Reference Manual

# The Observer XT

## Version 12.5

Noldus

Information Technology

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# Chapter 1

# Introduction

# 1.1 An introduction to The Observer XT

This chapter gives a general overview of what The Observer XT program does. Please note that this chapter is a conceptual overview; it shows the basic ideas behind the way in which The Observer XT translates your observations into computer language, and then processes them to produce statistics and graphs. This chapter describes why you have to carry out certain steps with The Observer XT before you see the results of your study, and not how. We recommend reading this chapter to all first-time users of The Observer XT. For more detailed descriptions listing all The Observer XT's functions, please see the rest of the chapters in this manual.

***Sample projects***

On The Observer XT download page (www.noldus.com/downloads), you 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 pfd-file 'Description of The Observer XT sample projects', to get an idea on how to implement a research project in The Observer XT. See **Restoring a Project** on page 408 how to open a sample project.

## WHAT IS THE OBSERVER XT?

The Observer XT is a professional and complete 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 without an automated system. 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 Observer XT was first developed as an automated system to collect observations of behavioral patterns in animals. However, soon it became clear that the flexibility and powerful analysis functions of The Observer XT made it suitable for almost any study involving observational data. In human psychology, The Observer XT aids in collecting data on behavioral development, parent-child as well as any social interaction (Figure 1.1), communication, education, language acquisition, cognition, psychological assessment, etc.

***Figure 1.1*** *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 (Figure 1.2), usability of products, or to study human-machine interactions.

***Figure 1.2*** *Recording arm movements in an ergonomics study.*

## OVERVIEW

The entire process carried out with The Observer XT can be summarized as follows (see also Figure 1.3):

1. A researcher formulates a research question.
2. The researcher defines for which individuals (animal or human) and their behaviors quantitative data need to be obtained in order to answer the research question.
3. Each individual and each behavior is linked to a keycode in a coding scheme.

4. The researcher defines independent variables, for example treatment, or whether the parent is present or not. Independent variables remain constant throughout the experiment but may affect the outcome.

5. The researcher watches one or more individuals (humans or animals) and enters the behaviors that occur as codes in The Observer XT.

6. The observational data can be visualized and analyzed. The Observer XT produces lists, tables, graphs or statistical calculations to answer the research question.

1 Research question: Does the presence of a parent influence a child's play behavior?

2 Behavior to quantify: Not playing / Playing/ Type of play

3 Keycodes:

| | |
|---|---|
| N | Not playing |
| P | Play parallel |
| O | Play with other child |

5 Independent Variables: Parent present/absent?

| User-defined | |
|---|---|
| Parent present? | |
| | |
| Boolean | |
| | |
| Yes; No | |
| Observation | |
| Optional | |

4 Observe and code:


5 Visualize and analyze:

| | | 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 |

6 Produce output:

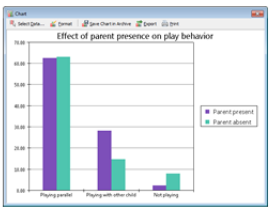


***Figure 1.3*** *From research question to analysis output with The Observer XT.*

## HOW THE CODES ARE STORED IN THE OBSERVER XT

The example in Figure 1.3 has codes for behaviors only. If you study multiple individuals, you have to define codes to them as well. Individuals are called **Subjects** in The Observer XT. When you score the observation "Jeffrey is Walking" at time 0:00:01, The Observer XT stores this in the following way.

| Time | Subject | Behavior |
|---|---|---|
| 0:00:01 | Jeffrey | Walk |

When another action is scored (for example, "Jeffrey is sitting" at time 0:00:03, The Observer XT stores it by creating another record consisting of the same elements:

| Time | Subject | Behavior |
|---|---|---|
| 0:00:01 | Jeffrey | Walk |
| 0:00:03 | Jeffrey | Sit |

Each record 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 records as Jeffrey has walked 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 score where Jeffrey is sitting:

'Jeffrey is sitting on a chair'

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

| Time | Subject | Behavior | Modifier |
|---|---|---|---|
| 0:00:01 | Jeffrey | Sit | Chair |

In this case, the Modifier specifies location where the behavior takes place. Modifiers can be numerical as well, for example to score sound level, or aggression class.

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

## THE STEPS IN THE OBSERVER XT

Steps 1 to 4in Figure 1.3 are carried out before you start working with The Observer XT. It is possible to skip these steps, start observing and build the coding scheme while you observe. However it usually benefits the quality of the observational data if you have arranged your coding scheme according to your research questions. Your coding scheme also determines the data you obtain and the kind of statistical analysis you can carry out.

Steps 4, 5, and 6 are included in the three main steps in The Observer XT Setup, Observe and Analyze. These steps are visible in the overview window of The Observer XT, in the Project Explorer on the left side of your screen and in the menu at the top of your screen.

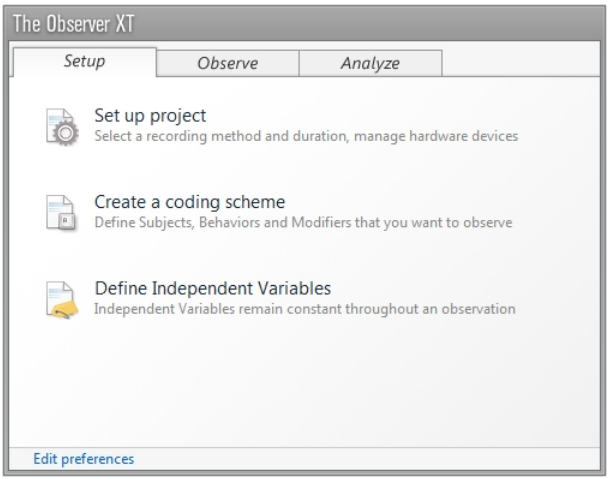


***Figure 1.4*** *The overview window of The Observer XT in which you can navigate to the different main components: Setup, Observe, Analyze.*

### *Setup*

You first set the main features of your project. In this step you specify:

- The source of the observation (live or from video or audio).
- The observation method (continuous, by intervals or a combination of the two).
- The coding scheme;
- The independent variables, which are factors that can vary per observation, but remain constant during each observation. Typical examples of independent variables are age and identity of your subjects, or the observer that carries out the observation.

### *Observe*

You carry out your observations, either live or from previously recorded video files. If you use video files, you can go through them for each subject or behavior group separately, to score every event accurately.

### *Analyze*

In this step you visualize and analyze your data.

### *Visualization*

With the **Visualize Data** function, The Observer XT produces an event plot in which events are plotted horizontally against a time axis. If you have scored data from video or audio, you can play this back synchronously with the observational data. If you have the External Data Module (see page 21), you can play back the imported external data synchronous with the events and videos as well.

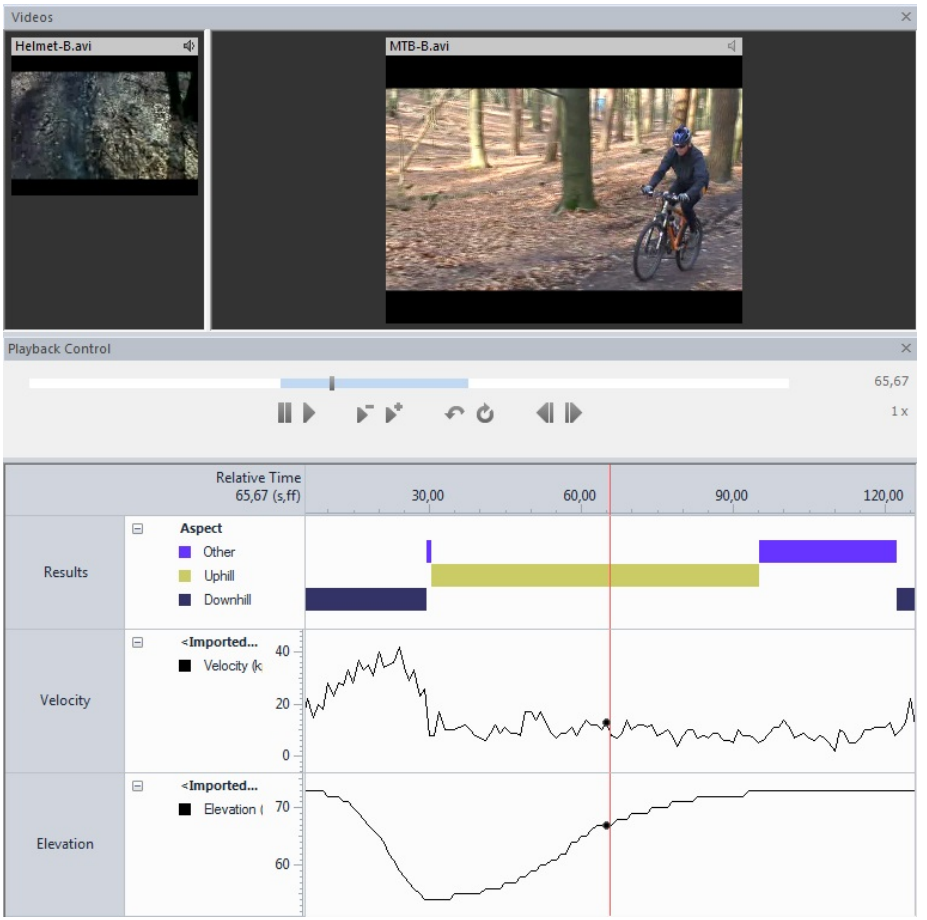


***Figure 1.5*** *An example of the* ***Visualization*** *window containing the videos, the playback control and the time-event plot with observational data. When you have the External Data Module, the* ***Visualization*** *window also shows the imported physiological data.*

Then you analyze the data. The Observer XT can give many descriptive statistics for your data, like the number of times an event takes place, its mean duration, total duration, standard deviation, and statistics for non-normally distributed data.

### *Data selection*

Instead of analyzing all data, you may want to analyze a time interval. For example to analyze pupils' behavior when a teacher explains something, or to analyze the behavior of a social group of monkeys when the alpha male is aggressive. For this purpose, The Observer XT has a data selection feature. The Observer XT is very flexible in the options for defining a time interval, it can be based on time, or on events that take place. If you have the External Data Module (see page 21) the time interval can be based on the value of the external data as well. After you defined the interval, you calculate the descriptive statistics as you would do for all data.

To select data, you build a sequence of selection boxes connected to each other. This sequence always starts from a box called **Start**, containing all the data in your project, and represents the flow of data progressively extracted from each box. The last box, called **Results**, represents the data set you use for visualization and analysis.

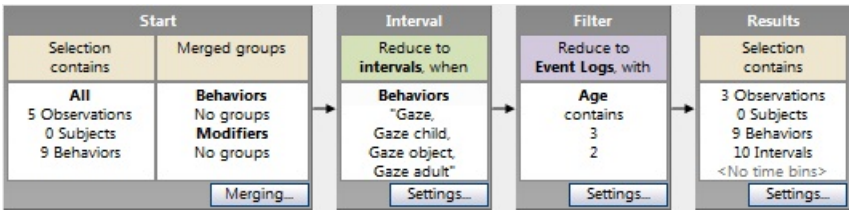


***Figure 1.6*** *An example of a data selection sequence. 1. Start box, containing all observations of all data. 2. Interval box to make time intervals based on the behaviors specified in this box. 3. Filter box, specifying the observations to be analyzed. 4. Results box, representing the container of the selected data.*

### *Episode selection*

The Episode Selection functionality of The Observer XT makes it possible to create a video from selected fragments. This can be useful when you want to demonstrate what a certain behavior looks like.

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The Observer XT supports the use of Chinese simplified characters, Japanese characters, and Cyrillic characters.

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## 1.2 Extra options for The Observer XT

The Observer XT has five modules:

- **Base Module** – With the Base Module of The Observer XT you can score events in a live situation, without using video files. This module can be extended with one of the other modules.
- **Media Module** – You need this module if you want to score data *Live* with a video device, or *Offline* from video files (see Section **Observation Source** in Chapter 3 of The Observer XT Reference Manual). The module allows you to play back and record a maximum of two media files.
- **Multiple Media Module** – You need this modules to be able to record and play back a maximum of four media files at the same time.

  If you have a fast computer, it is in principle possible to play back more than four video files (up to 20) simultaneously. Please contact us for more information.
- **External Data Module** – With this module, you can import any external data stored in ASCII 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 and subsequently visualize, select and export these data.

  Note that if you work with interbeat intervals, you do not need this module. See The Observer XT Service Manual for details. You can download this manual from www.noldus.com/downloads.
- **Advanced Analysis Module** – With this module you can carry out a Reliability Analysis to analyze your own consistency as observer, or to determine whether multiple coders code the same. The Advanced Analysis Module also includes Lag Sequential analysis, with which you can analyze what precedes or follows a specific event.

***Additional licenses***

You can extend The Observer XT with the following licenses:

- **Pocket Observer license**– If you need to be mobile during observations, you can use this module and score events with **Pocket Observer** installed 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.

### *Tools*

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

- **Noldus uASQ** – With Noldus uASQ you can set up questionnaires and collect subjective information from your test participants. Typical questions could be ”How do yo assess the workload at the moment (low/medium/high)?” or “How do you rate the attractiveness of this web page (scale 1-5)?”.

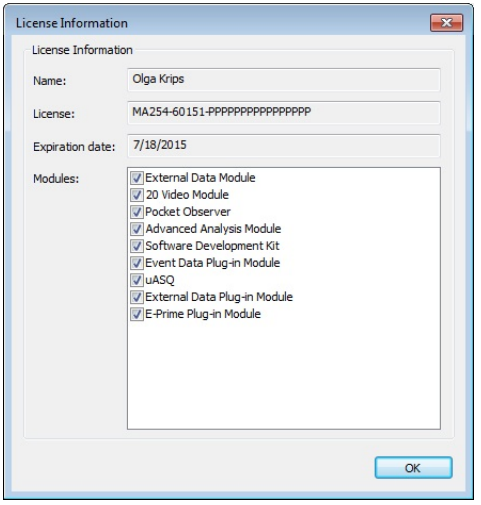
  For details, please refer to the Noldus uASQ Reference Manual which can be found in the documentation folder on the installation DVD.

- **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 Kit** – The 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. See the paragraph **The Software Development Kit** on page 161 for more information.

### *How do I know which licenses and tools I have?*

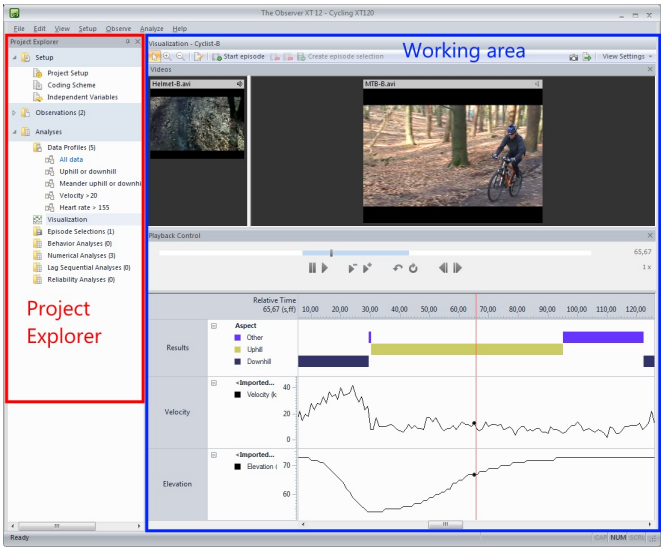
In The Observer XT, choose **Help** > **About The Observer XT** > **License info**. Under **Modules** you find which options are enabled with your license.



# 1.3 The Observer XT interface

When you create or open a Project, the overview window of The Observer XT appears on your screen (see Figure 1.4). 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 Analysis in the left part of your screen (the Project Explorer, see below).

By default, the interface of The Observer XT consists of two views: the Project Explorer, and the working area that depends on where you are in the program, for example project setup, visualization or analysis.




The Project Explorer gives an overview of the observations and analysis results of your project. Use the Project Explorer for management of your project data. The other windows

are customizable. The tool bar contains **View Settings**, which you can use to define what windows to display.

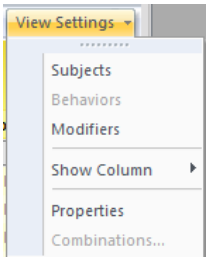



***Figure 1.7*** *The* ***View Settings*** *list for the coding scheme.*

## PROJECT EXPLORER

The Project Explorer displays all the project files belonging to your currently opened project. In the example in Figure 1.8, a project called 'Rat in open field' has been created. The project details have been made visible by clicking the arrows.

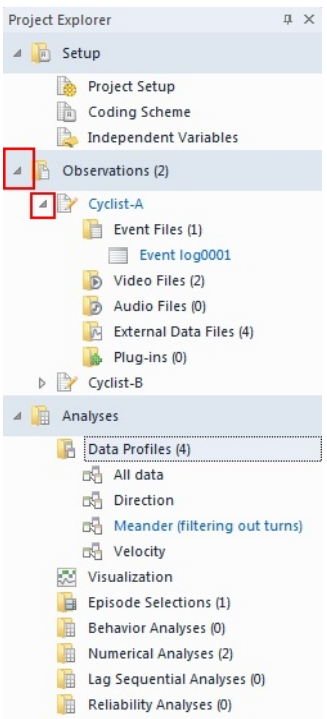
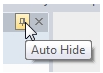


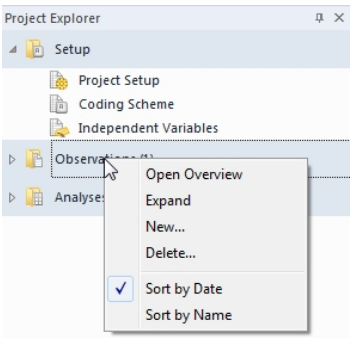

***Figure 1.8*** *The Project Explorer.*

You can resize and undock the Project Explorer. In the **View** menu, you can select to view or hide the Project Explorer. And it can be minimized, using the **Auto Hide** button.




### *Right-click menus*

Most items in the Project Explorer are equipped with 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.




# 1.4 What's new in The Observer XT

Users of previous versions of The Observer XT should read this section to get an idea of the improvements and changes in The Observer XT 12.5 relative to The Observer XT 11,5 (see page 25) and The Observer XT 12 (see page 27).

## FOR USERS OF THE OBSERVER XT 11.5

### *Windows 7, 64 bit and Windows 8.1, 64 bit compatible*

The Observer XT is compatible with the 64 bit versions of Windows 7 and Windows 8.1. For more information, see “System requirements for Noldus software” on www.noldus.com/downloads.

### *Episode selection in visualization*

It is now possible to select episodes in the time event plot to create an episode selection and a video with only these episodes. In contrast to the other methods to create an episode

selection, this method is independent from the start and stop of events. This means that you can start and stop the episode based on, for example, an audio or visual cue, which can appear halfway in an event. Furthermore, the new method is easy to use and intuitive, you can see immediately which video segments you have selected.

***Visualization of comments***

Comments that are scored in the event log can now visualized in the time event plot. This is especially useful if you use The Observer XT for the transcription of a conversation. The visualization of comments allows you to see in one view what was said and when. But also if you used the comments to make notes about the experimental setup, it can be useful to see these together with the events.

***Playback control customizable***

The **Playback control** window has been redesigned and is now customizable. Buttons that are not commonly used, like the step frame forward and step frame backward button, are hidden by default. You can select to show or hide these buttons in the Project Settings, so you can adjust the Playback control window to your own needs.

***New statistics***

The statistics for behavior and numerical analysis now include the Median and the 25th and 75th percentile.

***Find and export***

With the find functionality you can easily make a selection of events. It is now possible to export these events directly to excel or a text file, for example for statistical analysis in a program like SPSS.

***Improved external data import***

If you have the External Data Module of The Observer XT, you can import external data like heart rate, or galvanic skin response data. This way you can for example calculate the heart rate during the behavior *Running*, or see what behavior took place when the heart rate was above a certain threshold. External data can only be imported into The Observer XT when they have time stamps that deviate maximally 10% from being equidistant. Previous versions of The Observer XT were not able to import external data files when some time stamps, or samples were missing. This is now possible, missing time stamps are interpolated, and samples at those timestamp get the value NaN.

## FOR USERS OF THE OBSERVER XT 12.0

### *Loop in video*

You can set a loop in the video to play it back repeatedly. This way you can repeatedly view a fragment. This can be useful to score a fragment accurately, to inspect part of an observation, or to demonstrate your project in a presentation. You can set the start and the end of the loop manually, but also use a loop of a fixed length. This way you can, for example, first score the first minute of a video accurately and then move the loop to the next minute.

### *Data selection by duration*

You can now select events and intervals with a minimum or maximum duration. This way you can, for example, select only those *Aggression* events that lasted minimally 1 minute. Or, for example, you can analyze only analyze those time intervals during which a child looked away from the mother for maximally 30 seconds.

### *Compatibility with European Data Format*

If you have the External Data Module (see **Additional licenses** on page 21), you can now import European Data Format (EDF) files. EDF is a standard binary format to store and exchange physiological data. It is also possible to import EDF+ data, that may contain annotations, but the annotations are not imported into The Observer XT. Import of BioSemi Data Format (BDF and BDF+) files, which is the 24 bit version of EDF (+), is also supported.

### *Compatibility with Viso*

It is now possible to import sessions created by the video recording and annotation program Viso into The Observer XT. Annotations done in Viso are imported as event logs in The Observer XT and Viso videos are automatically linked to these event logs. In The Observer XT, you can carry out more advanced annotations with your own coding scheme. And you can analyze the Viso data.

### *uLog 3.5*

Together with The Observer XT 12.5, a new version of the key logging program uLog is released. This version is compatible with the 64 bit versions of Windows 7 and 8.1. uLog 3.5 creates log files in .odx format that can be imported into The Observer XT. In The Observer XT, you can analyze the logged computer activities. For more information, see the uLog 3.5 Reference Manual.

### *Improved Coding Scheme setup*

Adding behavior and behavior groups is now easier, because the behavior and group types are explained while adding them. Mutually exclusive groups are no longer exhaustive by default. This means it is no longer necessary to define and score initial state events.

# 1.5 Additional information

## HELP MENU

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

- **Help topics** – Opens the PDF of The Observer XT Reference Manual.
- **Video Tutorial** – Take a few minutes to learn about how to set up an observational study in The Observer XT.
- **The Observer XT Online** – If your computer is connected to the Internet, choose this option to go to:
  - **The Observer XT home page of the Noldus website**. The Observer XT home page contains all kinds of information about the program as well as examples of how The Observer XT is used.
  - **Check for Updates** – This opens a page on the Noldus website with available updates including an explanation of what problems have been fixed. You can download the updates after you have logged in on the website.
  - **Contact Help Desk** – The Observer XT Help desk page of the Noldus website. Here you can find the phone numbers of our help desks and support request forms.
  - **Knowledge Base** – The Knowledgebase is a database with hundreds of entries submitted by our customers to the Noldus support department with answers by our support staff.
  - **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.

  On the Noldus website you can also:
  - **Download technical documentation and sample projects**. Visit www.noldus.com and browse to the **Downloads** section.
  - **Get information about known problems and their solution**. This information is also available on the Support - Downloads section.
- **Upgrade** – If you have purchased an upgrade of The Observer XT, choose this option to type the new Upgrade Key number that you have received from Noldus.
- **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.

If you want to be kept up to date about the latest developments, click the link under **Latest news** on the window that appears when you start The Observer XT or close a project.

## 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.

# Chapter 2

# Installation

# 2.1 System requirements

## OPERATING SYSTEM

The Observer XT 12.5 supports Microsoft Windows 7 Service Pack 1, 64-bit Professional edition and Windows 8.1 Pro, 64 bit.

On Windows 7, Service pack 1 or higher must be installed, otherwise installation is not possible.

### *Languages*

It has also been tested with and 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, please see the section using Chinese, Japanese or Cyrillic characters in The Observer XT Service Manual. You can download this manual from www.noldus.com/downloads.

### *Supported hardware*

Drivers of the supported hardware must be installed separately. These drivers are available on The Observer XT 12.5 installation disc. The following hardware works with The Observer XT 12.5 running on 64-bit Windows 7 and 8.1:

**Recording devices**

- Epiphan DVI2USB 2.0 screen capture device.
- Epiphan DVI2USB 3.0 screen capture device.

> **!** Do not record with a higher frame rate than 30 fps with the Epiphan DVI2USB screen capture devices. The device may crash if you do so. To change the frame rate, see page 50.

- Microsoft LifeCam Studio webcam.

**Video controlling device**

- Contour ShuttlePRO v2 Jog/shuttle device.

**Mobile scoring device for Pocket Observer**

- Psion Workabout Pro WA4003-G2 handheld computer*.
- Samsung Galaxy S GT-I9000 and Samsung Galaxy Note GT -7000 smartphones**.
- Samsung Galaxy 2 10.1 GT-P5100 tablet**.

* Used for Pocket Observer 3.1 which runs on Windows Mobile 6.1. Please note that Windows Mobile 6.1 is no longer supported by Microsoft Windows.

**Tested with Android versions 2.2 and 2.3 for the phones and 4.0 for the tablet.

For more information, see **System requirements for Noldus software** on www.noldus.com/downloads.

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The Observer XT is not designed for use with the touch features of Windows 7 and 8.1.

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## COMPUTER

The type of computer you need to run The Observer XT depends on the use you will put The Observer XT to. 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 will be necessary. If you purchase a complete setup from Noldus then we will make sure that you get a computer suitable for your purposes. Otherwise we recommend that you contact us for advice before purchasing a computer to use with The Observer XT.

### *System requirements for simple 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 normal use*

For working with The Observer XT and video (files or cameras), 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 install software which installs codec packages on your computer, this can interfere with the codecs installed by The Observer XT (see the section **Formats, containers and codecs** in The Observer XT Service Manual that you can download from www.noldus.com/

downloads). This includes DVD-burning software. We recommend to uninstall DVD burner software, video editing packages and similar.

