observation.
- When you have selected **Compare all events** from the Comparison scope list and one or both of the following is true:

  - One observation is longer than the other.

  - You have aligned the two observations in such a way that one starts earlier than the other. For example, two live observations started at different time, and you have selected **Use the start of observations** as Synchronization method.

Error

Rows and columns named **Error** appear in the table when you chose Frequency or Duration as comparison method.

It shows the number of occurrences (frequency method) or seconds (duration method) that events differ in both observations.

- Numbers in the **Error** row indicate that events occurred more often, or longer in the first observation of a pair.
- Numbers in the **Error** row indicate that events occurred more often, or longer in the second observation of a pair.

Window Error

Rows and columns named **Window error** can appear in the Reliability Analysis table when you chose Frequency/Sequence as comparison method. Rows and columns named **Window Error** show the disagreements between the events of the same type whose onset times differ for more than the Tolerance window.

- The **Window Error** row shows the disagreements between the same event types where the event in observation 1 (left of the diagonal) occurs earlier than that in observation 2.
- The **Window Error** column shows the disagreements between the same event types where the event in observation 1 occurs later than that in observation 2.

Notes

- If you have defined two or more observation pairs for comparison, the size of the matrix is constant across pairs of observations, because it includes the combinations of events in all pairs no matter whether a specific event was scored in a specific pair of observations. This means that if event A was scored in an observation of Pair 1 and in neither observation of Pair 2, the matrix of Pair 2 still contains the row and column for event A.
- If you have selected Show elements not scored, the matrix also includes those combinations of Subject, Behavior and their Modifiers that were not scored in those observations. Therefore, the matrix can be much larger.

  If you select **Include all results combined** for multiple comparisons (see Combine multiple pairs of observations), the confusion matrix of the combined results page sums up all agreements and disagreements from all pairs of observations.

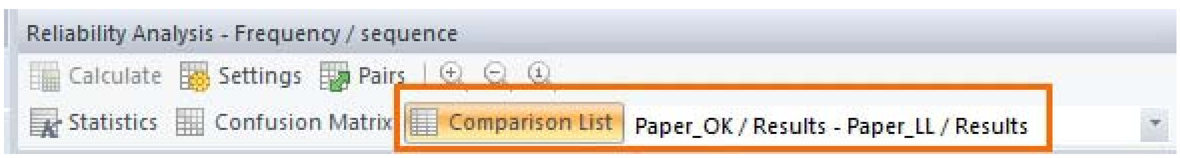
Comparison List

How to display the Comparison list

The Comparison list is available when you used the Frequency/Sequence comparison method. To display it:

1. Choose **Analyze** > **Reliability Analysis** > **New**.
2. Select the Frequency/Sequence method, specify the other settings and click **OK**.

   See Reliability Analysis General Procedure
3. Click the **Comparison list** button on the toolbar of the Reliability Analysis Results.
4. Select the pair from the list next to the **Comparison List** button.



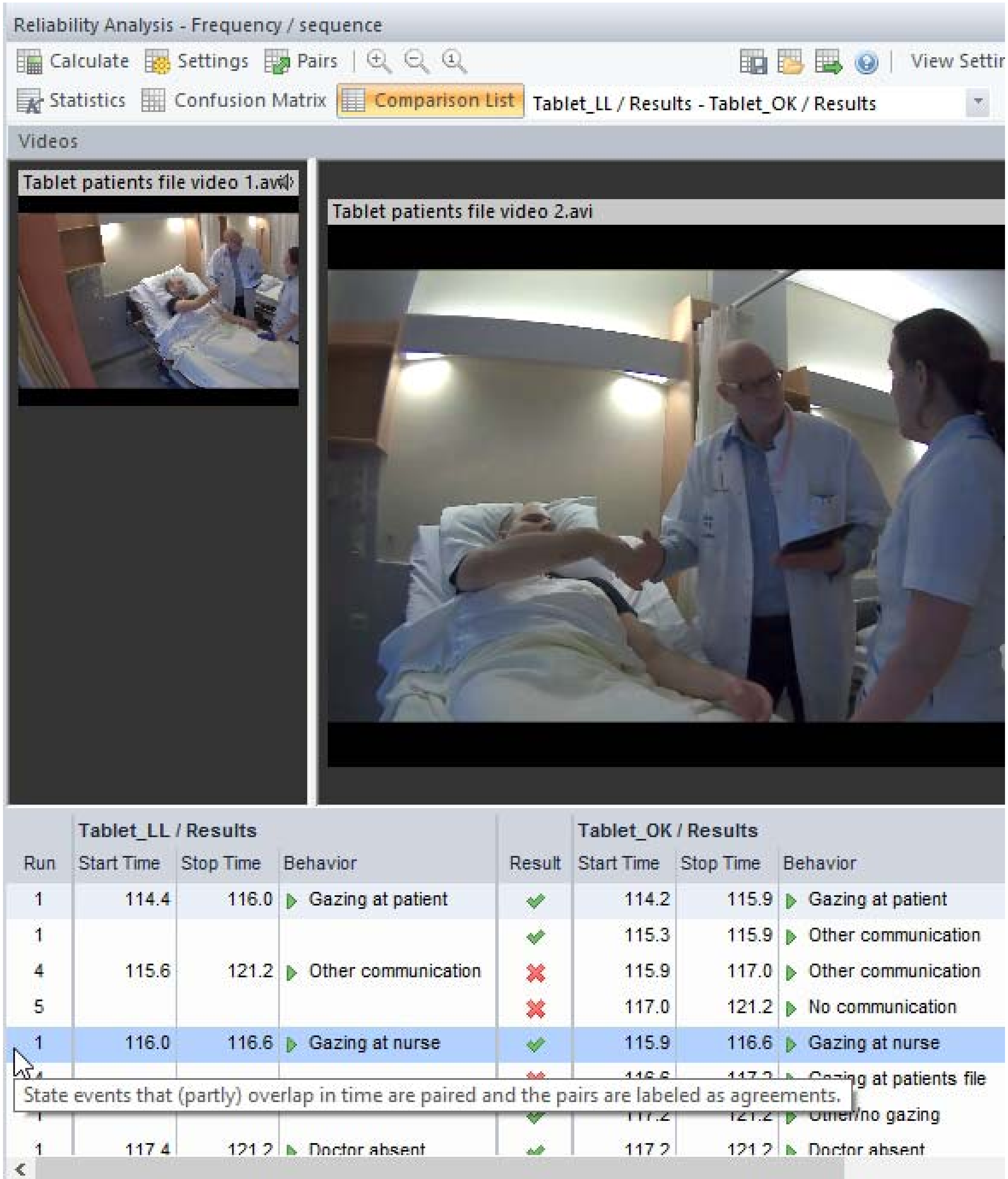
The Comparison List window

The Comparison List lists all agreements and disagreements of the observations compared with the Frequency/Sequence method.

It contains from left to right:

- The **Run** number of the reliability analysis algorithm (see The Frequency/ Sequence Method in Detail). If you hover over this number with the mouse pointer, a tool tip is displayed with a short explanation.

  By default, the **Run** column is hidden. To show it, choose **View Settings** > **Run**.
- The events with duration (with their start and stop time) and events without duration (with their start time) of the first observation of each pair selected in the analysis settings window.
- The **Result** of the comparison between the records of the two observations.
- The events with duration (with their start and stop time) and events without duration (with their start time) of the second observation.



The comparison list in detail

Symbols

Marks starts of events with duration (mutually exclusive and start-stop), including the <Gap “behavior name”>.

Marks events without duration.

Marks an agreement between an event in the two observations.

Marks a disagreement between an event in the two observations.

Observation start

Paper_LL / Results				Paper_OK / Results		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
0.0		Observation start		0.0		Observation start
0.0		Synchronization point		0.0		Synchronization point
50.4	50.7	Other/no gazing	✓	49.4	50.4	Other/no gazing
50.7	54.8	Gazing at patient	✓	50.4	54.7	Gazing at patient
54.8	57.0	Gazing at nurse	✓	54.7	56.8	Gazing at nurse

Observation start marks the observation start time relative to the point where the program starts comparing the data files.

See Synchronization

Please note:

- If you have selected **Use the start of observations** from the Synchronization list and you are comparing live observations, Observation start shows the time difference between the two start times.
- If you have selected **Align first scored events** from the Synchronization list and there are no events starting at 0:0, the comparison starts at the first scored event, which gets time 0.0. Therefore, Observation start is negative (for example, -50.4 if the first event starts occurs at 50.4 s).

Paper_LL / Results				Paper_OK / Results		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
-50.4		Observation start		-50.4		Observation start
0.0		Synchronization point		0.0		Synchronization point
0.0	0.3	Other/no gazing	✗	0.0	4.3	Gazing at patient
0.3	4.4	Gazing at patient	✓			
4.4	6.6	Gazing at nurse	✓	4.3	6.4	Gazing at nurse

- If you have started observing from a point in a media file later than 0:0, and you select **Align video start time** from the Synchronization list, Observation start shows the start of the observation relative to the video start time (for example, 60.0 if you start observing at 1 minute in the video file).

Synchronization point

The point in time where the program starts comparing the two files. It is always the same for both observations.

Paper_LL / Results				Paper_OK / Results		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
0.0		Observation start		0.0		Observation start
0.0		Synchronization point		0.0		Synchronization point
50.4	50.7	Other/no gazing	✔	49.4	50.4	Other/no gazing
50.7	54.8	Gazing at patient	✔	50.4	54.7	Gazing at patient
54.8	57.0	Gazing at nurse	✔	54.7	56.8	Gazing at nurse

<Nothing scored in combination>

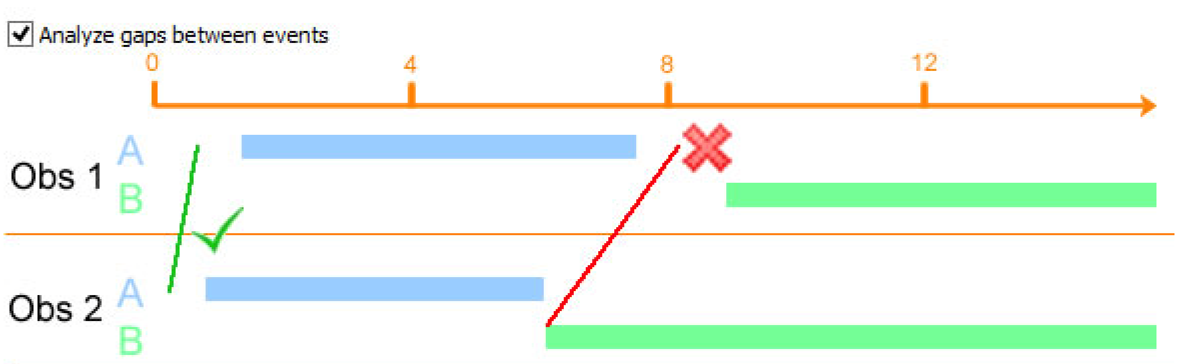
Events in one observation are paired to <Nothing scored in combination> when there is no data from the same subject and behavior group in the other observation. This results in a disagreement.

<Gap “Behavior name”>

Gaps in the observations are only analyzed when the option Analyze gaps between events has been selected.

Events in one observation are paired to <Gap “Behavior name”> when the closest event in the other observation is the stop of an event with duration that is not followed by the start of a new one. For example, when you score the stop of a behavior by using the Stop code. These instances usually result in disagreements.

When the gaps overlap in two observations, you get an agreement between a pair of <Gap “Behavior name”>.



The comparison list of the example above looks like this:

Observation 1 / Results				Observation 2 / Results		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
00:00.00		Observation start		00:00.00		Observation start
00:00.00		Synchronization point		00:00.00		Synchronization point
00:00.00	00:01.30	<Gap Behavior group AB>	✔	00:00.00	00:00.80	<Gap Behavior group AB>
00:01.30	00:07.50	A	✔	00:00.80	00:07.80	A
00:07.50	00:10.90	<Gap Behavior group AB>	✖	00:07.80	00:15.64	B
00:10.90	00:15.64	B	✔	00:07.80	00:15.64	B

See also Reliability Analysis and Gaps

Disagreements caused by modifiers

Events with the same subject and behavior result in disagreements if they have different modifiers. If the modifiers are numerical, they result in a disagreement only if they differ by more than the margin value set

See Modifiers

Edit the comparison list

To change the time format

By default, the Comparison List shows the event times as time elapsed from the point where the two observations are aligned. To change the format, do so in the Project Settings.

To change the decimal symbol

Change the decimal symbol in Windows Regional Settings. Then restart The Observer XT and re-run the analysis.

Note

If you select **Include all results combined** for multiple comparisons (see Combine multiple pairs of observations), the comparison list of the combined results sums up all agreements and disagreements from all pairs of observations.

Effect of the Coding Scheme on Reliability Analysis

How behaviors are organized matters

Reliability analysis works different for behaviors that exclude each other in a mutually exclusive behavior group and behaviors that may overlap in a Start-Stop group.

- Behaviors in a Mutually Exclusive group are compared with each other within the group.
- Behaviors in a Start-Stop group are compared with the same behavior in the other observation. This may result in more disagreements in a Start-Stop group than in a Mutually exclusive group.

See:

- Effect of Behavior group - Frequency/Sequence method
- Effect of Behavior group - Duration/Sequence method

See also:

- Behavior group types in Select Data for Analysis

Effect of Behavior group - Frequency/ Sequence method

Mutually Exclusive groups

In a Mutually Exclusive group, the behaviors are compared within the group. In the example below, events A, B, and C are part of the same Mutually Exclusive group. Two observations differ in that event B was scored at time 16 in Observation 1 while event C was scored in Observation 2 at that moment.

When you do not select Analyze gaps between events and run a Reliability Analysis with the Frequency/Sequence method, one disagreement is found at time 16.

See Frequency/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups what happens when you include gaps between events in the analysis.

Obs 1

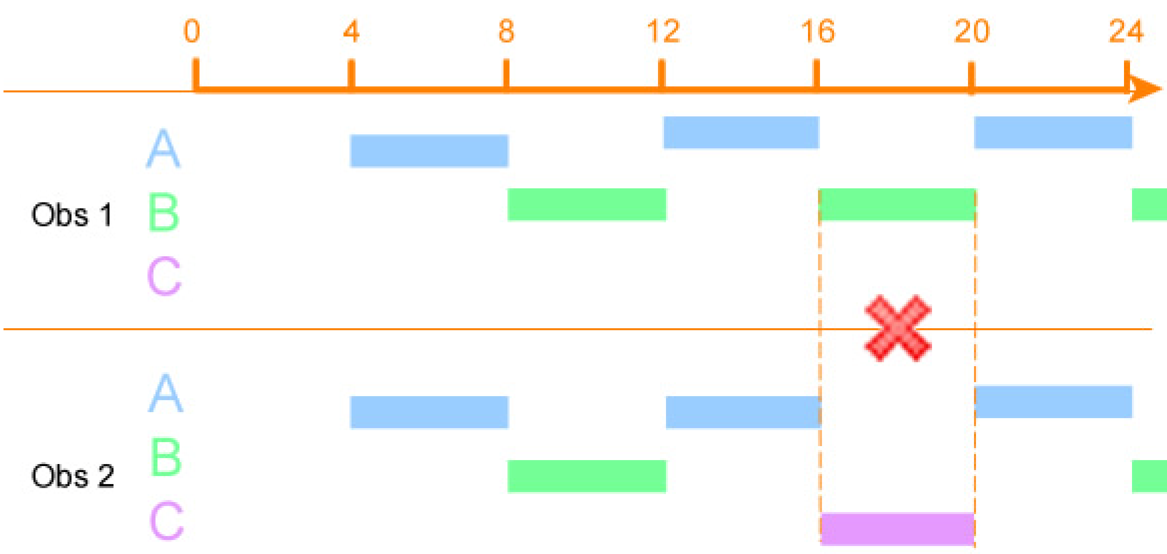
Time	Behavior
0.0	**Start**
4.0	A
8.0	B
12.0	A
16.0	B
20.0	A
24.0	B

Obs 2

Time	Behavior
0.0	**Start**
4.0	A
8.0	B
12.0	A
16.0	C
20.0	A
24.0	B

☐ Analyze gaps between events

Obs 1 / Results				**Obs 2 / Results**		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
0.0		Observation start		0.0		Observatio n start
0.0		Synchronization point		0.0		Synchroniz ation point
4.0	8.0	A	✔	4.0	8.0	A
8.0	12.0	B	✔	8.0	12.0	B
12.0	16.0	A	✔	12.0	16.0	A
16.0	20.0	B	✘	16.0	20.0	C
20.0	24.0	A	✔	20.0	24.0	A
24.0	26.9	B	✔	24.0	26.9	B



Start-Stop groups

In a Start-Stop group, each behavior is analyzed independent from the others. The frequency/sequence method searches for matches between event A and event A, between event B and event B, and event C and event C. This means that there will be no disagreements like *Event B (Obs 1) - Event C (Obs 2)*, that you do find with Mutually exclusive groups. Instead you will find disagreements like Event B (Obs 1) - No event (Obs 2), and disagreements in the time events of the same type were scored in both observations.

In the example below, with similar observations as in the example above, Reliability Analysis finds two disagreements.

The first disagreement (1 in picture below) is found at time 16.00, because the time of event B in Observation 1 does not match the time of event B in Observation 2. The nearest event B in Observation 2 is from 8.00 to 12.00. This is outside the tolerance window and therefore it is a disagreement.

The second disagreement (2 in picture below) is found because event C was scored at time 16.00 in Observation 2, while no event C was scored at that moment in Observation 1. See number 2 in the picture below.

See Frequency/Sequence and Gaps; Start-Stop Behavior Groups what happens when you include gaps between events in the analysis.

Obs 1

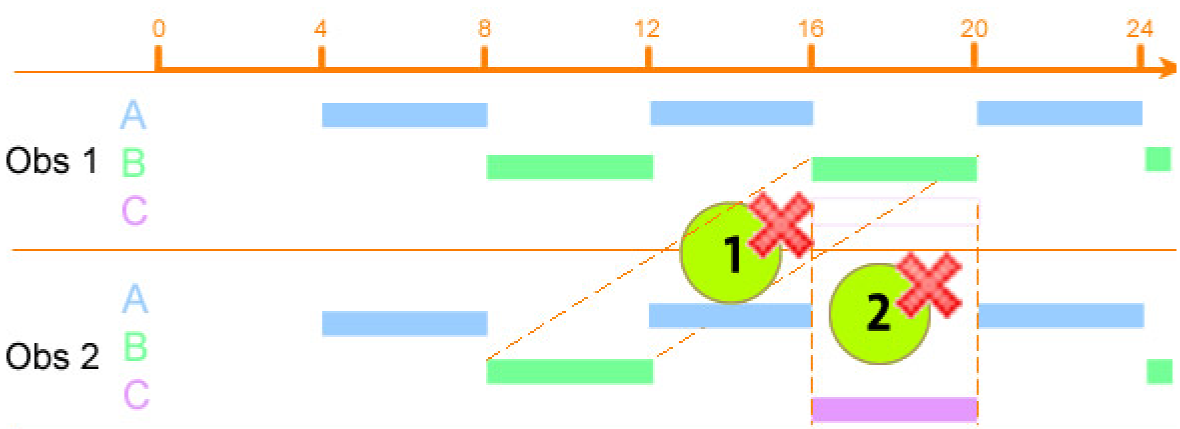
Time	Behavior
0.00	**Start**
4.00	▶ A
8.00	■ A
8.00	▶ B
12.00	■ B
12.00	▶ A
16.00	■ A
16.00	▶ B
20.00	■ B
20.00	▶ A
24.00	■ A
24.00	▶ B
24.22	■ B

Obs 2

Time	Behavior
0.00	**Start**
4.00	▶ A
8.00	■ A
8.00	▶ B
12.00	■ B
12.00	▶ A
16.00	■ A
16.00	▶ C
20.00	■ C
20.00	▶ A
24.00	■ A
24.00	▶ B
24.22	■ B

☐ Analyze gaps between events

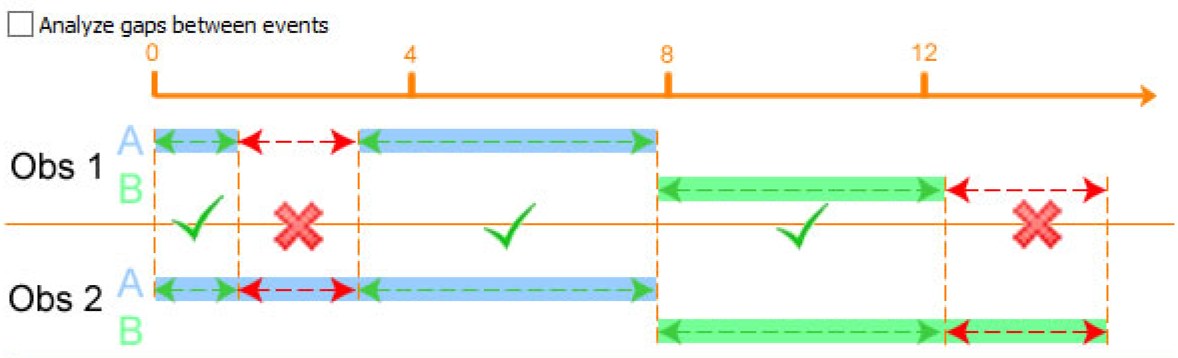
Observation 1 / Results				**Observation 2 / Results**		
Start Time	Stop Time	Behavior	Result	Start Time	Stop Time	Behavior
00:00.00		Observation start		00:00.00		Observatio n start
00:00.00		Synchronization point		00:00.00		Synchroniz ation point
00:04.00	00:08.00	▶ A	✓	00:04.00	00:08.00	▶ A
00:08.00	00:12.00	▶ B	✓	00:08.00	00:12.00	▶ B
00:12.00	00:16.00	▶ A	✓	00:12.00	00:16.00	▶ A
00:16.00	00:20.00	▶ B	✗	00:08.00	00:12.00	▶ B
-	-	<Nothing scored in combination>	✗	00:16.00	00:20.00	▶ C
00:20.00	00:24.00	▶ A	✓	00:20.00	00:24.00	▶ A
00:24.00	00:24.22	▶ B	✓	00:24.00	00:24.22	▶ B