***Recommended computer***

If you order a complete solution from Noldus Information Technology, you will obtain a Dell Precision™ T5810 workstation (or its successor), or a M4800 laptop (or its successor) with The Observer XT software installed and ready to use. These computers are the standard test platforms for The Observer, and we recommend that you use those computers. The Observer XT has been tested with Dell Precision™ T3610 or T5810 PC's and the M4800 laptop.

Technical specifications Dell Precision™ T3610 PC:

- Processor: Intel Xeon E5-1620 v2 (Quad Core), 3.7 GHz.
- Internal memory: 8 Gb.
- Hard disk: 1 TB.
- Graphics card: 2 Gb NVIDA Quadro K2000, resolution 1920x1080.

Technical specifications Dell Precision™ T5810 PC:

- Processor: Intel Xeon E5-1620 v3 (Quad Core), 3.5 GHz.
- Internal memory: 8 Gb.
- Hard disk: 1 TB.
- Graphics card: 2 Gb NVIDA Quadro K620, resolution 1920x1200.

Technical specifications Dell Precision™ M4800 laptop

- Processor: Intel Core I7-4800QM (Quad core), 2.7 GHz.
- Internal memory: 8 GB.
- Hard disk: 500 GB.
- Graphics card: 2 GB NVIDA Quadro K2100M, resolution 1920x1080.

If you are planning to purchase a different computer than the T5810 or the M4800, please contact us for detailed advice.

We recommend that you do not use the following computers, as these have caused our customers problems in recent years:

- All HP (Hewlett Packard) computers.
- Dell Optiplex or Dell Vostro.
- Low-end consumer models.

### *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. That 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 PC's) do not.

- **For Windows 8.1** — Direct3D Acceleration is enabled by default.
- **For Windows 7** — To check whether your card has Direct 3D Acceleration, open the Windows **Start** menu and type **dxdiag** in the **Search Programs and Files** field. Open the program **dxdiag.exe**. Open the **Display** tab. Under **DirectX Features**, **Direct3D Acceleration** should be enabled. If you have multiple screens, Direct3D acceleration should be enabled for all screens.

## DISK SPACE TO STORE MEDIA FILES

If you are scoring from video files on the hard disk, you need sufficient free space to store them. Here below you find an estimate of the disk space required per hour, depending on the video format. Please note that file size may vary according to video resolution, bit rate etc. For compressed video, the actual disk space required for a recording also depends on the amount of change in the images. Video images with much movement requires larger disk space.

| Format | Disk space required |
|---|---|
| MPEG-1 | 600 MB/hr |
| MPEG-2 | 2.4 GB/hr |
| MPEG-4 DivX | 700 MB/hr |
| MPEG-4 H.264 | 0.6 - 2 GB/hr |
| DV-AVI | 12 GB/hr |
| QuickTime | 1 GB/hr |

Note: If you are scoring from video files on CD, DVD or mobile devices, you should copy the video files to your hard disk.

For supported media formats, see The Observer XT Service Manual that you can download from www.noldus.com/downloads.

# 2.2 Installation

This chapter instructs you about the installation of The Observer XT and the connection and installation of all hardware and software components necessary to work with the program. It provides you with step-by-step instructions on how to perform certain tasks. Please follow these instructions carefully, and in the order they are presented.

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, having read this chapter and the separate equipment manuals, you still have problems or questions regarding installation, please contact our Technical Support department (see page 457).

# 2.3 Before you install

To be able to install The Observer XT you must have administrator rights, i.e. either you are the system administrator or you are a member of the Windows group **Administrators** and have been assigned administrator rights. Windows Power Users cannot install The Observer XT.

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.

The contents of your package differ for new and existing users:

- If you are a new user of The Observer – You received The Observer XT software DVD, The Observer XT documentation and a hardware key (see the picture on page 41).
- If you are upgrading from older versions of The Observer – You received The Observer XT software DVD and this Reference Manual. You also received a number to upgrade your current hardware key. Hence, no hardware key is enclosed, because the one you have is upgraded automatically when you start The Observer XT for the first time and enter the upgrade number.

### TURN OFF AUTOMATIC UPDATES FOR DEVICE DRIVERS

Although the general recommendation from Microsoft to use automatic updates is good, especially for security updates, automatic updates of hardware device drives can sometimes

give problems. The procedure below describes how to specifically turn off the automatic updates only for device drivers. If you ordered a computer from Noldus IT, the automatic updates for device drivers have already been turned off.

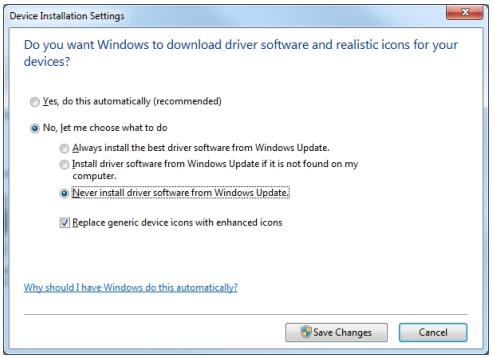
1. Windows 7
2. From the Windows **Start** menu, go to **Devices and Printers**


If you do not see **Devices and Printers**, open the Windows **Start** menu and type **Devices and Printers**.

3. Right-click the icon of your computer and select **Device installation settings**.


4. To the question "**Do you want Windows to download driver software and realistic icons for your devices**?," select **No, let me choose what to do** and then

5. Select **Never install driver software from Windows Update**.



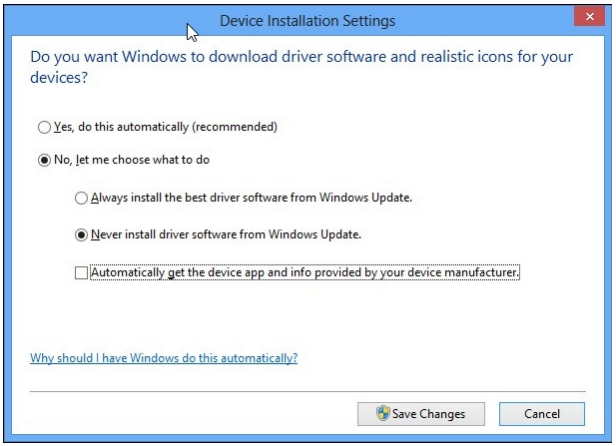

6. Click **Save Changes**.

***Windows 8.1***

1. Open the **Start** window with tiles and type **Settings**.
2. Click the **Settings** tile.
3. Click **Change Device Installation Settings**.


4. To the question "**Do you want Windows to download driver software and realistic icons for your devices**?," select **No, let me choose what to do** and then
5. Select **Never install driver software from Windows Update.**

6. Also deselect the checkbox in front of **Automatically get the device app and info provided by your device manufacturer**.




7. Click **Save Changes**.

## 2.4 Installing The Observer XT

Important: first install The Observer XT and then connect the hardware key to your computer, not the other way around!

1. Insert The Observer XT software DVD into your DVD-ROM drive. The setup program should start automatically.

   If the setup program does not start automatically, browse the DVD and double-click the file setupbrowser.exe.

2. The Observer XT Setup Browser appears. Under **Install software**, click **The Observer XT 12**.

3. In **The Observer XT 12.5 Installshield Wizard**, click **Next**, read the license agreement, select **I accept the terms in the license agreement** and click **Next**.

4. On the **Destination Folder** screen, select where to install The Observer XT program files. We recommend that you accept the default location. Then click **Next**.

5. On the **Document Folders** screen, accept the default directories below or select others to which you have write access. Then click **Next**.
   - **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.
6. Select whether you use Media Recorder on the same computer as The Observer XT and click **Next** and then **Install**. If you use Media Recorder on the same computer, recording video must be done by Media Recorder.

   The Observer XT requires that the **Noldus MainConcept Codec Package 8.5.32** (To play back video files), the **Noldus MainConcept Encoder Package 7.7.10** (To create video files) and the **Noldus LAV Audio Filter 1.0.6** (To play back audio) be installed on your PC. They will be installed during installation of The Observer XT, when not already present.
7. The **Installshield Wizard Completed** screen appears, informing you that the program has been installed successfully.
8. Insert the hardware key in one of your PC's USB ports, select **Launch The Observer XT** and click **Finish**.

***Notes***

- The installation software checks if DirectX 9.0c or higher is installed on your computer. If none of those versions is detected, it will be installed. Follow the instructions on the screen. You will be asked to restart your computer.
- 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 (6.60.1.36770).
- In order to view the documentation in PDF format, you need Adobe Reader, or another PDF reader installed on your computer. If you do not already have this program, click **Adobe Reader XI** under **Install software** in the **Setup Browser** and follow the instructions on the screen.
- When you select **Media Recorder is used in this computer**, you cannot use the LifeCam cameras and the DVI2USB 2.0 or 3.0 screen capture device to record video with The Observer XT. You must use Media Recorder on that computer to record video from those devices.
- If you re-install The Observer XT, and during installation you change the Project default folders (step 5 on page 40), the new path is only applied when clicking **Reset to Default** in the **Preferences** window.

- You can download The Observer XT installation file from www.noldus.com/downloads., with or without codecs. The version without codecs is for scoring live only. The video tutorial can be downloaded separately.
- **Installing uASQ** — uASQ is not shown in the Setup browser. You can install uASQ from the installation DVD, under uASQ. 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 installation disc of The Observer XT 12.5.
- **Installing uLog** — uLog is not present on The Observer XT installation disc. You receive it separately when you buy it.

## INSTALLING AND UPGRADING THE HARDWARE KEY

Each license for The Observer XT comes with a hardware key, which determines which setup is available to you (base functionality with or without Video Support, Physiological inputs or Mobile scoring). This is a very important piece of equipment, as it represents the full value of your license and cannot be replaced if lost. Full 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.

---

Please keep this in mind and make sure that you do not lose the key! You will need to pay for a new license if so.

Please be careful with the hardware key. It is sensitive and can be easily damaged.

---

***Connecting the hardware key***

---

Important: You must connect the hardware key **after** you install the software.

---

1. Plug the key into the correct USB port.
2. Start The Observer XT.

If you remove the hardware key accidentally while The Observer XT is running, a message appears. Plug the key again in the PC, then click **Close**.

*Upgrading the hardware key*

If you are upgrading from previous versions of The Observer, you can either uninstall the old version before installing The Observer XT, or leave it on your computer and install the new version to a different program directory.

When you start The Observer XT for the first time after installation, the system automatically detects the old hardware key and asks you to type the new Upgrade Key number in the **Enter Upgrade Key** dialog box (see Figure 1; the **Enter Upgrade Key** option is selected). This 20-digit number is normally sent to you by e-mail or in your welcome letter.

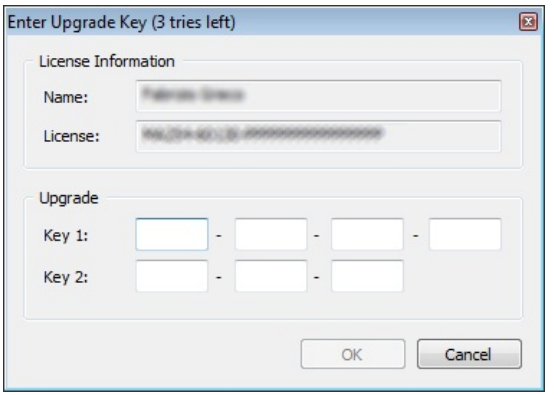



**Figure 1** *The **Enter Upgrade Key** window.*

This is the only occasion where this dialog box appears automatically. At other times, you can view it by selecting **Upgrade** from the **Help** menu.

You can also use The Observer XT 12.5 as a trial version, using a Trial Key (see **The Observer XT 12.5 trial version** on page 43).

An **Upgrade Key** produced for a certain The Observer XT version can only be used in that version. For example, if you have The Observer XT 8 and you have an upgrade Key for The Observer XT 12.5, then you need to install The Observer XT 12.5 and enter that key there.

# 2.5 Upgrading to XT 12.5

See the system requirements on page 33 to check that your computer can run The Observer XT12.5.

- **Installing The Observer XT 12.5 while keeping a previous version** – You can install The Observer XT 12 while keeping a version lower than XT 12. To do so, during installation (see

page 39) make sure that the destination folder on **C:\Program Files x86** is not the same as that of the previous version (for this purpose we advise you to keep the default folders selected). Installing The Observer XT 12.5 removes The Observer XT 12 from your computer.

- **Opening a project created with an older version in The Observer XT 12.5** — You can open a project that was created in an older Observer version with The Observer XT 12.5. The project is then converted to an Observer XT 12.5 project. A project created in The Observer XT 12.5 cannot be opened in previous versions. To work with that project in older versions of The Observer XT, restore the project from the backup file (see the section **Restoring a Project** in Chapter 11 of The Observer XT Reference Manual).

# 2.6 The Observer XT 12.5 trial version

***If you have a previous The Observer XT version***

Remove the hardware key and follow the instructions below.

***If you do not have a previous The Observer XT version***

1. Go to the following web page:

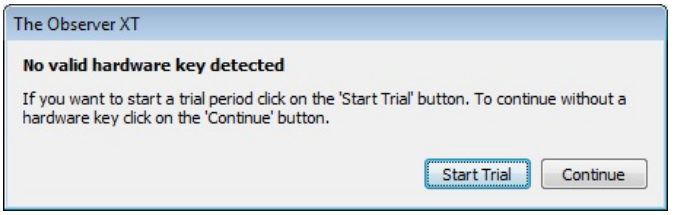
   http://www.noldus.com/animal-behavior-research/products/the-observer-xt

   or

   http://www.noldus.com/human-behavior-research/products/the-observer-xt

   and click **Free trial** to receive a free Trial activation code by e-mail.

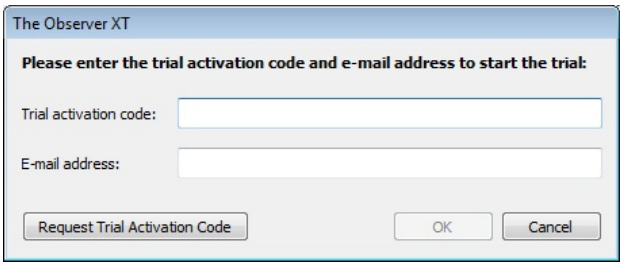
2. When you install and start The Observer XT 12.5, a window appears on top:




3. Click **Start Trial**.

   If you click **Continue**, the program will close.

4. In the window that appears, enter the trial activation code and your mail address.




5. Click **OK**.

6. To see how many days you have left, from the **Help** menu select **About The Observer XT**.

The trial version has a number of restrictions:

- Use The Observer XT for 30 days.
- No recording of video files.
- Maximum number of video/audio files per observation is 2.
- Maximum number of observations is 5.
- Maximum observation time is 30 minutes.
- The use of the External Data module is disabled.
- The use of Pocket Observer is disabled.
- The use of Noldus uASQ and other plug-ins is disabled.

When the trial period expires, a message is shown at start up. Click **Contact Noldus** to request a new Trial activation code.

When you purchase an Observer XT 12.5 license, insert the hardware key in your PC. The trial version license is replaced by a full license.

# Chapter 3

# Setting up your Project

# 3.1 To get started

***Create new project***

To get started, 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, accept the default location or choose a new one, and click **OK**. Continue with **Project setup** on page 47 to create your settings, and then your coding scheme (page 66) and independent variables (page 86).

---

It is also possible to start with a previously created template with settings, coding scheme and independent variables. See **Create new project from template** below.

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

---

***Open project***

To open an existing project, choose **File** > **Open Project**. Browse to the project and click **Open**.

***Save project***

Choose **File** > **Save Project**. Choose **Save Project As**, to rename the project.

***Create new project from template***

With a project template you do not have to make the same settings and coding scheme for every new project. See page 46 to make a project template. Use a template when:

- You want to use settings and coding scheme from an existing project for a new one.
- You work in an observational lab and want to use the same settings to control other software and hardware for all new projects.
- You have a multiple coding station set-up with a main computer with The Observer XT and coding stations with coder licenses. See also "Creating a multiple coding station configuration" on page 409.

1. To create a new project based on an existing template project, choose **File** > **New Project From Template**.
2. Click the **Select** button to select a template project (*.otb, or *.otx if the template was made with a previous version of The Observer XT).
3. Give the project a name and click **OK**.

In a project created with a template, the configuration is locked. To change settings or the coding scheme, choose **Setup** > **Unlock Configuration.** See page 55 for more information about locking the configuration.

### SAVING A PROJECT AS A TEMPLATE

1. Choose **File** and then **Save Project As Template**.
2. Optionally click the **Save options** for the following additional options:
   - **Include Independent Variables**.
   - **Include hardware and software devices** – When you select this option, the hardware and software settings in the **Devices** list (see page 48) and settings for tools like Noldus uASQ and E-Prime are stored in the template project. This is useful, for example, if you use The Observer XT in an observation lab and want to make standard hardware and software settings.

   Settings for hardware devices are only useful if you work with the same computer. A hardware device (e.g., a webcam) is not the same device if it is used on a different computer or even in a different USB port.

   - **Template information** – For additional information like a project description.

# 3.2 Project setup

In the project setup you specify whether you carry out a live or offline observation, which observation method you want to use and the duration of the observation.

If you plan to make several projects with the same project setup, make a project template.

Choose **Setup** > **Project Setup**. Choose the observation source, observation method, observation duration and optionally enter project information (see below).

## OBSERVATION SOURCE

Choose one of the options:

- **Offline Observation** – To score data from previously-recorded video or audio files.

  See The Observer XT Service Manual, that you can download from www.noldus.com/downloads, for the supported video and audio formats.

- **Live Observation** – If you want to score data from a live scene.

  Choose this option also:
  - To record video with The Observer XT.
  - To record data other than events (for example, physiological data).

You can change the observation source for different observations. Select the observation source before you create a new observation.

***Devices for live observation***

If you select **Live Observation**, the **Devices** window opens. You can also open the **Devices** window, by clicking the **Devices** button under **Live Observation.** You have the following options (for more information, see also The Observer XT Service Manual):

- **DAQ Settings** (available with the External Data Module) – Select this option if you want to co-acquire external (physiological) data during your observations. Double-click the cell under **Status** or click the **Edit Settings** button at the bottom of the table. Select the correct DAQ hardware profile.

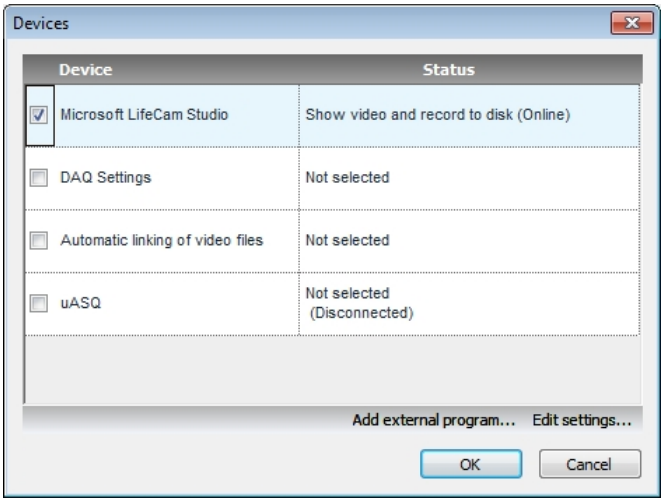
  There may be a name other than DAQ Settings displayed in the **Devices** list, depending on what DAQ hardware settings profile is on top of the list in the **DAQ Hardware Settings** window.

- **Automatic linking of video files** – Select this option if you want to capture video during the observation (for example, to capture the screen content of a test PC), and want The Observer XT to associate the saved video with that observation. In the window that appears, instruct the program on how to locate the video files.

- **Other options** – Depending on what devices are connected, more options may be available:
  - **External programs** – You can have one or more programs running when you carry out an observation. For example, Media Recorder, or eye-tracking software. See The Observer XT Service Manual, that you can download from www.noldus.com/downloads, for instructions.

- **Video devices** – To view live images from a camera and optionally record video with The Observer XT. The Observer XT supports the Microsoft LifeCam Studio USB camera and the Ephiphan DVI2USB 2.0 and DVI2USB 3.0 screen capture devices. For other cameras or devices, we recommend to create video files with Media Recorder and score offline.

  Connect the camera to a USB port of your computer before you start The Observer XT. Open the **Devices** window and select the camera. Double-click the text under **Status** or click the **Edit Settings** button at the bottom of the table.

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If you accidentally unplugged the device, plug it in again and restart The Observer XT.

---

In the **Video Settings** window (Figure 3.1) that opens, check that the camera image is present in the **Video preview** box.

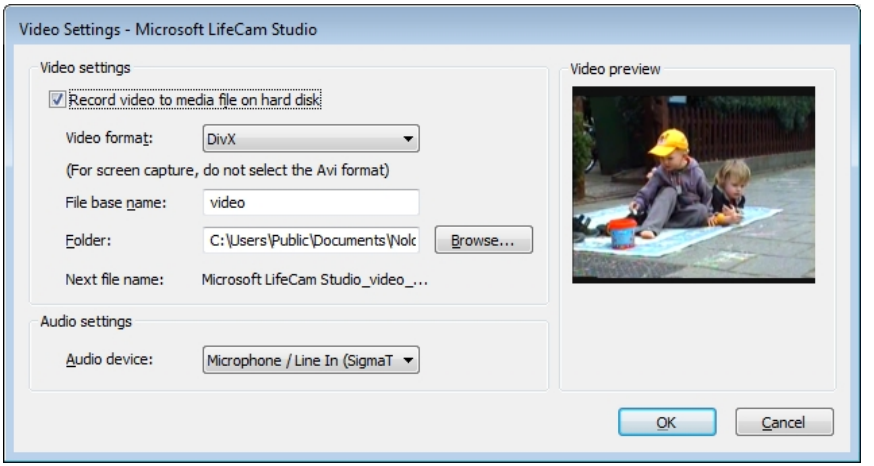



***Figure 3.1*** *The* ***Video Settings*** *window for a web camera connected to the Observer computer.*

Under **Video settings**, select **Record video to media file on hard disk** if you want The Observer XT to record video. Then select the **Video format**. DivX is an MPEG-4 format and AVI is an uncompressed high quality format with a very large file size (about 12.5 GB/hour). If you choose AVI, check that you have enough disc space to store them. If you have the Xvid Codec installed on your computer, you can also use that format. The quality of Xvid is similar to DivX. Also choose the **File base name**, which will be used in every video file created by The Observer XT. Each file will be named as [name of video device]+[base name]+[number]. In addition, choose the location for the video files and your audio device. If your camera does not have a microphone, you need a separate microphone.

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.

It is not possible to record audio without video with The Observer XT. To do so, use the Windows Sound Recorder software. Type **Sound Recorder** in the search field of the **Start** menu of Windows 7, or in the tiles of Windows 8.

### *Recording with the DVI2USB screen capture devices*

Use a maximum frame rate of 30 fps for the Epiphan DVI2USB screen capture devices. The device may crash if you use a higher frame rate.

To change the frame rate:

1. Locate the program **V2UGUI2.exe**, which is by default in **C:\Program FIles\Epiphan\Frame Grabber Software**
2. Right-click the file **V2UGUI2.exe** and select **Properties**.
3. Open the tab **Compatibility** and under **Privilege level**, select **Run as administrator**. Ask your system administrator for help if you do not have administrator rights on your computer.
4. Open the program **Epiphan Capture Tool**.
5. Choose **Capture** and then **Configure device**.
6. In the **DirectShow** tab, select the checkbox **Limit frame rate to** and select a frame rate of maximally 30 fps.

## 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.
- **Instantaneous Sampling** – With this method you record the behavior of one ore more subjects at preselected moments in time (s). 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”.

---

**!** Instantaneous Sampling in The Observer XT is different from “one-zero sampling”; with one-zero sampling it is recorded whether a behavior occurred (one) or not (zero) during the previous sample period.

---

- **Combine Continuous and Instantaneous Sampling** – This method combines the previous two methods.

***Which Observation method do I choose?***

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.


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.

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


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.

Use **Combine Continuous and Instantaneous Sampling** 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 monkeys and want record the behavior of the alpha male in detail and the behavior of the rest of the group at regular time intervals.

### *Sample interval length*

Once 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.

## OBSERVATION DURATION

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. The maximum is 500 hours.

- **Duration based on observed time** – The observation stops after a predefined time, excluding the time the observation was suspended. (see **SUSPENDING AN OBSERVATION** on page 149).Enter the time in the **Observation duration** field that appears. The maximum is 500 hours.

---

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 page 171).

---

- **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** (see Figure 3.2).

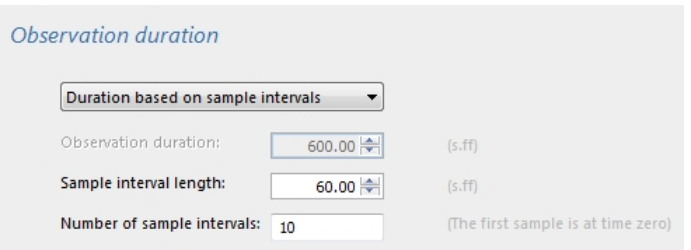



***Figure 3.2*** *Observation duration based on sample intervals. The Observation duration is based on the combination of the* ***Number of sample intervals*** *and the* ***Sample interval length****.*

---

Because the first sample is taken at 0 seconds, the duration of the observation is actually shorter than the displayed Observation duration when you use Instantaneous Sampling.

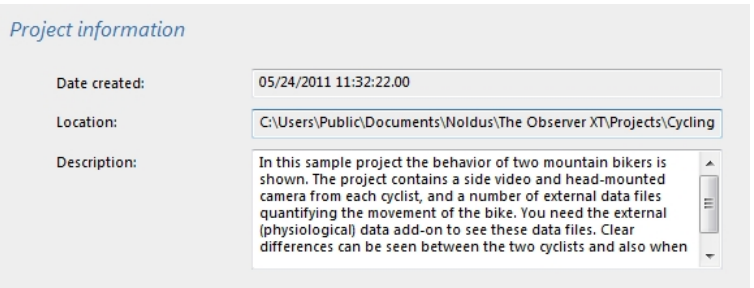
Example – In Figure 3.4 the observation duration is set to **Duration based on sample intervals**. You set the Sample interval length to 30 secs and the Number of sample intervals to 30. The Observation duration is then automatically set to 0:15:00. However, the first sample is at 0 seconds, so the last sample is at 0:14:30. There is no sample at the exact stop time of the observation.

---

## 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 page 447. To change the default location of future projects, see page 93.
- **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 contain Template information with the **Name**, **Date created** and additional information. The template information cannot be edited.

## LOCKING THE PROJECT SETUP

If you want to prevent changes to the setup to occur, you can 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 page 48 for more information about selecting devices for live observation.

- **Observation method** – see page 51.
- **Observation duration** – see page 53.
- **Sample interval length** – see page 53.
- **Project information** - see page 55.
- **Coding scheme** – see page 66
- **Independent variables** – You cannot define new independent variables or change the properties of existing variables. Entering/editing independent variable values is possible. If you are coding offline, you can add new video files. See page 86 for more information about independent variables.

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

***Unlocking the Project setup***

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

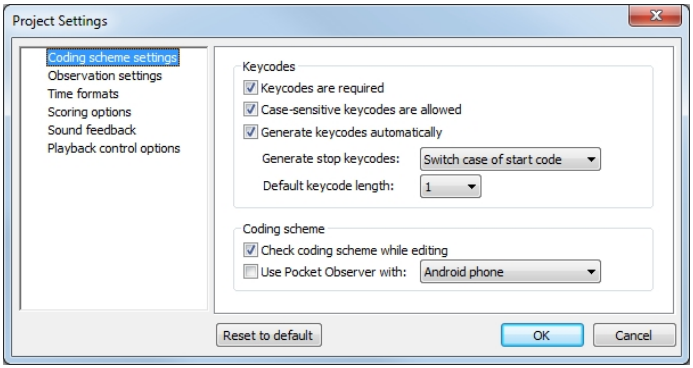
# 3.3 Project Settings

With project settings you define the way you record data, for example options for the keycodes, in what way the time should be displayed and which playback control buttons to use. 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.

The following settings are available:

## CODING SCHEME SETTINGS

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




Specify:

### *Keycodes are required*

Select this option if you want to code your observations by typing keycodes on the keyboard and not with mouse clicks on the screen.

Default - Keycodes are required.

### *Case-sensitive codes are allowed*

Select this option when you want 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.

Default - Case sensitive is selected.

### *Generate start 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.

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.

Default – Generate automatically is selected.

***Generate stop keycodes automatically***

Select this option to let The Observer XT automatically generates keycodes to code the end of Start-Stop behaviors (see page 71). Choose one of the following two options:

- **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).

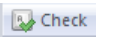
Default - Option selected, with the option **Switch case of start code**.

***Default keycode length***

The keycode length for keycodes that are automatically generated.

Default - Keycode length 1.

***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 page 83 for more information.

Default - The option is selected.

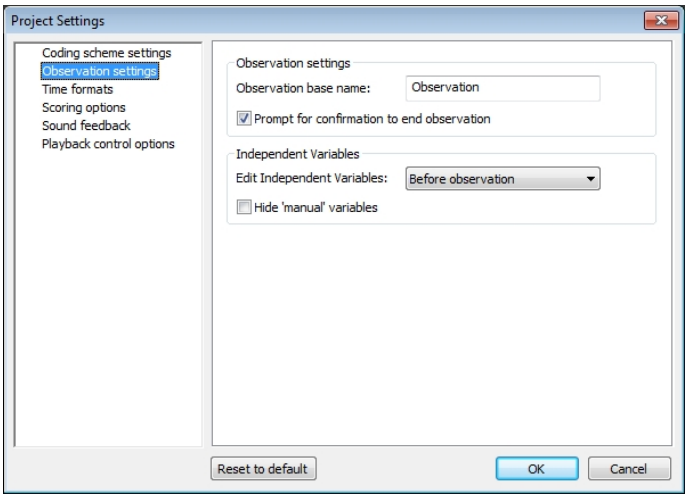
***Use Pocket Observer with...***

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 3.1 for Windows Mobile 6, or 3.2 for Google Android. From the list select either **Android device** or **Windows Mobile device**. See the Pocket Observer Reference Manual for more information.

Default - The option is not selected.

## 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>0001, <Base Name>0002, 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 to ask you whether you really want to end the observation, when you stop it.

### *Edit Independent Variables*

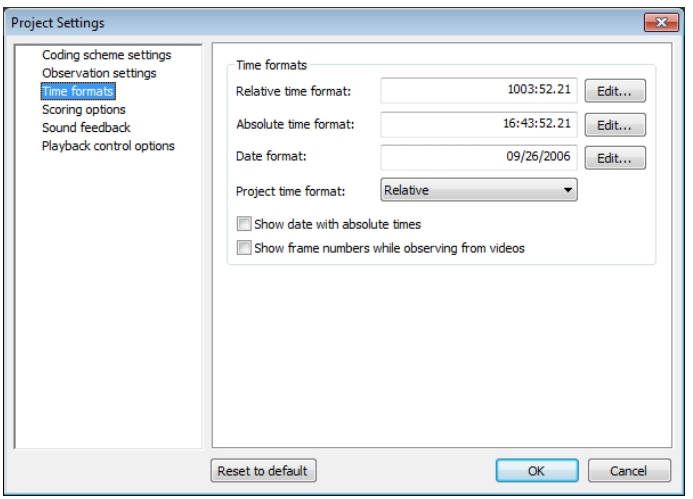
Specify whether to enter the values of independent variables before, after, or both before and after the observation.

Select **Hide 'manual' variables** if you want The Observer not to show variables that are specified as **Manual** in the Value update field of the independent variables list (see page 87). 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).

### *Show date with absolute times*

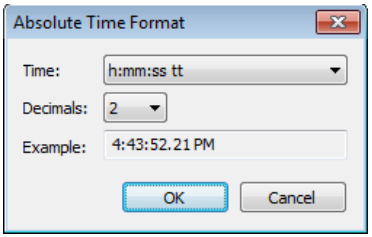
Select this option if you want to include the date in the time stamps.

### *Show frame numbers while observing from video*

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

***Note about absolute time format***

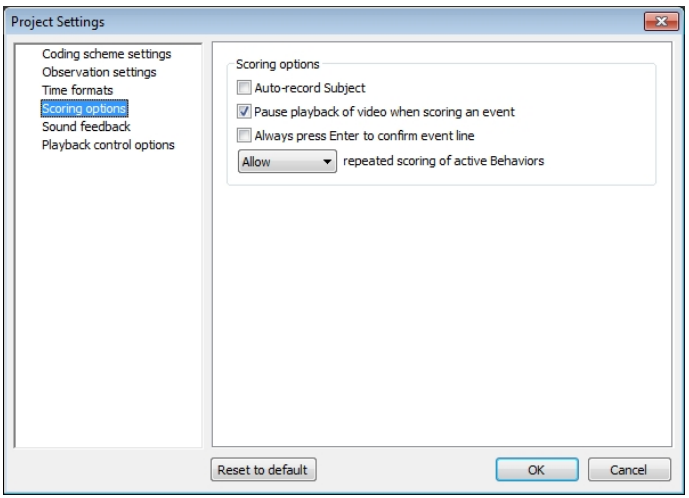
It may happen that you do not see AM or PM notation, even if you selected this in the **Absolute Time Format** window (see picture below).




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** and then the **Time** tab. After **AM symbol** choose **AM** and after **PM symbol** choose **PM**.

## SCORING OPTIONS

From the **Setup** menu, choose **Project Settings**, and then **Scoring options**.



***Auto Record Subject***

Select this if you want 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.

Default - Option not selected.

***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).

Default - Option selected.

***Always press Enter to confirm event line***

An event can consist of more than one elements (Subject, Behavior, Modifier). By default, The Observer 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** without scoring the **Modifier**.

Default - Option not selected.

***Repeated scoring of active behaviors***

Suppose you score an event at time 5 seconds. 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.

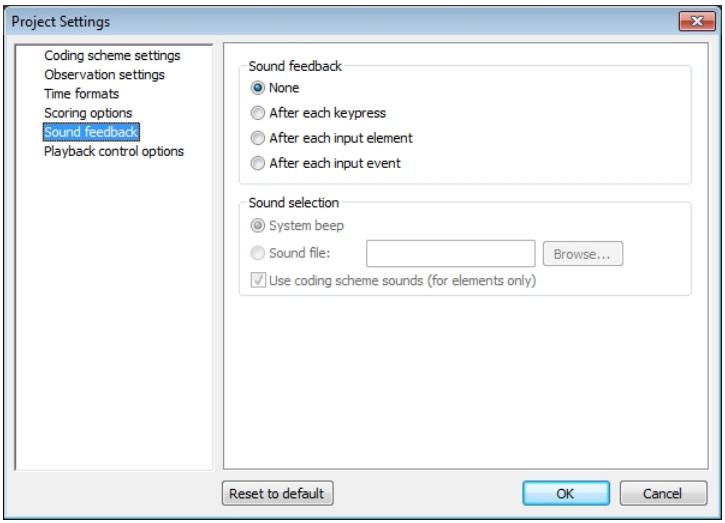
- **Allow repeated scoring of active Behaviors** – The Observer XT records the end of the first event at T=5s and starts a new event at this point. This means that two different states will be recorded, that is one from T=5 to T=10 and one from T=10 to the stop of this event. The frequency of this event 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 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).

Default - Ignore repeated scoring of active Behaviors.

## SOUND FEEDBACK

From the **Setup** menu, choose **Project Settings**, and then **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 been entered.
- **After each input event** – A sound after the event has been completely coded.

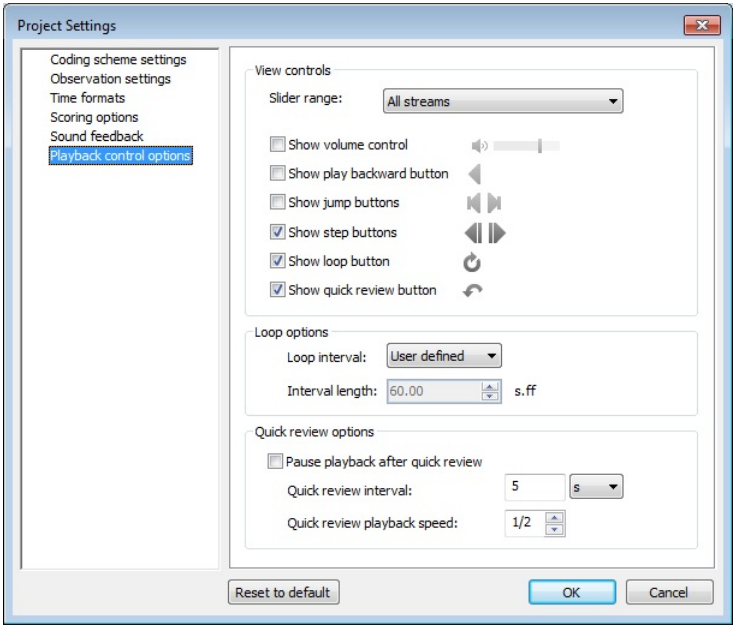
Default - The option **None** is selected.

### *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 (for subjects, see page 67, for behaviors, see page 70, for modifiers, see page 79). This option only applies when you have selected a sound feedback **After each input event** (see above).

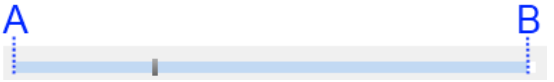
## PLAYBACK CONTROL OPTIONS

From the **Setup** menu, choose **Project Settings**, and then **Playback control options**. Alternatively press **Ctrl+M** to open this window.




### *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/physiological/media file and the end of the latest event/physiological/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.

Default - The option **All streams** is selected.

### *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 **PLAYBACK CONTROL OPTIONS** on page 64 for more information on the buttons and see **Showing and hiding playback control buttons** on page 145 how to select and deselect them.

### *Loop options*

To replay a video fragment for accurate scoring or demonstration purposes. See **Playback control buttons** on page 141 for more information on the loop function.

- **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 **Playback control buttons** on page 141 for more information)
- **Interval length** – This option is enabled if you select **Fixed interval** in the **Loop interval** list. Set the length of the loop.

Default - **User defined interval** is selected.

### *Quick review*

With the **Quick Review** function (see **Playback control buttons** on page 141) 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.

Default -Pause playback after **Quick review** is not selected. A Quick review interval of 5 seconds with half playback speed.

# 3.4 Coding scheme

The coding scheme is the set of elements that describe the events to be recorded. It consists of Subjects (optional), Behaviors, and Modifiers (optional).

To change the terminology of your coding scheme elements, for example to use *Participants*, or *Animals* instead of *Subjects*, or *Actions* or *Events* instead of *Behaviors*, choose **File** > **Preferences** > **Terminology**.

***Keycodes***

Each of these elements can be linked to a keycode, which is a key or a combination of keys (maximum length of 3 characters) on the keyboard that you use to record your behavioral events during scoring. If you code without keycodes, you have to click cells 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. Make sure that the keycodes are unique. If you want to use a multiple keycode, you cannot for example use the code 'a' for subject 1 and code 'ab' for subject 2. However, you can use 'ab' and 'ac'. The keycode length may be different for subjects, behaviors and modifiers and may also differ within the categories.

The Observer XT can generate keycodes automatically while you build your coding scheme (see page 57). If you want the program 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**.

Follow the steps below to build your coding scheme:

1. Define Subjects (optional; page 67), Behaviors (page 70), and Modifiers (optional; page 79).
2. Check the coding scheme for errors (see page 83).

## 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.


If you want to specify the name or other properties of each subject, then create an independent variable (see page 86) that specifies the name or other properties of those individuals for each observation.

Subjects can be individual animals or humans, but also, for instance, hands (on a keyboard), muscles in the face or shoals of fish. If you plan to observe only one subject in each observation, it is not necessary to use subjects. You can specify the actual name or identity of the subject as an independent variable (see page 87).

It is not mandatory to score subjects, it is also possible to score only behaviors. In fact, even that is not compulsory, you can also decide to score neither subjects nor behaviors and record only comments (free text).

***Examples***

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

### *Defining subjects*

To define subjects, you must view the **Subjects** panel (Figure 3.3) on your screen. If you do not see it, select **Subjects** with **View Settings** at the far-right side on the Component tool bar.

A Subject group is created for each observation method you have selected (see page 51). Figure 3.3 below shows the **Subjects** panel 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”. This is because a subject should be linked to a behavior group to score for that subject. When you first open the coding scheme window, no behavior groups have yet been defined.

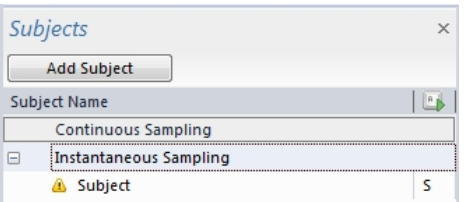
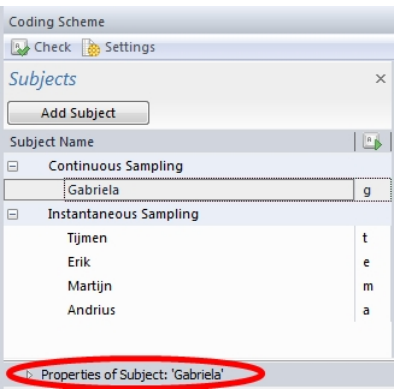



***Figure 3.3*** *The* **Subjects** *panel.*

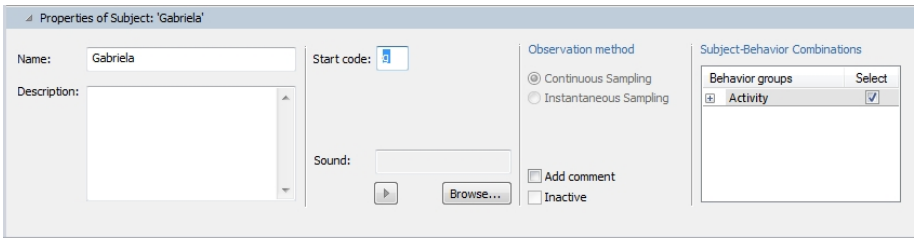
Add subjects by clicking the **Add Subject** button. Give the new subject a name. All subject names should be different and names cannot be longer than 64 characters (16 characters for Pocket Observer 3.1 and 3.2).

### *Subject properties*

To make other subject properties visible, click the subject name and then the **Properties** button at the bottom of the **Subjects** panel.

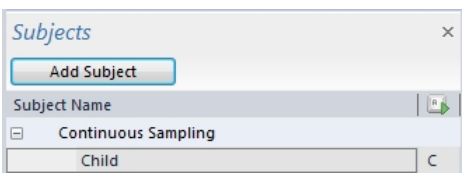


The **Properties** pane appears showing the properties of the subject currently selected.




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.

- **Description** – Optionally add a description to you 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** – Enter a key if the program does not automatically create keycodes (see **Generate keycodes automatically** on page 57).




**Limitations** - All subject codes must be unique. The characters you use for keycodes must be ASCII characters in the range between 32d and 127d, excluding the space bar.

- **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** (see page 63).
- **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** – Select this checkbox if you want to add a comment every time you score that subject. If you select this option, the cursor jumps to the **Comment** column in the Event Log window after you scored an event for this subject. Press **Enter** to leave the **Comment** column and score the next event.
- **Inactive** – Select this check box if you want to make the subject inactive when you do not want to use it anymore. For more information see page 86.
- **Subject-Behavior Combinations** – 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.

---

**!** If you delete a combination and you have already scored data for that combination, the observation contains errors (see page 147). To remove the errors, restore the combination, remove the events with errors, or re-score them using valid combinations.

---

## 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.

It is not mandatory to score behaviors, it is also possible to score only subjects. In fact, even that is not compulsory, you can also decide to score neither subjects nor behaviors and record only comments. However, you can only visualize an observation that contains scored behaviors (see Chapter 7 for information about visualizing your data).

### *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. See page 71 for more information on behavior groups. Examples of behavior groups are:

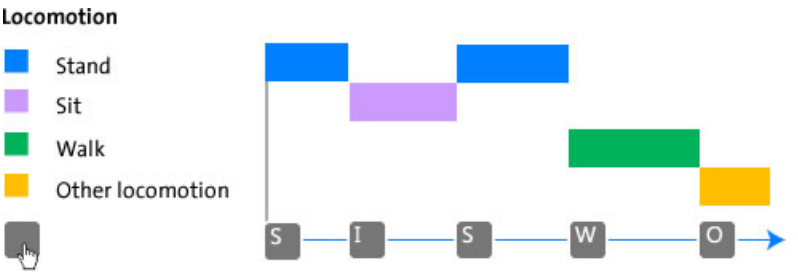
- Mother-infant interaction study – A *Gaze* group including *Gaze mother, Gaze elsewhere*; An *Emotion* group including *Baby smile, Baby neutral,* etc.
- Research on Monkeys – A Locomotory group including *Walk, Climb,* etc.; A *Social* group including *Bite, Groom* etc.


- Usability study – A *Tasks* group including *Task 1, Task 2*, etc.; A *User experience* group including *Usability hit, User error*, etc.

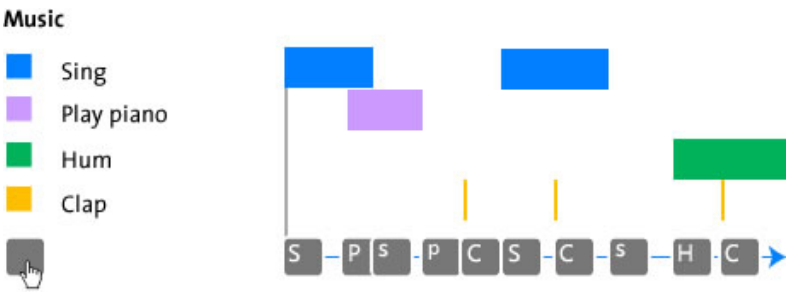
***Behavior group types***

There are two types of behavior groups:

**Behaviors in this group type 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.




**Behaviors in this group type 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.

### *Mutually exclusive and exhaustive*

A group in which behaviors cannot occur at the same time can have gaps between behaviors. If you do not want that, you can fill the gaps between the events with a behavior like *Other*, for example *Other locomotion*, or *No locomotion* in a behavior group *Locomotion*. This way you make the group *Exhaustive*, which means that always one behavior is active within the group. To do so, 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**.

---

**If you upgraded The Observer XT to version 12.5** — In previous versions 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 (see **Behavior types** on page 73).

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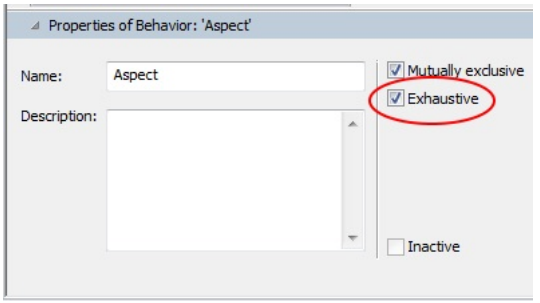



If you use a mutually exclusive and exhaustive behavior group, a behavior must be scored at the start of the observation. For this purpose, one of the behaviors in this group must be the **Initial State Event** (see **Behavior types** on page 73).

### *Sample group*

When you use instantaneous sampling (see page 51), 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.


### *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 *Mutually Exclusive* and *Exhaustive* behaviors groups. 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 (see page 72).

### *Defining behaviors in a behavior group (continuous sampling)*

To define behaviors, you must view the **Behaviors** panel (Figure 3.4) on your screen. If you do not see it, open the coding scheme (see page 66).

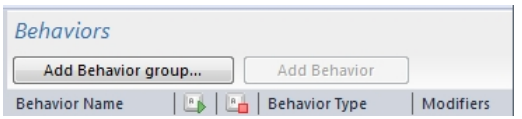
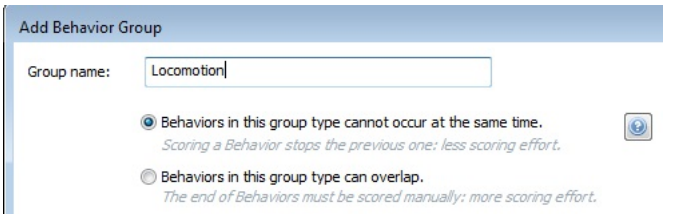



***Figure 3.4*** *The* ***Behaviors*** *panel.*

First create a behavior group. Then you can add either behaviors to an existing group, or add new groups.

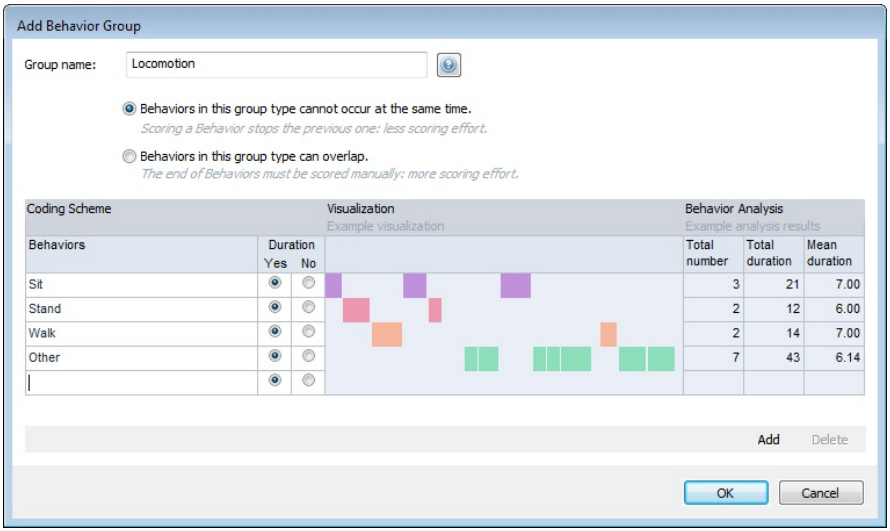
To define a behavior group:

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




   Choose whether the behaviors in the group type cannot occur at the same time or can overlap (see **Behavior group types** on page 71).

3. Add the behaviors and select whether they have duration or not (see **Behavior types** on page 73). Take notice of the example of the data you can obtain with this behavior type under **Behavior Analysis**. Each behavior should have a unique name. Names are limited to 64 characters (16 characters for Pocket Observer 3.1 and 3.2).




4. When done, click **OK**. The new group appears in the **Behaviors** panel.

### *Defining behaviors in a sample group (instantaneous sampling)*

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.

To define behaviors in a sample group, first create the group. Then add behaviors to an existing group, or add new groups.

To define a sample group:

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

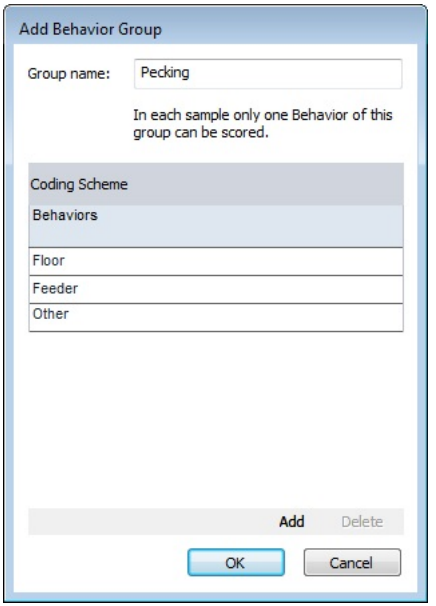



***Figure 3.5*** *The* ***Add Behavior Group*** *window (for a behavior group for instantaneous sampling).*

**4.** When done, click **OK**. The new group appears in the **Behaviors** panel.

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 page 70).