Effect of Behavior group - Duration/ Sequence method

One Mutually Exclusive group

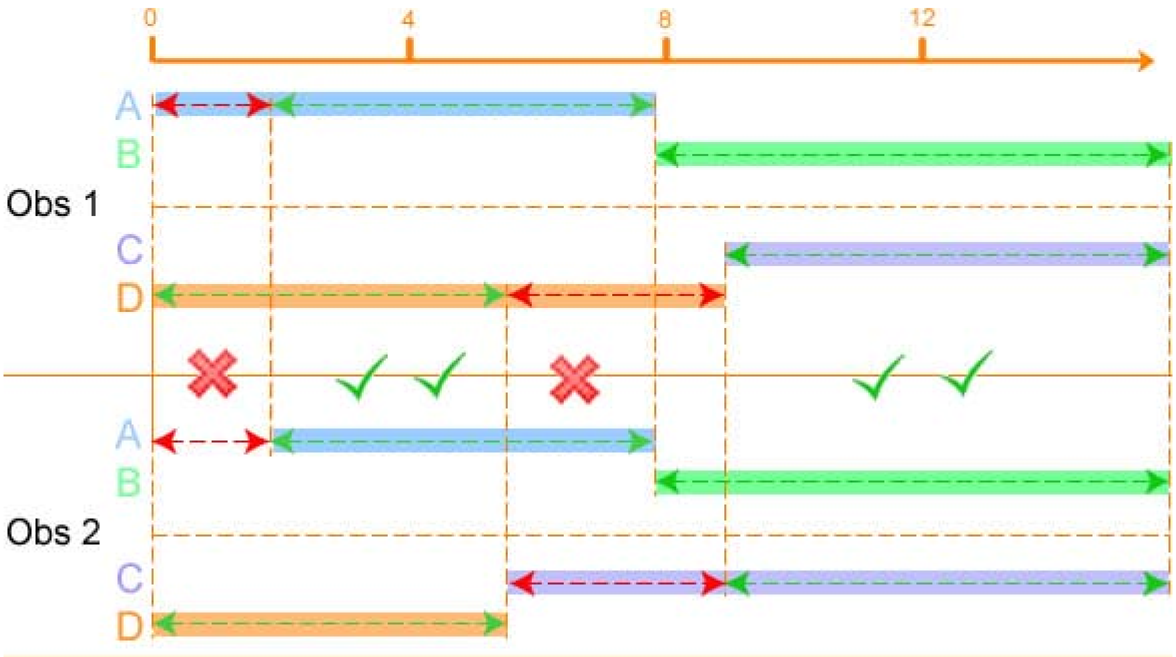
In a Mutually Exclusive group, instances of the behaviors within the group are compared. Within the group these behaviors will never overlap. Therefore, within the behavior group, the agreements and disagreements will exclude each other and the total agreement and disagreement will never exceed the observation length.



Multiple Mutually Exclusive groups

When you have multiple Mutually Exclusive groups, behaviors from different groups may overlap. This means that also the agreements and disagreements may overlap and the total agreement and disagreement is likely to be larger than the observation length.

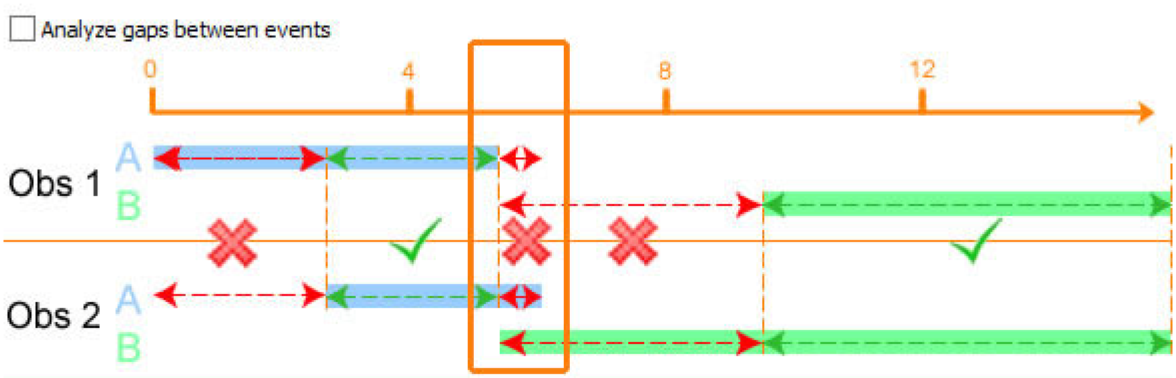
In the picture below events A and B form one Mutually Exclusive behavior group and events C and D another. Note that the sum of the Agreement and Disagreement is almost twice the observation length. This is because the Agreements and Disagreements in the two groups overlap.



See Duration/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups what happens when you include gaps in your analysis.

Start Stop groups

In a Start Stop group, behaviors may overlap within the group. Therefore agreements and disagreements may also overlap within the group. See the double disagreement at time 5.5 s in the example below.



See Duration/Sequence and Gaps; Start-Stop Behavior Groups what happens when you include gaps in the analysis.

Reliability Analysis and Gaps

Definition of a gap

A gap in an observation is the time interval in which no event was scored for a specific behavior group. In the following example, a gap occurs after the end of Event A and before the start of Event B. The two events form the behavior group 'Group AB'.

When do gaps occur and how are they analyzed?

Gaps can occur:

When suspending a live observation

See Reliability Analysis and Gaps when Suspending an Observation

In behavior groups in which behaviors exclude each other

Gaps in this group type can only occur if the behaviors in the group are not exhaustive, so they do not add up to 100%. The way gaps are treated differs between comparison methods.

See:

- Frequency/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups
- Duration/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups

In behavior groups in which behaviors can overlap

The way gaps are treated differs between comparison methods.

See:

- Frequency/Sequence and Gaps; Start-Stop Behavior Groups
- Duration/Sequence and Gaps; Start-Stop Behavior Groups

Reliability Analysis and Gaps when Suspending an Observation

Definition of a gap

The interval during which the observation was suspended is treated as a gap. When you score, for example, behavior A and then suspend-resume the observation, you have one occurrence of behavior A with a gap. The reliability analysis, then counts two occurrences of behavior A: one before suspend, and one after resume.

Example

Consider for example the figure below. It shows part of the visualization of an observation which was suspended and resumed; behavior A was active before and after suspend-resume. In the reliability analysis, this is counted as two occurrences of behavior A as if A was scored again after resuming the observation.

How is the suspended time analyzed?

The suspended time is analyzed just like any other gap. This depends on the group type and the comparison method. See:

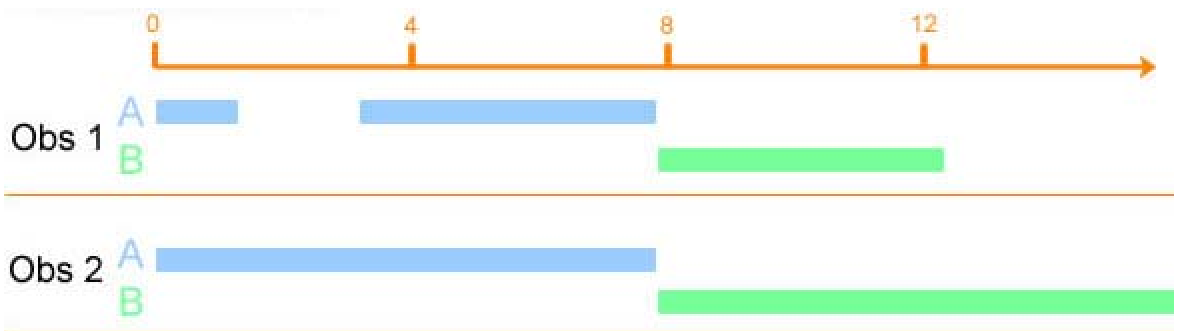
- Frequency/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups
- Duration/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups
- Frequency/Sequence and Gaps; Start-Stop Behavior Groups
- Duration/Sequence and Gaps; Start-Stop Behavior Groups

Frequency/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups

Example

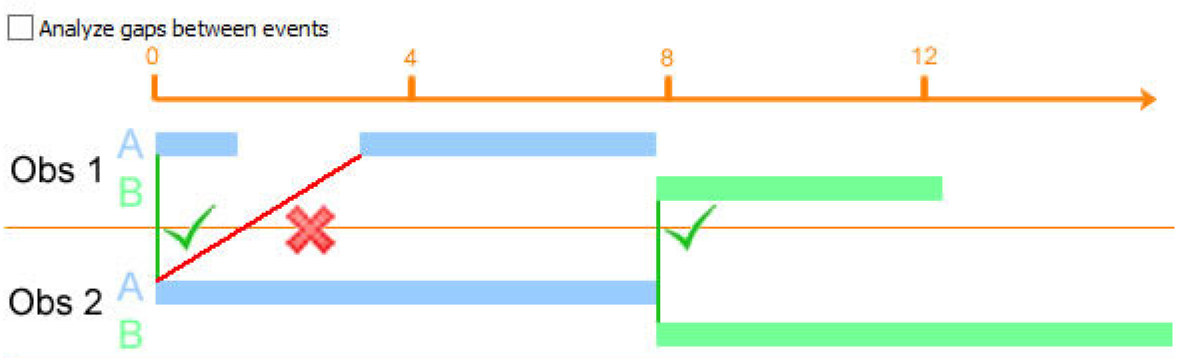
The figure below shows the visualization of two observations, Obs 1 and Obs 2 with events (A, B) from a group in which behaviors exclude each other. The behaviors in the group are non-exhaustive, which means that gaps between events may occur. Obs 1 contains two gaps:

- From 1.3 to 3.2 s.
- From 12.3 s till the end of the observation.



Without analyzing gaps

When you de-select Analyze gaps between events, Two agreements (✓) and one disagreement (✖) are found.

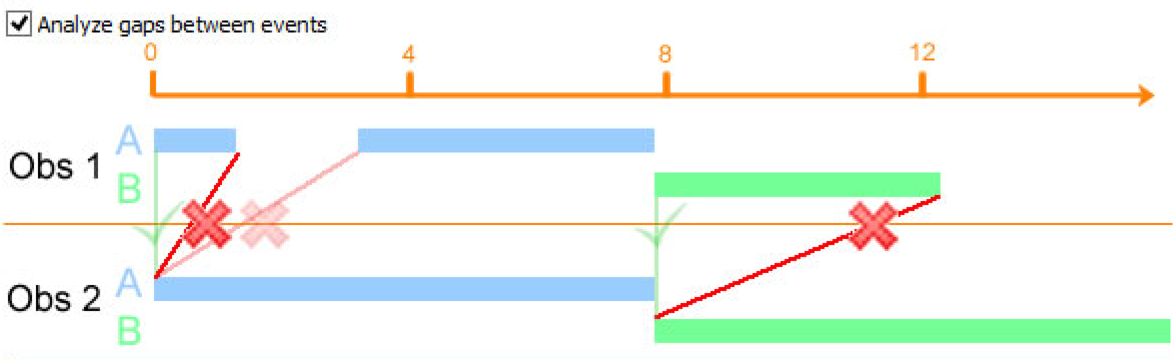


- Agreement: 0.0 A (Obs 1) - 0.0 A (Obs 2).
- Disagreement: 3.2 A (Obs 1) - 0.0 B (Obs 2).

- Agreement: 7.9 A (Obs 1) - 7.9 B (Obs 2).

With analyzing gaps

When you select Analyze gaps between events, the comparison of observations 1 and 2 gives two extra disagreements () between a gap in observation 1 and an event in observation 2.



This results in the following:

- Agreement: 0.0 A (Obs 1) - 0.0 A (Obs 2).
- Disagreement: 1.3 <Gap Group AB> (Obs 1) - 0.0 A (Obs 2).
- Disagreement: 3.2 A (Obs 1) - 0.0 A (Obs 2) (this is a disagreement because 0.0 A (in Obs 2) was already in agreement with event A in Obs 2).
- Agreement: 7.9 B (Obs 1) - 7.9 B (Obs 2).
- Disagreement: 12.3 <Gap Group AB> (Obs 1) - 7.9 B (Obs 2).

Note

If during an observation no behaviors from a mutually exclusive non-exhaustive group are scored, Reliability Analysis will consider a gap for that group from the start to the end of the observation.

Duration/Sequence and Gaps; Mutually Exclusive, Non-Exhaustive Behavior Groups

Example

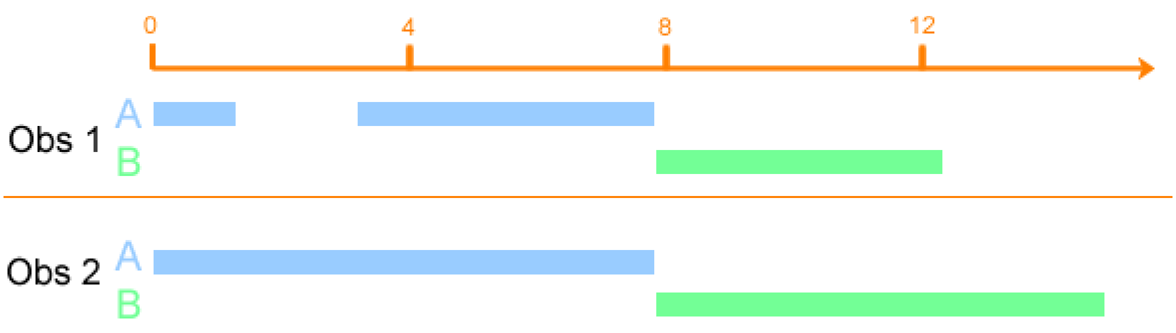
The figure below shows the visualization of two observations, Obs 1 and Obs 2 with events (A, B) from a group in which behaviors exclude each other. The behaviors in the group are non-exhaustive, which means that gaps between events may occur.

Obs 1 contains two gaps:

- From 1.3 to 3.2 s.
- From 12.3 s till the end of the observation (16.0 s).

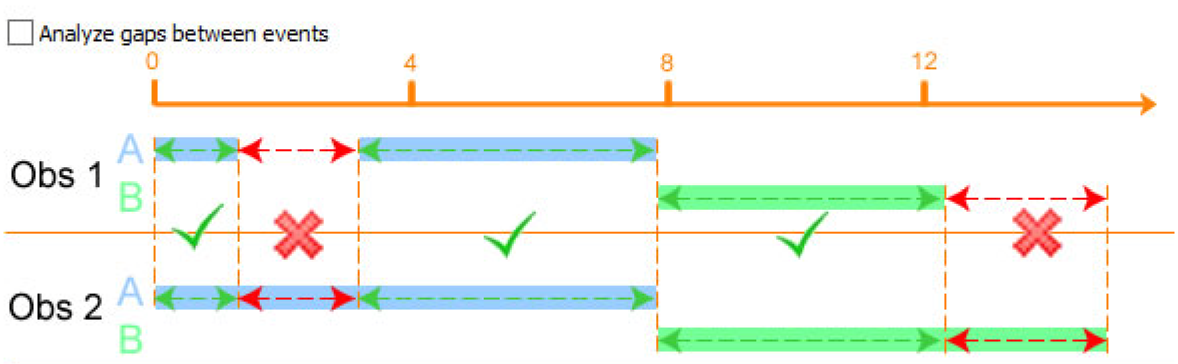
Obs 2 contains one gap:

- From 14.9 s till the end of the observation (16.0 s).



Without analyzing gaps

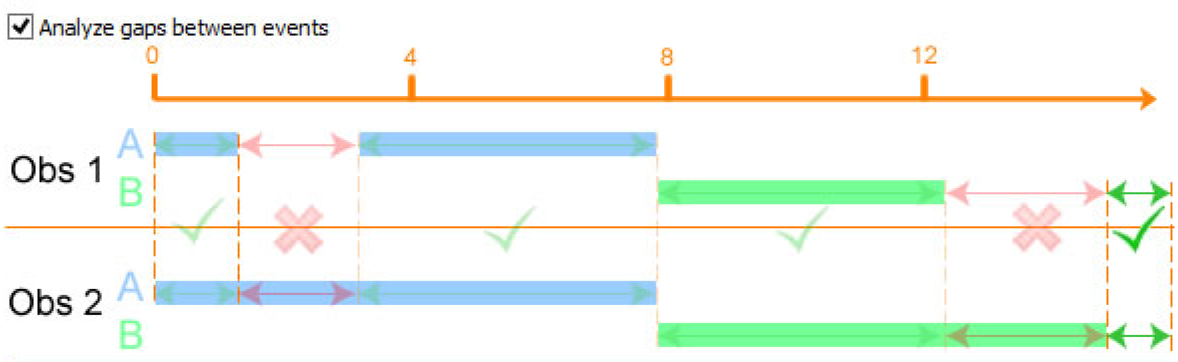
When you de-select Analyze gaps between events, the comparison of Obs 1 and Obs 2 results in the following three agreements (✓) and two disagreements (✗):



- Agreement: from 0.0 till 1.3 s; Event A overlaps; duration 1.3 s.
- Disagreement: from 1.3 till 3.2; gap in Obs 1 and Event A in Obs 2; duration 1.9 s.
- Agreement: from 3.2 till 7.9 s; Event A overlaps in both observations; duration 4.7 s.
- Agreement: from 7.9 till 12.3 s; Event B overlaps in both observations; duration 4.4 s.
- Disagreement: from 12.3 till 14.9; gap in Obs 1 and Event B in Obs 2; duration 2.6 s.

With analyzing gaps

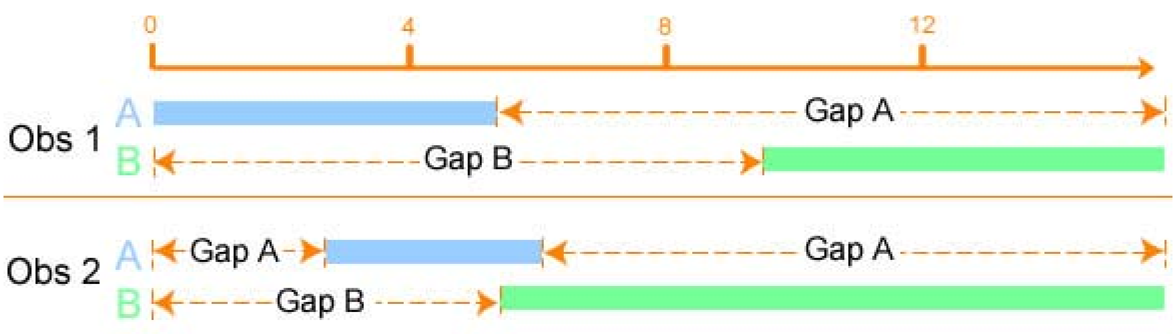
When you select Analyze gaps between events, this example contains an extra agreement, because there is an overlapping gap of 1.1 s at the end of both observations.



Frequency/Sequence and Gaps; Start-Stop Behavior Groups

Gaps in Start-Stop groups

In a behavior group in which behaviors may overlap, each behavior is analyzed independent from the others. The frequency/sequence method searches for matches between event A and event A, and between event B and event B (see Start-Stop groups for a detailed explanation). When you analyze gaps between events, the same is true for the gaps in such groups. For each individual behavior is recorded whether there is a gap or no gap. So the program compares Gap A with Gap A, and Gap B with Gap B.



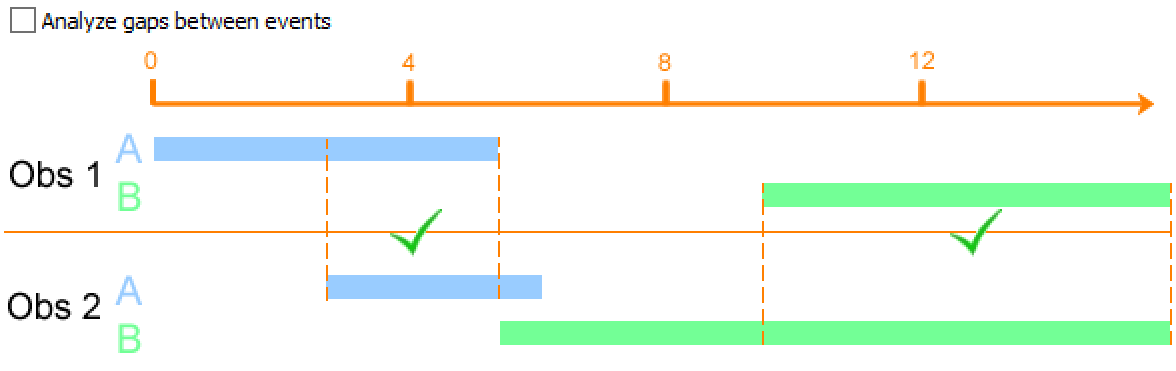
Note

If during an observation a start-stop behavior is not scored, Reliability Analysis will consider a gap for that behavior from the start to the end of the observation.

Example

Without analyzing gaps

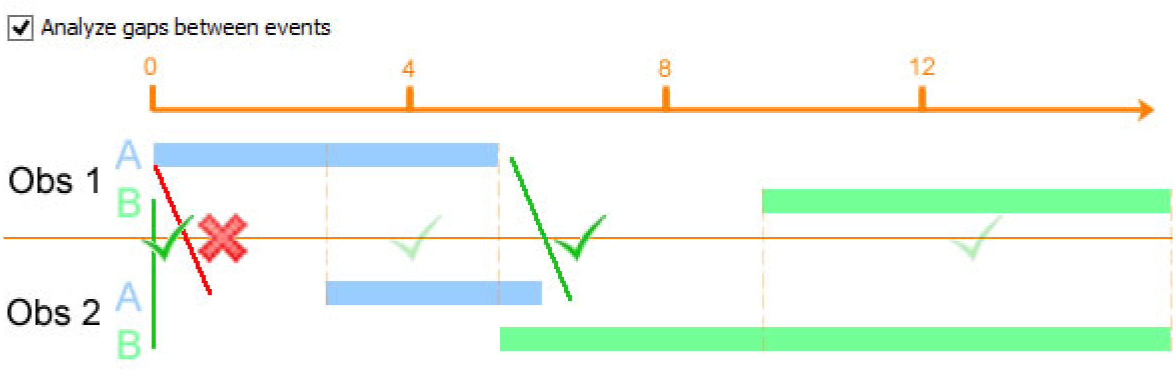
When you do not analyze gaps between events, the Reliability Analysis gives the following two run 1 Agreements (✓), because the events partially overlap in both observations:



- Agreement: 0.0 A (Obs 1) - 3.2 A (Obs 2)
- Agreement: 9.5 B (Obs 1) - 5.5 B (Obs 2)

With analyzing gaps

When you select Analyze gaps between events, two agreements and one disagreement are added, so you obtain four agreements (✓) and one disagreement (✖):

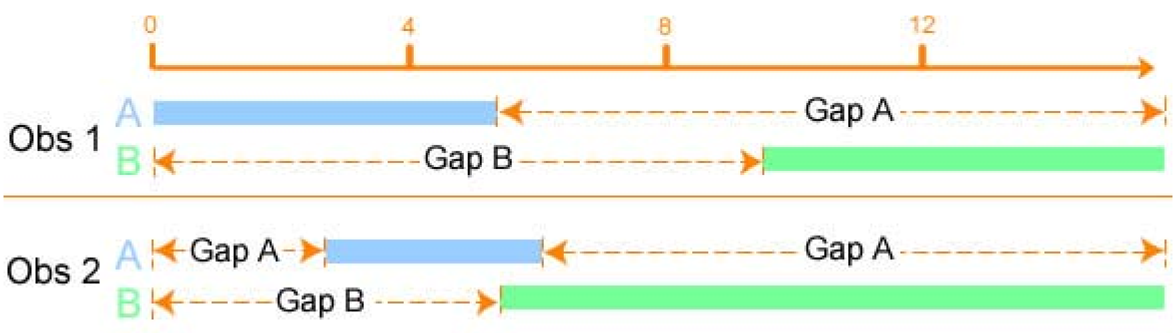


- Agreement: 0.0 Gap B (Obs 1) - 0.0 Gap B (Obs 2).
- Agreement: 0.0 A (Obs 1) - 3.2 A (Obs 2)
- Disagreement 0.0 A (Obs 1) - 0.0 Gap A (Obs 2)
- Agreement 5.5 Gap A (Obs 1) - 6.1 Gap A (Obs 2)
- Agreement: 9.5 B (Obs 1) - 5.5 B (Obs 2)

Duration/Sequence and Gaps; Start-Stop Behavior Groups

Gaps in Start-Stop groups

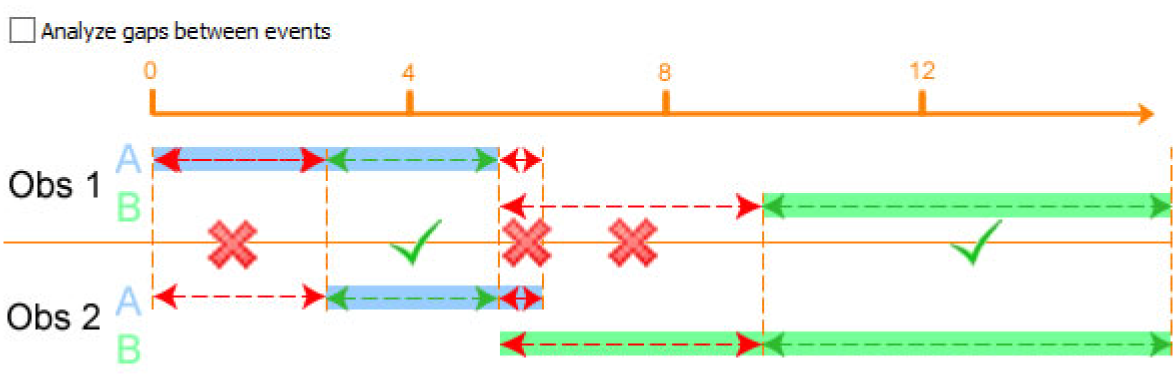
In a behavior group in which behaviors may overlap, each behavior is analyzed independent from the others. The duration/sequence method searches for overlaps between event A and event A, and between event B and event B (see Start Stop groups for an explanation). When you Analyze gaps between events, the same is true for the gaps in such groups. For each individual behavior is recorded whether there is a gap or no gap. So the program compares overlaps of Gap A with Gap A, and Gap B with Gap B.



Example

Without analyzing gaps

When you de-select Analyze gaps between events, comparison of observations 1 and 2 results in the following Agreements and Disagreements:

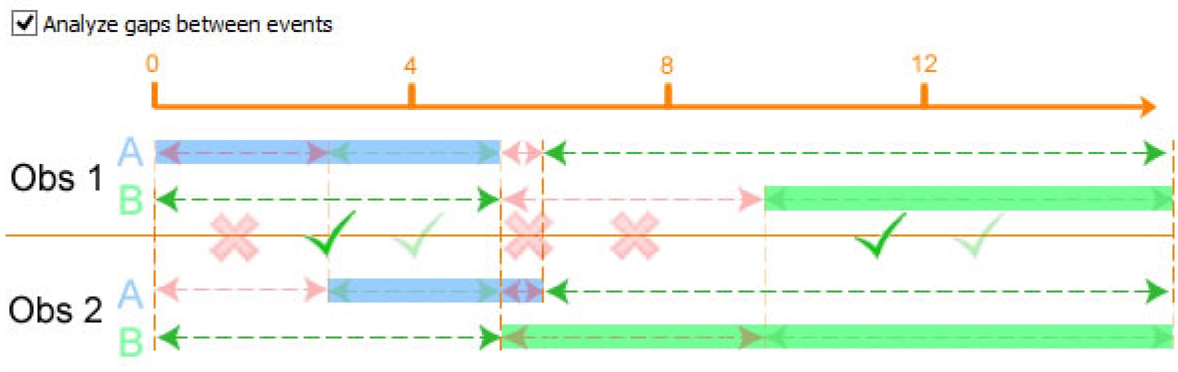


- Disagreement: from 0.0 till 3.7 s; Event A in Obs 1 and Gap A in Obs 2; duration 3.7 s.
- Agreement: from 3.7 till 5.5 s; Event A overlaps; duration 1.8 s.

- Disagreement: from 5.5 till 6.1 s; Gap A in Obs 1 and Event A in Obs 2; duration 0.6 s.
- Disagreement: from 5.5 till 9.5 s; Gap B in Obs 1 and Event B in Obs 2; duration 4.0 s.
- Agreement: from 9.5 till 16 s; Event B overlaps; duration 6.5 s.

With analyzing gaps

When you select Analyze gaps between events, extra agreements are found for Gap B from 0.0 till 5.5 s and for Gap A from 6.1 till 16 s = 9.9 s.



Frequently asked questions about Reliability Analysis

Why do I get different kappa values with different comparison methods?

Different comparison methods have different ways to calculate the number of Agreements (*A*) and Disagreements (*D*). *A* and *D* are used to calculate Kappa.

See:

- The Frequency/Sequence Method in Detail
- The Duration/Sequence Method in Detail
- The Frequency method in detail
- The Duration method in detail
- Statistics

Why are the Combined kappa and Average kappa not the same?

- The Combined kappa is the kappa of the sum of all agreements and disagreements in the observation pairs.
- Average kappa is the average of all kappa's of the observation pairs.

These values differ in the same way as the average of all values in a number of samples differs from the mean of the averages of the individual samples. When there is a bias in one observation pair, this has a larger effect on the Average kappa than on the Combined kappa.

Why is Rho high, while Kappa is low?

Cohen's Kappa and Pearson's Rho do not measure the same thing! Rho measures correlation between observations while Kappa measures agreement between observations. A high Rho could result even when agreement measured by Kappa is low.

Example – Events are coded by means of predefined numerical modifiers (10, 20, 30...). If one coder consistently codes 10 points higher than the other coder, the correlation between observations is high, while the agreement is low. So Rho is high, but Kappa is low (will even be negative).

Why does the frequency method give different statistics compared to the frequency/sequence method, while I have only point events?

With the frequency method, the total number of each event in both observations is compared. With the frequency/sequence method you investigate event pairs instead of the number of events.

Consider the example of two observations with the only difference that at the same time behavior b was scored in observation 1 and behavior a in was scored observation 2. The behaviors a and b are point events in the same start-stop group.

Frequency/sequence method

With the frequency/sequence method, the behaviors a and b are compared with each other, which leads to 1 disagreement.

	Observation 2 / Results						
	Behaviors	a	b	c	**No Records**	**Window Error**	**Total**
Observation 1 / Results	a	3	-	-	-	-	3
	b	1	2	-	-	-	3
	c	-	-	3	-	-	3
	No Records	-	-	-	-	-	-
	Window Error	-	-	-	-	-	-
	Total	4	2	3	-	-	9

Frequency method

With the frequency method, the total number of occurrences of behavior a is different between the two observations, and the total number of occurrences of behavior b is different as well. This results in two disagreements. It also adds an extra count to the **Total number**, which is the sum of all agreements and disagreements.

	Observation 2 / Results					
Observation 1 / Results	Behaviors	a	b	c	**Error**	**Total**
	a	3	-	-	-	3
	b	-	2	-	1	3
	c	-	-	3	-	3
	Error	1	-	-	-	1
	Total	4	2	3	1	10

See:

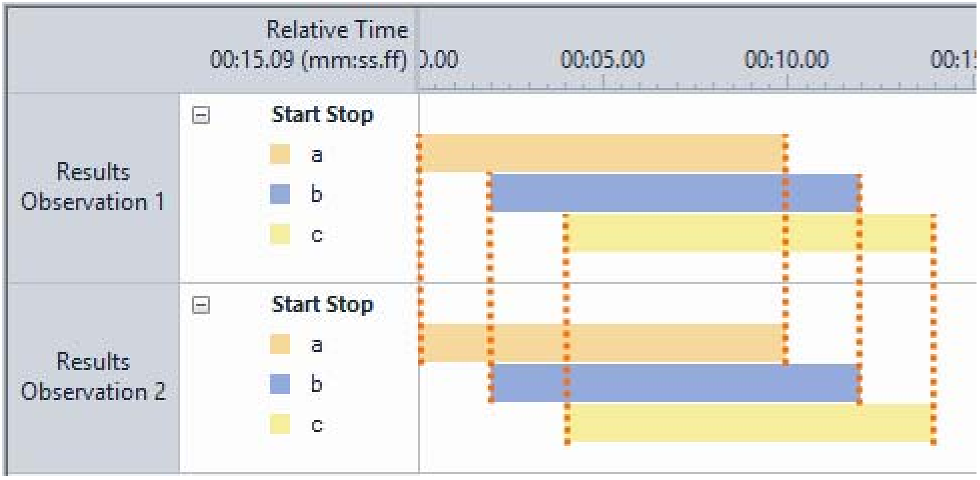
- The Frequency/Sequence Method in Detail
- The Frequency method in detail

Why is the total agreement duration longer than my observation duration?

The total agreement duration can be longer than the observation duration, in the following case:

1. Your observations contain overlapping behaviors. You defined a behavior group in which behaviors can overlap, or you have multiple behavior groups. And:
2. You used the Duration/Sequence or the Duration comparison method.

Consider the example below with a Behavior group in which behaviors a, b, and c may overlap. The three behaviors each overlap for 10 seconds in both observations. Both observations have a duration of 15 s.



The Duration/Sequence method calculates three agreements of 10 seconds, which is a total of 30 seconds. This is longer than the observation duration. Similarly, the Duration method calculates a total duration of 10 seconds for all three behaviors in both observations. This also results in a total agreement of 30 seconds.

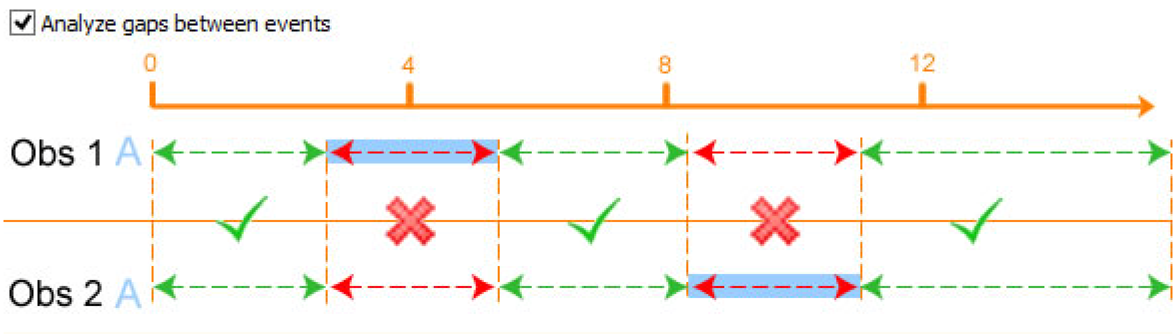
Observation 1 / Results \ Observation 2 / Results Behaviors	a	b	c	**No Records**	**Total**
a	00:10.00	-	-	-	00:10.00
b	-	00:10.00	-	-	00:10.00
c	-	-	00:10.00	-	00:10.00
No Records	-	-	-	-	-
Total	00:10.00	00:10.00	00:10.00	-	00:30.00

See also:

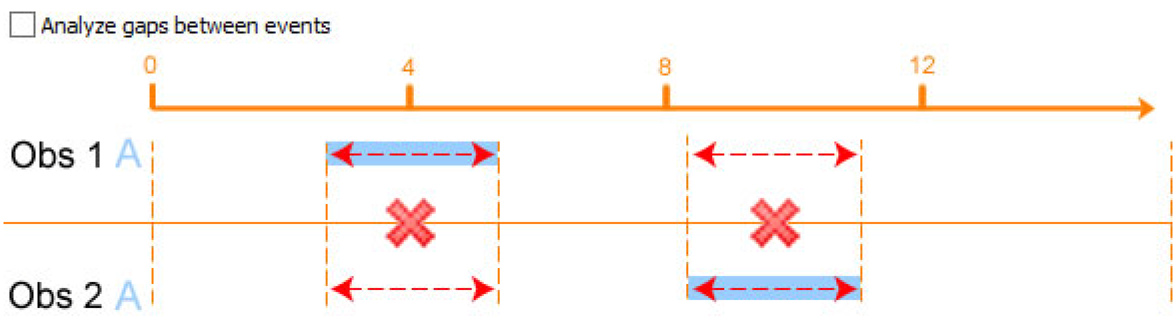
- The Duration/Sequence Method in Detail
- The Duration method in detail
- Effect of Behavior group - Duration/Sequence method

Why is the Agreement much higher than I expect?

If you have many gaps between the events and select the option Analyze gaps between events, you may get an unrealistically high Agreement. This is because gaps are treated as events, so the gaps in the observation pairs are compared with each other and counted as agreements. Therefore, if there are many gaps, they bias the statistics towards agreements as is shown in the picture below. In this example the Duration/Sequence method was used.



To solve this, deselect Analyze gaps between events. The Reliability analysis would then result in only the two disagreements.



Why does Rho change for old pairs when I add new pairs?

If you add more observation pairs to the List of pairs and run analysis again, it could happen that the Rho value for the pre-existing pairs differs slightly from those obtained in the previous analysis. This happens because the confusion matrix, which is used to calculate the statistics, always contains all event types in the observations selected, regardless of which event types were scored in a specific observation. When you add more observations to the List of pairs, this could result in adding event types to the confusion matrix that were not scored in the pre-existing observations. Additional event types means extra rows and columns. Because of the way Rho is computed (see Pearson's Rho (ρ)), this changes the values of Rho in the Statistics page. If you want to keep the confusion matrix fixed, select the **Show not scored elements** option (see Choose table layout options).

Why is an event paired with multiple events in the Comparison list?

The comparison list is shown if you use the Frequency/Sequence comparison method. In some cases, an event is associated with two or more events (not necessarily of the same type) in the other observation. For example, 4.24 Walk in observation 1 is associated with 6.00 Walk (Agreement) and 0.00 Walk in observation 2 (Disagreement).

4.24	8.29	Walk	✗	0.00	2.00	Walk
			✓	6.00	8.00	Walk
8.29	14.11	Run	✓	9.00	12.11	Run

This is an inevitable consequence of the fact that one observation contains more events that the other. In such cases only one agreement is counted (usually the one found in run 1 of the algorithm; see The Frequency/Sequence Method in Detail). All other associations are scored as disagreements, no matter if the event type is the same.

File Management

What is File Management

File management involves the handling of different type of files that you can open, save, rename, import or export. File management also involves the settings for file locations.

Important notes

- To store your project at a secure location, Create a backup of a Project and store the *vpb file. Copying files from the Project folder, for example only the *.vop file does not copy the entire project. Create a backup of your videos as well.
- Carry out all your file management in The Observer XT Project Explorer. If you delete, move or rename files using the Windows Explorer, The Observer XT may not be able to find the files again (because The Observer XT files contain references to other files).
- Never shut down the computer by pressing the power button or cutting off the electricity. Your project data may become lost, even after you saved your project. Always use the Windows shut down feature to close your computer.

File types

File types that can be managed in The Observer XT are:

- Project files (*.vop) – See Open a Project
- Project backup files (*.vpb) – See Create a backup of a Project
- Template projects (*.otb) – See Save a Project as a template

- Observational Data (*.odx from The Observer XT, or other observational data in text format) – See Export data to The Observer XT data files (*.odx) and Import Observational Data
- External data – See External Data and Import External Data
- European Data Format files (*.edf; *.bdf) – See Import European Data Format files
- Media files (*.avi, *.mpg, *.mpeg) – See Import Media Files
- Analysis Results (*.arx, or *.arm from previous versions) – See Manage Analysis Results
- Episode Selections (*.esr) – See Export Episode Selections
- Independent Variables – See Export Independent Variables

Main topics

- Manage Projects
- Export Observational Data
- Export Independent Variables
- Export Episode Selections
- Export External Data
- Export Data to Text Files with the Find Function
- Import Observational Data
- Create a Multiple Coding Station Configuration
- Import External Data
- Import Viso Sessions
- Import Media Files
- Manage Analysis Results
- Export Independent Variables
- File Locations
- Recover Data

Manage Projects

Projects

A project contains the elements Project Setup, Coding Scheme, Independent Variables, Observations, Data Profiles, Episode Selections, Analyses. These are visible in the Project Explorer and can be opened either from the menu or by clicking an element or item in the Project Explorer.

What do you want to do?

- Create a new project
- Save a Project
- Rename a Project
- Save a Project as a template
- Open a Project
- Create a backup of a Project
- Restore a backup of a project

Create a new project

You can create a project in two ways:

- A new blank project – This empty project contains no settings.
- A project from a template – This template project contains settings like a coding scheme and independent variables.

Create a new blank Project

1. To open a new project do one of the following:

   - In The Observer XT startup window, under **Create a new project**, click **New blank project**.

   - Choose **File** > **New Project**.

   - Press **Ctrl**+**N**.

2. Enter a name and click **OK**.

Create a new Project from a template

See Save a Project as a template for information about a project template.

1. Do one of the following:

   - In The Observer XT startup window, under **Create a new project**, click **New project from template**.

   - Choose **File** > **New Experiment From Template**.

2. Click the **Select** button to select a template project (*.otb) from the **Template** folder.

   See also Save a Project as a template

3. Enter a name and click **OK**.

Notes:

- The Project is saved in a Project directory with the same name.
- A Project file name cannot contain any of the following characters: \ / : ; * ? " < > | .

Save a Project

Choose **File** > **Save** or press **Ctrl**+**S**.

Auto-save

Use auto-save to temporarily save a project at regular times:

Choose **File** >**Preferences > Auto recovery**. Select **Save auto recovery** and set the interval.

Auto Recovery saves data to a temporary file. Your data are only saved in the Project file when you actually choose **File** > **Save Project**. Media files, or external data files are not saved to this temporary folder. When the program crashes, you get the choice to open the auto-saved project or to open The Observer XT. When you choose the latter option, you can open the manually saved project.

Rename a Project

Choose **File** > **Save Project As** and enter the new name.

Save a Project as a template

A template is a copy of an existing project, but without the observations and analyses. Use it to create a similar project without having to create the Coding Scheme, Independent Variables and other settings again. A template contains project settings, coding scheme and independent variables but no data. You can use a template project to exchange coding schemes or to re-use devices in the project setup.

The templates (*.otb) replace the templates and read-only projects (*.otx and *.vpx) from previous versions of The Observer XT.

1. Choose **File** > **Save Project as Template**.
2. Enter a name.
3. Click the **Save options** button and, optionally select:

   - Include Independent Variables – To include Independent Variables in the template.