To re-open the behavior/sample group, double-click the name in the **Behavior Name** column.

***Behavior group properties***

To display the properties for a behavior group, select the group name and click the **Properties** button at the bottom of the screen.

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.

- **Description** – Optionally add a description to you 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** – Select/de-select this check box if you want 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**. This way always one behavior from this behavior group is active, also at the start of the observation. If you make the behavior group exhaustive, you must define one of the behaviors in this group as *Initial State Event* (see **Behavior types** on page 73).
- **Inactive** – Select this check box if you want to make the behavior group inactive when you do not want to use it anymore. For more information see page 86.

***Behavior properties***

To display the properties for a behavior, select it and click the **Properties** button at the bottom of the screen. Many properties can also be shown on columns, see the note under 'Behavior group properties'. You can modify the following behavior properties:

- **Description** – Optionally add a description to you 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** – Accept the suggested code (if the program generates that automatically; see **Generate keycodes automatically** on page 57), or change it.
- **Color** (for visualization purposes; see Chapter 7). The Observer XT automatically assigns colors and patterns to your behaviors. 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** (see page 63)
- **Event Type** – Specify whether the behavior is an **Initial State Event**, a **State Event** or a **Point Event (**see **Behavior types** on page 73).

- **Add comment** – Select this checkbox if you want to add a comment every time you score that behavior. If you select this option, the cursor jumps to the **Comment** column in the **Event Log** window after you scored an event for this subject. Press **Enter** to leave the **Comment** column and score the next event.

  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. For more information see page 86.

- **Modifiers** – Choose the modifier groups you want to link to that behavior. See page 79 for information about modifiers, how to define them and how to assign modifier groups to behaviors.

***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 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 previous versions of The Observer XT. This is no longer the case in The Observer XT 12.5.

- **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, split 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.
- **Can I use Point Events from 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**.

## MODIFIERS

### *What are Modifiers?*

Modifiers can be attached to behaviors. They are used to limit the scope of a behavior. Modifiers can be either nominal or numerical, and must always be organized in groups. Modifiers cannot be part of groups within larger groups. Modifiers and modifier groups are defined in the **Modifiers** panel. Once defined, 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, Wrong weblink* as a modifier group for the behavior *User error*.
- Aggression in lobsters – To describe the level of aggressiveness in territorial interactions, a modifier group *Level* that includes the values *0* to *5*.

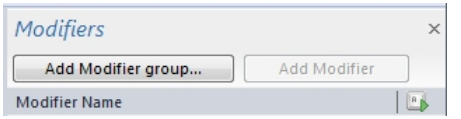
### *Modifier group types*

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 also calculate these statistics. In addition to this, you can calculate 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= 4, Average= 2, Minimum = 1 and Maximum = 3.

### *Defining modifiers*

To define modifiers, you must have the **Modifiers** panel open on your screen. If you do not see it, select **Modifiers** with **View Settings** at the far-right side on your screen.

To open the coding scheme, see page 66.




First create a modifier group. Then add either modifiers to an existing group, or add new groups.

To define a modifier group, click the **Add Modifier group** button and choose **Add Nominal Modifier** group or **Add Numerical Modifier** group (see **Modifier group types** on page 79).

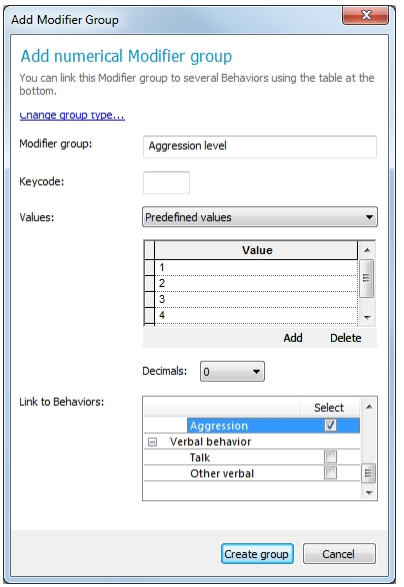
**Nominal modifiers**

1. Give the modifier group a name and select the following:
   - **Mutually exclusive** – Select this for a mutually exclusive group (see **Behavior group types** on page 71 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.
2. Enter the modifiers in the **Value** fields. Each modifier should have a unique name of maximally 64 characters (16 characters in Pocket Observer 3.1 and 3.2).
3. Define to which behavior the modifier group should be attached in the **Link to behaviors** field.

**Numerical modifiers**

1. 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.




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

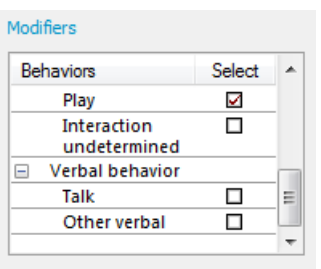



***Figure 3.6*** *An example of linking a modifier group to a behavior. The modifier group has been linked to the behavior Play.*

To re-open the modifier group, double-click the name in the **Modifier Name** column.

### *Modifier group properties*

To display the properties for a modifier group, select the group name and click the **Properties** button at the bottom of the screen.

---

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.

---

- **Description** – Optionally add a description to you 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 check box if you want to make the modifier group inactive when you do not want to use it anymore. For more information see page 86.
- **Modifiers** – Select in this field to which behaviors the modifier group should be attached.

### *Modifier properties*

To display the properties for a modifier, select it and click the **Properties** button at the bottom of the screen. Many properties can also be shown on columns, see the note under 'Modifier group properties'. You can modify the following behavior properties:

- **Description** – Optionally add a description to you 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.
- **Define keycodes** – Accept the suggested code (if the program generates that automatically; see **Generate keycodes automatically** on page 57), or change it.
- **Color** (for visualization purposes; see Chapter 7). The Observer automatically assigns colors to your behaviors. 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** (see page 61)
- **Inactive** – Select this check box if you want to make the behavior inactive when you do not want to use it anymore. For more information see page 86.

*Defining subjects as modifiers*

- 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. To do so, click the first subject name, hold the **Shift**-key and click the last subject name. Copy the cells by right clicking any of them and select **Copy**, or press **Ctrl+C**. Paste the cells into an empty nominal modifier group. The header **Subject name** is also pasted. Right-click it and select **Delete**.

## MAXIMUM NUMBER OF ELEMENTS

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.

Different limits apply if you use Pocket Observer. See the Pocket Observer Reference Manual for details.

## CREATING A CODING SCHEME FROM PREVIOUSLY-RECORDED DATA

You can create a coding scheme by importing a data file, for instance an ODX file from The Observer XT (see page 424). 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 **MAXIMUM NUMBER OF ELEMENTS** above). You can only import files that comply with these restrictions.

## CHECKING YOUR CODING SCHEME

You cannot carry out an observation when your coding scheme contains errors. Therefore check the coding scheme before starting an observation. When you have the **Check Coding Scheme while editing** option selected in the **Coding scheme settings** window (see page 58), a warning triangle appears in front of the coding scheme element 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.

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


The **Check Coding Scheme** window appears with all the errors in your coding scheme (see Figure 3.7). In this example, the behaviors Gaze adult and Gaze elsewhere have the same keycode (conflicting keycodes).

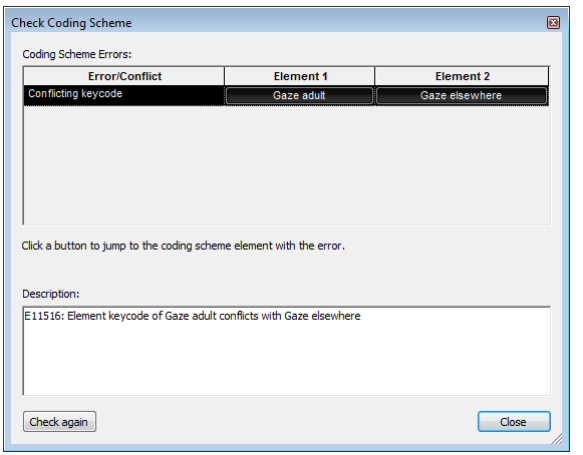



***Figure 3.7*** *An example of a* ***Check Coding Scheme*** *window.*

To correct the 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 page 73).
- You have selected the **Use Pocket Observer with...** option in the **Coding Scheme settings** (see page 58) and you have created a behavior group with only one behavior.

## MODIFYING YOUR CODING SCHEME

You can rename or add coding scheme elements at any time. You can only remove coding scheme elements before they have been scored in an observation.

### *Adding 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.

### *Removing a coding scheme element from a group*

To remove a behavior or modifier from a group, either delete it or move it to another group (see below). This is only possible when you did not score the element yet. You cannot place a behavior or modifier outside any group.

### *Moving a coding scheme element from a group to another*

Click the behavior/modifier you want to move, and drag the mouse to the name of the group where you want to place it. When ready, release the mouse button.

### *Sorting 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 its name and drag it below the name of other groups.

### *Editing 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.

***Deleting 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.**

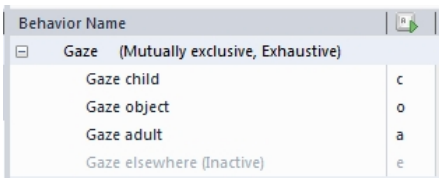
---

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**.

# 3.5 Independent variables

Choose **Setup** and then **Independent Variables** to open the **Independent Variables** list. The Observer XT distinguishes four kinds of independent variables:

- **User-defined variables** – Variables that describe the subjects, observation sessions and environmental conditions. You can define your user-defined variables in the **Independent Variable List** (see Figure 3.8 for an example). See page 87 for more information.
- **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 page 90)

  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 page 90).

  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 chapter 5 how to import external data into an observation).

- **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 | User-defined | Video | User-defined | User-defined |
|---|---|---|---|---|---|---|
| Label | Temperature | Sky condition | Name of observer | Chimpanzees.mpg | Name of focal sub | Presence of visitor |
| Description | | | | | | |
| Type | Numerical | Text | Text | File reference | Text | Text |
| Format | x.x | | | | | |
| Predefined Values | From 10.0 To 3 | Partly cloudy; C | | | Dylan; Alice; Ka | Yes; No |
| Scope | Event Log | Event Log | Event Log | Event Log | Event Log | Event Log |
| Value Update | Optional | Optional | Optional | External | Optional | Optional |

| Observation | Event Log | Subject | No. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dylan_1 | Event log00 | | 1 | 19.0 | Partly cloudy | LL | ...anzees.mpg | Dylan | Yes |
| Dylan_2 | Event log00 | | 2 | 19.0 | Partly cloudy | LL | ...anzees.mpg | Dylan | Yes |
| Dylan_3 | Event log00 | | 3 | 19.0 | Partly cloudy | LL | ...anzees.mpg | Dylan | Yes |

***Figure 3.8*** *Example of the Independent Variable List. The upper part of the list shows some* ***User-defined variables****,* ***Video*** *and* ***Audio*** *files. The lower part lists the observations in the project and the values of each independent variable for those observations.*

## ADDING USER-DEFINED VARIABLES

User-defined variables are variables that potentially determine the value of a dependent variable (for example, behavior). They are either simple descriptive categories (such as the name or age of the subject), or conditions manipulated by the observer (such as the type of treatment given to an animal or the substance being tested). You can add maximally 40 user-defined variables.

Click **Add Variable** to add user-defined variables. Optionally enter a name (maximum 64 characters) and a description (maximum 255 characters). The following options are available for user-defined variables:

### *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. It was called *Logical* in The Observer 11.0 and older versions.

### *Variable format*

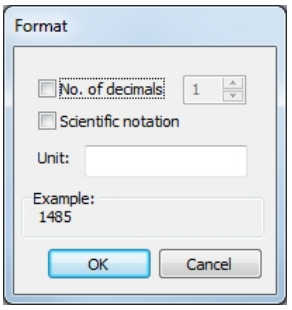
**Text and Boolean variables** – For **Text** and **Boolean** variables you cannot specify a format.

For the other types of variables, click the arrow in the **Format** field to display the **Format** window. The program uses the decimal separator specified in your computer's **Regional Settings**. If you change regional settings, close and restart The Observer XT.

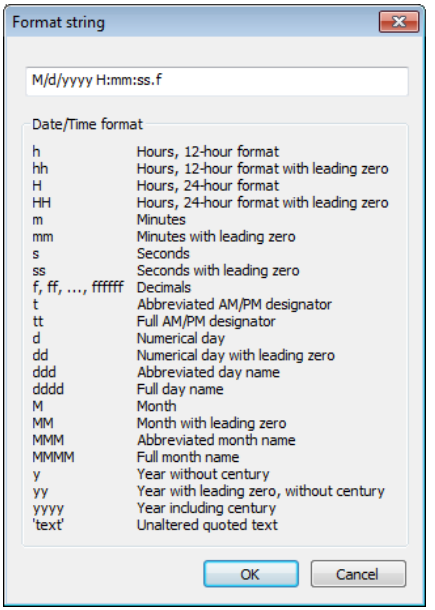
**Numerical variables** – Choose the number of decimals (maximum 9). The Observer uses the decimal separator from the regional settings of the computer where the variable has been defined. If you change regional settings, close and restart the program. Deselecting the **No. of decimals** checkbox will result in using integers.

Selecting the **Scientific notation** checkbox will result in numbers to be displayed as, for example, 1.485e+0.03 instead of 1485.236.

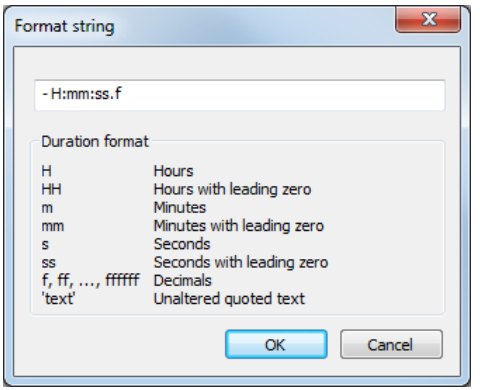
In the **Unit** field, enter the unit of your variable, for instance, 'years' for the age of the subject. Click **OK**.



**Timestamp variables** –Enter your preferred format. The format **f** represents the decimals you specified in the **Time formats** tab of the **Project Settings** window (see page 60).




**Duration** variables – Enter your preferred format. The format **f** represents the decimals you specified in the **Time formats** tab of the **Project Settings** window (see page 60).

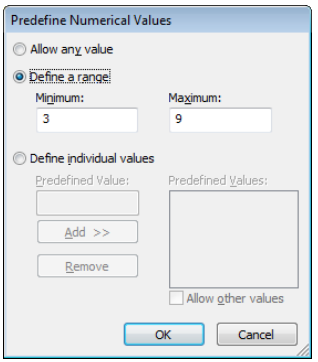


### *Predefined variable values*

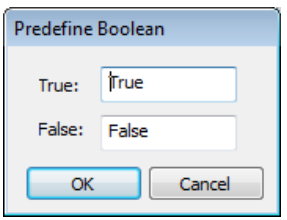
Optionally predefine values. By doing this you can select from the predefined values when you edit the user-defined variables. For **Timestamp** and **Duration** variables you cannot specify predefined values.

**Text variables** – Enter the text you want to choose from when you start or end an observation. Select the **Allow other values** check box 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 the **Allow other values** check box 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 'presence of observer', you may define the values 'No' (False) and 'Yes' (True).




**Editing predefined values** – To replace or delete predefined values, delete first all the values from the variable column.

### *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 setup. Also, if you observe only one subject per observation, 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.

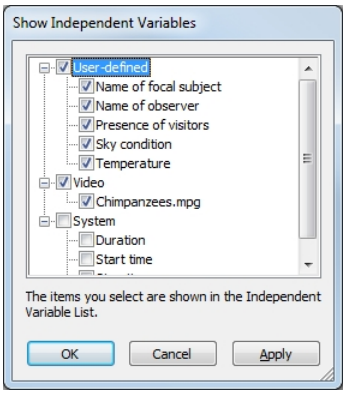
- **Subject –** This option is only available if you defined **Subjects** in your coding scheme. If your observation contains multiple subjects and the user-defined variable has different values per subject, select scope **Subject**. Typical examples of user-defined variables with scope **Subject** are age, gender, and identity of your subjects.

If you plan to create groups of observations for analysis, set the **Scope** of independent variables to either **Observation** or **Subject**, not **Event log** (see page 90 for details).

**Changing a variable's scope** – 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.

### *Showing/hiding 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**.

### *Value Update*

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. See page 101 for more information.

Choose whether editing variable values is:

- **Compulsory** – You are always prompted to edit your independent variable values (at the start or the end of an observation or both) and must enter a value to proceed.
- **Manual** – You are prompted to edit your independent variables, unless you defined in the **Observation Settings** tab of the **Project Settings** to **Hide 'manual' variables** (see page 59). If you chose this option in the project settings, open the independent variable list to update the values.
- **Optional** – You are always prompted to edit your independent variables (at the start or the end of an observation or both), but you do not need to enter a value.

### *Entering variable values*


Enter the user-defined variable values in the window that opens when you start or end an observation (dependent on what you chose in the **Observation settings**, see page 59). To enter or edit the values, open the independent variables list and fill in the values. You can also copy and paste values from, for example, Excel. However if you predefined a range, the values should fall within that range.

### *Exporting Independent Variables*

To export the independent variables and their values, choose **File**, **Export** and then **Independent Variables**. For details, see page 444.

### *Removing variables*

Right-click in one of the variable fields and choose **Delete Independent Variable** to remove the variable.

### *Printing the Independent Variable List*

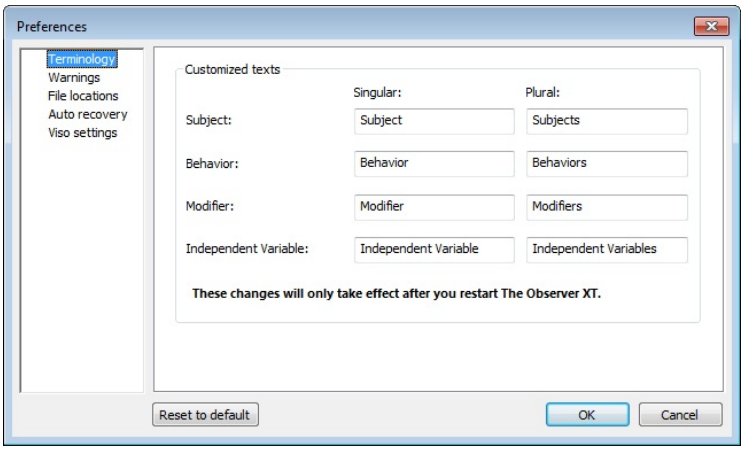
In the current version of The Observer XT, printing is not fully supported. To print the independent variable list, copy and paste the columns into another program such as Excel. If you copy the columns to Microsoft Word, you can use the convert text to table function.

# 3.6 Preferences

You can set preferences for terminology in the program, showing warning messages, file locations and the time interval at which The Observer XT saves your project. Choose **File** and then **Preferences** to open the **Preferences** window. Restart The Observer XT after you edited the preferences. 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.

## TERMINOLOGY

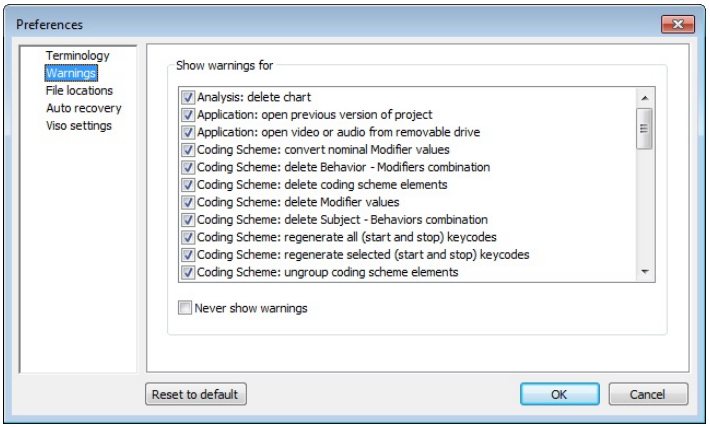
In the **Preferences** window, click **Terminology**.




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.

## WARNINGS

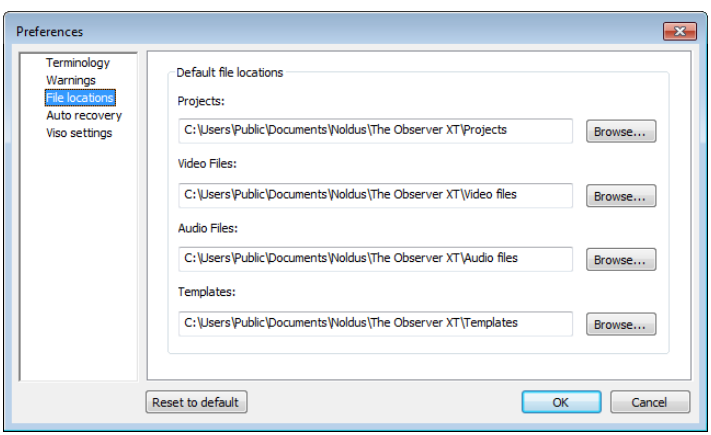
In the **Preferences** window, click **Warnings**.




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

In the **Preferences** window, click **File locations**. The default file locations are set during installation.

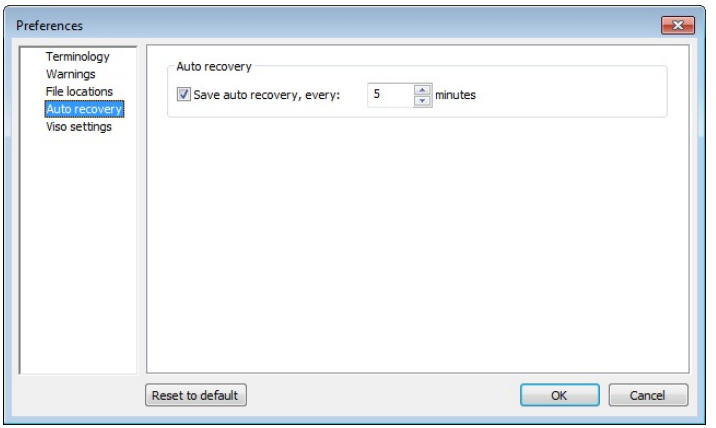


You can change file locations for:

- **Projects** – The location you choose here, will be the default project location when creating a new project (see page 46).
- **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 page 99). This is also the default location where video files generated from episode selections are saved (see page 290).
- **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 page 47 for information on how to create a template from a project.

## 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 12\Temp. Media files, or external data files are not saved to this temporary folder.

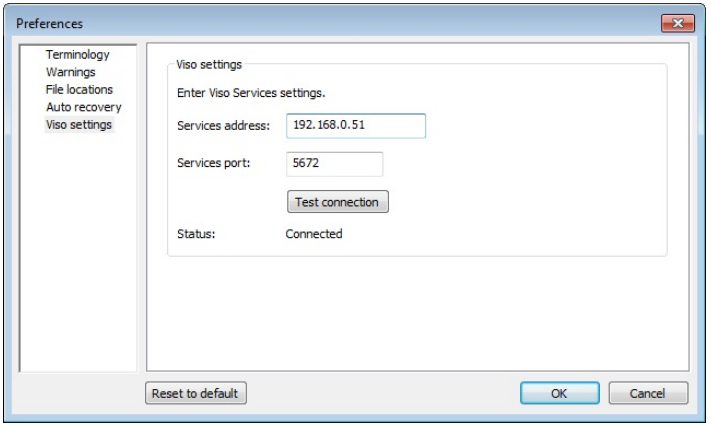



Your data are only saved in the project file when you manually save them (from the **File** menu, choose **Save Project** or press **Ctrl+S**). If the program crashes, you get the option to recover the auto-saved project, which is the temporary file, or to continue with The Observer XT. In the latter case, you can open the version of your project that was manually saved.

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.

## VISO SETTINGS

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




In the **Viso settings** tab of the **Preferences** window 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 page 436 how to import Viso Sessions into The Observer XT.

# Chapter 4

# Carrying out an Observation

# 4.1 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**. However, you can import Event data files into your **Observation**, which are stored as separate Event Logs. Furthermore, Pocket Observer files and files from certain Plug-ins, such as data from FaceReader that measures facial expressions, or 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 Figure 4.1).

If you score data from one or more media files, those files are part of an observation. Similarly, if you import physiological data (see Chapter 5), those are part of an observation although they are stored in separate files.

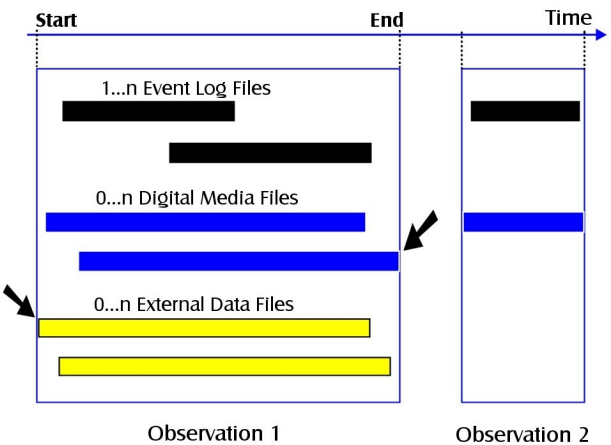



***Figure 4.1*** *An observation can be composed by one or more* ***Event log files*** *containing the behavioral data, zero, one or more* ***Media files****, and zero, one or more* ***External Data files****. Note: the* ***Start*** *and* ***End*** *time of an observation are determined by the earliest start time and the latest end time of any data set (indicated by the black arrow), unless you change them manually (see page 125).*

In The Observer XT, the **Event logs** contain the event data. You can view the observation as a desk on which lay one or more sheets, the Event logs, containing the actual scored data plus media files and external data files (see Figure 4.1).