   - Include hardware and software devices – To include the hardware and software from the **Devices** list in the template (see Control External Devices or Programs during a Live Observation in Set up your Project). This is useful, for example, if you use The Observer XT in a observation lab and want to create a new project but use the standard hardware and software setup of your lab.

   - Template information – To enter additional information about the template project.
4. Click **OK** twice to save the template project.

Open a Project

1. Choose **File** > **Open Project** or press <**Ctrl**+**O**>.
2. Browse to the folder where the project is stored.
3. Open the folder with the same name as the project.
4. Select the *.vop file and click **Open**.

Notes:

- See Restore a backup of a project to open a backup file (*.vpb).
- If you open a project created in a previous version of The Observer XT, it is automatically updated to an Observer 17 project. This then can no longer be read in the previous version. The Observer XT 17 automatically creates a backup (*.vpb) copy of the project in the Projects folder which can be opened in the previous version of The Observer XT.
- If your project includes Chinese/Japanese/Cyrillic language characters:

  You can view Chinese/Japanese/Cyrillic characters on a computer with an English language Windows system only when the correct Chinese, Japanese, or Cyrillic language pack has been installed.

- If the project was created on an English language Windows system (with Chinese, Japanese, or Cyrillic language pack installed), you can view it on a Chinese/Japanese/Cyrillic language Windows computer.

  In all other cases the project opens but you cannot view the Chinese/ Japanese/Cyrillic characters.

- Use Latin characters in the path names and file names as otherwise The Observer XT cannot find the data.

Create a backup of a Project

Aim

To create a copy of your project that can be stored as a backup, sent to a colleague or to our Technical Support department in case of problems.

Procedure

1. Choose **File** > **Make Backup**, or press **Ctrl**+**B**.
2. Select the following (optional):

   - External data (selected by default) – To include the external (physiological) data files (*.pbi) in the backup file. If you do not select this option, the backup still contains the name of the files (*.pbi). You can copy those files manually to the project's **External** folder. If your project contains no physiological data, selecting/deselecting this option has no effect.

   - Import profiles – Select this option if you want to include the import profiles used to import the physiological data (*.eip) in the backup file.

3. Optionally, change the file name and file location.
4. Click **Save**.

Notes

- The backup file contains a zipped copy of the entire Project folder and of the log file. It also contains Preferences, references to media files and external (physiological) data outside the Project folder.
- Media files are not stored in the backup file. Store a copy of the videos at a safe location as well.
- If you want to quickly copy observations, including references to media files and external data, export them as ODX.

  See Export data to The Observer XT data files (*.odx)

- Store the backup file on a secure medium (CD, DVD, external hard disk or network drive), in a separate location.
- The Observer XT creates a backup automatically every tenth time you save a project.

Restore a backup of a project

To open a project from a backup file:

1. Choose **File** > **Restore Backup**, or press **Ctrl**+**R**.
2. Locate and select the backup file (*.vpb) and click **Open**.

The Project directory and all associated files in the project are now restored.

Notes:

- If your backup file includes external data and import profiles (see the options in Create a backup of a Project), these are copied to the External project folder and the Profiles folder (see Project-level folders), respectively.
- If you chose not to include the external data, you can still recover them. Open the Independent Variables List and point the mouse to the cells in the **External data** columns. A tool tip informs you about the name of the imported file (*.pbi). Copy this file to the **External** project folder. See Project-level folders for its location.

Export Observational Data

Aim

To export logged events and related data. You have the following options:

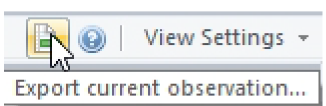
- Export data to The Observer XT data files (*.odx) – To transfer event data from one project to another with The Observer XT data files (*.odx).
- Export data to Excel files (*.xlsx) – To export event data including external data to a Microsoft Excel workbook (*.xlsx) for further analysis.
- Export data to text files (*.txt) – To export event data including external data to other software for further analysis with text files (*.txt). Also use this option to export part of your event data selected in a data profile.

Export data to The Observer XT data files (*.odx)

1. To export event data to Observer XT ODX files, you have the following options:

   - Export multiple observations at once - Choose **File** > **Export** > **Observational Data**. In the window that opens, choose **The Observer XT**. Then select the observations to export.

   - Export a specific observation - Open the observation. Click the **Export current observation** button on the toolbar and choose **The Observer XT**.

2. Under **Export options**, choose one of the following (optional):

   - **Include media files** – To include a copy of each media file associated with the observations in the same folder as the ODX file.

   - **Include external data** – To include a copy of the external data files (*.pbi) associated with the observations. This option is only available if your license includes the External Data Module.

   - **Create separate file per observation** – To export each observation to a separate ODX file. Otherwise, all observations are exported to a single ODX file.

3. Click **OK**.
4. Enter a name and file location and click **Export**.

What an ODX file contains

- Observations – All selected observations are included in one ODX file. If an observation contains multiple event logs, these are all included in the ODX file. You cannot choose to export some of the event logs from an observation.

  ODX files also contain the coding scheme, the coding scheme settings, the values of independent variables for the exported observations, event logs and subjects, and the current Project Settings for those observations.

- Media files – The ODX file contains the path to the media files associated with the observations. Even if you choose not to include those media files in the ODX file, when you import the observations to another project, the program can find your media files and re-link them to the observations provided that the media files are on the same computer or a network server.

  See Import Media Files.

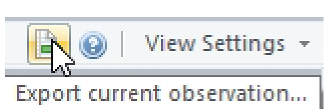
- External data – The ODX file contains a link to the location the external data files associated with the observations, not the external data itself. When you next import the observations into another project, make sure that the external data folder contains those files otherwise the program cannot open them. To do so, locate the file with the extension *.pbi in the folder to which you exported the observation. Create a new project and save it. Then close the new project and copy the *.pbi file to the folder /External of the new project. Do not rename this file. Now re-open the new project and import the ODX file. The external data are now imported together with the observational data.

Export data to Excel files (*.xlsx)

1. To export event data to an Excel file, you have the following options:

   - Export multiple observations at once - Choose **File** > **Export** > **Observational Data**. In the window that opens, choose **Microsoft Excel**.

   - Export a specific observation - Open the observation. Then click the **Export current observation** button on the toolbar and choose **Microsoft Excel**.

   - Export event data selected in the currently active Data Profile (indicated in blue and bold in the Experiment Explorer) - choose **Analyze** > **Select Data** >**Export Selected Data** and then **Microsoft Excel**.

2. In the **Export Observational Data** window, in the **Observations** tab, select the observations you want to export.
3. If your project contains external data, the **Export Observational Data** window also contains an **External Data** tab.

   See Export External Data

4. Under **Export options**, select the following:

   - Create a single sheet with all observations – all observations are exported to a single Excel sheet.

   - Create separate sheets per observation – each observation is exported to a separate Excel sheet.

   - Create separate files per observation – each observation is exported to a separate Excel file.

   - Include user-defined Independent Variables – The user-defined Independent Variables are added to the export file.

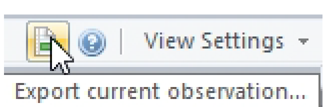
5. Click **OK**.
6. Enter a name and click **Export**.

Export data to text files (*.txt)

1. To export event data to a text file, you have the following options:

   - Export multiple observations at once - Choose **File** > **Export** > **Observational Data**. In the window that opens, choose **Other software** > **OK**.

   - Export a specific observation - Open the observation. Then click the **Export current observation** button on the toolbar and choose **Other software**.

   - Export event data selected in the currently active Data Profile (indicated in blue and bold in the Experiment Explorer) - Choose **Analyze** > **Select Data** > **Export Selected Data**.

2. In the **Export Observational Data** window, in the **Observations** tab, select the observations you want to export.
3. If your project contains external data, the **Export Observational Data** window also contains an **External Data** tab.

See Export External Data

4. Under Export options, select the following:

   - List separator – The selected list separator (comma, semicolon, tab or space, or the default Windows list separator) is used in the text file to separate columns. You can find and change the default Windows list separator in the Control Panel. Go to **Region and Language** and click **Additional Settings**.

   - Include user-defined Independent Variables – User-defined Independent Variables are added to the export file.

   Create separate file per observation – Each observation is exported to a separate text file. Otherwise, all observations are exported to a single text file.

5. Click **OK**.
6. From the **Save as type** list, select Unicode Text (in case your data file contains Chinese/Japanese/Cyrillic characters, or characters like "ä", "õ" etc.,) or ANSI Text (in all other cases). Choose ANSI if you want to import your data into SPSS.
7. Optionally, change the file name and file location and click **Export**.

How event data are exported

- Each event is exported with its original time stamp. All start and stops are exported, also for mutually exclusive behavior groups. For each behavior, the event type is indicated in a separate column.
- Coding scheme elements (Subject, Behavior, Modifier) that were not scored for any of the exported observations are not included in the text file.
- Modifiers of the same group are put in the same column. All observations contain the same number of modifier columns.
- Event logs of the same observation are merged.
- Observations are written as contiguous block above each other without empty rows in between.
- The following columns are exported to both the Excel and text file:

Date/time columns

- Date_Time_Absolute_dmy_hmsf) – The day, month, year, hour, minutes, seconds with three decimals.
- Date_ dmy – The date (day - month - year) belonging to the absolute time.

- Time_Absolute_hms – The hours, minutes and seconds belonging to the absolute time.
- Time_Absolute_f – The decimals belonging to the seconds of the absolute time.
- Time_Relative_ hmsf) – The time since the start of the observation in hours, minutes, and seconds with decimals.
- Time_Relative_hms – The hours, minutes, and seconds belonging to the relative time.
- Time_Relative_f – The decimals of the seconds belonging to the relative time.
- Time_Relative_sf – The seconds with decimals belonging to the relative time.

Other columns

- Duration_sf – The duration of the current state in seconds with decimals.
- Result Container – This column is only present if you exported the data selected with a Data profile (Analyze > Select Data > Export Selected Data). It contains the name of the result container in the Data profile.
- Observation – The Observation name.
- Event_Log – The Event Log name.
- Coding scheme element columns (if scored) – Behaviors, Subjects or Modifiers.
- Event_Type – State start, State stop, Point, Sample, Suspend, Resume.
- Comment – Only present when comments were scored.
- Independent Variable.

Notes on export of event data

- To export media files and external data together with observational data, choose ODX as export format.

  See Export data to The Observer XT data files (*.odx)

- Default name – The suggested name of an exported text file with multiple observations consists of the [Project name] - [first selected observation name]-[last selected observation name] - “Event Logs”.

Export Independent Variables

Two export files

Independent variables are exported in two files. One file contains the Header with variable names and their properties. The other file contains the actual values of the variables for each combination of observation, event log and subject.

1. Choose **File** > **Export** > **Independent Variables**.
2. Browse to the folder where you want to store the variable list.
3. In the **File base name** field, enter a name. The file name will start with this name.
4. Select **Unicode** or **ANSI** from the Encoding list.
5. From the **List separator** list, select the column separator you require. By default, Windows default list separator is selected.
6. Click **Save**.

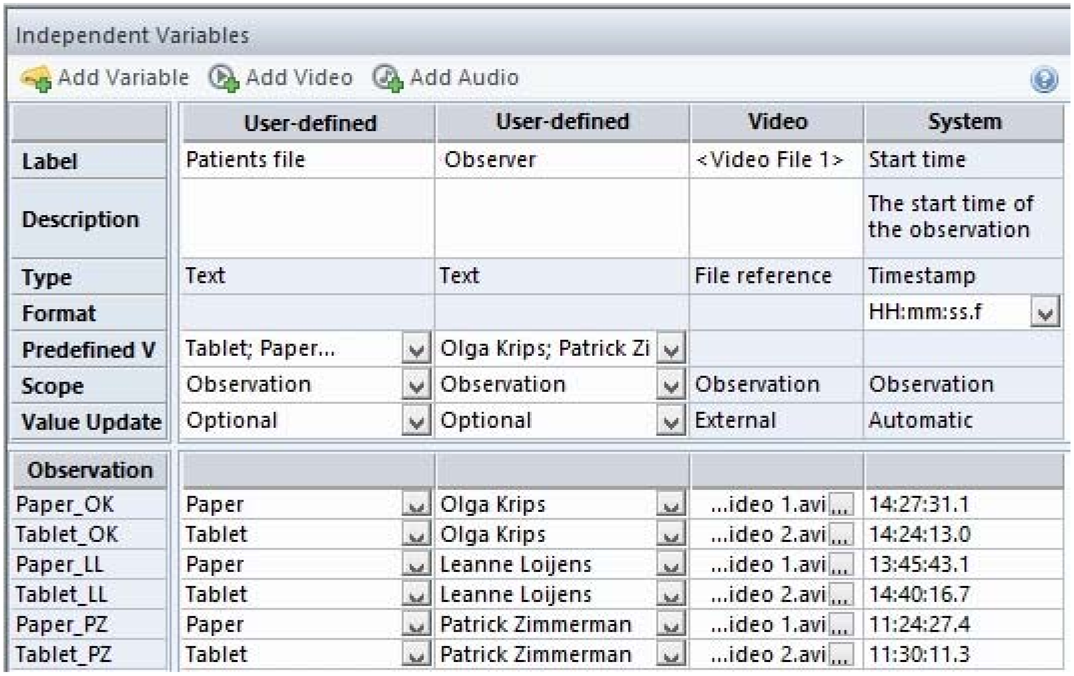
Structure of the export file

- The values file contains the values of all independent variables, including those you chose not to display in the Independent Variables List.

  See Show/hide variables in Set up your Project
- Each combination of observation, event log and subject is written in a row. Values of variables with Subject scope are written in those rows.
- If a variable has Event log or Observation scope, it gets an additional row. Values of such variables are written in those rows.
- All other cells are filled in with missing values ("").

See also Variable scope in Set up your Project

Example - The project contains six observations, each with one event log. The independent variables include the user-defined variable Patients file and Observer with Observation scope.

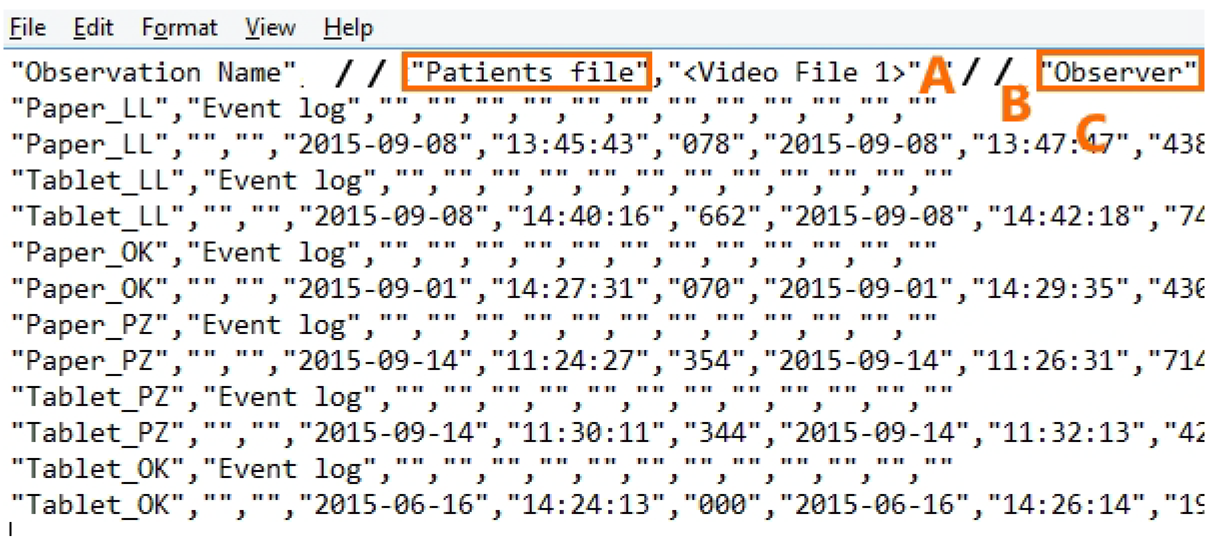


Independent Variables

Add Variable | Add Video | Add Audio

	User-defined	User-defined	Video	System
Label	Patients file	Observer	<Video File 1>	Start time
Description				The start time of the observation
Type	Text	Text	File reference	Timestamp
Format				HH:mm:ss.f
Predefined V	Tablet; Paper...	Olga Krips; Patrick Zi		
Scope	Observation	Observation	Observation	Observation
Value Update	Optional	Optional	External	Automatic
Observation				
Paper_OK	Paper	Olga Krips	...ideo 1.avi	14:27:31.1
Tablet_OK	Tablet	Olga Krips	...ideo 2.avi	14:24:13.0
Paper_LL	Paper	Leanne Loijens	...ideo 1.avi	13:45:43.1
Tablet_LL	Tablet	Leanne Loijens	...ideo 2.avi	14:40:16.7
Paper_PZ	Paper	Patrick Zimmerman	...ideo 1.avi	11:24:27.4
Tablet_PZ	Tablet	Patrick Zimmerman	...ideo 2.avi	11:30:11.3

The export file opened with the Notepad contains the following:



File Edit Format View Help

```
"Observation Name" / / "Patients file","<Video File 1>" / / "Observer"
"Paper_LL","Event log","","","","","","","","","","","",""
"Paper_LL","","","2015-09-08","13:45:43","078","2015-09-08","13:47:47","438
"Tablet_LL","Event log","","","","","","","","","","","",""
"Tablet_LL","","","2015-09-08","14:40:16","662","2015-09-08","14:42:18","74
"Paper_OK","Event log","","","","","","","","","","","",""
"Paper_OK","","","2015-09-01","14:27:31","070","2015-09-01","14:29:35","436
"Paper_PZ","Event log","","","","","","","","","","","",""
"Paper_PZ","","","2015-09-14","11:24:27","354","2015-09-14","11:26:31","714
"Tablet_PZ","Event log","","","","","","","","","","","",""
"Tablet_PZ","","","2015-09-14","11:30:11","344","2015-09-14","11:32:13","42
"Tablet_OK","Event log","","","","","","","","","","","",""
"Tablet_OK","","","2015-06-16","14:24:13","000","2015-06-16","14:26:14","19
```


For Observation 1, we can distinguish:

- A – First line containing the variable names. Note that for readability parts of the line were deleted.
- B – A line specifying the event log. In this file there are no variables with Event Log scope, thus all values for this line are "". Note that this line does not contain the subject names.

- C – A line specifying the observation. This line contains the values of the system variables, since those have Observation scope. It also contains the variable values of the user defined values with Observation scope.

If the Coding Scheme also contained Subjects, the export file would contain extra lines for each subject.

Export Episode Selections

Aim

To export the data selected in an Episode Selection.

Prerequisite

You created an Episode Selection.

Procedure

1. Choose what to export:

   - all episode selections at once, choose **Analyze** > **Episode Selection** > **Export**.

   - a single episode selection, click the **Export Selected Data** button on the toolbar.

2. Browse to the folder where you want to store the episode selections.
3. In the **File base name** field, enter a name. The export file name will start with this name.
4. Select whether you want the files to be exported as Unicode (UTF-16) (choose this if your export file contains Chinese, Japanese, or Cyrillic characters, or characters like "ä", "õ" etc.) or ANSI text files from the Encoding list.
5. Select the column separator you require from the **List separator list**. By default, Windows default list separator is selected.
6. Click Export.

Notes

Default folder – By default, The Observer opens the Export folder of your project.

- If you have set roll-on and roll-off times, the samples within these intervals are also exported.
- Exporting multiple episode selections – The name of each text export file is: [Base filename]-[Episode Selection name] (#).txt.

Export External Data

Aim

To export external data to an Excel file (*.xlsx) or an text file (*.txt). Export of external data can be done either with or without the associated event data.

Prerequisites

Your license must include the External Data Module

Procedure

1. Select one of the following options:

   - To export external data from multiple observations at once - choose **File** > **Export** > **Observational Data**. In the window that opens, choose **Excel** or **Other software**. Then select the observations to export.

   - To export a specific observation - open the observation. Then click the **Export current observation** button on the toolbar and choose **Excel** or **Other software**.

   - To export external data selected in a Data Profile, open that Data Profile, and choose **Analyze** > **Select Data** >**Export Selected Data**.

2. If you also want to export event data, select your observations in the **Observations** tab.
3. If you want to exclude event data from the export, make sure you select the option **Export external data only and exclude event data** described in step 5 below.
4. In the **External Data** tab, select the External data signals you want to export.
5. Under **Export** options, you can select the following:

   - Export external data only and exclude event data – If you select this option, no event data are exported.

   - Point events with the same time-stamp are exported in:

   One column – If you select this option, point events and instantaneous samples, that have the same time-stamp after resampling, are exported to one column and separated by comma's. Select this option if you have used Point events as markers.

Separate columns – If you select this option, point events and instantaneous samples, that overlap in time after resampling, are exported each to a separate column. Select this option if you have used Point events to score behaviors and want to analyze Point events.

- Missing value symbol – If the external data file contains missing values, you can select here “Blank”, “NaN”, “–” or “.” to replace the missing values. Missing values are ignored in the external data statistics.

- Under **Resample options**, you can select the following:

External data sample rate – Here you can select one of the available sample rates (Hz) based on the selected external data signals. By default, the lowest available sample rate is selected.

User defined sample rate – Here you can enter a user-defined sample rate (possible range between 0.001 and 2000 Hz).

See also How external data are resampled

Notes

- If you export external data and event data combined, the time basis (that is, time-stamps at regular intervals) of the external data is used in the export file.

  For more information on how combined event data and external data are exported, see How combined external data + event data are exported

- The option **Point events with the same time-stamp are exported in** is not available, if you have selected the option Export external data only and exclude event data.
- Columns are separated by the List separator that you can select under Export options in the Observation tab.

  See Export Observational Data

How combined external data + event data are exported

- Event data and external data are resampled, based on the sample rate you select. This makes time stamps equidistant for both external and event data.

  See Resampling

- For an event with duration, the value at a sample is exported.
- For a point event (without duration) and an instantaneous sample, the value at the next sample after the event time of the point event/instantaneous

sample is exported. If a point event was scored more than once in between two samples, only the last value is exported at the next sample.

- Each Subject - mutually-exclusive Behavior group combination is exported to a separate column, including modifiers. Each Subject - start-stop Behavior group combination is exported to a separate column.
- Observations are written as contiguous block above each other without empty rows in between.
- Each independent variable is exported to a separate column. Independent variables with event log or subject scope are exported to separate columns. For example, when you have an observation with two event logs and an independent variable ‘Task’, this results in two separate independent variable columns with headings ‘Task/Event Log 1’ and ‘Task/Event Log 2’.
- The same columns are exported as when you export event data (see How event data are exported) except for the columns Durations (s), Event Log, Event type, and Comments.

Resampling

Why resampling?

Event data and external data are not likely to have the same sample rate. Also, for the event log, it is unlikely that the timestamps are equidistant. Therefore, if you export the event log together with external data, exporting them at the sample rate of the external dataset, means that the event log must be resampled.

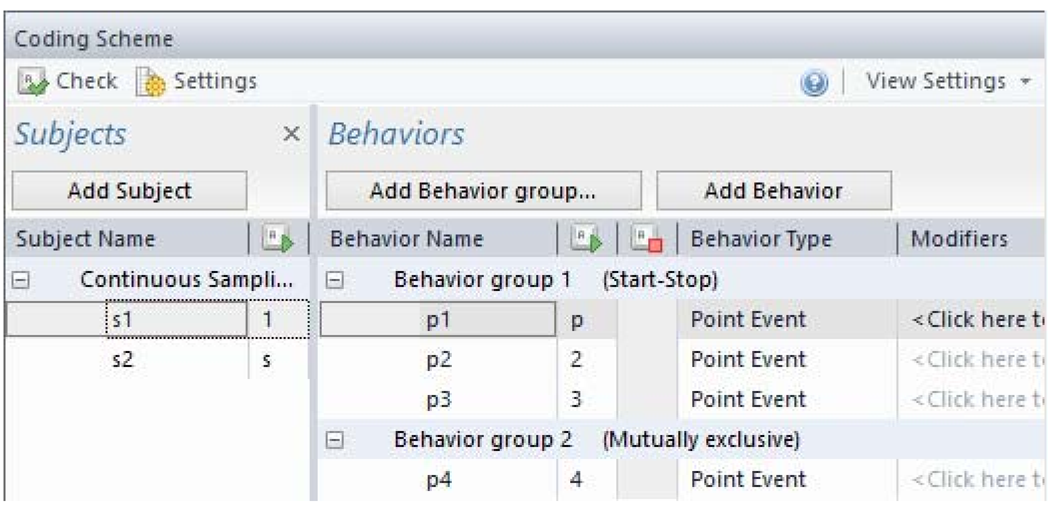
If you have different external datasets, these may differ in sample rate. If you export all external dataset linked to an observation and these differ in sample rate, some external datasets will be resampled.

What information are you looking for?

- How Point events are resampled
- How external data are resampled
- How event data and external data are resampled

How Point events are resampled

Example – You have a Coding scheme with two Subjects and two Behavior groups with only Point events (see figure below).



Part of the observation is shown in the figure below.

Time	Subject	Behavior
00:00.00	**Start**	
00:00.00	s1	p2
00:00.30	s1	p1
00:00.30	s2	p4
00:00.70	s1	p2
00:00.80	s2	p4
00:01.00	s1	p3
00:01.20	s1	p1
00:22.76	**Stop**	

Simultaneously, external data is acquired with a sample rate of 1 Hz.

Next, you export the event data and external data. You export the Point events to Separate columns and choose a sample rate of 1 Hz. The figure below shows what the export file looks like.

F	G	H	I	J	K	L	M	N	O
Time_Relative	Observation	Subject	Behavior	Subject	Behavior	Subject	Behavior	Subject	Behavior
0	Observation0001			s1	p2				
1	Observation0001	s1	p1	s1	p2	s1	p3	s2	p4
2	Observation0001	s1	p1						

When you export the same event data + external data to One column, the same Subject - Behavior group combinations that have the same time-stamp after resampling are exported to the same column (see the figure below and compare with the figure above).

F	G	H	I	J	K
Time_Relative	Observation	Subject	Behavior	Subject	Behavior
0	Observation0001	s1	p2		
1	Observation0001	s1	p1,p2,p3	s2	p4
2	Observation0001	s1	p1		

Notes

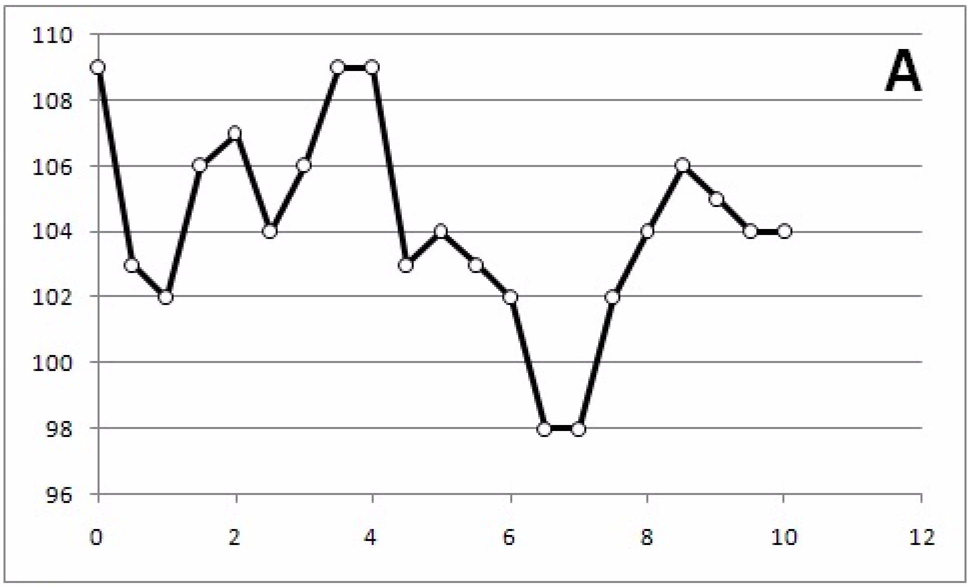
- If you have mainly defined Point events (events without duration) in your coding scheme to score and analyze your data, you should export Point events to Separate columns (see Export External Data). As a result, Point events that have the same time-stamp after resampling are written to separate columns.
- Different Subject - Behavior group combinations are always exported to separate columns.

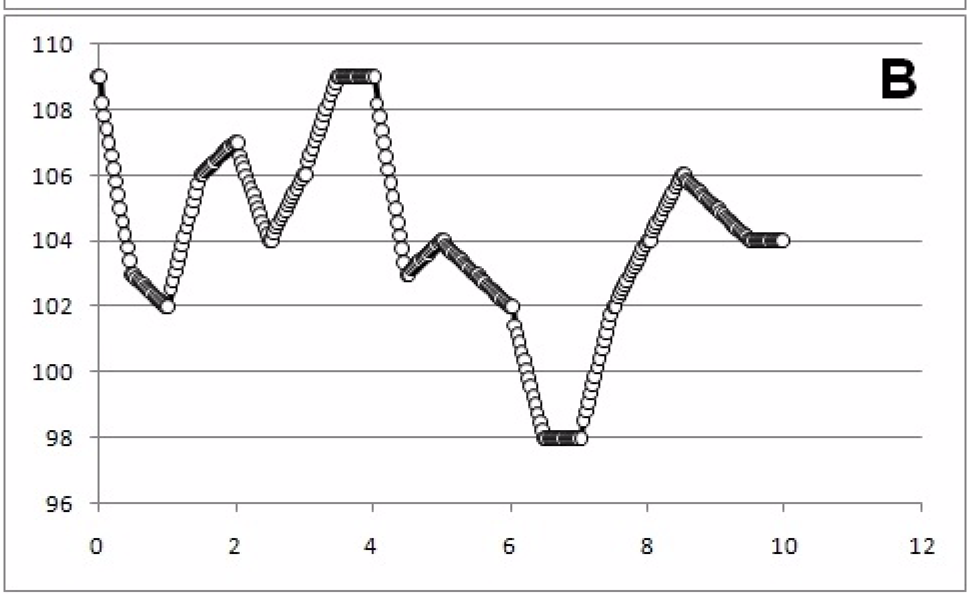
How external data are resampled

Example – You study the response of a child to playing an online game. You have imported heart rate data (sampled with 2 Hz) and FaceReader data (sampled with 29.981 Hz). You want to export event data + external data with a sample rate of 29.981 Hz. In this case, the heart rate data needs to be resampled. This is done by linearly interpolating the heart rate data at the sample time points for which heart rate data is missing.

The figure below shows how the external data are resampled.

- A - Original heart rate data (sample rate: 2 Hz)
- B - The same heart rate data resampled with a sample rate of 29.981 Hz.





How event data and external data are resampled

Example – You study the response of a child to playing an online game. In the observation, two video files are recorded, one of the child's face, one with the screen capture of the monitor. Simultaneously, the child's heart rate is monitored. FaceReader is used to analyze the video recording of the child's face. Both the FaceReader log files with the states as observational and external data (sample rate: 29.981 Hz) are imported into The Observer. The heart rate data are imported as external data (sample rate: 0.5 Hz) into the observation. After import of the FaceReader and heart rate data, you score the vocal behavior of the child manually, as point events (without duration).

You make a Data Profile in which only the first minute of the observation is selected, because you initially want to study the response of the child in the first minute of the test.

In the export, besides the events in the observations, you include the external heart rate data and FaceReader's external data signal 'Happy'. Under Export options, you select 'One column' from the **Point events with the same time-stamp are exported in** list. Under Resample options, you select External data sample rate with the value of external data 'Heart rate', which is '0.5'.

As a result, the event data and the heart rate data are resampled before they are exported.

In the export file (text or Excel) with event data and external data combined (see the figure below for an example), the column with relative time contains the time stamps based on the chosen Sample rate (0.5 Hz in this case). Because 'One column' was selected, the event with duration Unknown and event without duration Vocalization that occur at the same time are exported to the same column, separated by a comma. The event Vocalization is resampled at the first sample (8.0 s) following the original time the event occurred (7.07 s).

See How Point events are resampled

Time_Relative_sf	Observation	Behavior	Behavior	Heart rate
0	Willard	Unknown	No	80
2	Willard	Unknown	No	83
4	Willard	Unknown	No	85
6	Willard	Unknown	No	88
8	Willard	Vocalization,Unknown	No	90
10	Willard	Neutral	No	88
12	Willard	Neutral	No	87
14	Willard	Neutral	No	86
16	Willard	Neutral	No	83
18	Willard	Neutral	No	85
20	Willard	Neutral	No	84
22	Willard	Neutral	No	90
24	Willard	Surprised	No	92
26	Willard	Surprised	No	91
28	Willard	Surprised	No	94
30	Willard	Surprised	No	98
32	Willard	Surprised	No	95
34	Willard	Surprised	No	98
36	Willard	Surprised	No	96
38	Willard	Surprised	Yes	102
40	Willard	Neutral	Yes	105
42	Willard	Neutral	Yes	107
44	Willard	Vocalization,Unknown	Yes	105

How missing values are resampled

If your dataset contains missing samples, the sample will also be converted into the symbol NaN. When such external data are exported the resampled samples will get a NaN value in the export file, when at least one of the samples used for interpolation has a NaN value. The figure below explains this in more detail.

Upsampling

Time	$Y_{original}$	$Time_{resampled}$	$Y_{resampled}$
1 Hz		3 Hz	
0.000	5.000	0.000	5.000
		0.333	4.966
		0.666	4.933
1.000	4.900	1.000	4.900
		1.333	4.866
		1.666	4.833
2.000	4.800	2.000	4.800
		2.333	***NaN***
		2.666	***NaN***
3.000	***NaN***	3.000	***NaN***
		3.333	***NaN***
		3.666	***NaN***
4.000	***NaN***	4.000	***NaN***
		4.333	***NaN***
		4.666	***NaN***
5.000	4.500	5.000	4.500

Downsampling

Time	$Y_{original}$	$Time_{resampled}$	$Y_{resampled}$
1 Hz		0.6 Hz	
0.000	5.000	0.000	1.000
1.000	4.900		
		1.666	4.833
2.000	4.800		
3.000	***NaN***		
		3.333	***NaN***
4.000	***NaN***		
5.000	4.500	5.000	4.500

Export Data to Text Files with the Find Function

Aim

To quickly export your data by copying them and pasting them into another program, or to export a specific selection of your events. Use this method for a quick view of your events or a selection of events.

Procedure

1. Open an observation.
2. Do one of the following:

   - Click the **Find** button on the toolbar.

   - Choose **Edit** > **Find**

   - Press **Ctrl**+**F**.
3. Specify the selection in the upper part of the screen.

   See Find Events in Carry out an Observation
4. Click **Find**.
5. Optionally, hide columns that are not of interest. To select which columns to show or hide, right-click a header and specify your selection.
6. If you scored Start-Stop events and do not want to export the stop events, select **Hide Stop events**.
7. To export all events, click the **Export all events** button. Otherwise, select the events you want to export and click the **Export selected events** button. You can export the events as a text file or to Excel.

Notes

- The Find function does not create a subset of data ready to be analyzed (for example, to calculate statistics). For this purpose, select data in the data profile.

  See Select Data for Analysis
- You can also copy the events and paste them in another program. To do so, right-click one of the cells and select **Copy all**.

- To use the exported data in a statistical package you may need the event start time together with the event durations. Make sure the **Duration** column is visible. If it is hidden, right-click a column header, select **Show column** and select **Duration**.

Import Observational Data

Aim

To import observational data into an existing project. Observational data can be:

- Exported The Observer XT data files (*.odx).
- Observer log files from FaceReader (*.odx).
- Exported Viso sessions (*.odx).

See Import ODX files

- Other data in text format containing a header, a column with time stamps and one or more columns with codes.

See Import other observational data

Import ODX files

Import ODX files as separate observations

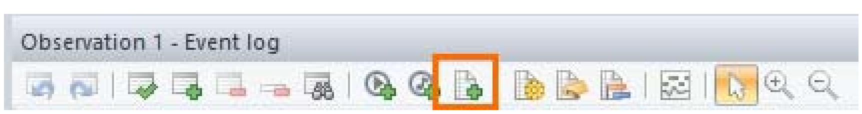
1. Choose **File** > **Import** > **Observational Data**.

   Alternatively, in the Project Explorer, click the **Observations** item, then in the overview window, click **Import observations**.

2. Make sure that The Observer XT (*.odx) is selected in the **Files of type** list.
3. Browse to the file and click **Open**.

Import ODX files to an existing observation

1. Open the observation you want the data to be imported to.
2. Click the **Import Data** button on the toolbar, then choose **Import observational data**.

3. Make sure that The Observer XT (*.odx) is selected under **Files of type**.
4. Browse to the file and click **Open**.

Notes

- If the ODX file contains multiple observations and you import it into an existing observation, data are imported only for the first observation.

- The imported event logs retain their original names. If the observation already contains event logs with that name, a suffix _imported [#] is added to the imported file names.
- If your coding scheme or data contain special characters like ü or ç or Chinese, Japanese, or Cyrillic language characters, before importing *.odx files make sure that your Windows Regional Options support those characters. Open the Control Panel and choose **Language**. Choose your preferred language. Next, close and restart The Observer.
- Export files from FaceReader can be very large when you choose the option to save all analyses to a single odx-file. Such large files take very long to import into The Observer XT, or it may even not be possible to import them. We recommend to transfer FaceReader data to The Observer XT with the Noldus network communication protocol N-Linx.

  See Observe Live and Analyze with FaceReader in Set up your Project

  Alternatively, export results of single participants or analyses and import them one by one into The Observer XT.

What happens to the coding scheme?

- An ODX file contains information on the coding scheme of the project it was exported from. All elements of the coding scheme are imported, no matter whether they were scored in those observations. When you import an observation to a project, The Observer XT checks that the elements in that observation have exactly the same characteristics as the elements in the coding scheme of the destination project. For example, that a behavior has the same name, properties (with or without duration and belonging to the same group type or not, etc.) and modifiers.
- If the element is exactly the same, the existing element is used. Differences in Description, Sound file, Plot color and 'Always add comment' option is ignored. If there is any other difference, a new element is added to the coding scheme.
- Possible conflicts between imported data and existing data:

  If your imported data contain restrictions between subject and behavior, or connections between a subject/behavior and a modifier that are not specified in your coding scheme, the data already present in your project may be invalidated. The Observer XT performs a check when you import observational data. If errors are found, a window appears in which the errors are listed. You can choose to let The Observer XT fix the errors automatically, or you can correct the errors yourself.

  See Check the event log for errors

Example 1 – You import an observation where the behavior *Play* can be scored for subject *Child*, not the subject *Parent*. If the project contains data like *Parent-Play*, these are marked as errors.

Example 2 – You import an observation where the behavior *Play* is attached to the required group of modifiers *Play type*. If the project contains events like *Play* without modifiers, these are marked as errors.

- Event logs with errors cannot be analyzed or visualized. Open those observations and edit the data to correct those errors.

  See Correct Event log errors manually in Carry out an Observation

What happens to the Independent Variables?

If a variable is already present in the Independent Variable List of the destination project, it is updated with the values from the imported observations. If it is a new variable, it is added to the Independent Variable List.

Import media files and external data

If you have chosen to include media files or external data files in the exported observations (see Export Observational Data), the programs looks for those files in the folder where the ODX file was stored.

- Media files – The original path to the file that was written in the ODX file is stored in the Independent Variables List under Video or Audio if the file was not found in the folder where the ODX is stored. When opening the observation, the program asks you to locate that media file.
- External data – The ODX file contains a link to the location of the external data files associated with the observations, not the external data itself. When you next import the observations into another project, make sure that the external data folder contains those files otherwise the program cannot open them.

  If the external data cannot be opened, locate the file with the extension *.pbi in the folder to which you exported the observation. Create a new project and save it. Then close the new project and copy the *.pbi file to the folder **/External** of the new project. Do not rename this file. Now re-open the new project and import the ODX file. The external data are now imported together with the observational data.

How are the imported data synchronized?

When you import observational data that are collected offline from video, the absolute time stamps differ from the time stamps of the observation. Therefore, the time stamps of the imported data are not aligned with the time stamps of the Event log. This is also the case when you, for example, import data from FaceReader that were collected offline. See the table below in which case The Observer XT does or does not align the time stamps of the imported data with the time stamps of the Event log.

	Live observation in The Observer XT	Offline observation in The Observer XT
Imported ODX collected in live observation	Time stamps are aligned	Time stamps are NOT aligned
Imported ODX collected in offline observation	Time stamps are NOT aligned	Time stamps are NOT aligned

Import other observational data

To import event data stored as text files:

1. Choose **File** > **Import** > **Observational Data**.

   Alternatively, in the Project Explorer, click the **Observations** item. In the overview window, click **Import observations**.

2. If you already have an Import Profile for the observational data file, select the name of this profile from the under **Files of type**. If not, Create a Custom Import Profile
3. If the data file does not have a column that specifies whether events have duration or not, choose how to import the behaviors by selecting **Point events** (no duration) or **State events (mutually exclusive)** (with duration) in the **Treat new Behaviors as** group.
4. Select the external data file and click **Open**.

Create a Custom Import Profile

Aim

To make a template for import of observational data stored in text files.

Prerequisites

- The observational data file contains a column with time stamps.
- Subjects, Behaviors and Modifiers are in different columns.
- Each time stamp contains a value that indicates the start or stop of a behavior.

  See the Data set field in the picture below for an example.

Procedure

1. Choose **File** > **Import** > **Observational Data**.

   Alternatively, in the Project Explorer, click the **Observations** item, then in the overview window, click **Import observations**.

2. Choose **Custom Import Profiles** > **New**.
3. Browse to a representative file for defining your import profile and click **Open**.

Build the import profile by specifying the position of the header in the data file and cells or columns containing the time information and the data. This is done by dragging and dropping cells. To make a selection undone, select the cell to which content was dropped and press **Delete**.