# 4.2 Carrying out an observation

## 1 - CREATING A NEW OBSERVATION

When you create a new observation, you create an empty worksheet for event logging called an **Event Log**, and prepare The Observer for the start of the observation.

1. Choose **Observe** > **Observation** > **New**.
2. Optionally change the name and add a description.

3a. **Live** – Select devices in the **Devices** tab if you have not already done so (see page 48). Click **OK**.

3b. **Offline** – the **Device** tab is grayed out. Click **OK**.

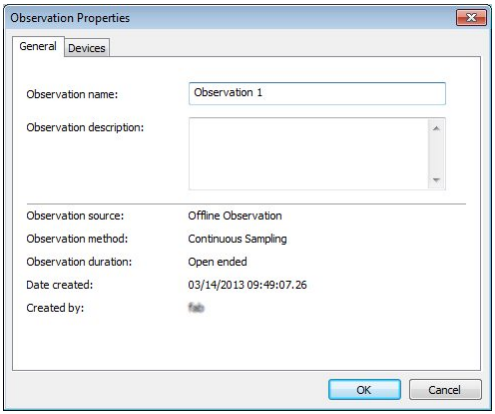
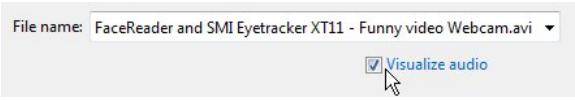



***Figure 4.2*** *The New Observation properties window.*

Select your video. To visualize the audio of a video file as a waveform, select the **Visualize audio** check box.



To code from audio files without video, close the **Select Video** window and click the **Import audio** button on the tool bar. Click **OK**.

## 2 - CHOOSING THE CORRECT INITIAL STATE EVENTS (MUTUALLY EXCLUSIVE AND EXHAUSTIVE GROUPS ONLY)

1. If you defined mutually exclusive and exhaustive groups in your coding scheme, the Initial state events (see page 73) now appear in your event log. Check that the states are correct. If not, select the correct states.

   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.

   Score the correct event behavior by pressing the key code. This behavior is now recorded at time 0.

2. If the initial state events are linked to one or more modifiers that must be scored (see page 80), you must score the modifiers before you can start the observation.

3. Repeat these 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*). Note: the **Event 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 | |
| - | | | |

## 3 - POSITIONING THE VIDEO (SCORING OFFLINE ONLY)

1. If you score offline, position the video with the playback slider to where you want to start scoring. Use the playback buttons for fine positioning (see page 141).


If you do not see the **Playback Control** window, select it with **View Settings** on the far-right side of the tool bar.

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If you know the exact video time at which you want to start the observation, click the **Offset** button on the tool bar and select **Numerical Offset**. Locate the cell under **Offset** for the media file. Type the time in the video/audio file you want to start at, preceded by "-". For example, if you want to start at one minute in the video/audio file, type -0:01:00.00. For more information, see page 127.

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2. Click the **Start Observation** button to start the observation (see below).

## 4 - STARTING THE OBSERVATION

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 page 59), enter the values in the window that appears. You can skip values that are not compulsory (see page 92).

3. Now score your data.
   - for continuous sampling see page 102.
   - for instantaneous sampling see page 105.
   - for combine continuous and instantaneous sampling see page 109.

## 5 - SCORING DATA

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. 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 page 118).

The following symbols appear in your Event log.

The start of an event.

The stop of an 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.

A Point event.

An instantaneous sample event.

---

If you have keycodes with the **Shift**-key it may happen that you 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, open the **Control Panel** and go to **Ease of Access Centre** in Windows 7 or press the **Windows key + U** in Windows 8. 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.

---

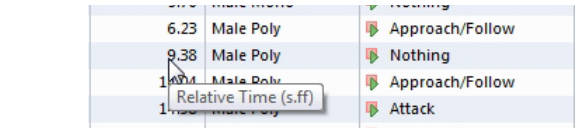
## 5A - CONTINUOUS SAMPLING — HOW TO SCORE EVENTS

The procedure described below is very general and may not apply to your own coding scheme (for example, if you have not defined subjects or modifiers, then ignore the instructions referring to them). Also, the terms shown below may not be those you have chosen in the **Preferences** window (see page 93). For example, **Subjects** may refer to Actors, or Test participants etc. Furthermore, you can change the usual order of scoring (for example, score first the behavior, then the subject; see page 119).

1. The cursor is present in the **Subject** column. 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**. The time code is assigned to a record when the first element or the coding scheme is entered, no matter whether it is a subject, behavior or modifier. In the case you enter only free text, the time code is assigned when you enter the first character under **Comment**.

| Time | Subject | Behavior |
|---|---|---|
| 0.00 | **Start** | |
| 3.48 | Child | |




2. The cursor moves to the **Behavior** column. The **Codes** window now shows all possible behaviors for this subject. Score the behavior.

3. **Result** – The name of the behavior appears in the row.

| | | |
|---|---|---|
| 0.00 | Child | Lying |
| 4.76 | Child | Walking |

4. If the behavior was linked to one or more modifiers, the cursor moves to the **Modifier** column. The **Codes** window now shows all the modifiers that can be attached to the scored behavior. Score the modifiers.

| | | | |
|---|---|---|---|
| 0.00 | **Start** | | |
| 2.08 | Child | Initiate Play | Constructive |

   **Result** – The name of the modifier appears in the row.

   - For numerical modifiers with a predefined range, first score the numerical modifier group and then type the value. The range of values allowed is shown in the **Codes** window under the modifier group name.
   - For modifiers with predefined values, score the numerical modifier.

     Score the other modifiers that are linked to that behavior, If scoring modifiers is not compulsory (see page 80), you can skip them by placing the cursor in the **Comment** column, or pressing **Enter**. 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 Figure 4.3) 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.

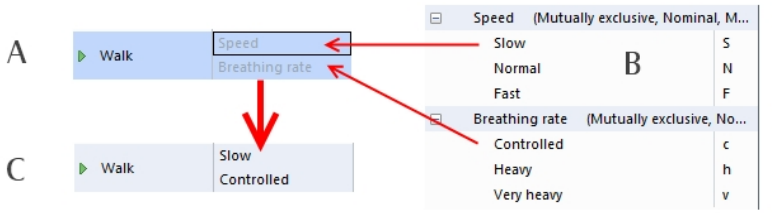



*Figure 4.3 An example of how required modifiers are scored. In this example, the behavior 'Walk' has two modifier groups: 'Speed of walking' and the associated 'Breathing rate' of the subject.* **A** *- The Event Log before the Modifiers of behavior Walk are scored; the Modifier column indicates in 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.*

If you confirm the event by pressing **Enter** without scoring the required modifier, The Observer XT warns you that the event is not complete:

Error! Event not complete; Behavior requires (additional) Modifiers

| Time | Subject | Behavior | Modifier |
|---|---|---|---|
| 0.00 | **Start** | | |
| 1.76 | Child | Initiate Play | Constructive Duet |

5. To stop a behavior or modifier, first score the subject, then:
   - **Start-stop group** – 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.
6. If you have selected **Add Comment** in the **Properties** pane of the subject or the behavior you have just scored (see page 77), and the **Comment** column is shown in the event log (see page 138 for how to hide/show columns), the cursor moves to the **Comment** column, with the word 'Comment' in gray. Enter a comment if you require one, and press **Enter**.

| | | | |
|---|---|---|---|
| Child | Initiate Play | Constructive Duet | Says "Do you want to play?" |

If you do not want to add any comment, just press **Enter**. You can also copy and paste comments.

7. The event is now complete.

| | | | | |
|---|---|---|---|---|
| 2.84 | Child | Initiate Play | Constructive Duet | Says 'Do you want to play?' |

The cursor moves to a new row, and the **Codes** window now shows the subjects again. Add new events by repeating the steps above. Press the **Undo** button on the tool bar 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 page 120.

For more information, see:

- The Notes on Continuous Sampling below.
- How to.. procedures on page 114.
- Additional observation functions on page 147.

## 5B - INSTANTANEOUS SAMPLING – HOW TO SCORE EVENTS

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 and in gray the behavior groups that are linked to the subjects (see page 70).

   When you carry out an Offline observation, the video/audio file pauses until you scored all subjects, irrespective of whether you selected the option **Pause playback of video when scoring an event** in the project settings (see page 61).

| 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 |

***Figure 4.4*** *The event log for Instantaneous Sampling. This example shows the first block of subject-behavior combinations that need to be scored.*

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

Codes

Subjects | Behaviors | Modifiers

| | Status | |
|---|---|---|
| **Behavior** | | |
| Null | Female 1,... | N |
| Play | | P |
| Groom | | G |
| Eat | | E |
| Kiss | | K |
| Hit | | H |
| Bite | | B |

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

| Time | Subject | Behavior |
|---|---|---|
| 0.00 | **Start** | |
| 0.00 | **Instantaneous Sample (1)** | |
| 0.00 | Female 1 | Inactive |
| 0.00 | Female 1 | Posture |
| 0.00 | Female 2 | Behavior |

***Figure 4.5*** *The event log for Instantaneous Sampling. In this example, the first behavior for subject Female 1 was scored.*

3. If the behavior was linked to one or more modifiers, the cursor moves to the modifier column. 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.

| Time | Subject | Behavior | Modifier |
|---|---|---|---|
| 0.00 | **Start** | | |
| 0.00 | **Instantaneous Sample (1)** | | |
| 0.00 | Female 1 | Inactive | |
| 0.00 | Female 1 | Lying | grass |
| 0.00 | Female 2 | Behavior | |

   If modifiers are not required (see page 80), you can skip them and go to the **Comment** column (see below) or start a new event line. To do so, press **Enter**.

   If modifiers are required and you confirm the event by pressing **Enter**, a message appears on the bottom of the Event Log:

   Error! Event not complete; Behavior requires (additional) Modifiers

   Score the modifier, so that the cursor moves to the **Comment** column or to a new row.

4. If you have selected **Add Comment** in the **Properties** pane of the subject or the behavior you have just scored (see page 77), the cursor moves to the **Comment** column with the word 'Comment' in gray. Optionally 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 any comment, just press **Enter**.

   If you do not want the cursor to move to the **Comment** column every time you score an event, make sure that for all behaviors and subjects the **Add Comment** option is not selected (see page 84).

5. The event is now complete.

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

6. **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.

You can 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 next?***

- Errors may occur while scoring data. Please see page 120 for how to correct errors.
- For stopping the observation, see page 110.
- For more information, see:
  - The Notes on Instantaneous Sampling below.
  - How to.. procedures on page 114.
  - Additional observation functions on page 147.

***Notes on Instantaneous Sampling***

- In the **Timers** window, the **Remaining Interval Time** is displayed. If no **Timers** window is visible, select **Timers** from **View Settings** at the far-right side of the component tool bar. 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 | - |

  - For a Live observation, the timer counts down until the next Instantaneous sample.
  - For an Offline observation, the timer displays the sample interval length.
- The subjects are listed in the event log in the same order as in the coding scheme. However, you can score the subjects in a different order; this is useful in a live situation in which some subjects might be initially out of sight. See **Score the data in the order you prefer** on page 119 for more information.
- 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, 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.

## 5C - Continuous and Instantaneous Sampling – How to score events

1. As soon as the observation is started, the cursor moves to the first Instantaneous sample block. Score this sample, according to the general procedure for instantaneous sampling (see **5B - Instantaneous sampling – How to score events** on page 105).
2. As soon as you finish scoring the Instantaneous sample, Continuous Sampling starts and you can score data for Continuous Sampling until the next Instantaneous sample. Follow the procedure described in **5A - Continuous sampling — How to score events** on page 102. 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.

***Note on Continuous and Instantaneous Sampling***

- What do I do when my focal subject changes behavior while I am scoring the Instantaneous sample? – Click the row under **Instantaneous Sample (#) End** (see Figure 4.6) 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, 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.

| 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 | | |

***Figure 4.6*** *Example of simultaneously carrying out Instantaneous and Continuous Sampling. When the Instantaneous Sample (3) starts (at 60 secs, row 29), the focal animal 'Adult' is 'Standing'. While scoring the Instantaneous sample (3), 'Adult' starts 'Walking'; this is scored by clicking row 36 under* ***Instantaneous Sample (3) End*** *and scoring 'Walk'.*

## 6 - STOPPING THE OBSERVATION

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

---

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

---

***Automatically stopping an observation***

When the predefined maximum time is reached or the video/audio file ends, The Observer XT stops the observation.

---

If the maximum time was reached while you were 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 page 34).

---

***Manually stopping an observation***

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

3. If you selected **Prompt for confirmation to end observation** in the **Project Settings** (see page 59), you get a warning. Click **Yes** to end the observation.
4. If you selected either **After observation** or **Before and after observation** under **Edit Independent Variables** in the **Project Settings** (see page 59), what happens depends on the **Value Update** property of your Independent Variables (see page 92):
   - If at least one variable is **Compulsory**, **Optional** or **Manual** and you did not select the **Hide manual variables** option (see page 91), the **Enter User Defined Variables values** window displays.
   - If all your independent variables are **Manual** and you selected the **Hide manual variables** option, the **Enter User Defined Variables values** window does not open.
5. Edit the Independent Variable values and click **OK**.

---

For Compulsory variables, you must enter a value if the corresponding cell is empty. For Optional variables, you are free to enter a value or leave the cell empty.

---

***What next?***

- You can play back, visualize and analyze data immediately after you end an observation.
- To play back the data, use the **Play** buttons in the **Playback Control** window (not the **Start Observation** button!). For details on data playback, see page 141).
- To visualize data, from the **Analyze** menu, select **Visualize Data** (see Chapter 7), or click the **Visualize** button on the tool bar.

- If you have recorded external data during the observation, you need to import it in the observation before you can visualize all data together (see Chapter 7).

- To analyze data, select the data set you want to analyze (see Chapter 6), then choose an option from the **Analyze** menu (see Chapters 8-10).
- **Checking for errors** – When closing an observation, the program checks that the event log currently open contains errors, for example a start code without a matching stop code. Event log with errors are not analyzed nor visualized. For more information see page 147.

## IMPORTANT NOTES

### *How and where observations are saved*


- While you are scoring observational data, these are saved in a temporary folder that has the same name of your project, preceded by the character '~' in the folder C:\ProgramData\Noldus\The Observer\XT 12\Temp. For example, ~Kids at play. Each observation is stored in a sub folder named **Event Data**, within the temporary folder. Every time you edit the observation, the event log currently open is saved in that sub folder.
- 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.

---

### *Where digital media files are saved*

If you score observations live with a video signal, and you have specified to record the video to a digital media file (see page 48), the resulting video files are saved in the folder specified under **Video files** in the **File locations** tab of the **Preferences** window (see page 94). For the default file locations, see page 447.

***If you record live video (general)***

Please read this and the next note if you record live video while observing (the corresponding settings are explained on page 48).

- There may be some delay (around 0.5 s) between the real scene being recorded and the image on your computer screen. This is because displaying the on-screen image has lower priority than the recording on media file.
- We cannot guarantee that the video files being recorded and the event data files are 100% exactly synchronized with each other. This is due to several factors, including the workload of the processor during video recording, the type of camera you use and the format of digital video file being recorded.
- If you use the Media Recorder to record the videos, these are automatically synchronized with your observation.
- It is always a good idea to check synchronization once the observation has ended. If necessary, you can adjust the synchronization point between video files, and between video files and event data (see page 127).

To improve synchronization between video files, you can use a visual signal, for example a brief flash that can be video-recorded. Alternatively, you can use the SyncBox (see The Observer XT Service Manual that you can download from www.noldus.com/downloads). You can adjust synchronization (see page 40) by re-positioning the video files at the point when the visual signal appears on the images.

***If you record live video to DV-AVI files***

- Check carefully that you have enough space on the hard drive chosen to store the resulting files. An hour of DV-AVI files requires about 12.5 GB of disk space!
- Once you stop an observation, the video files (one or two, depending on your settings; see page 48) recorded during the observation are opened in separate windows, so you can play them back immediately. The video files are synchronized with the events and, if you have imported them, external data.

If the available disk space is not sufficient to store the whole video, The Observer gives no message until you stop the observation. The Preview window freezes once the drive is full. The video file is saved up to that moment.

# 4.3 How to...

## PLAY BACK OBSERVATION DATA

Once you have stopped an observation (see page 110), you can play the data back for review and data editing.

- If you add or remove a variable in the **Independent Variables List** (see page 86), the corresponding object (for example, a **Video** window if the variable is video file) is displayed or removed, respectively.
- You can also play back the data (including video and audio) in the Visualization mode. See Chapter 7.
- To play back external data, you must first import the external data files in that observation. See Chapter 5.

***How to play back data***

- To play back data for reviewing purposes, click the **Play forward** button in the **Playback Control** window. You can use the **Play** buttons as usual to control playback.
- To play back data and add/edit event data, click the **Start Observation** button. You can now score data as usual (see page 102). When you are done with scoring, click the **Stop Observation** button.

If you have scored data live with a video signal and recorded video to a media file (see page 48 for how to set this), when you play back the data the video is played back too, synchronized with the events. If you have recorded two or more video files, video is played synchronously.

## ADD AN ELEMENT TO THE CODING SCHEME WHILE OBSERVING

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 video/audio 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 below).

---

If you add a new modifier, remember to define its connections to subjects or behaviors.

If the configuration is locked (see page 54), or the project is read-only (see page 451), 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 do so, open the coding scheme.

---

***How to 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 tabbed you want to add an element to. For example, if you want to add a behavior, click Behaviors.
3. Click the button that applies at the bottom of the **Codes** window, or press **Ctrl+E** (only for adding elements, not groups). The corresponding window displays. See the instructions below for the category that applies. Next, you can keep scoring data.

---

The **Codes** window allows you to make limited changes to the coding scheme. To change other properties of the elements like the sound, you must stop and close the observation and re-open the coding scheme.

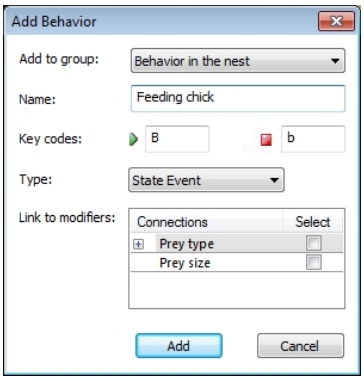
---

***Adding a subject***

4. In the **Add Subject** window, enter the name of the new subject and its keycode, or accept the suggested code. Next, click **Add**. The new subject is listed in the **Codes** window.

### *Adding a behavior*

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




4. Type in the **Name** and the **Keycodes** for the new behavior, or accept the suggested ones.
5. From the **Type** list, select whether the new behavior is a **Point Event**, a **State Event** or an **Initial State Event** (see page 73).
6. In the **Link to** box, select the modifier groups you want to associate with the behavior.
7. Click **Add**. The new behavior is listed in the **Codes** window, under the corresponding group name.

   When your Observation method is Instantaneous Sampling, it does not matter which Behavior type you choose.

   When you add a behavior, this is automatically included in the subject-behavior combinations that have been assigned to the group that behavior belongs to.

### *Adding 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. In the **Add behavior group** window, 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** on page 71 for more information.
3. Enter the behaviors and, for each behavior, choose whether it has duration or not. See **Behavior types** on page 73 for more information.

*Adding a modifier*

4. In the **Add Modifier** window, select the group which the new modifier belongs to. If you think that the modifier does not belong to any existing group, create a new group first (see below).
5. Under **Value**, type in the modifier value or accept the suggested value. Under **Keycode**, type in the keycode for the new modifier or accept the suggested one.
6. Click **Add**. The new modifier is listed in the **Codes** window under the corresponding group name.

*Adding a modifier group*

4. In the **Add Modifier group** window, click the option you require. For more information on the difference between Nominal and Numerical modifier groups, see page 79.
5. Type in the name of the modifier group and in the **Behaviors** box define all the modifiers of the group.
6. In the **Link to Behaviors** box, select the behaviors that you want to associate with the modifier group. Next, click **Create group**.

## MODIFY OR REMOVE A CODING SCHEME ELEMENT AFTER OBSERVING

To modify or remove an element of the coding scheme, you must first close the observation.

1. Stop the observation (click the **Stop Observation** button or press **Ctrl+Alt+Q**).
2. Open the coding scheme (from the **Setup** menu, select **Open Coding Scheme**).
3. Click the element you want to change, and then make sure that the **Properties** pane is expanded (click **Properties** at the bottom of the screen, or right-click the element in the Event log and select **Properties**). Modify the element properties (see Chapter 3 for details) or delete the element (press **Ctrl+Delete**).
4. 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. For more information on inactivated elements, see page 86.

## ENTER EVENTS AS FREE TEXT

With The Observer XT you can log events in form of free text by using the **Comment** column. Once you have typed the event description, press **Enter** to submit the event line.

### *Entering text associated with a scored event*

If you want the free text to be always associated with a scored event, score the event as usual, then click the **Comment** cell for that line and type in the text. Do this especially if you want to visualize the comments in an event plot, because comments are not visualized if they are not associated with a scored event. If necessary, create a dummy behavior in the coding scheme and select the option **Add a comment** for that behavior.

### *Entering text only*

To enter a new line of text only, press **Ctrl+I** or click the **Insert event** button on the tool bar.

Next, click the **Comment** cell for the new line and enter the text. The time stamp of an event line that only includes **Comment** is the time when you type the first character in the **Comment** column.

### *Entering long text with the Comment window*

You can enter a text line of up to 1024 characters using the **Comment** window (**Ctrl+W**).

1. Score the event or click directly the **Comment** cell in a new line (see above).
2. Press **Ctrl+W**. The cursor is now in the **Comment** window.
3. Enter the text, or paste it from an external source (e.g. the Windows Notepad).

   Note: When you type characters in the **Comment** window, the content of the **Comment** cell is updated accordingly and vice versa.
4. Press **Enter** to confirm.

If the text to copy is longer than 1024 characters, only part is copied to the **Comment** window up to a total of 1024 characters. Type or copy the remaining text in a new line of the event log.

To edit existing text, double-click the **Comment** cell in the event log and press **Ctrl+W** to switch to the **Comment** window. Next, edit the text.

Before starting the observation, hide the columns of the event log that are not useful for free text logging, that is, Subject, Behavior and their Modifiers. To hide columns, see page 52.

You cannot analyze free text, but you can use the **Find** function (see page 60) to find text across all observations, including a quantification of how many events a given word occurs in.

If you want to continually type text while listening to audio to transcribe speech, de-select the option **Pause playback of video when scoring an event** in the Project Settings (**Scoring options** tab; see page page 61).

If most event lines must contain a comment, select the option **Add a comment** for the corresponding behavior in the coding scheme.

Do not press **Enter** to separate text lines within the same Comment. If you press **Enter** the **Comment** window is cleared and the text typed up to that moment is saved in the **Comment** cell of the event log. To keep two or more lines of text separated, create multiple event lines.

You can also open the **Comment** window from the View Settings (page 133).

Event lines made of **Comment** text only, that is, without accompanying scored events, are not visualized in an event plot. However, they can be visualized in an episode selection.

## SCORE THE DATA IN THE ORDER YOU PREFER

### *Instantaneous Sampling*

Subjects in an instantaneous sample block appear in the order they are placed in the coding scheme. To score them in a different order:

1. Click the behavior cell of another subject (or use the arrow keys to navigate to another cell).
2. Score this Subject-Behavior combination.
3. The event log now continues with the next unscored Subject-Behavior combination.
4. Continue until you have scored all Subject-behavior combinations in the sample block.

## SUBMIT AN INCOMPLETE EVENT

If an event is made of several elements (for example, **Subject**, **Behavior**, and three **Modifiers**), The Observer checks that all the required elements are scored. However, you can still allow incomplete events by selecting the **Always press Enter to confirm Event Line** option (see page 61).

To submit an incomplete event, press **Enter**, or click the **Finish sample** button at the top of the Event log.

## SCORE NUMERICAL MODIFIERS

You can score numerical modifiers (see page 80), that is, modifiers that have numbers as possible values instead of text. For example, you may want to score a behavior that has modifiers ranging from 1 and 10, so that you can later calculate the average and variation of the scored values. The values of the range are shown in the **Codes** window under the modifier group name.

To score numerical modifiers, score the behavior that is linked to numerical modifiers. The column of the modifier becomes highlighted. Score the numerical modifier (click the **Start** column in the **Codes** window or type in the corresponding code).

---

**!** You must first score the modifier group name before scoring the actual values of the modifiers in the following cases:

- When you have two or more groups of numerical modifiers attached to a behavior, and you have just scored that behavior.
- When you enter the modifier values of an initialized state.

---

## EDIT DATA AND CORRECT SCORING ERRORS

---

**!** Always make a backup of your project before editing data (see page 450).

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 page 95).

---

### *Replace or delete an element in the Event log*

1. Click the cell where the element is scored.

---

You can also use the arrow keys to reach the line and the cell you want to edit.

---

**Result** – The event line becomes highlighted and the **Codes** window displays the elements that can replace the selected one.

2. Do one of the following:
   - To replace the element, either type in the keycode for the new element or click the code in the **Codes** window.
   - To delete the element, press **Delete** or right-click and select **Delete**, or click the **Delete current element** button at the top of the Event Log.

3. Click another line to confirm.

### *Add an element to a scored event*

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

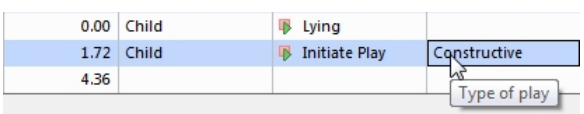
1. Click the cell where you want to add the element.

---

You can also use the arrow keys to reach the line and the cell you want to edit.

---

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** - You want to add an event between the event scored at 00:02:30 and the event scored at 00:02:35.

1. Click the row immediately above where you want the new row (in the example above, the header of the row with 00:02:30).
2. Click the **Insert event** button on the tool bar.