Follow the procedure in these sections:

1 - Header

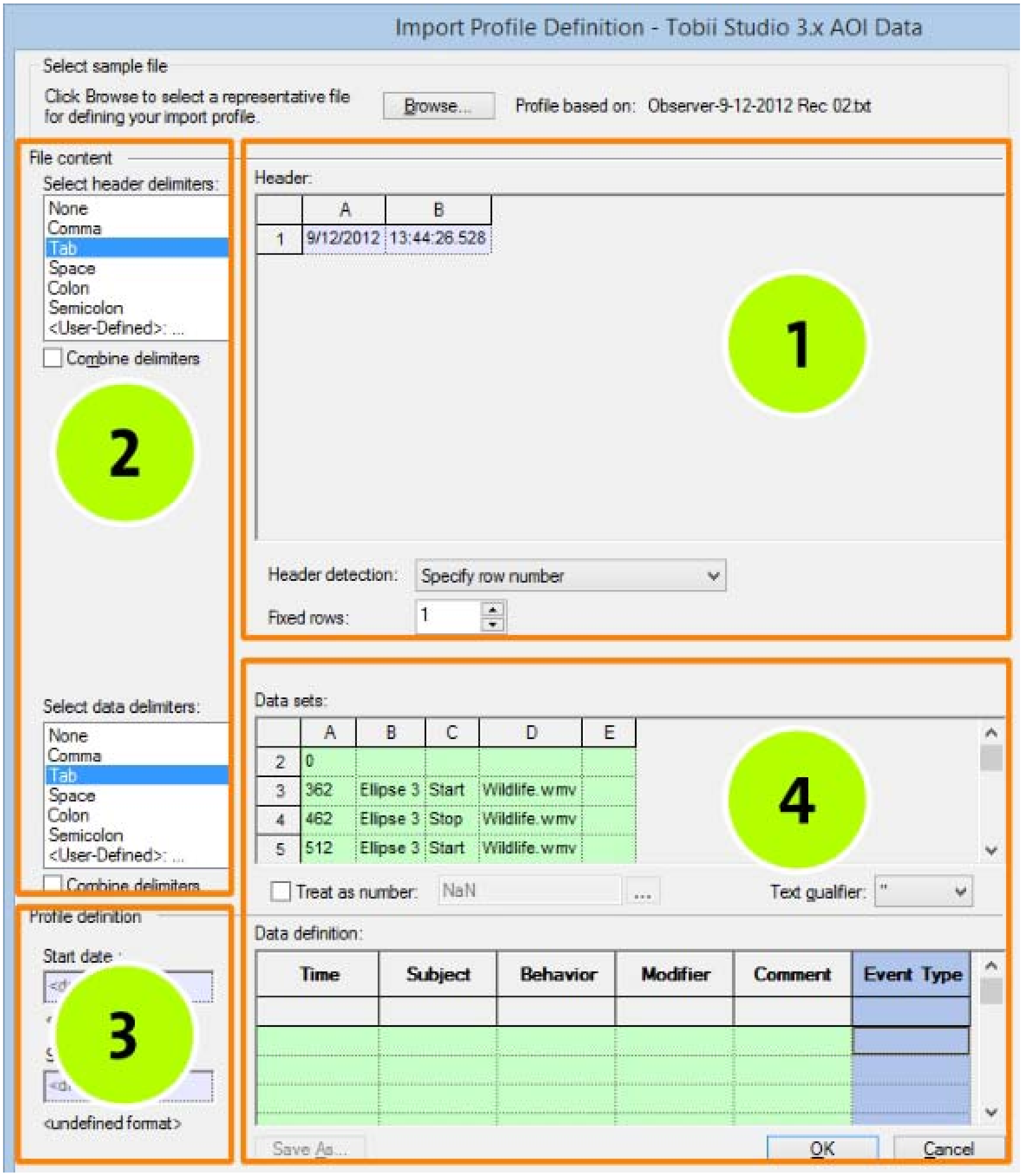
2 - Delimiters

3 - Time information

4 - Data

4. Import a text file with the new import profile

The numbers in this figure correspond with the numbers of the headers in the text below.



1 - Header

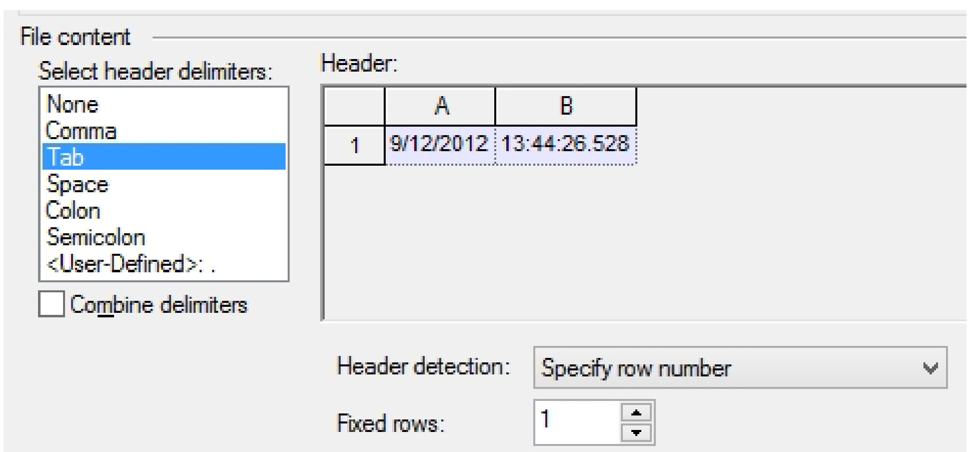
The Observer XT usually automatically detects header and data information in the file. If not, specify which part of the data file contains the header. Choose an option from the **Header detection** list:

- **Automatic** (default) – The Observer XT is set to automatically detect the header and data sections in the data file. Choose one of the other options if automatic header detection does not work.
- **Specify tag** - Select this option if the data file has a variable number of header lines and the header always ends with the same word. Specify the phrase (with either nominal or numerical information) that indicates the end of the header part of the file. If necessary, also specify the number of rows between the header line that contains this phrase and the data.

  Example - The header always ends with a line containing the text [Data]. After the line with this text there is always an empty line before the data starts. Enter [Data] in the End tag field and 1 in the Extra rows field.
- **Specify row number** - If the data file always has the same number of rows in the header, select this option and specify the number of header rows.

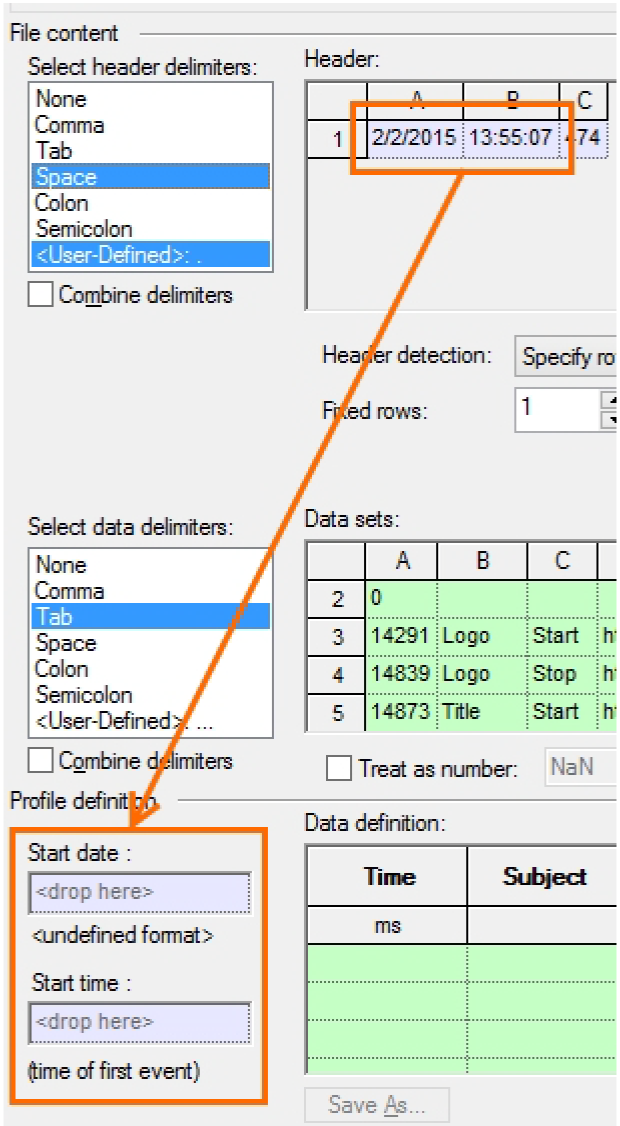
2 - Delimiters

The Observer XT uses the comma as the default delimiter to separate text in the header and data sets. However, the data file may have other delimiters. If this is the case, select the correct ones from the **Select header delimiters** and **Select data delimiters** lists. You can also select multiple delimiters.



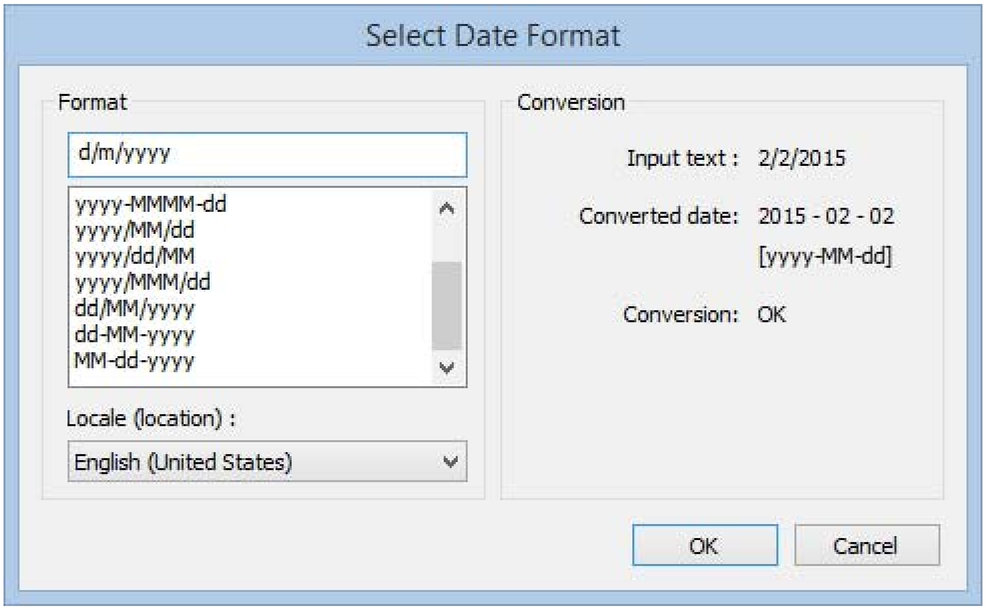
3 - Time information

Drag-and-drop content from the **File content** section to the corresponding cells in the **Profile definition** section.

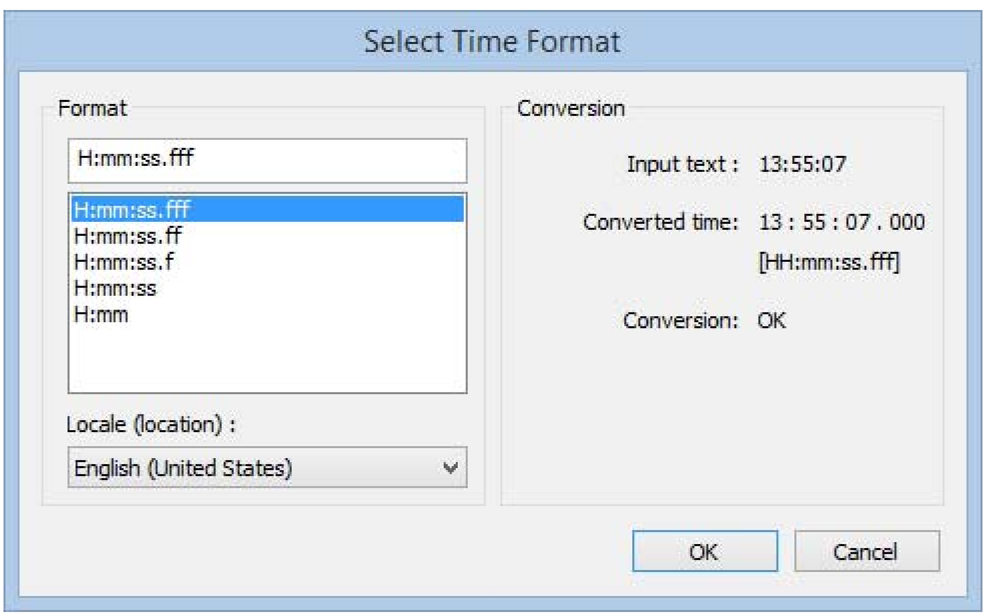


If the Header contains date and time information, drag-and-drop this to the **Start date** box and the **Start time** box in the **Profile definition** section.

When you drop the date in the **Start Date** box, the **Select Date Format** window opens. If the date matches one of the predefined formats, The Observer XT automatically selects one. **Converted Date** shows the date and **Conversion** is **OK**. If not, define your own format by typing a 'd' for each number representing 'day', an 'M' for 'month' and a 'y' for each number representing 'year'. If the proper date is shown after **Converted date**, click **OK**.



When you drop the time in the **Start Time** box, the **Select Time Format** window opens. If the time matches one of the predefined formats, The Observer automatically selects one. **Converted time** shows the time and **Conversion** is **OK**. If not, define your own format by typing an 'H' for each number representing 'hour', an 'm' for 'minute', an 's' for second and a 'f' for each number representing millisecond (see the next picture). If the time is correct, click **OK**.



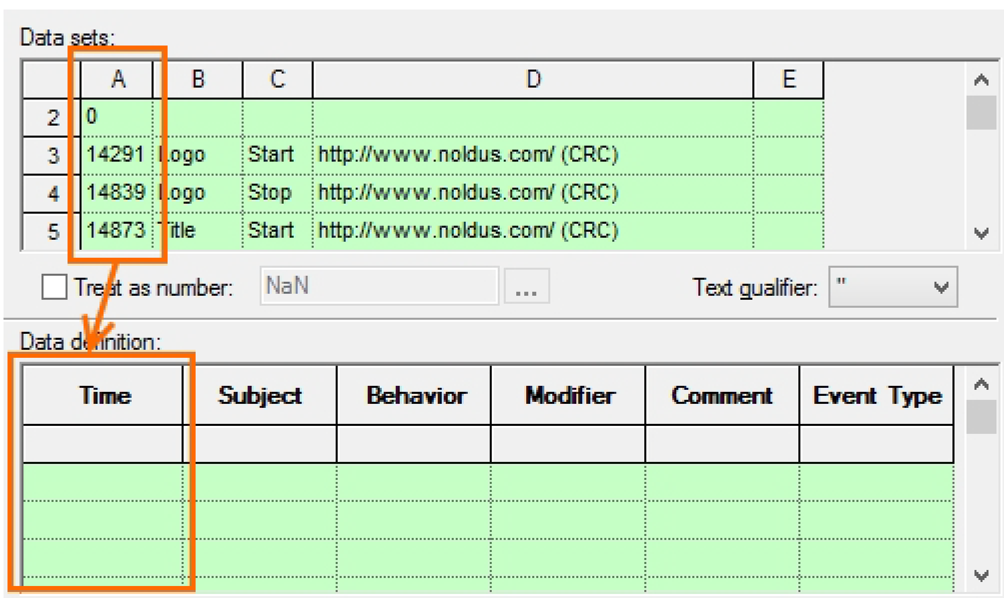
4 - Data

Assign Data Set information to the corresponding columns in the **Data definition** part.

1. **Missing samples** – If your data set contains missing samples indicated by non-numeric symbols, you need to specify this symbol first. If you do not do this, The Observer XT will interpret the symbols as indicating that all the file up to that point is the header.

   Select the **Treat as number** check box. Type in the non-numeric symbol in the **Treat as number** field or click the button next to it to select one or more predefined symbols. To select a specific text, click **<User Defined>** > **OK** and enter this text after a comma (,). If text is identified by a character, select this from the Text qualifier list.

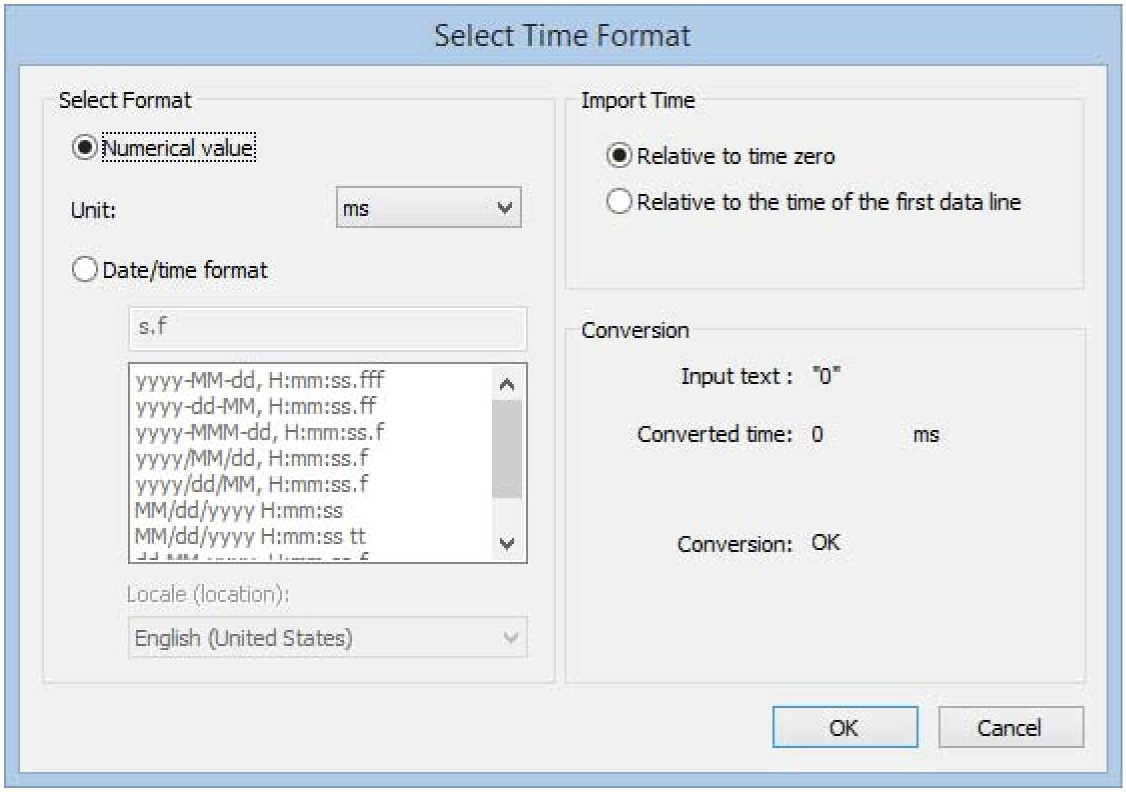
2. **Time** – Drag-and-drop one of the cells containing time stamps to the Time column. The **Select Time Format** window opens. Under **Select Format**, select a Numeric Value or a Date/time format. Click **OK** if the **Converted time** shows the right format and **Conversion** is **OK**.

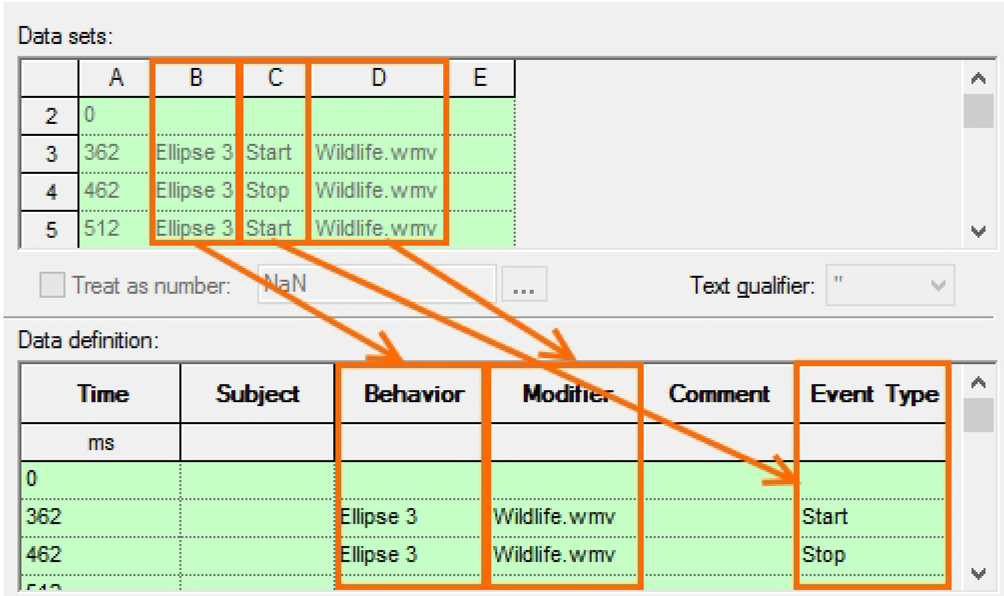
   Under **Import Time**, select one of the options:

   Relative to time zero - Suppose the first row in the imported event data set has time 00:00:05. When the option Relative to time zero is selected, the time stamp of the first row of the imported data set will remain 00:00:05.

   Relative to the time of the first data line - Suppose the event data set you want to import starts at 14:28:00 and sample every 5 seconds. With the option Relative to the time of the first data line, the first row of the imported event data will get the time stamp 00:00:00. The second row will have time stamp 00:00:05.



3. Subject, Behavior, Modifier, Comment. Drag-and-drop cells containing information on Subject, Behavior, Modifier and Comment from the **Data Sets** sheet to the corresponding column in the **Data definition** sheet. To import multiple modifiers, select multiple modifier columns in the **Data Sets** group and drag them to the **Modifier** column in the **Data definition** group. The modifiers placed in different columns in the import file will be automatically organized in separate groups in the coding scheme.



Event Type – If the import file contains a column that specify whether the event line is a start/stop of an event, drag this column to the **Event Type** column in the **Data definition** group. In the **Define Event Keywords** window that appears, under **Keyword** enter the text that identifies the start of a state event (with duration), the stop of a state event and the point event (without duration) in the import file. Click **OK** to confirm.

Save the import profile

When all the information is in the **Import Profile Definition** sheet, click the **Save As** button and give the profile a name.

Import a text file with the new import profile

The newly created import profiles is now in the **Files of Type** list.

1. Locate the data file and select the filename.
2. Click **Open**.

Edit an import profile

1. Choose **File** > **Import** > **External Data**.
2. Click the **Custom Import Profiles** button.
3. Select the Import Profile from the list and click **Edit**.

   In the **Select Sample File** group, you see the original sample file next to **Profile based on**.

4. Browse to the original, or a new observational data file and click **Open**.
5. Follow the general instructions in Procedure to create an import profile.
6. When done, click **Save Profile As**.
7. Enter a name and choose **OK** > **Close**.
8. Select the new import profile from the **Files of Type** list.
9. Select the observational data file and click **Open** to import the data.

Notes

- If the import file contains data collected with Instantaneous Sampling, the Define Event Keywords window does not recognize the samples. We advise you to import sample data as ODX files.

  See Import ODX files
- If you add datasets to the Event Type columns, the **Treat new behaviors as** option (see Import Observational Data) is disabled because the program recognizes events automatically.
- To import data with Chinese, Japanese, or Cyrillic characters or characters like "ü" or "ç", make sure that the import file is Unicode UTF-16 encoded.
- To import data recorded with Instantaneous sampling, see Import ODX files
- You cannot specify the type of modifier which is imported. If you import multiple modifiers of different types, all modifiers are imported as Numerical 'range' Modifiers.

Create a Multiple Coding Station Configuration

Aim

To create a main project on a computer with a full license of The Observer XT and collect data from a number of coding stations with a coder license. You export the data from the coding stations and import them into the main project.

Prerequisites

- You have one full license of The Observer XT
- You have at least one coder license for The Observer XT
- You created a project with a coding scheme on the main Observer XT computer.
- You installed The Observer XT on the coding stations.

Procedure

To copy the project to the coding stations

1. On the main Observer XT computer, choose File > Save Project as Template.

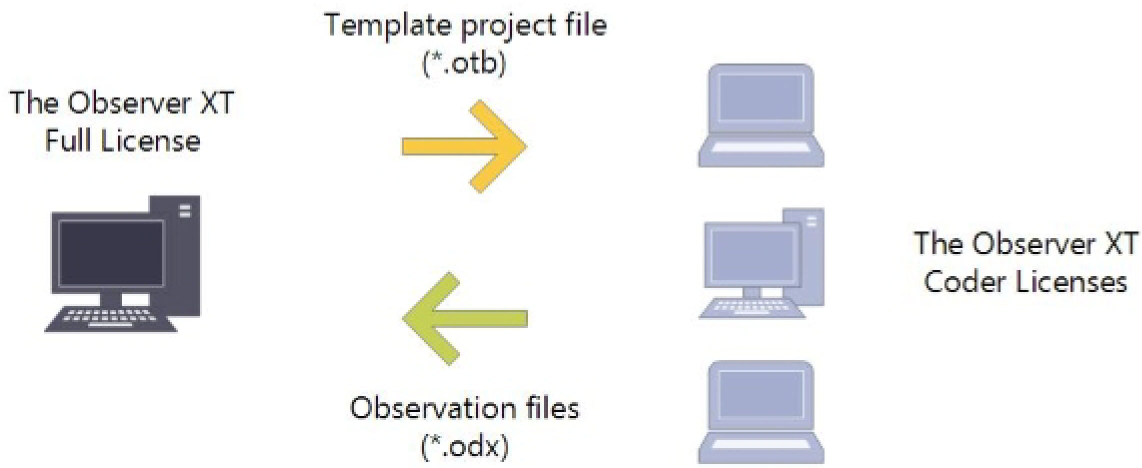
   See Save a Project as a template

2. Copy the template project to each coding station.

   If you copy the template project to the **Templates** folder of The Observer XT, the program automatically locates the template. By default the location of this folder is:

   C:\Users\Public\Public Documents\Noldus\The Observer XT\Templates.

3. On a coding station, start The Observer XT and choose **File** > **New Project From Template**.
4. If the project is stored in the **Templates** folder, the correct location is selected automatically. Otherwise browse to the correct location.
5. Click the **Select** button and open the template project (*.otb)
6. Repeat steps 2-5 for all coding stations.



To code on the coding stations

Create observations, enter independent variables, and code, like in a project with a full license.

See Carry out an Observation

To copy the observations to the main project

1. On each coding station, choose **File** > **Export** > **Observational Data**. Choose the observations to export (see below) and specify whether you want to export external data and media files. Make sure that ODX files from different coding stations have unique names (for example: Coding Station 1 File 0001.odx).
2. Copy the ODX file from each coding station to the main PC.
3. In the main project, choose **File** > **Import** > **Observational Data**.

   The observations are imported in the main project, including the observational data, the independent variable values and the coding scheme.

   See Import Observational Data

Notes

- If you open a template project in the Coder License version of The Observer XT, the name of the project is **[name of template project] - sub**.
- The Project Setup, Coding Scheme and Independent Variables in the new project are locked on the coding stations (indicated by a lock icon in the Project Explorer).

- We recommend to also lock the settings of the main project, to make sure the settings stay the same. To do so, choose **Setup** > **Lock Configuration**.

Read more

See Technical Note - Coder License The Observer XT for a detailed procedure. You can download this document from the MyNoldus section of the Noldus website.

https://my.noldus.com

Import External Data

Supported formats

External data can be imported as .txt files and as European Data Format (EDF) and BioSemi Data Format (BDF) files. Your license must include the External Data Module to be able to import external data. See:

- Text files – See Import External Data as Text Files
- EDF and BDF files – See Import European Data Format files

Import Viso Sessions

Aim

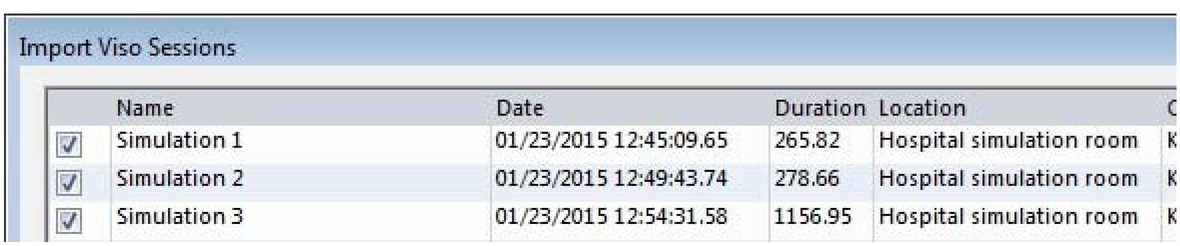
To import sessions made in the Noldus video recording program Viso into The Observer XT.

Prerequisites

- You have a license for Viso that includes the Annotation Module.
- If your Viso license includes User Management, your user role allows import of Viso sessions.
- You recorded sessions in Viso.
- The computer with The Observer XT are in the same network as the Viso computers.

Procedure

1. Choose **File** > **Preferences** > **Viso settings**
2. Enter the IP address of the computer with Viso Services in the **Services address** field. Do not change the **Services port** *5672*, unless this was also changed in Viso.
3. Click the **Test connection** button. If the two computers are connected properly, the **Status** *Connected* appears.
4. Choose **File** > **Import** > **Viso Sessions**.
5. Enter the login details for your Viso account.
6. Select the sessions and import them.


Import Viso Sessions

	Name	Date	Duration	Location	C
☑	Simulation 1	01/23/2015 12:45:09.65	265.82	Hospital simulation room	K
☑	Simulation 2	01/23/2015 12:49:43.74	278.66	Hospital simulation room	K
☑	Simulation 3	01/23/2015 12:54:31.58	1156.95	Hospital simulation room	K

Notes

- The Viso subjects, markers and remarks are imported into the coding scheme and event log. Viso subjects are imported as subjects, markers are imported as behaviors without duration (point events) and remarks as comments in the event log.

- If the computers are in different networks, export the sessions in Viso to The Observer XT and import the sessions (*.odx) as observational data into The Observer XT.

  See Import Observational Data

- For more information on Viso sessions in The Observer XT, consult the Viso Help.

Import Media Files

Supported formats

See Media files for an overview of the supported media formats.

Aim

To select a video or audio file if you did not already did so when you created an observation.

Prerequisites

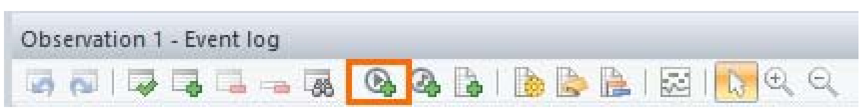
You carried out at least one observation.

Your license for The Observer XT includes the Single Media Module or the Media Module.

Procedure

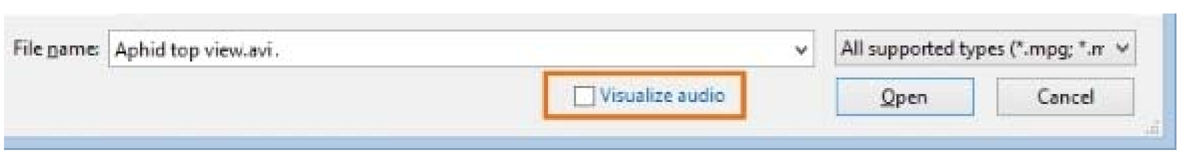
To add a video file

1. Open the observation.
2. Click the **Import Video** button on the Component toolbar.

3. Select a video file.
4. Optionally select **Visualize audio**, to display the audio of the video as waveforms.

   See Visualize Audio in Visualize Data

5. Click **OK**.

To add an audio file

1. Open the observation.

2. Click the **Import Audio** button in the Component toolbar.

3. Select an audio file and click **OK**.

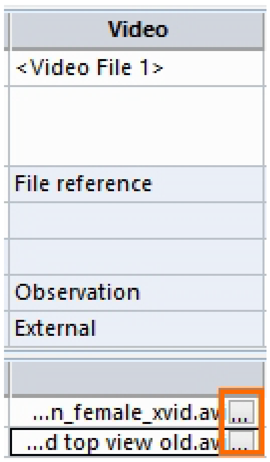
To replace a media file

1. Open the Independent Variable List window by doing one of the following:

   - Choose **Setup** > **Independent Variables**.

   - In the Project Explorer, click **Independent Variables**.

2. Click the ellipsis button next to the video you want to replace.



3. Select another media file and click **Open**.

To remove a media file from an observation

To remove a single media file from an observation, open the Independent Variables list (see To replace a media file) and click the corresponding cell in the **Video** or **Audio** column. Then press **Delete** > **OK**.

The media file is only removed from your project, not deleted from disk.

Remove a media file variable

The instructions below remove a **Video** or **Audio** column in your Independent Variable List. This means that all the links between the video/audio files in that column and the observations are removed.

To remove a specific media file from your project, see To remove a media file from an observation

1. Open the Independent Variable List.

See Independent Variables in Set up your Project

2. Right-click in a Video or Audio column and select **Delete independent variable**.
3. Click **OK**.

Notes

- You can add one video and/or audio files to an existing observation in the The Observer XT with the Single Media Module. With the Media Module you can add a maximum of 20 media files.
- Media files are always added with Scope Observation.

  See Variable scope in Set up your Project

Manage Analysis Results

What do you want to do?

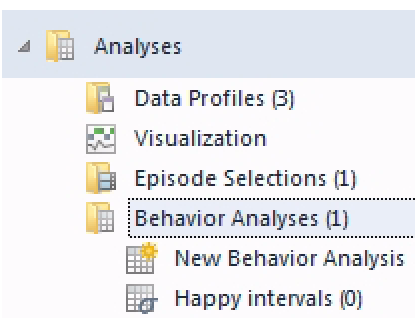
- Save analysis results
- Open analysis results
- Remove analysis results
- Export analysis results

Save analysis results

1. Make sure that the analysis result is open on the screen.
2. Click the **Archive** button on the toolbar.

3. Enter a name and click **Save**.

The Analysis Result now appears in the Project Explorer in the appropriate folder under Analyses.



Notes

- The destination folder is named as the type of analysis you have run, and is located under Analysis Results in the current Project folder. You cannot save your analysis results outside that folder.
- The default name for the Analysis Results file is: <prefix><number>.arx. The prefix varies according to the type of result (Behavior Analysis, Reliability Analysis etc.). The number is augmented by 1 every time you save the result with the default name.

Open analysis results

Do one of the following:

- Choose **Analyze**, select the analysis type and then **Open Archive**. Select the result file and click **Open**.
- Click the Analysis result in the Project Explorer.
- Right-click the Analysis result in the Project Explorer and select **Open**.

Remove analysis results

To remove an archived analysis result, right-click it in the Project Explorer and select **Remove**. Removing an analysis result does not delete the file (*.arx) from the **Analysis Results** folder of your project. To open it again, click the **Open Archive** button on the Component toolbar.

Export analysis results

You can export analysis results to Excel or ASCII (text).

1. Make sure that the analysis result you want to export is open on the screen.

   See Open analysis results

2. Choose **Analyze** > **Export Analysis Results**, or click the **Export** button on the Component toolbar.

3. Browse to the folder where you want to store the exported file. By default, this is the **Export** folder within your project folder.
4. From the **Save as type** list, select either, Excel Workbook (*.xlsx), or Text File (*.txt).

   If you choose Text File, select a column separator from the **List separator** list next to **Encoding**.

   Optionally, select the option Merge header rows. Do so if you want to open the analysis results in SPSS.

   Select whether you want to export as:

   - Unicode (UTF-16) - if your export file contains Chinese, Japanese, or Cyrillic characters, or characters like "ä", "õ" etc.

   - ANSI - if you want to open the analysis results in SPSS.

5. Enter a name and click **Export**.

Notes

- You can only export the current analysis result or those saved previously. If you plan to export many results, first save each of them, or export each of them before creating the next one.
- Exporting to Text files –Results in separate sheets are exported to separate text files. The name of such a file is: [File name]_[name of sheet].txt.
- Exporting to Excel – Results in separate sheets are exported as separate worksheets within the Excel file.

File Locations

General folders

The default application folder of The Observer is:

C:\Program Files\Noldus\The Observer XT 17

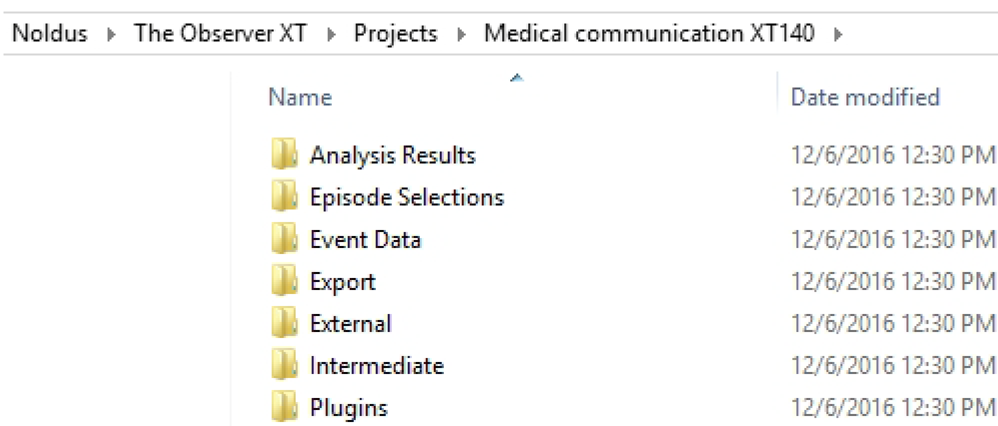
You can change the application folder during installation.

Your The Observer XT files are stored, by default in:

- C:\Users\Public\Public Documents\Noldus\The Observer XT \Projects
- C:\Users\Public\Public Documents\Noldus\The Observer XT \Video files
- C:\Users\Public\Public Documents\Noldus\The Observer XT \Audio files
- C:\Users\Public\Public Documents\Noldus\The Observer XT \Templates

Project-level folders

Each project you make has its own folder. It is named as the project and contains the following subfolders:



- Analysis Results - with the analysis results files (*.arx).
- Episode Selections - with the episode selection files (*.esr).
- Event Data - with the binary observational data files.
- Export - with the exported files (*.odx, *.txt, *.xls).
- External - with the imported binary external data, or imported European Data Format Files (*.pbi).
- Intermediate – with files created by the external data analysis.

- Plug-ins – with settings of installed external plugins.

Other folders

Import profiles

The Profiles for import of observational (*.oip) and physiological data (*.eip) are stored in:

C:\ProgramData\Noldus\Common\Profiles.

Log and dump files (for Technical Support)

The Observer continually records computer events to a log file. In the case you encounter problems using the software, the Technical Support Department may ask you to send us two files, the log file **Observer.log** and the dump file **The Observer XT 17.dmp**. These are stored on:

- Log file – C:\ProgramData\Noldus\The Observer\XT 17\Log.
- Dump file – C:\Users\<user name>\AppData\Local\Temp\.

Recover Data

Autosave

Temporary project

When you open a project, The Observer XT creates a temporary copy of the entire project folder in the folder:

C:\ProgramData\Noldus\The Observer\XT 17\Temp.

The ProgramData folder is usually hidden. To show it, open Windows Explorer and select **Hidden files** from **View** menu.

The name of the temporary copy is the same as the project folder, but with a tilde (~) at the front. This folder contains the file **~[project name].vop** and **~[project name].bkp**. When you save a project, all files from the temporary copy are copied to the original project folder.

When you score observational data, data are saved every new event line, to the temporary copy. When you save the project, the new data are saved in the original project folder.

The temporary copy only contains files created by The Observer XT. Other files, like video files, are not copied to the temporary folder.

The temporary copy can be used to restore a damaged project. Contact Noldus support if this is needed.

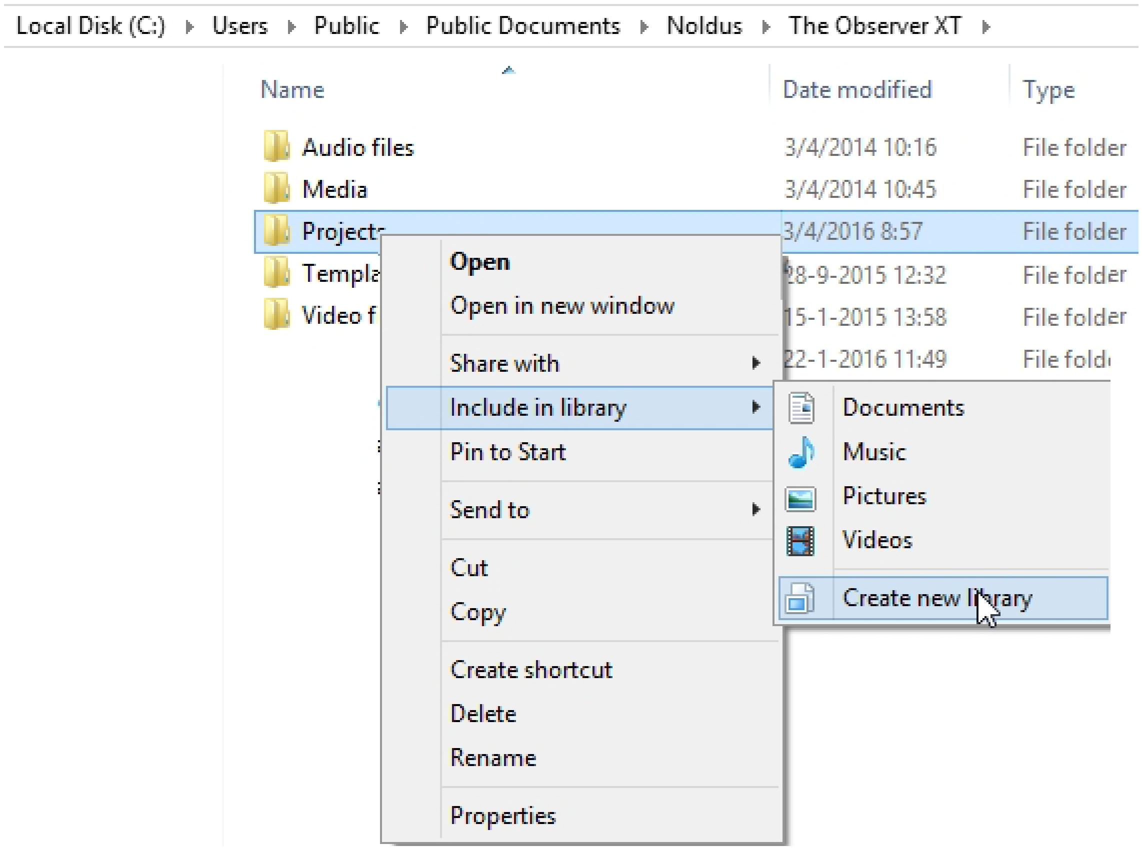
Autosave

The Observer XT by default automatically creates a temporary backup every five minutes. To change this, choose **File** > **Preferences** > **Auto recovery** and specify the settings.

Backup in Windows 10 and Windows 11

Besides the Backup function in The Observer XT (to back up single projects) you can use the **File History** function of Windows 10 and 11 to backup multiple projects automatically.

1. Include your project folders in a Library. To do so, open Windows File Explorer, right-click the folder you want to backup, for example the entire **Noldus\The Observer XT folder**. Select a library, or choose **Create new library** to make a new one.



2. Connect your computer to a network drive or an external harddisk.
3. In the Apps window type **File History**.
4. Click the **File History** tile that appears.
5. Choose a drive for the backup.
6. Choose **Advanced Settings**, choose how often the changed files are backed up, and how long the files are kept.
7. Choose **Exclude folders**, and select the folders to leave out of the back up.
8. Click **Turn on**.