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

   **Result** – A new empty event is added above 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 video/audio, you can also insert a line in the following way: position the video/audio file to the time you require, then score the event as usual. The new event line is inserted between two existing lines.

---

### *Remove one or more event rows from the Event log*

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

   **Result** – The entire row is highlighted in black.

---

To select more rows, drag across row headers, or click the header of the first row you want to delete, then hold down the **Shift** key and click the header of the last row you want to delete.

---

2. Click the **Delete Event** button on the tool bar, press **Ctrl+Delete**, or right-click in the first column and select **Delete event(s)**.

### *Change the time code for a scored event*

**Example** – You have scored an event composed of many elements, however it was scored slightly later (or earlier) than the 'real' time. Instead of deleting the event and re-score it on the right time, just 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.

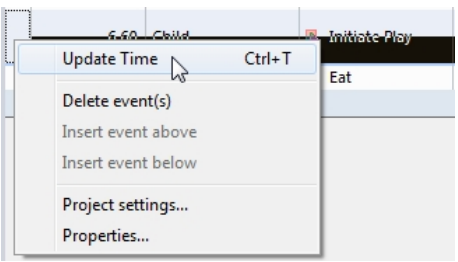
   **Result** – The time cell is highlighted in blue.

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


---

The new time has to be between the previous and the next event times. If you set an earlier or later times, the row changes position according to its time.

If you have scored an event slightly earlier or later than it occurs in the video/audio, you can click the left cell of the event line to select the line, move the video/audio to the correct time and use **<Ctrl+T>** to update the time in the Event log to the correct timestamp from the video/audio. Alternatively, right-click the row and select **Update Time**.




The timestamp copied from the video/audio to the event log cannot be earlier or later than the timestamp of the previous or next event from the same Behavior group.

---

3. Press **Enter**.

*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 tool bar. To make a correction undone, press the **Redo** button.

- **When inserting an event between two existing events** – Select the event line and click the **Delete Event** button on the tool bar. Alternatively, right-click in the first column of the event you want to remove and select **Delete event(s)**.

## RE-OPEN AN OBSERVATION OR EVENT LOG

**Example** – You want to re-open an observation to watch the video/listen to the audio and add or edit data.

1. Do one of the following:

   To open an observation –
   - From the **Observe** menu, select **Observation**, then **Open** or press **Ctrl+Alt+F6**. Select the observation and click **Open**.
   - In the Project Explorer, click the observation name under Observations.
   - In the Project Explorer, right-click an Observation folder and select **Open**.
   - If you want to continue with the last observation you were working on, in the Project Explorer, click the **Observations** folder and click Continue last observation in the overview window of The Observer XT that appears.

   To open an event log within an observation, open first the observation which contains the event log (see above), then –
   - From the **Observe** menu, select **Event Log**, then **Open** or press **Ctrl+Alt+O**. Select an event log and click **Open**.
   - Click the arrow sign in front of the observation name in the Project Explorer, click **Event Files**, and then click the event log.

2. Start the observation to edit the data (see page 101).

   If your observation consists of two or more event logs, opening an observation results in opening the most recent event log.

## CHANGE THE OBSERVATION'S START TIME AND DURATION

No matter what and how many data files an observation is made of (Event Log, Video, Audio and External Data), the **Start time** and **Stop time** are the earliest Start time and the latest Stop time of any data set, respectively (see the picture on page 98). The **Start Time**, **Stop Time** and **Duration** are a property of the Observation. You can view those times in the Independent Variable List (from the **Setup** menu, select **Independent Variables**). This section describes how to change those times. The synchronization between individual files will not change.

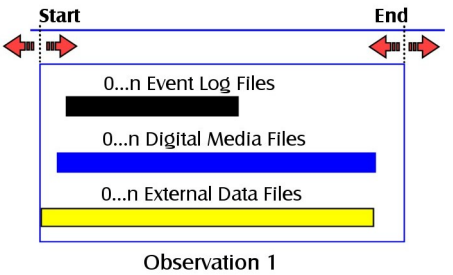



***Figure 4.7*** *Changing the Start and/or Stop time of an observation.*

Changing the Start Time and/or Duration of an observation does not "move" the single Event Log, 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 starting point of the single files.

If you want to change the synchronization between two or more files (that is, change the start time of one file relative to others'), see the next section.

Why should I change an observation's Start Time and Duration? – You may want to change Start and/or Stop time if for any reason the Start and/or Stop time of an observation is wrong.

***How to change the observation's Start Time and Duration?***

1. Do one of the following:
   - From the **Setup** menu, select **Independent Variables**.
   - Click the **Independent Variables** button on the Component tool bar.

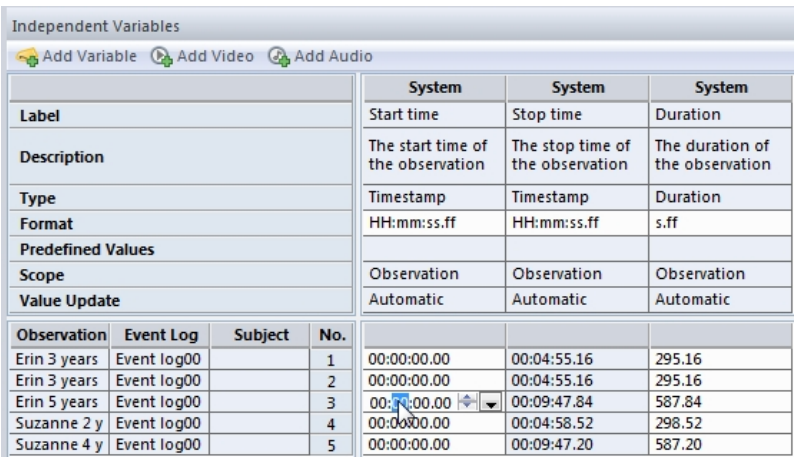
   - In the Project Explorer, open the **Setup** folder and click **Independent Variables**.

   **Result** – The **Independent Variable List** window appears.

2. Click **Show Independent Variables** and in the **Show Independent Variables** window make sure that **Start Time**, **Stop Time** and **Duration** are selected, then click **OK**.

3. Locate the observation in the list and the cells corresponding to **Start Time** and **Duration**.

4. To change the observation's start date and time, edit the content of the **Start Time** cell.




| | 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:[illegible]: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 |

To change the observation's duration, edit the content of the Duration cell accordingly (Stop time= Start time+Duration). The observation stop time is changed automatically, according to the changes in the observation start time and duration. Events that are recorded before the start time or after the stop time of the observation are shown in grey in the Event Log.

The **Stop Time** cell cannot be edited.

5. Press **Enter** to confirm.
   - If you change the Start/Stop time of an observation, the single files within that observation are not 'moved' together with the Observation. Therefore, if you set the observation start time later than the start time of an event log, you might exclude event logs (or part of) from the Observation itself.

     For example, if your observation is one-hour long and you change the Start date to the day after (from May 24 to May 25), the event log still starts on May 24. The Observation is now starting on May 25 and lasts one hour, but no data are included in that interval.
   - When part of your event log data are excluded because they fall outside the Observation duration, they are shown in grey. For example, this is an event log scored from 00:00:00, after the Observation Start time was changed to 00:02:00. The events scored before this time are grayed out:

| | | |
|---|---|---|
| 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 |

   - If you want the event logs and other data streams to start at the new Observation start time, adjust the offset of each file (Event Log, Video, Audio, External Data; see **Enter directly the Offset time** in the next section).

## CHANGE THE SYNCHRONIZATION POINT BETWEEN EVENT LOGS, VIDEO, AUDIO AND EXTERNAL DATA SETS

This section describes how you can change the Start time of a data set (Event Log, Video, Audio, External Data) relative to others.

You can change synchronization between data sets at any time, before or after scoring data.

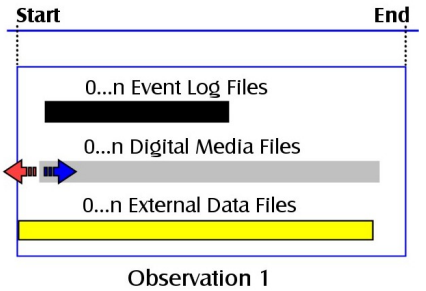



***Figure 4.8*** *Changing the synchronization point of one file relative to another within an observation.*

**Example 1** – Before starting scoring data, synchronize two video files in such a way that one video starts when the other is positioned at 30 seconds.

**Example 2** – After scoring data, change the offset time between two event logs.

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

   **How?**

   - For video files. open **View Settings** on the tool bar and click **Video files**. Make sure that the correct video file is selected.
   - For audio files, open **View** Settings and click **External Data and Audio** and subsequently **Show Audio**. Make sure that the correct audio files are selected.
   - For external data, open **View Settings** and click **External Data and Audio** and subsequently **Show External Data**. Make sure that the correct external data files are checked.

2. You can change the synchronization point in two ways: (1) Numerical offset, or (2) Manual offset. See below for details.

   You can change the synchronization point between external data and other data (video, audio and event logs) only after you have imported external data in the current observation (see Chapter 5). Once you have imported them, follow one of the two procedures below.

---

If you use the Media Recorder to record video, the video files are automatically synchronized with your observation.

---

### *Numerical Offset*

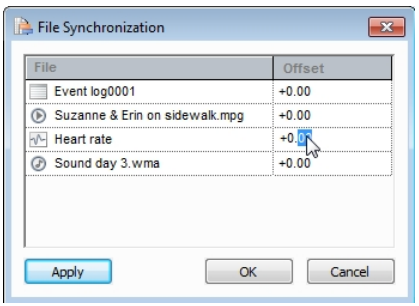
1. Click the **Offset** button on the Component tool bar, then choose **Numerical Offset**.

   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 synchronization point relative to others, and click the **Offset** cell.

3. Enter the offset value.




   **Example** – If you want to have the start of the event log synchronized with the position of the video file at 20 seconds, then locate the row of the video file and enter -20 in the seconds group of the **Offset** column.

4. Click **Apply**.

### *Manual Offset (only for video/audio files or external data)*

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

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

2. Click the video image (for modifying the synchronization of a video relative to the rest of the observation), the audio graph (for modifying the synchronization of an audio file relative to the rest of the observation) or the external data graph (for modifying the synchronization of external data relative to the rest of the observation).

   **Result** – The video/audio/external data window is highlighted in red.

3. Use the Playback Control buttons to play the video or audio to the new position, or drag the cursor in the external data window to the new position. The aim is to position the video/audio/external data to the point that you want to correspond to the start of the event log.
4. Click the **Offset** button again.

   **Result** – The highlighting edges disappear. The files are now synchronized as you have specified.

You can use the **File Synchronization** window to check that the time difference between video, audio, event log and other data streams is the one you require. You can change this difference at any time (see **Numerical offset** above).

## SCORE ACTION-REACTION DATA (TRIGGERING BEHAVIOR)

If you want 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, make sure that you define a group of modifiers (see page 78) containing all subjects reacting (like Subject 2 in the example) and another group of modifiers containing all response behaviors (like Behavior B). Next, score the data in sequence (Subject - Behavior - Modifier of first group - Modifier of second group).

## SCORING RECIPROCAL BEHAVIOR

To score reciprocal behavior (that is, behavior that has no specific direction, for example Mark Plays with James), you must score two event lines (Mark Plays with James, and James Plays with Mark). If necessary, pause the video/audio or edit the time in the event log (see page 169) afterwards to ensure the events receive the same time value.

## SCORE DATA AFTER IMPORTING EXTERNAL DATA

1. Create a new observation (see page 99).
2. Import the external data (see Chapter 5).
3. If necessary, change the synchronization of the external data files relative to the (still empty) Event Log file by adjusting the Offset (see page 129).
4. Start the observation and score data (see page 101).

## MODIFY THE NAME AND DESCRIPTION OF AN OBSERVATION OR EVENT LOG

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, then click the arrow sign next to the observation containing the event log, and open the Event Files folder. Right-click the event log and select **Properties**.

2. Edit the name of the Observation or Event Log (max 64 characters) and Description (max 255 characters), then click **OK**.

## IMPORT DATA INTO AN OBSERVATION

### *Import event data*

You can import event data in form of:

- Observational data files from The Observer 4/5 projects, Pocket Observer 3 and Observer XT projects.
- External observational data files – That is, any data files in which events are organized in rows.

  For the detailed procedure, see page 424. For transferring files between The Observer XT and Pocket Observer 3, see the Pocket Observer Reference Manual.

### *Import external (physiological) data*

For the detailed procedure see Chapter 5.

### *Import video files*

Make sure that your observation is open, and from the **Observe** menu, select **Video** and then **Open in Current Observation** or click the **Import video** button in the Component tool bar. Browse to the folder where you stored your video files, select the appropriate file and click **Open**.

### *Import audio files*

Make sure that your observation is open, and from the **Observe** menu, select **Audio** and then **Open in Current Observation** or click the **Import audio** button in the Component tool bar.

Browse to the folder where you stored your audio files, select the appropriate file and click **Open**.

If your observation already contains media files, or you want to import multiple media files, or you want to show the audio from video in form of waveforms, see page 158.

## EXPORT OBSERVATIONAL DATA

You can export observations to The Observer XT files (XML format), to Microsoft Excel format (*.xlsx format) or to text files.

From the **File** menu, select **Export** and **Observational Data**, then choose the observations to export. If you want to export one observation, open the observation and click the **Export current observation** button on the tool bar. For more information, see page 411.

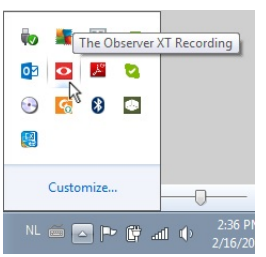
## DETECT THAT AN OBSERVATION IS BEING RECORDED

When an observation is being recorded, you can detect this by looking at the Playback Control window: The Stop Observation button is available.

You can also check that the observation is being recorded in the following way:

Locate The Observer XT icon in the system tray (next to the clock):


If the icon is green, The Observer is not recording an observation. If you hover the mouse over this icon, a small text "The Observer XT" is shown.




If the icon is red, The Observer is recording an observation. If you hover the mouse pointer over this icon, a small text "The Observer XT Recording" is shown.

# 4.4 The windows on your observation screen

You can change the look-and-feel of your observation screen according to your needs:

- Choosing the windows you want to view (below).
- Positioning the windows on the screen (see page 134).
- Customizing the properties of each window (see the information at the end of the section about each specific window).
- Showing or hiding playback control buttons (see page 145)

## CHOOSING THE WINDOWS TO VIEW

**View Settings** (located in the upper-right corner of your tool bar) lists the elements you can visualize during the observation. You can undock this window by clicking the dots under the header **View Settings**. Subsequently you can drag the window to a new location.

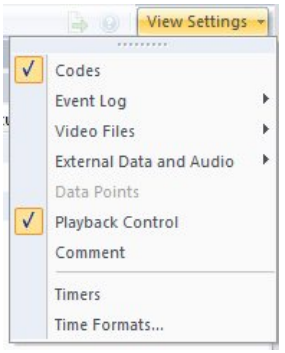



***Figure 4.9 View Settings** in the Observation window.*

Select the objects you want to view during the observation.

- **Codes** – Keep this selected if you want to view the **Codes** window, which you can use to score data with mouse clicks.
- **Event Log** – Click this if you want to choose to view Subjects, Behaviors, Modifiers or Comments in your Event Log.
- **Video files** – (only if video files have been selected in the project) Select the video files you want to view.

- **External Data and Audio** – Select this if you want to view the External Data window or the audio files. Click **Show External Data** to select the external data files to be displayed. Click **Show Audio** to select the audio files (or audio from video) to be displayed.

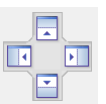
  External data (for example physiological data) is imported after the observation is completed. During data recording, the external data are not shown in The Observer screen.

- **Data points** - Select this option if you want the data points to be displayed in your external data or audio window.
- **Playback Control** – Select this if you want to view the **Playback Control** window (see page 141).
- **Comment** – Select this if you want to view the **Comment** window (see page 118).
- **Timers** – Select this if you want to see the **Timers** window with the absolute and relative time while scoring.
- **Time formats** – Select this if you want to change the format of your time stamps in the Event log.

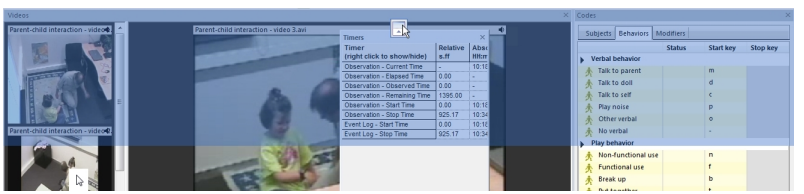
## POSITIONING AND RESIZING THE WINDOWS ON THE SCREEN

By default, all the windows displayed in the observation screen are docked. You can change their position and resize them according to your needs.

- To re-position a window, click its title bar and drag it to the new position. To undock a window, click its title bar and drag anywhere until you see its margins no longer constrained by other windows. Docking icons appear, to show you where you can position the undocked window.

  If you hover with your window over one of the docking icons, the new position of the window is shown in blue.

  If you release the window, the window is positioned at the chosen location.

- To resize a window, hover the mouse on one of its margins until the cursor changes to the symbol as outlined here. Next, drag the margin to adjust window size.

## TIMERS WINDOW

The Timers window (see Figure 4.10) can display both the Relative and Absolute time. You can select to display one or two columns by right-clicking the Timers window and selecting/de-selecting a column.

The Timers window contains the following counters:

- **Observation - Current Time** – The current, absolute time during an observation. This time is also displayed during playback.

  When you stop the observation, the **Observation - Current Time** timer shows the same time as 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 (see page 149), 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 page 53), this is the amount of 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 time 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.

Timers

| Timer (right click to show/hide) | Relative s.ff | Absolute HH:mm:ss.ff |
|---|---|---|
| Observation - Current Time | - | 00:04:55.16 |
| Observation - Elapsed Time | 295.16 | - |
| Observation - Observed Time | 295.16 | - |
| Observation - Remaining Time | 52.89 | - |
| Observation - Start Time | 0.00 | 00:00:00.00 |
| Observation - Stop Time | 295.16 | 00:04:55.16 |
| Event Log - Start Time | 0.00 | 00:00:00.00 |
| Event Log - Stop Time | 295.16 | 00:04:55.16 |

***Figure 4.10*** *The* ***Timers*** *window.*

- **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 in 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 in the Timers window and select **Interval - Remaining time**.

***How to customize the Timers window***

- The time format of the Relative and Absolute time can be set in the **Time formats** tab of the Project Settings (see page 60).
- To hide one of the timers, right-click in the middle of the Timers window and de-select the appropriate timer from the list. To restore a timer, right-click and select the timer from the list.

## CODES WINDOW

The **Codes** window displays the elements of the coding scheme and of their properties. To score data, click a code or press the corresponding keys. The **Codes** window contains three tabs:

- **Subjects** – Lists the Subjects defined at that time, 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 defined at that time, and their start and stop code under **Start** and **Stop**. Behaviors in a mutually exclusive and exhaustive 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 defined at that time, and their code under **Start**. If state behaviors are active for a certain subject, these are shown under **Status**, separated by a comma.

  If you add a new element to the coding scheme during an observation (see page 114), the new element is shown in the last row of the corresponding tab.

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... | = |

***How to customize the Codes window***

To change the width of a column, point to the boundary on the right side of the column and drag it accordingly.

## EVENT LOG WINDOW

Erin 3 years old - Event log0001

| Time | Behavior | Modifier | Comment |
|---|---|---|---|
| 31.16 | Gaze elsewhere | | |
| 35.60 | Gaze object | | |
| 37.88 | Talk | Other child | O, me too |
| 45.24 | Talk | Other child | I have got new shoes, new ones |
| 54.48 | Talk | Other child | why? |
| 59.32 | Talk | Self | I... |
| 63.32 | Talk | Self | chalking |
| 65.48 | Play | Type of play undetermined<br>Parallel | |
| 66.12 | Talk | Other child | chalking |
| 76.32 | Play | Manipulative<br>Parallel | |
| 80.36 | Talk | Other child | I will not chalk on top of yours |
| 87.72 | Talk | Other child | Purple |

***Figure 4.11*** *The Event Log window.*

The Event Log is the window in which you score and edit your data. When you score data, what you see in this window is essentially your data file.

The Event Log tool bar includes the following buttons:

**Undo** (**Ctrl+Z**) - Click this button to undo your latest entry.

**Redo** (**Ctrl+Y**) - Click this button to undo your latest correction to your Event log.

**Check Event Log** – Click this button when you want to check for errors in the data. For more information, see page 147.

**Insert event** – Click this button when you want to insert an event between two existing events. For more information, see page 121.

**Delete event** (**Ctrl+DEL**) – Click this button when you want to delete the selected event from the event log (not from the coding scheme). You can also delete an event from the event log by selecting the event line and pressing **Delete**.

**Delete element** (**DEL**) – Click this button when you want to delete the selected element from the event log (not from the coding scheme). You can also delete an element from the event log by clicking the cell and pressing **Delete**.

**Finish sample** – Click this button (or press **Ctrl+Enter**) when you want to finish scoring the current sample without scoring all subject-behavior combinations.

**Find** (**Ctrl+F**) - Click this button to find events (see page 151 for the detailed procedure).

**Import Video** – Click this button when you want 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** - Click this button when you want to import audio files in the current observation.

**Import data** - Click this button when you want to import observational data, external data, and other types of data in the current observation. For more information, see page 131.

**Settings** - Click this button when you want to open the **Project Settings** (see page 99).

**Independent Variables** (**Alt+F3**) - Click this button when you want to open the Independent Variables (see page 86).

**Offset** (**Ctrl+Shift+=**) – Click this button when you want to change the offset of one video/audio/external data file relative to other data sets in your observation. See page 127 for the detailed procedure.

**Visualize** (**Alt+F8**) - Click this button to visualize your current observation (see Chapter 7 for the detailed procedure).

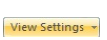
**Mouse pointer** – Click this button to select or deselect the zoom in or zoom out button.

**Zoom in** (**Ctrl+.**) – Click this button to zoom in the external data plot. This button is available when an observation is open that contains external data (see page 114).

**Zoom out** (**Ctrl+,**) – Click this button to zoom out the external data plot. This button is available when an observation is open that contains external data (see page 114).

**Export current observation** – Click this button to export the observation to another project in The Observer XT, Microsoft Excel, or a text file.

**Quick help** – Click this button for more information on carrying out an observation.




**View settings** – Click this button to choose which windows to display.

*How to customize the Event Log window*

- **Choosing the time format** – You can change the format of the time in the **Event Time** column.

  **a** Right-click one of the rows of the event log and select **Project Settings**, or select **Time Formats** in **View Settings**.

  **b** In the **Time formats** tab of the **Project Settings** window, from the **Project time format** list, select **Absolute** (absolute clock time) or **Relative** (elapsed time). If you choose **Absolute** and want to include the date in your time stamps, select the check box **Show date with absolute times**.

  Alternatively, select **Show frame numbers while observing from videos** to display frames in the event log window.

  **c** Next, click the corresponding **Edit** button to specify the time format.

If you do not use video files for the current observation and select **Show frame numbers while observing from videos**, **Event Time** shows the time mode selected in the **Project time format** list.

For more information on time formats, see page 60.

If you hover over the **Time** column with your mouse, a tool tip shows the time format.


- Hiding columns that are not of interest

  By default all elements defined in the coding scheme appear in the event log. Also a **Comment** column is visible. To hide a column

  **a** Right-click one of the column headers of the event log.

  **b** De-select the category you want to hide.

To show columns that were previously removed, right-click and select the corresponding element.

You cannot score an element that is hidden in the Event log 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.

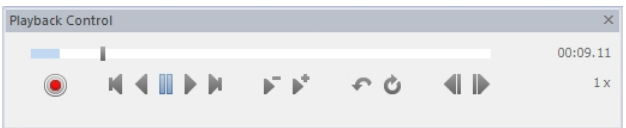
- Changing column width

  To change column width, point to the boundary on the right side of the column header until the cursor changes to a double arrow, and drag it until the column is the width you want.

## 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.




### *Playback control buttons*

**Start Observation** (**Ctrl+Alt+B**) – Starts the observation in the current event log. Corresponds to the menu item **Observe**, **Start Observation**.

**Stop Observation** (**Ctrl+Alt+Q**) – Stops the current observation. It corresponds to the menu item **Observe**, **Stop Observation**.

**Pause/Still** (**Ctrl+0** or **spacebar**) – Pauses the video/audio.
When you pause the video, the video stops at the current frame and the event log and other modalities are aligned with the video.
Pressing **spacebar** toggles between **Pause** and **Play forward** at speed 1.

**Play forward** at speed 1 (**Ctrl+4** or **spacebar**) – Plays the video at the normal play speed.
Pressing **spacebar** toggles between **Pause** and **Play forward** at speed 1.

Increases the forward or backward playback speed with one step.

The speed ranges from 1/25 or 1/30 depending on your video standard to +16 if the video plays forward, or 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.

Not all playback speeds might be available. Depending on the video format, you may not be able to play video at a specific speed. If you open multiple video files and one of them can be played at fewer speeds than others, only those speeds are available for all videos.

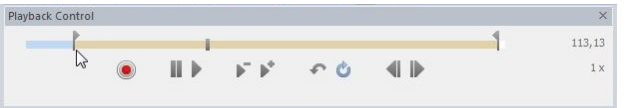
Decreases the forward or backward playback speed with one step. See also the notes in the row above about increasing the playback speed with one step.

**Quick review** (**Ctrl+Backspace**) – Click this button when you want 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 event lines. You can also press the button multiple times to let the video jump back more.
You can specify the review length and speed (see page 64). This button can be hidden (see page 145).
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** (see page 64).

**Loop** (**Ctrl+L**) or (**Ctrl+Shift+Home**) – Click this button when you want 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 (see page 65).

- **User defined** – Play back the entire observation, or a segment a number of times. Upon clicking this button, two flags appear, one at the start and one at the end of the slider. Move these flags if you want to select a segment of your observation.




  Alternatively, you can position the video and click **Ctrl+J** to set the start of the loop and **Ctrl+K** to set the end of the loop. You can also right-click an event in the event log and select **Start loop here**, or **Stop loop here**. To reset the start and end of the loop to the start and end of the slider, click **Ctrl+H,** or right-click an event and select **Reset loop**.
  Click the **Loop** button again to stop the loop. The **Loop** button can be hidden (see page 145).

- **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 (see page 65). 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 (see page 65). 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. You can use the shortcut key **Ctrl + K (**next interval) and **Ctrl + J (**previous interval) to jump to another interval.

**Step forward** (**Ctrl+Right-arrow key**) – Moves the video one frame forward with each click of the button. Moves audio files 1 second forwards. When you click this button during video playback, the video is paused and moves one frame forward. This button can be hidden (see page 145).

**Step backward** (**Ctrl+Left-arrow key**) – Moves the video one frame back with each click of the button. Moves audio files 1 second backwards. When you click this button during video playback, the video is paused and moves one frame backward. This button can be hidden (see page 145).

2.88

**Time** – Shows the time elapsed from the start time of the observation (the latter is shown in the **Timers** window as **Observation - Start Time**).
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 time decimals.

4 x

The playback speed.

### *Optional playback control buttons*

The following buttons are hidden by default. To show them on the **Playback control** window, open the **Setup** menu and select **Project Settings**. Click **Playback Control options** in the left pane. Alternatively press **Ctrl+M** to open this window. Select the checkbox in front of the button you want to visualize.

**Play backward** at speed 1 (**Ctrl+Shift+4** or **Shift+spacebar**) – Plays the video/ audio/event log backward at the normal play speed.
Pressing **Shift+spacebar** toggles between **Pause** and **Play backward** at speed 1.

**Jump to begin** (**Ctrl+Up-arrow key**) – Advances the video/audio/event log to the beginning.
If an offset exists between video/audio/data streams, clicking the **Jump to begin** button results in positioning to the start of the earliest. For example, if the event log starts one minute after the first video frame (that is, the offset between event log and video is +60 s), clicking **Jump to begin** results in positioning at the start of the earliest stream, that is the video.

**Jump to end** (**Ctrl+Down-arrow key**) – Advances the video/audio/event log to the end.
If an offset exists between video/audio/data streams, clicking the **Jump to end** button results in positioning to the end of the latest stream.

**Volume control** – Move the slider to increases or decreases 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.

### *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** (**Ctrl+Alt+X**) – Suspends the current observation. It corresponds to the menu item **Observe**, **Suspend Observation**. This button turns blue upon clicking.

**Resume Observation** (**Ctrl+Alt+V**) – Resume the observation. It corresponds to the menu item **Observe**, **Resume 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** (**Ctrl+Shift+Up-arrow key**) – 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.

***How to customize the Playback Control window***

- To show and hide buttons, see below.
- To move and resize this window, see page 134.
- To customize the time interval represented by the slider, see page 64.

***Showing and hiding playback control buttons***

Three playback control buttons are hidden by default: (see **Optional playback control buttons** on page 144). Four other buttons can be hidden, which are:

- The volume control.
- The **Play backward** button.
- The **Jump to begin** button.
- The **Jump to end** button.

To show or hide buttons, open the **Setup** menu and select **Project Settings**. Click **Playback Control options** in the left pane. Alternatively press **Ctrl+M** to open this window. Select the checkbox in front of the button you want to visualize.

## VIDEOS WINDOW

The **Videos** window only applies if you score data live with a video camera, or offline from video files. If you score data from more than one video file or video device, additional **Video** windows appear on your screen.

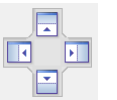
- **Video Properties** – To display the properties of the video currently selected, right-click the video image and select **Properties**. You can view the file location, video image size and duration. Under **Video codec** and **Audio codec**, the file formats The Observer XT reads from the video file are given. In addition, under **Filter details**, the filters and codecs that The Observer XT uses to play back the video file are listed. If the video file was created

with the Media Recorder, the **Video Properties** contain a field **Recording details**. This field contains the start time of the recording with the Media Recorder and the offset between the video file and the observation. This offset is applied automatically.

- **Time** – It is possible that the time displayed in the Video window is not exactly the same as the time in the **Event Log**, **Playback Control** and **Timers** window. The difference may vary from 0 to 0.04 s. This happens because each data stream, be it video or event data, has its own time running. If you want to make sure that an event gets exactly the same time stamp as the video time, click the arrows next to the time in the Video window, until the time equals that shown in the **Current** line of the Event Log.

***How to customize the Video window***

- **Resizing the window** - Drag the window's borders until you are satisfied with the video size. The aspect ratio of the original image is maintained.
- **Docking/undocking a window** - To undock a window, click its title bar and drag anywhere until you see its margins no longer constrained by other windows. Docking icons appear, to show you where you can position the undocked window.



  If you hover with your window over one of the docking icons, the new position of the window is shown in blue. If you release the window, the window is positioned at the chosen location (see also page 134).

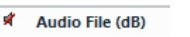
- **Docking/undocking multiple videos** - If you have multiple videos, to undock a window, right-click the image in the window and select **Undock**. The Video is displayed at 100% size. If you have two monitors, move this window to the second monitor for better view. To dock a window back, right-click and select **Dock**, or click this window and press **Alt+F4** or click the **Close** button.

  If you just have one video, you cannot select **Undock**. You can undock the window by double-clicking it’s title bar. If you have two monitors, you can drag the whole video window to the second monitor for better view.

- **Turning the audio on/off** - Click the speaker symbol on the top right corner of the Video window for a specific video file.

  Alternatively, right-click the video window and select **Mute**. If your observation includes two or more video files, keep the audio on only for the video file you want to hear.

  If your observation has audio files, you can mute their sound by clicking the speaker symbol in the External Data and Audio window.



- **For multiple video: switching between video files** - If your observation is associated with two or more video files, one video file is positioned on the right half of the window, and the remaining on the left half.


***Figure 4.12*** *Multiple video files displayed in the Video window.*

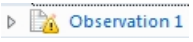
Click one of the video files on the left to have it displayed on the right half, or right-click and select Swap. Drag the margins of the separation bar between the videos to adjust the picture size.

# 4.5 Additional functions

### CHECKING THE EVENT LOG FOR ERRORS AND CORRECTING ERRORS AUTOMATICALLY

This function allows you to check an event log for errors and to fix the errors automatically. Errors may occur when for example you stop a behavior that was not active at that time. You can also use the event log checker to see what states are currently active.

An event log error is also indicated by a warning sign next to the observation in the Project Explorer.




To check an event log, click the **Check Event Log** button in the Event Log window.

If the event log contains errors, a window will open with a description of the errors. You can let The Observer XT fix the errors by clicking the Fix Errors Automatically button. The Observer can fix the following types of errors:

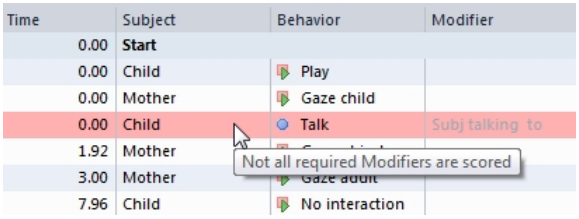
- **Missing stop codes** – These will be added.
- **Stop codes without corresponding start code** – These will be deleted.
- **Gaps between mutually exclusive, exhaustive behaviors** – These will be corrected. If no initial state event has been scored, this will be added. If there is a gap further on in the event log, it will be corrected by extending the behavior that was active before the gap.
- **Overlaps between mutually exclusive behaviors** – These will be corrected. The stop code of the overlapping behavior will be moved to the start of the behavior it overlaps with.

  These errors may occur in event logs made in The Observer 6, 7 or 8.
- **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.

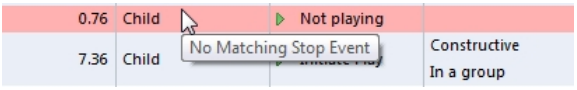
If you do not choose to fix the errors automatically, The Observer will indicate how many errors have been found. The event rows with errors are highlighted in red. Point the mouse to those rows to know more about the error they contain. See page 120 for information on correcting coding errors manually.

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.

Another possible error is that a behavior was not scored with all the required modifiers (see the picture below).




To check what state events are currently active during an observation, in the **Codes** window click the **Behaviors** tab and look in the **Status** column which behavior is active. Alternatively, in the event log point the mouse on the red rows. States that are active are indicated by 'No matching stop event'.



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 page 68).

## SUSPENDING AN OBSERVATION

You can only suspend a live observation. You can do this at any time, for example when a subject is out of view. When you suspend an observation, the currently active states for all subjects are stopped. The Observer is put in standby awaiting that you resume the observation.

1. To suspend an observation, do one of the following:
   - From the **Observe** menu, select **Suspend Observation**.
   - Click the **Suspend Observation** button in the **Playback Control** window or press **Ctrl+Alt+X**.

   **Result** –
   - In the **Timers** window, the **Observation - Observed Time** timer stops and the **Observation - Elapsed Time** timer continues. In the **Playback Control** window, the status is **Suspended** (below the Stop button).
   - In the Event Log, two lines are added: **Suspend** (marked by the time when the observation was suspended) and **Resume** (with time 'not defined 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 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. These are the

states that The Observer XT assumes to be active when you resume the observation. You can change them immediately before or after resuming the observation (see below).

| 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 20.65. 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. These start codes cannot be changed into stop codes, since this would lead to errors in the Event Log. If the behaviors are not active immediately after suspension, after resume the observation, immediately score the correct behavior.

2. When your subject comes back into view or when you are ready to resume, update the behaviors in the lines below the Suspend 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, the state *Play* was changed to *Groom* (compare with the previous picture).

| | | |
|---|---|---|
| 20.65 | Play | Dylan |
| 20.65 | Other | |
| 20.65 | **Suspend** | |
| 158.03 | | |
| 158.03 | **Resume** | |
| 158.03 | Groom | Dylan |
| 158.03 | Other | |

3. When you are ready, to resume the observation from the **Observe** menu, select **Resume Observation**, or click the **Resume Observation** button. 

4. Continue scoring data as usual.

   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.

## FINDING EVENTS

Use the **Find** function to:

- Find a specific event type (for example, *Twin 1 - Imitates - Twin 2*).
- Find multiple event types which share the initial part of the name of the subject/ behavior (for example: *Twin 1 - Play* and *Twin 2 - Play*.
- Find multiple event types which share modifiers (for example *Play - Duet* and *Play - Alone*).
- Find free text entered in the Event log's **Comment** column (for example,"I want to play").

You can specify to search one or multiple observations simultaneously. The Observer creates a list of events that correspond to your search criteria. You can then:

- Position video, audio, event log and external data at the time corresponding to one of the events found.
- Copy the list of evens found.

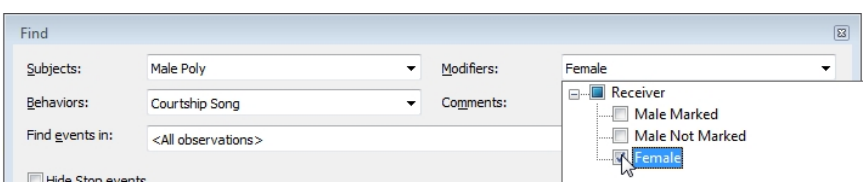
You can only search for events in the event log, not in the event plots.

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 Chapter 6).

***Procedure***

1. Click one of the observations in the Explorer, or from the **Observe** menu, select **Observation**, then **Open** and select one of the observations.
2. Click the **Find** button on the tool bar, select **Find** from the **Edit** menu, or press **Ctrl+F**. The **Find** window appears.

3. Choose the option that applies:
   - To search for a specific event type, select the subject, the behavior and the modifier (when applicable) from the corresponding lists **Subjects**, **Behaviors** and **Modifiers**.

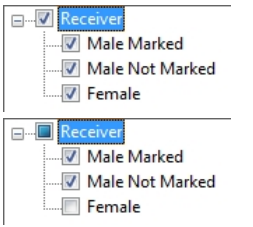


To select an element of the coding scheme, click the down-pointing arrow in the corresponding list and select that element.

To search for an event type independent of the subject, leave **<Any subject>** selected in the **Subjects** list.

To search for an event type independent of the behavior, leave **<Any behavior>** selected in the **Behaviors** list.

To search for an event type independent of the modifier entered for one group, select the name of the modifiers group. All modifiers in this group are automatically selected.

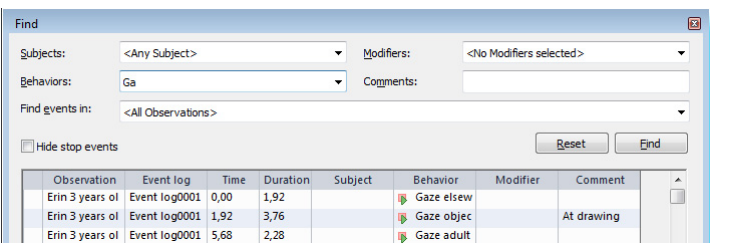



To search for an event type that contains one modifier OR another of the same group, and exclude others, select the modifiers that you require.

If you select a group of numerical modifiers, you can choose to search for a specific value or a range of values. See page 154 for more information.

- You can also search for multiple subjects and behaviors, provided that these share the initial part of the name. For example, to find all events with subject *Twin 1* or *Twin 2* ("Twin" is shared), or to find all events with behavior *Sitting* or *Standing* ("S" is shared).

  In the **Subjects** or **Behaviors** list, type in the initial part of the name that is shared by the subjects/behaviors (for example, *Tw*). If the text is completed automatically, delete the part that is not shared.




If the first character of the subject/behavior name is not shared, you cannot find events with this option. Rather, do the search for the different subjects/behavior separately.

- 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 any of specific words, type in those words without quotes. (for example, puppet ball cards).

4. From the **Find events in** list, select the observations you want to search.
5. To start searching, click **Find**.

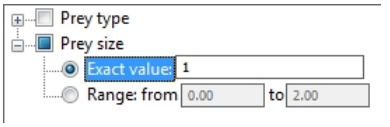
   The window lists the events found with their time and duration. The number of events found is displayed at the bottom of the window. If no events are found, the message is shown **<No events found>**.
6. To position the video, audio, event log and other data at the time corresponding to an event, click the **Open event** button at the bottom of the list, double-click the event in the list, or right-click it and select **Open event**.
   If the event is stored in an event log other than that currently open, the new event log opens and the current one closes.

***Notes***

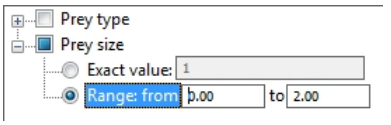
- You can either select one subject (or behavior) from the corresponding list, or all subjects/behaviors by selecting **<Any subject>** or **<Any behavior>**. You cannot select some subject/behaviors, not others.
- If you select modifiers in two or multiple groups, the program searches for the events 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.
- If you select a subject, a behavior and/or a modifier, the program searches for the events which contain all these criteria. For example, if you select the **Subject** *Child*, the **Behavior** *Play* and the **Modifier** *Play alone*, only the events containing *Child*, *Play* and *Play alone* are found.
- Once you select modifiers to search for, the **Modifiers** list shows the name of the modifiers group if all modifiers in this group are selected, otherwise it shows the selected modifiers.
- If your observation contains multiple event logs, search is done in all event logs. You cannot directly search specific event logs within the same observation. However, you can view which event log an event corresponds to by sorting the Find results according to Event Log (see below).
- You can hide columns that are not of interest. Right-click one of the column headers and de-select the column you want to hide. To show columns that were previously removed, right-click a header, click **Show column** and select the corresponding element.
- 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 the **Hide stop events** checkbox.

- **Using wildcards** –
  - Type one or more characters in one of the coding scheme lists. The name of the coding scheme element which starts with those characters appears in the list. If two or more element names start with the same characters, the name of the element created first in the coding scheme appears.
  - Search for coding scheme elements is case sensitive. For example if you type in "T", The Observer finds all events beginning with T.
  - Typing a character in the **Comments** field results in finding all events containing that character. Search for free text in Comments is not case-sensitive. If you type in "watch", you may get results like "Watch out!" and "watch out".
  - Characters like * and ? cannot be used as wildcards, The Observer will search for those literal characters.
- To reset the search criteria, click **Reset**.
- If **Find** is in progress and you want to stop it, click the **Stop** button.
- To close the **Find** window, click the **Close** button at the lower-right corner of the window, or right-click the window title bar and select **Close**.
- When you reopen the **Find** window, the search criteria last used are selected automatically, until you open another project or restart the program.
- **Searching for numerical modifiers -**

  From the **Modifiers** list of the **Find** window, select the group of numerical modifier you want to search.
  - If you want to search for events with a specific value of the modifier, select **Exact value** and enter that value.




  - If you want to search for events with multiple values, select **Range** and enter the **from**... **to**... limits of the range in which the values lie.



### *Sorting the Find results*

To sort the results, click the header of the column click the header that you want to use as a sorting criterion (for example, **Behavior**). If you click once, the events are sorted in descending order. Click again to sort in ascending order.

### *Exporting the Find results*

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With the Find function you can very quickly obtain a text file of the selected data. Select the events you are interested in and copy them into another program.

---

To export all the events from the **Find** window, click the **Export all events** button in the bottom-right corner of the **Find** window.

To export a selection of events, make your selection. Use the **Shift** key to select a range of events and the **Ctrl** key to select multiple single events. View the number of selected events in the lower-left corner of the window. Click the **Export selected events** button in the bottom-right corner of the **Find** window. You can export the events to Excel and as a text file.

To copy the events and paste them into another program:

1. Right-click one of the events in the list, and select **Copy All**.
2. In the other program, click **Ctrl+V** or from the **Edit** menu, select **Paste**.

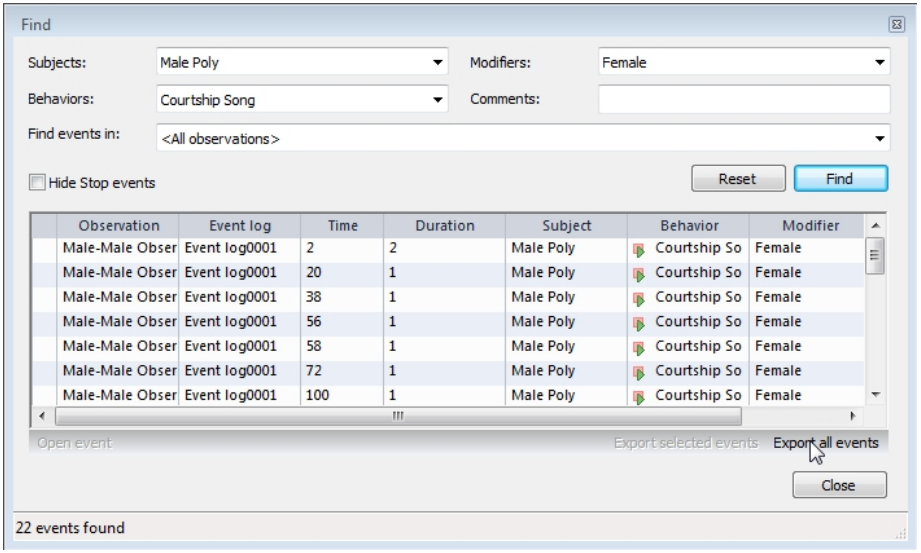



***Figure 4.13*** *Exporting events.*

# 4.6 Carrying out observations with external data

***What is external data?***

In The Observer XT, external data is any numerical data set acquired with a separate Data AcQuisition (DAQ) system and stored in form of an ASCII file. Examples of external data include physiological data like EEG, ECG, blood pressure, etc. or environmental data (temperature, humidity, etc.), or quantities like speed.

***How do I work with external data?***

1. Connect your DAQ system to its dedicated computer (that is, the computer that records such data) and the Observer computer, and select **DAQ co-acquisition** in **Project Setup** (see below). Next, you start an observation and code the behaviors as usual, while the DAQ system records the external data.

   The external data are saved in the computer dedicated to the DAQ device, not in the Observer PC. However, you must connect The Observer PC to the DAQ device in order for The Observer to send its synchronization signal (see below).

2. In The Observer XT, import the external data file(s) and associate each of them with an observation (see page 173).

   Therefore, The Observer PC only records the manually coded data (events). During the observations, you do not see the external data on your Observer screen.

   External data are always stored in form of ASCII files in the computer dedicated to the DAQ device. These data files must be imported in The Observer in order to be displayed.

***Specifying external data acquisition in The Observer XT***

1. Open the **Project Setup** and select **Live Observation** under **Observation source** (see page 48).

2. Select **Live scoring**. Select **DAQ settings** (or any other name indicating the external data acquisition device) and double-click the text under **Status**, or click the **Edit Settings** button.

   You can co-acquire external data only when you score data live.

   If you score data from previously-recorded video files, you can still import external data that were recorded while you recorded video, but you must make sure that video and external data can be synchronized in some way.

3. In the **DAQ Hardware Settings** window under **Predefined Settings**, select the item corresponding to your Data Acquisition device, or create a new one (see page 187).
4. Click **OK**.

   Start the observation as usual. The Observer asks you to start data acquisition on your DAQ device. Make sure that your DAQ device is connected to your PC and recording data, then click **OK**.

   ---

   **!** If you click **Cancel** the observation starts anyway, but the synchronization signal is not sent to the DAQ device!

   ---

5. The program sends a synchronization signal to the Data acquisition device.
6. After stopping the observation, import the external data (see page 173).

   For more information on how to work with physiological data in The Observer XT, see Chapter 5.

# 4.7 Carrying 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 to record additional data. For example, Media Recorder can be used to record high-quality video files.

***When do I need this information?***

You need this information if you want to make a program start or perform an action when you do something in The Observer (for example, start recording with Media Recorder when you start an observation).

***Automatic linking of digital video files***

When you carry out an observation you can simultaneously start making a video file with another program. This program, for example, the Media Recorder, can be started and stopped from within The Observer. After you have carried out the observation, the media file generated by Media Recorder can be automatically linked to the associated observation.

***Procedure***

The procedure to carry out observations with external programs is described in detail in The Observer XT Service Manual.

***Start and stop recording with Media Recorder***

If you defined the Media Recorder as external program to start and stop recording automatically when starting and stopping an observation, the video files are automatically synchronized with the observation.

# 4.8 Using multiple media files simultaneously

You can select up to two video or audio files for a specific observation (or four if you have the Multiple Media module). However, depending on the computer, it is possible that more than four video/audio files can be played back smoothly.

***Level of association of media files and data sets***

Media files are always associated with data files at the Observation level. All events scored in an observation are associated with those media files, no matter of how many event logs and subjects that observation includes. The scope of the Video and Audio variable in the Independent Variable List is always **Observation**.

***Note for users of previous versions of the Observer XT***

In the Observer XT 12.5 it is not possible to set the scope of media files at **Event Log** level, **Subject** level or to set the scope of different media files at different levels.

## SELECTING MEDIA FILES

***Selecting multiple media files***

1. Choose the option that applies:
   - If you still have to create the observation in which to import the media files – From the **Observe** menu, select **Observation**, then **New**. Name the observation and click **OK** in the **Observation Properties** window.
   - If you have created an observation and you want to add media files – Make sure the observation is open on your screen. Next, from the **Observe** menu, select **Video** /**Audio** depending on the media file, then **Open in Current Observation**. Alternatively, click the **Import video** or **Import audio** button on the tool bar.

2. Browse to the location where you stored the media files and select the files you want to open for that observation.
   - To select non-adjacent files, click one file and then hold down the **Ctrl** key and click each additional file.
   - To select adjacent files, click the first file in the sequence and then hold down the **Shift** key and click the last file.
3. Click **Open**.

---

Open the Independent Variable List and check that each media file is selected in one of the **Video/Audio** columns for that observation.

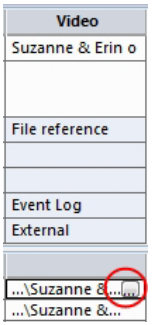
To replace or remove a media file from an observation, see the section **Replacing and removing a media file** below.

---

## REPLACING OR REMOVING A MEDIA FILE

### *Replacing a media file*

1. Open the Independent Variable List (see page 86). 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.




2. Select the new media file and click **Open**. When opening the observation, the new media file is displayed.

### *Removing a media file*

Removing a media file makes sense if no data have been collected for the observation associated with that media file.

Open the Independent Variable List. In the **Video** or **Audio** column, right-click the cell corresponding to the observation for which you want to delete the media file. Select **Delete** and click **OK** to remove the file from the observation.

The media file is not removed from other cells where it is selected. Note that the media file is never deleted from the hard disk.

## VISUALIZING AUDIO WAVEFORMS FROM A VIDEO FILE

1. Open the observation in which you want to display the audio waveforms.
2. Click the **Import video** button on the tool bar.

3. Select the video file you want to open. Select the **Visualize audio** option next to the **Open button**.
4. Click **Open**. A conversion dialog is shown for a few seconds.
5. The audio waveforms are displayed in the **External Data and Audio** window.