Notes

- To restore the backed up library, click **Restore personal files**. Use the arrow keys at the bottom to select the correct version and click the restore button.
- To create a backup of an individual project, choose **File** > **Backup** in The Observer XT.

  See Create a backup of a Project

Media Files

Main topics

- Media files
- Supported Formats
- Troubleshooting
- Record Video
- Codecs installed by Other Programs

Media files

Formats, containers and codecs

The term Video format can often be confusing, because it involves two distinct, and very different technology concepts: containers (created by software called multiplexer) and codecs (short for coder/decoder).

The container describes the structure of the file where the video and audio streams are stored, how they are interleaved, and which codecs are used by which stream. It is used to package the video & its components (audio/metadata) and is usually identified by a file extension such as .AVI, or .MPG.

Codecs are used inside of a container. A codec is a way of encoding audio or video into a stream of bytes. It is the method used to encode the video and is the chief determiner of quality. The important thing to realize is that most good container formats can hold many codecs. Even .AVI files can hold a wide variety of codecs as their contents. The container does not decide the quality or features of the video itself, that is up to the codec.

The proper way to describe video is to indicate both: for example, an .AVI file containing DivX video and MP2 audio.

How do I know the format of my video file?

There are free tools available to see what format your video file has and which codec, container, and audio format is used. Examples are MediaInfo, or GSpot. GSpot gives a lot of information on your video files, but has, however, not been maintained since 2007.

https://mediaarea.net/nl/MediaInfo

http://www.headbands.com/gspot/

Play media in The Observer XT

Decoders installed with The Observer XT

Decoders are needed to play back media files. When you install The Observer XT, it installs the The LeadTools Package 20.0 to play back video.

IMPORTANT Codecs from, for example, DVD burning software may conflict with the ones used by The Observer XT. See Codecs installed by Other Programs

The LeadTools Codec Package 20.0 contains the following:

- MP4 Demultiplexer

- MPEG Demultiplexer
- H.264/AVC Video Decoder
- MPEG-2 Video Decoder
- MPEG-4 Video Decoder
- AAC Audio Decoder

Supported Formats

Supported video formats

See How do I know the format of my video file? how to determine video formats. The Observer XT supports playback of the following digital video formats:

- MPEG-1 (*.mpg, *.mpeg).
- MPEG-2 (*.mpg, *.mpeg, *.vob).
- MPEG-4 (*.avi) including DivX, Xvid, and H.264 *.
- Uncompressed AVI (*.avi).
- DV-AVI (*.avi).
- MPEG-4 QuickTime (*.mov)

Note that not all playback speeds may be available in The Observer XT, even for supported formats.

* These video formats are not supported for creating an Episode Selection

IMPORTANT We recommend not to open a video file directly from a mobile device (a smartphone, or a tablet etc.). First copy the files to the PC with The Observer XT, then open that copy in the observation.

Supported audio formats

- MP3 (*.mp3)
- WAV (*.wav)
- WMA (*.wma)

AAC (*.aac) audio files are not supported, but video files with .aac audio are.

The maximum number of audio files that can be opened is determined by your license. With the Single Media Module you can import one audio file. With the Media Module, you can import up to twenty audio files in a single observation.

Supported audio formats for visualization

You can visualize the following audio formats:

- MPEG Audio Stream, Layer 1 (*.mp1)
- MPEG Audio Stream, Layer 2 (*.mp2)

- MPEG Audio Stream, Layer 3 (*.mp3)
- MPEG-2 Advanced Audio Coding file (*.aac)
- AC3 Audio file format (*.ac3)
- PCM – Pulse-Code Modulation (*.wav)
- ADPCM – Adaptive Differential Pulse-Code Modulation (*.wav)
- Adaptive Multi-Rate ACELP Codec (*.amr)
- Windows Media Audio (*.wma)

When you play your video at a higher or lower speed, .wma audio files are still played at normal speed.

Other formats may be displayed depending on the audio decoders installed on your computer.

Troubleshooting

Invalid video/audio

When you try to open a video/audio file, you may get a message stating that the file is of invalid type. This can occur for different reasons, for example the appropriate codec is not installed, or the codec cannot play that format, or the file does not contain a video stream, or the appropriate demultiplexer is not installed.

The warning message shows details of the format The Observer XT tries to play. Check in the list above whether it corresponds to the supported formats, and that the necessary codecs are installed. If necessary, contact the Noldus Help Desk (see For more Information in Welcome to The Observer XT!) to solve this issue.

When a media file is opened and the audio codec is not found, an error message appears, however the video plays correctly in The Observer XT.

Record Video

Record video with MediaRecorder

We recommend to record video with MediaRecorder and use these videos in The Observer XT for offline scoring. See the MediaRecorder documentation for an overview of the supported cameras.

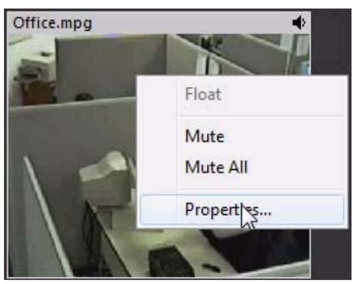
Codecs installed by Other Programs

Codecs can give problems

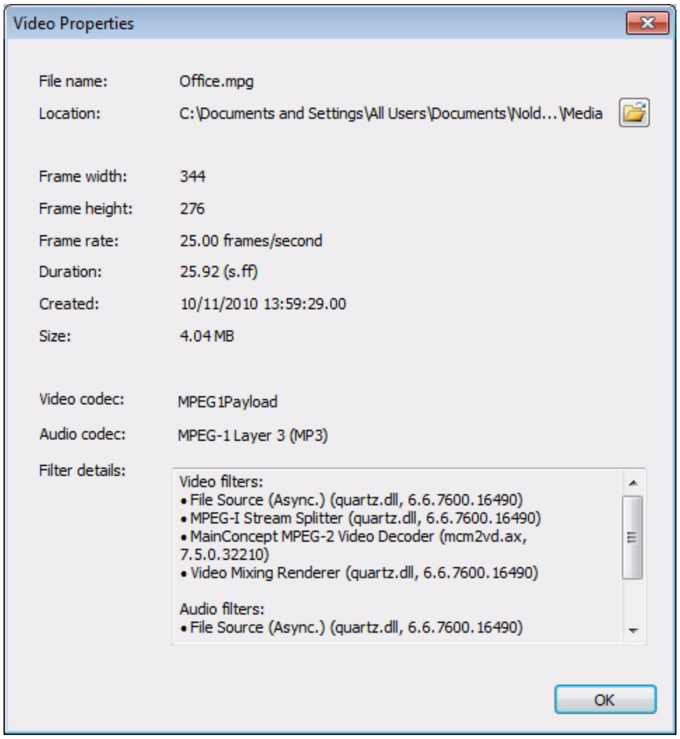
Codecs for media players and DVD burning software already installed on your PC may conflict with the codecs that are installed with The Observer XT. It may happen that The Observer XT uses the wrong codec to play back the videos. This may lead to wrong time stamps in the event log, or videos that cannot be played back. Therefore we strongly recommend to not install such programs on the computer with The Observer XT.

Check which codecs The Observer XT uses

1. Open the observation containing video.
2. Right-click the video window and select Properties.



The video and audio codecs that are used by The Observer XT are shown next to **Video codec** and **Audio codec**. Additional information is shown under **Filter details**.



The Observer XT provides some audio codecs (see Play media in The Observer XT). To play back other audio files you must have the right codecs installed. If the required codecs are not available, The Observer XT cannot play it back properly. Please note that The Observer XT plays audio files with a maximum of two audio channels.

Software Development Kits

What is a Software Development Kit?

A Software Development Kit (SDK) is a set of development tools that allows software engineers to create applications for use in combination with The Observer XT. The Observer XT has the following SDK's:

- The Observer XT SDK
- N-Linx SDK

To obtain an SDK, please contact support@noldus.nl. Please note that support on the SDK, including help with making them, is only available to customers with a service contract.

The Observer XT SDK

The Observer XT (SDK) is a set of development tools that allows software engineers to create applications for use in combination with The Observer XT. The Observer XT SDK includes a debugging aid, an example tool plus C++ sample source code and supporting technical documentation.

The Observer XT has a default folder for plug-ins.

C:\Program Files (x86)\Common Files\Noldus\Plugins.

However it depends on the requirements of the plug-in where they must be stored. Plug-ins can only work with The Observer XT if they have been written with specific methods. These methods are described in The Observer XT Software Development Kit (SDK).

The SDK includes the following applications:

- External application control
- Observational Data XML (ODX)
- Automatic Synchronization
- Plug-in Viewer COM-Object
- Event Data Plug-in
- External Data Plug-in

External application control

The Observer XT can execute other (external) applications during the user actions New observation, Start observation, Stop observation, Close observation. The Observer XT can execute a command with optional parameters, a batch file or Visual Basic scripting.

The SDK contains documentation with background information, examples of how to execute applications and a summary of batch file processing. The SDK also contains three pre-programmed command files.

Observational Data XML (ODX)

The SDK explains how to create an ODX file that can be imported into The Observer XT. An ODX file is an Observational Data file in XML format. With The SDK you can create your own ODX file to exchange information between your own application and The Observer XT.

The SDK contains documentation describing the contents/format of an ODX file. The SDK also contains an ODX file from The Observer XT, XSD schema definition files for an ODX file and a C++ header file with all tag names used in ODX files.

Automatic Synchronization

The Observer XT uses a serial binary data exchange mechanism for automatic synchronization of observational and external data. Two types of Sync Out signals are available to achieve this automatic synchronization. The SDK describes in detail the mechanism for automatic synchronization and the Sync Out signals. It enables you to decode the Sync Out signal and to use it with your own application.

The SDK contains a document describing the synchronization method, the Sync Out signals and a sample synchronization data file.

Plug-in Viewer COM-Object

With the SDK you can create a custom viewer in The Observer XT. To create a custom “The Observer XT”-viewer plug-in it must be a COM (Component Object Model) object according to the specifications described in the SDK document. Such a viewer can be used, for instance, to visualize the movement of a shoulder prosthesis, while simultaneously viewing a video of the patient and physiological data. For this plug-in your The Observer XT license must include the Media Module.

The SDK contains documentation describing how the Plug-in viewer COM-object works and how to work with plug-ins in The Observer XT.

To open viewer plug-in data while observing:

1. Create an observation or open an existing one.
2. Choose **File** > **Import** > **Plug-in Data**.

3. Select a plug-in from list, choose an observation and click **OK**.
4. If the plug-in requires a file to be opened, a new window opens: select a file and click **Open**.
5. Start the observation and score/review the data as you usually do.

To open plug-in data while visualizing data:

1. Choose **Analyze** > **Visualize Data**.
2. Choose **File** > **Import** > **Viewer Plug-in Data**.
3. Select a plugin from list, choose an observation and click **OK**.
4. If the plug-in requires a file to be opened, a window opens: select a file and click **Open**.

Similarly you can open plug-in data in an Episode Selection. See Episode Selection for more information.

Event Data Plug-in

This plug-in offers the possibility to obtain event data from an external program while you carry out a live observation in The Observer XT. The external events are imported during your observation in The Observer XT.

In The Observer XT, these event data are stored in a separate Event Log. You can visualize and analyze the event data like any other event data in The Observer XT.

External Data Plug-in

This plug-in offers the possibility to obtain external data while you carry out a live Observation in The Observer XT. The external data are imported during your observation in The Observer XT.

In The Observer XT, these external data are stored in the External data Files folder of the observation. You can visualize and analyze the external data together with event data in The Observer XT.

N-Linx SDK

The N-Linx SDK allows you to control external applications with The Observer XT and import their data into the observation. The SDK makes use of the Noldus network communication protocol N-Linx. The SDK contains a protocol to start and stop an external application when you start and stop an observation in The Observer XT. And it contains a protocol for real time import of data obtained by the external application into The Observer XT.

N-Linx Start Stop Protocol

This protocol offers the possibility to start and stop an external program while you carry out a an observation in The Observer XT. This enables synchronization of external and event data.

The SDK contains documentation with background information and examples to set up communication.

N-Linx Event and Continuous Data Import Protocol

This protocol offers the possibility to obtain events and continuous data from an external program while you carry out a live observation in The Observer XT. The external events are imported during your observation in The Observer XT. In The Observer XT, these event data are stored in a separate Event Log. You can visualize and analyze the event data like any other event data in The Observer XT.

The SDK contains documentation with background information and examples to set up communication.

Keyboard shortcuts

All the common functions in The Observer XT have keyboard shortcuts. You can use the keyboard to activate all the functions in The Observer XT that are on the menus. Press Alt plus the letter underlined in the menu and then select the desired function by scrolling down to the function or by pressing the underlined letter. For example, to go to Preferences on the File menu, press **ALT**+**F**, **f**.

Why Keyboard Shortcuts?

Keyboard shortcuts allow you to use The Observer XT without taking your hands off the keyboard. Using keyboard shortcuts can also help in the prevention of repetitive strain injury.

Keyboard shortcuts are only available when the corresponding menu or window is active.

Keyboard shortcuts:

- General
- Coding Scheme
- Carry out Observations
- Playback Control
- Data Profile
- Grids
- Select and Edit
- Windows

General

Ctrl+N	New project
Ctrl+O	Open project
Ctrl+S	Save project
Ctrl+Shift+S	Save As project
Ctrl+B	Make Backup
Ctrl+R	Restore Backup
Ctrl+P	Print
Alt+F4	Exit
Ctrl+M	Open **Playback control options** window

Coding Scheme

Ctrl+E	Add new element
Ctrl+Del	Delete element
Ctrl+C	Copy
Ctrl+V	Paste
Ctrl+Shift+E	Add new group
F2	Rename element

Carry out Observations

Alt+F6	New observation
Ctrl+Shift+N	New observation
Ctrl+Alt+F6	Open observation
Ctrl+Alt+O	Open an event log within the observation currently open
Ctrl+E	Add new element
Enter	Accept entry and go to first column of next row
Ctrl+Alt+B	Start observation
Ctrl+Alt+Q	Stop observation/ stop reviewing
Ctrl+Alt+X	Suspend observation
Ctrl+Alt+V	Resume observation
Ctrl+End	Go to end of Event Log Data File
Ctrl+Home	Go to begin of Event Log Data File
Ctrl+Shift+Down-arrow	Go to Next sample
Ctrl+Shift+Up-arrow	Go to Previous sample
Ctrl+Enter	Finish sample

Playback Control

Spacebar	Play forward at speed 1x; Pressing Spacebar toggles between Play forward and Pause
Shift+Spacebar	Play backward at speed 1x; Pressing Shift+Spacebar toggles between Play backward and Pause
Ctrl+=	Play one speed faster
Ctrl+- (key next to 0)	Play one speed slower
Ctrl+Up-arrow key	Jump to begin
Ctrl+Down-arrow key	Jump to end
Ctrl+0	Pause/Stop
Ctrl+Left-arrow key	Step frame backward
Ctrl+Right-arrow key	Step frame forward
Ctrl+Shift+Left-arrow key	Step 10 frames backward
Ctrl+Shift+Right-arrow key	Step 10 frames forward
Ctrl+Backspace	Quick review
Ctrl+Shift+=	Offset
Ctrl+1	Play forward at speed 1/25x
Ctrl+2	Play forward at speed 1/5x
Ctrl+3	Play forward at speed 1/2x
Ctrl+4	Play forward at speed 1x
Ctrl+5	Play forward at speed 2x
Ctrl+6	Play forward at speed 4x
Ctrl+7	Play forward at speed 8x
Ctrl+8	Play forward at speed 16x
Ctrl+9	Play forward at last used speed
Ctrl+Shift+1	Play backward at speed 1/25x
Ctrl+Shift+2	Play backward at speed 1/5x

Ctrl+Shift+3	Play backward at speed 1/2x
Ctrl+Shift+4	Play backward at speed 1x
Ctrl+Shift+5	Play backward at speed 2x
Ctrl+Shift+6	Play backward at speed 4x
Ctrl+Shift+7	Play backward at speed 8x
Ctrl+Shift+8	Play backward at speed 16x
Ctrl+Shift+9	Play backward at last used speed
Ctrl+Alt+1	Play forward at 1st available speed
Ctrl+Alt+2	Play forward at 2nd available speed
Ctrl+Alt+3	Play forward at 3rd available speed
Ctrl+Alt+4	Play forward at 4th available speed
Ctrl+Alt+5	Play forward at 5th available speed
Ctrl+Alt+6	Play forward at 6th available speed
Ctrl+Alt+7	Play forward at 7th available speed
Ctrl+Alt+8	Play forward at 8th available speed
Ctrl+Alt+Shift+1	Play backward at 1st available speed
Ctrl+Alt+Shift+2	Play backward at 2nd available speed
Ctrl+Alt+Shift+3	Play backward at 3rd available speed
Ctrl+Alt+Shift+4	Play backward at 4th available speed
Ctrl+Alt+Shift+5	Play backward at 5th available speed
Ctrl+Alt+Shift+6	Play backward at 6th available speed
Ctrl+Alt+Shift+7	Play backward at 7th available speed
Ctrl+Alt+Shift+8	Play backward at 8th available speed
Ctrl+.	Zoom+ (x-axis)

Ctrl+Mousewheel	Zoom+ (x-axis) or Zoom- (x-axis)
Ctrl+,	Zoom- (x-axis)
Ctrl+Shift+.	Zoom+ (y-axis)
Ctrl+Shift+,	Zoom- (y-axis)
Ctrl+L	Switch loop on/off
Ctrl+H	Reset loop to default (start and end of slider range)
Ctrl+J (User defined loop)	Set start of loop
Ctrl+K (User defined loop)	Set end of loop
Ctrl+J (Fixed loop)	Move loop to previous interval
Ctrl+K (Fixed loop)	Move loop to next interval

Notes

- Not all speeds may be available for your video files.
- The Ctrl+Alt(+Shift) shortcut-keys can be used for jog/shuttle devices. The speeds are not fixed but are set when they are available. For example, if only speed 1 (forward/backward) is available, pressing Ctrl+Alt+1 selects speed 1. If all speeds are available, pressing Ctrl+Alt+1 selects speed 1/25, pressing Ctrl+Alt+2 selects speed 1/5 etc.

Data Profile

General

Ctrl+Alt+F7	New Data Profile
Alt+F7	Show current Data Profile

Components window

Enter	Add box of selected component

Data selection window

Arrow key	Move the mouse pointer 10 pixels within the Data Selection window
Shift+arrow key	Move the mouse pointer 1 pixel within the Data Selection window
Alt+arrow key	Connect, move, size depending on the current position of the pointer

Grids

(e.g. Event log, Episode Selection window)

Ctrl+left-arrow key	Event log: move 1 second backward or 1 frame backward when video is available. Episode Selection: move one row backward
Ctrl+right-arrow key	Event log: move 1 second forward or 1 frame forward when video is available. Episode Selection: move one row forward
Ctrl+up-arrow key	Jump to start
Ctrl+down-arrow key	Jump to end
Arrow keys	Move highlight in direction of key
F2	Edit Event Time in Event Log
Ctrl+I	Insert row or Episode
Tab	Go to next cell in row. If last cell, do nothing
Shift+Tab	Go to previous cell in row. If first cell, do nothing
Enter	Accept entry and go to same column, next row.
Page Up	Go to row - no. of rows visible in window and highlight same location (and deselect)
Page Down	Go to row + no. of rows visible in window and highlight same location (and deselect)
Ctrl+Home	Go to first cell of first column
Ctrl+End	Go to last cell of last column
Up-arrow key	Step one row up
Down-arrow key	Step one row down
Shift+Down-arrow key, Shift+Up-arrow key	Select row

Select and Edit

Ctrl+Z	Undo
Ctrl+Y	Redo
Ctrl+X	Cut
Ctrl+C	Copy
Ctrl+V	Paste
Ctrl+Delete or Delete	Delete
Shift+arrow keys	Expand/ contract block selection in direction of arrow key
Ctrl+A	Select all

Windows

General

Esc	Cancel action
F1	Help
F2	Rename/edit
Alt+F4	Close application
Shift+F10 or context-menu key	Open context menu of selected item
Alt+Spacebar	Open shortcut menu of selected window
Ctrl+Esc	Display Start menu
Alt+underlined letter	Application: open corresponding main menu
	Dialog: carry out corresponding command
F10	Activate main menu bar
Main menu: Down-arrow key	Open menu-item/cycle through sub-items
Main menu: Up-arrow key	Open menu-item/cycle through sub-items
Main menu: Right-arrow key	Open sub-items/Cycle through items
Main menu: Left-arrow key	Close sub-items/Cycle through items
Spacebar	Select/clear box (if active option is a checkbox)
Arrow keys	Move/nudge cursor or selected item
Mousewheel	Scroll up or down
Ctrl+Mousewheel	Zoom in or out
Shift+Mousewheel	Scroll left or right

Project Explorer

End	Display the bottom of the active window
Home	Display the top of the active window
* on numeric keypad	Display all subfolders under the selected folder
+ on numeric keypad	Display the contents of the selected folder
- on numeric keypad	Collapse the selected folder
Left arrow key	Collapse current selection if it is expanded, or select parent folder
Right arrow key	Display current selection if it is collapsed, or select first subfolder
Up arrow key	Previous item
Down arrow key	Next item

Dialogs

Ctrl+Tab	Cycle through tabs (direction: left -> right and top -> bottom)
Ctrl+Shift+Tab	Cycle through tabs in reverse order
Tab	Cycle through options (direction: left -> right and top -> bottom)
Shift+Tab	Cycle through options in reverse order
Arrow keys	Cycle through options if option group (radio button group) is active

Switch applications

Alt+Tab	Switch between open applications
Alt + Esc	Cycle through applications in order they were opened