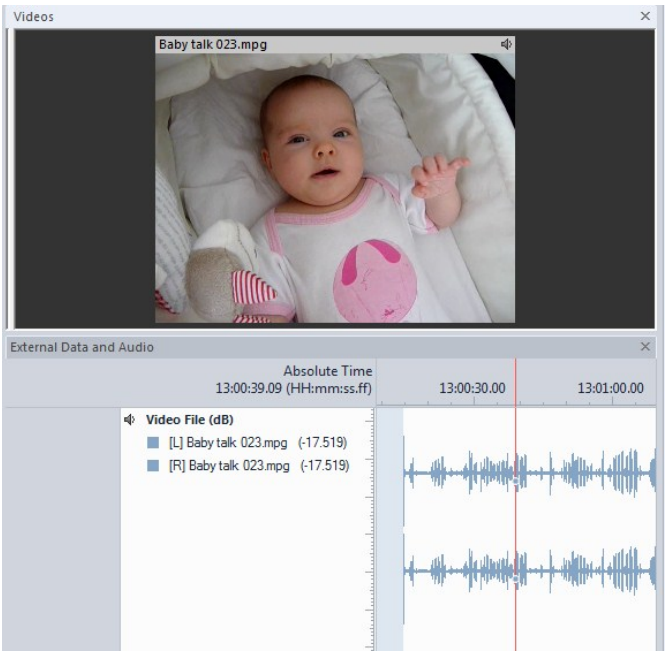



***Figure 4.14*** *An example of audio waveforms obtained from a video file. Note that the title of the plot is* **Video file**, *contrary to when importing real audio files.*

***Notes***

- If the video was already in the observation, open the Independent Variables List, click the button next to the cell containing the name of the video name (in the **Video** column), 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)**. Contrary to audio files, the audio waveforms from a video is not an independent variable. Only audio files imported into an observation are shown in the Independent Variables list.
- To show/hide audio waveforms from a video file:
  - If you have two or more video files in your observation, make sure that the corresponding video is visualized on the thumbnail panel on the left side of the **Video** window. From **View Settings** select **Video Files**, then **Show Video**. Select the video files whose audio you want to view, de-select the others and click **Apply**. Note that when you de-select a video file name, both video and audio waveforms are hidden.
  - If you have one video file in your observation, from **View Settings** select **Video Files**, and de-select **Show External Data and Audio Window**.
- To mute audio from video, click the speaker icon in the **External Data and Audio** window, or in the **Video** window.
- To remove the audio completely, remove the video file (see page 159).
- Synchronization between audio visualization and video images is within 2 frames (80 ms for PAL, 67 ms for NTSC).
- For each video file you can show up to two channels (**Left** and **Right**). If video contains more channels, only the first two are visualized.
- You can visualize audio for each video file allowed by your license. For example if you have a **Media Files** add-on license, you can visualize two videos and the two corresponding audio waveforms (plus two audio files).
- Whether audio can be visualized, depends on its format inside the video file. See the Observer XT Service Manual for a list of audio formats supported. Audio formats other than those supported may be visualized, depending on the audio decoders installed on your computer.

# 4.9 The Software Development Kit

The 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 SDK includes a debugging aid, an example tool plus C++ sample source code and supporting technical documentation.

To obtain the SDK, please contact support@noldus.nl. Please note that support on the SDK (see the description below), including help with making them, is strictly only available to customers with a service contract.

At the time of publication an SDK for the applications listed below is available.

It is possible that after publication of this manual more applications may become available. Please contact support@noldus.nl for more information about the SDK.

## EXTERNAL APPLICATIONS

The Observer XT contains a mechanism for executing other (external) applications during certain actions taken by the user in The Observer XT.

These user actions in The Observer XT are: New observation, Start observation, Stop observation, Close observation. When these user actions are carried out, you can execute a command with optional parameters. Furthermore, you can execute several external applications using a batch file or Visual Basic scripting.

The SDK contains documentation with background information, examples of how to execute one or more applications and a summary of batch file processing. The SDK also contains three pre-programmed command files.

## PLUG-IN VIEWER COM-OBJECT

With the SDK you can create a custom viewer and visualize the viewer in The Observer XT during an observation of visualization. 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 in The Observer, while simultaneously viewing a video recording of the patient and physiological data.

Using the plug-in mechanism requires the ‘Media Files’ add-on in The Observer XT.

The SDK contains documentation describing how to Plug-in viewer COM-object works and how to work with plug-ins in The Observer XT. The SDK also contains a Microsoft Visual Studio 2003 C++ sample COM-project for an audio-player plug-in, a MFC sample COM-project for a simple test viewer plug-in and two DLLs (audio player plug-in and a simple testviewer plug-in).

## 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. Most files created in The Observer XT are XML-based and are used to transfer data to and from The Observer XT. 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 exported 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, physiological 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.

## 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. The external events are imported simultaneously with your manually scored data in The Observer.

In The Observer, 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.

## EXTERNAL DATA PLUG-IN

This plug-in offers the possibility to obtain external data while you carry out a live Observation in The Observer. The external data are imported simultaneously with your manually scored data in The Observer.

In The Observer, 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.

# 4.10 Working with observations containing multiple event logs

***Note for users of previous versions of the Observer XT***

In the Observer XT 12.5 it is not possible to manually add an Event log in an existing observation. However, external event files can be imported as separate Event logs into one Observation. Hence, although you cannot create a second Event log within one Observation in the Observer XT 12.5, Observations can still contain more than one Event log.

If you want to separate data, create separate observations. You can then group the observations and carry out behavioral or numerical analysis.

## DEFINITIONS

***Observation***

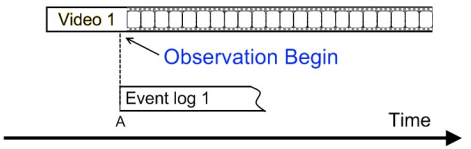
An observation is a container of data and video/audio files, rather than a file itself. An observation can contain one or more event log files. When you create a new observation, an empty event log Event log0001 is created automatically.

***Observation Start and Observation Stop***

You can view these two values in the **Timers** window (page 135).

- **Observation - Start Time** is the point marking the earliest time that you started observation, when you clicked the Start Observation button (Ctrl+Alt+B).
  - For a live observation, this is the clock time at which you started the observation.
  - For an observation from video/audio, this is usually 0:00:00.00 or another time in the video/audio.
  - The time also depends on the time settings (page 60).

  **Example** – Create an observation, open a video file, position video at five minutes. Then, start the observation. This time (A) is the Observation Start.



- You can view the Observation Start Time in the Independent Variable List. Click Independent Variables in the Project Explorer, then Show Independent Variables and select Start Time under System. The Start Time column shows the Observation Start Time of each observation.
- If you import an event log that has a start (relative to video/audio) earlier than that of the event logs currently in the observation, this time becomes the new Observation Start Time.

- **Observation - Stop Time** is the point in time that marks the latest stop of an observation, when you clicked the **Stop Observation** button (**Ctrl+Alt+Q**).

  Notes
  - You can view the Observation End time in the Independent Variable List. Click **Independent Variables** in the Project Explorer, then **Show Independent Variables** and select **Stop Time** under **System**. The **Stop Time** column shows the **Observation - Stop Time** of each observation.
  - If you import an event log that has a stop (relative to video/audio) later than that of the event logs currently in the observation, this time becomes the new Observation - Stop Time.

***Event log***

An Event log is a file containing data scored manually or imported in The Observer XT.

Each event log has a Start time and Stop time (see below). The duration of an event log is the difference between those times.

***Event Log Start Time and Event Log Stop Time***

You can view these two values in the **Observation Timers** window (page 135).

- **Event Log - Start Time** is the time that you started observing for that event log relative to Observation - Start Time.
- **Event Log - Stop Time** is the time that you stopped observing for that event log relative to Observation Start Time.

***Observation Duration***

Observation Duration is defined by the difference between Observation Stop Time and Observation Start Time.

Observation Duration is a System variable named Duration in the Independent Variables List, in Data Selection, and in Analysis results. Please do not confuse this with Analyzed Duration (see below).

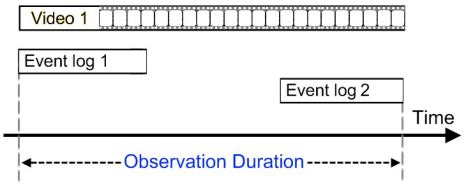
- Observation Duration can also include gaps in the time line with no data.

This can happen in the following cases:

**a** If you deleted parts of Event Logs.

**b** If you have imported a project from a previous version of The Observer which contained non-overlapping Event logs within Observations.

**c** If your data acquisition started later than you ended your manually scored Observation.




- Usually the Observation Duration is the time from the earliest start of an event log to the time of the latest stop of an event log. However, if you change the Offset between event logs some data may fall outside the Observation Duration:
  - If you change the Offset in such a way that the start time of an event log falls earlier than the Observation Start Time, the latter is not moved to an earlier time. The time between this event log's start time and Observation Start Time is excluded from analysis and showed in gray in the event log.
  - If you change the Offset in such a way that the stop time of an event log falls later than the Observation Stop Time, the latter is not moved to a later time. The time between Observation Stop Time and this event log's stop time is excluded from analysis and showed in gray in the event log.

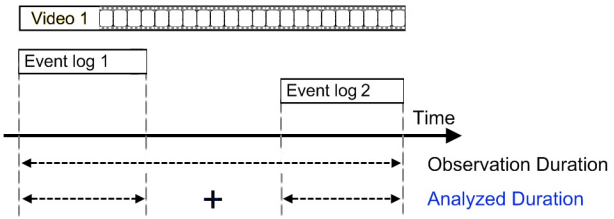
If you want to analyze the data that exceeds the Observation Start Time or Observation Stop Time, see page 168.

***Analyzed Duration***

Analyzed Duration is the sum of the duration of event logs within the Observation Duration, minus the time that the observation was suspended, minus the time filtered out by the active Data profile.

- If you analyze the event logs in an observation separately, Analyzed Duration does not include the gaps between event logs. For this reason, sometimes Analyzed Duration is

shorter than Observation Duration, even if your Data profile selects all data for analysis. Consider the example of the previous page:




Analyzed Duration is the sum of the durations of the two event logs, therefore shorter than the observation duration.

For information on analyzing event logs separately or as one data set, see page 330.

## MANAGING OBSERVATIONS WITH MULTIPLE EVENT LOGS

In The Observer XT 12.5 it is not possible to create a new Event log within the same manually scored Observation, for example when you change the subject observed. To keep those data separated, create a new Observation instead.

### *Importing event logs into an observation*

1. Export the event logs as ODX files (see page 411).
2. Copy the ODX files to the destination computer.
3. Open the observation, and click the **Import Data** button, then Import **Observational Data**.

4. Select The Observer XT Data File (*.odx) from the **Files of Type** list, then select the ODX file you require and click **Open**.

   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.

### *Checking that data are imported correctly*

1. Make sure that the observation you have imported data to is selected in the data profile, and that no intervals are defined.
2. Click the **Visualize** icon on the tool bar.

3. Check that the alignment of the different event logs is as expected, 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.

4. If the alignment is not correct, re-open the observation and click the **Offset** button  to adjust the time between event logs. For more information, see page 127.

   If some data are missing from the white area, you may need to expand the Observation duration (see the next section).

***Extending the Observation Duration to include data currently outside the observation***

If for any reason you have changed the offset between data files in your observation, some data may fall outside the observation boundaries (Observation Start Time and Observation Stop Time). You can check this in the event log. In the example below, an offset of -10 seconds has excluded the data in the first 10 seconds of the event log:

| Time | Subject | Behavior | Modifier |
|---|---|---|---|
| 0.00 | **Start** | | |
| 0.00 | Male Mono | Approach/Follow | Female |
| 0.00 | Male Poly | Nothing | |
| 2.78 | Male Mono | Courtship Song | Female |
| 5.15 | Male Poly | Intimidation | Male Not Marked |
| 5.62 | Male Mono | Approach/Follow | Female |
| 5.96 | Male Poly | Approach/Follow | Female |
| 6.45 | Male Poly | Intimidation | Male Not Marked |
| 6.94 | Male Mono | Nothing | |
| 6.97 | Male Poly | Nothing | |
| 8.00 | Male Poly | Approach/Follow | Female |
| 9.73 | Male Poly | Approach/Follow | Male Not Marked |
| 10.27 | Male Poly | Nothing | |
| 11.78 | Male Mono | Approach/Follow | Male Marked |
| 12.10 | Male Poly | Approach/Follow | Female |
| 13.16 | Male Poly | Nothing | |
| 14.87 | Male Mono | Approach/Follow | Female |
| 16.36 | Male Poly | Approach/Follow | Female |

Data occurring before Observation Start Time or after Observation Stop Time are greyed out. To recover and analyze those data:

- **If grayed out data occur before Observation Start Time** – In the **Timers** window, take note of the **Event Log - Start Time** (this is negative when the event log starts before Observation Start Time). Open the Independent Variables List and locate the **Start Time** column. Click the cell corresponding to the observation, and decrease the time value as much as the Event Log Start Time.

- **If the grayed out data occur after Observation Stop Time** – In the **Timers** window, take note of the **Event Log Start Time** (this is positive when the event log starts after Observation Start Time). Open the Independent Variables List and locate the **Duration** column. Click the cell corresponding to the observation, and increase the time value as much as the Event Log Start Time.

***Reducing the Observation Duration***

When you delete the earliest or the latest event log in an observation, the Observation duration does not change. In such cases you may want to reduce the observation duration in such a way that it only covers the event logs currently present in the observation.

- **To move Observation Start Time to a later time** – Open the Independent Variables List and locate the **Start Time** column. Click the cell corresponding to the observation, and increase the time value.
- **To move Observation Stop Time to an earlier time** – Open the Independent Variables List and locate the **Duration column**. Click the cell corresponding to the observation, and decrease the time value.

---

Be careful when adjusting the observation time boundaries, that may exclude data!

---

# Chapter 5

# External Data

# 5.1 What is external data?

External data can be data that have been acquired with a separate Data AcQuisition (DAQ) system, such as the MindWare or BIOPAC system. This can be, for example, physiological (e.g., ECG, EEG, blood pressure, skin temperature), environmental data (e.g., temperature, humidity) or eye-tracking data.

## WHAT CAN I DO WITH EXTERNAL DATA?

With The Observer XT you can import any external data which has been acquired with a constant sample rate and has been stored in ASCII-format. It is possible to synchronize logged events and associated physiological or eye-tracking data in The Observer XT. You can then visualize, select and analyze the external data. Subsequently, you can export the event data and external data to one file.

---

You can also import European Data Format (EDF) files or BioSemi Data Format (BDF) files into The Observer XT. See Section 11.5 on page 435 for details. The imported data can be synchronized with the event log in the same way as external data in ASCII format. See page 190 for the procedure.

You need the External Data Module (see **Additional licenses** on page 21) to import external data in ASCII format, EDF, or BDF data.

---

The current chapter focuses on the import of physiological data and the synchronization with logged events.

For selecting external data, see Chapter 6 Selecting Data.

For visualizing external data, see Chapter 7 Visualizing Data.

For analyzing external data, see Chapter 8 Calculating Statistics.

## HOW DO I WORK WITH EXTERNAL DATA?

Working with external physiological data involves the following basic steps:

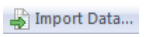
- Carry out a live observation and simultaneously send a synchronization signal from The Observer XT computer to the external DAQ system. The time information in this synchronization signal is stored in the physiological data file.

- Import the external data (including the time information from the synchronization signal) into The Observer XT and link it to an observation. The time information is used to synchronize observational and external data.
- Make a selection of external data in a data profile.
- Visualize the data.
- Calculate statistics in the Analyze menu on behaviors/modifiers and/or external data.
- Export event log data and associated physiological data in one file.

# 5.2 Importing external data

To import external data you need to add it to an existing Observation.

1. Do one of the following:
   - From the **File** menu, choose **Import**, then **External Data**.
   - Open an existing observation (see page 124). Click the **Import Data** button on the tool bar and select **Import external data**. The external data are linked to the selected observation.




   - Open the **Independent Variable List**. Right-click on an Observation, Event Log or Subject and select **Import Data**. The external data are linked to the selected observation.

The scope of the external data file is always Observation. See page 90 for more information.

All external data is imported in one step. The Observer XT offers Import profiles for a number of DAQ systems (MindWare, BIOPAC, DataScience, Polar).

2. The Import External Data window opens (see Figure 5.1). Select the type of external data file you want to import under Files of type. Next, locate the external data file and select the filename.

   In the **Files of type** list, select **All Files (*.*)** if you want to see all files in the folder.

   If your type of file is not in the list of predefined files of type you can create a new Custom Import Profile (see below).

3. In the **Import to group**, select an **Existing observation** from the list or select **New observation**.

   This option is only available when you import external data via the **File** menu.

4. If you want to import specific data sets from the external data file, continue at "Importing a specific data set" below.

5. To import the complete file including all data sets, click **Open**.

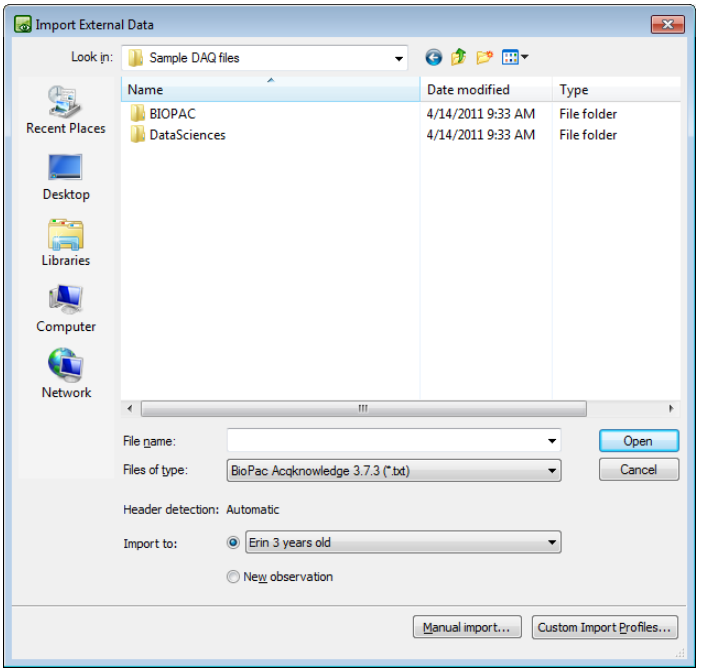



***Figure 5.1*** *The Import External Data window.*

### *Importing a specific data set*

If your external data file contains more than one data set and you want to import only specific data sets:

1. From the **File** menu, choose **Import** and **External Data**.
2. Next, follow the instruction above until step 3 then click the **Manual import...** button.

   A new Import External Data window opens showing one or more data sets (see Figure 5.2 below). The Independent Variable List also appears.

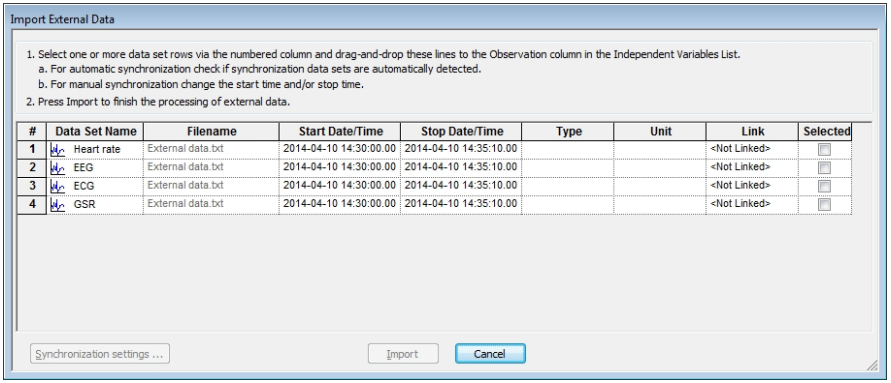



***Figure 5.2*** *The second Import External Data window. This window shows all the data sets acquired through the external DAQ system and, in this example, the corresponding file name, start date and start time.*

3. To link external data to an Observation, select on or more Data Set rows and drag-and-drop to the Independent Variable List window; you can choose to drag-and-drop to an Observation, an Event Log or a Subject (see Figure 5.3).

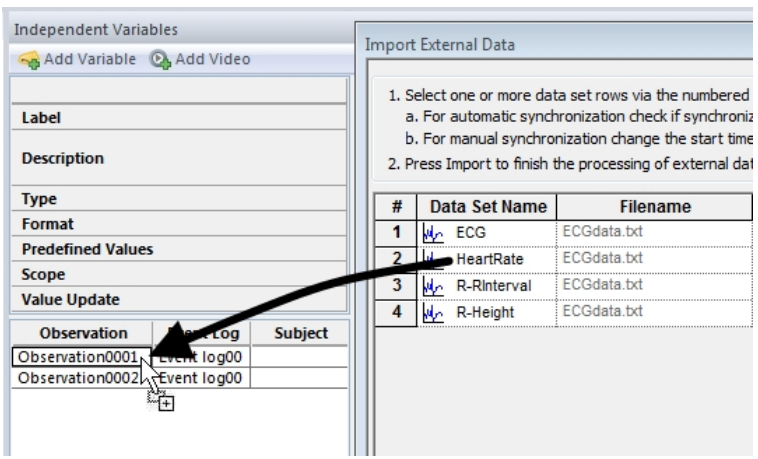



***Figure 5.3*** *Data sets are selected in the Import External Data window. In this example Data sets are linked to Observation001 by drag-and-drop.*

4. Click **Import** in the External Data window to finish the import of external data.

### *Creating a new Custom Import Profile*

1. From the **File** menu, click **Import**, then **External Data**.
2. In the **Import External Data** window, click the Custom Import Profiles button. The Import Profiles window opens; here you see a list of available import profiles. Click the Create New button.
3. To select an external data file, in the Profile Definition window, click the Browse button in the Select sample file section at the top of the window, locate and select the file and press Open.
4. The Observer XT automatically detects header and data information in the external data file. This information is visible in the File content section of the Import Profile Definition window (Fig. 6.4).

   If automatic header detection does not work, see **HEADER DETECTION** on page 185 how you can manually detect header and data information.

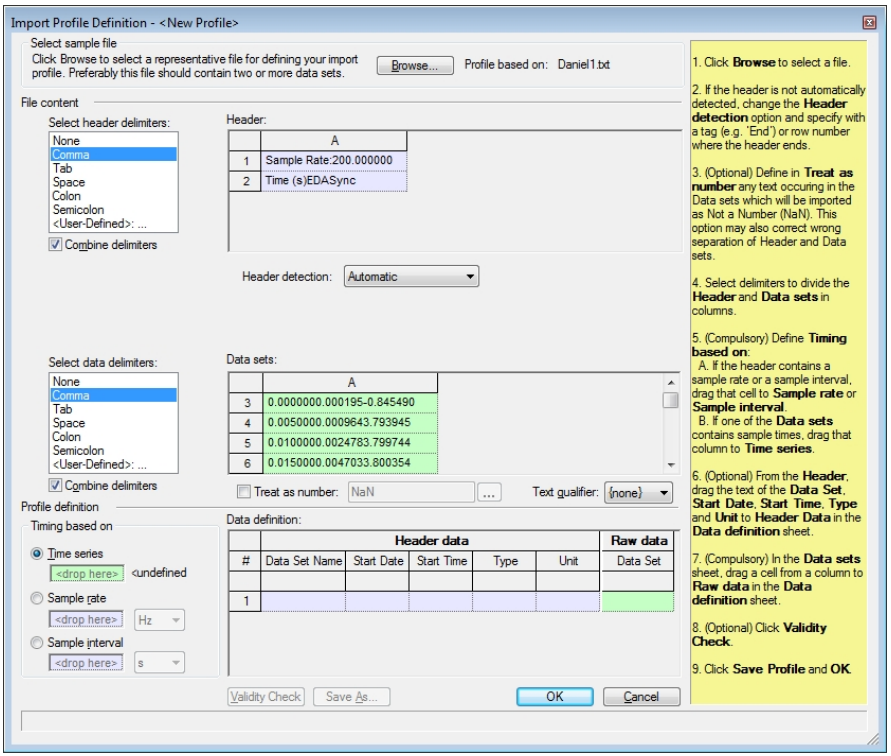



***Figure 5.4*** *The Import Profile Definition window with instructions on the right. This example shows electrodermal activity (EDA) data acquired with the MindWare system.*

5. The Observer XT uses the comma as the default delimiter to separate text in the header and data sets. However, if text that should be in separate columns is still in one column, you can separate the text by selecting the appropriate delimiters from the list under Select header delimiters and Select data 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.

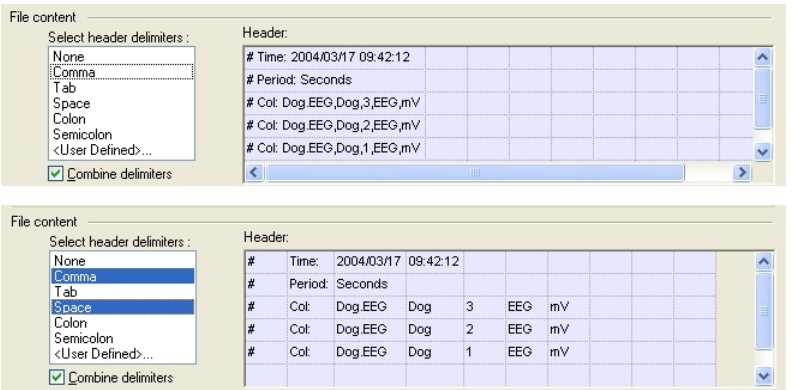



***Figure 5.5*** *The File Content section of the Profile Definition window. In the top image, all header text is in one column. The bottom image shows the same header, with the Comma and Space delimiter selected; the same text is now in separate columns.*

6. Now you can assign the information from the Header and the Data Sets in the File content section to the appropriate cells in the Profile Definition section.

   Under Data definition in the Profile definition section there are two parts. The lilac part is labeled **Header Data** where you enter Header information from the lilac cells in the **File content** section. The green part is labeled **Raw data** where you enter **Data sets** from the green cells in the **File content** section.

   First you define the sample rate of the external data acquired by the DAQ system.

   **a** If the Header contains the sample rate, select the **Sample rate** button under **Timing based on** in the Profile definition section. Drag the sample rate to the **Sample rate** box and select the appropriate **unit** (Hz or kHz) from the list.

   **b** If the Header contains the sample interval, select the **Sample interval** button in the Profile definition section. Drag the sample interval to the **Sample interval** box. Select the unit of time from the list.

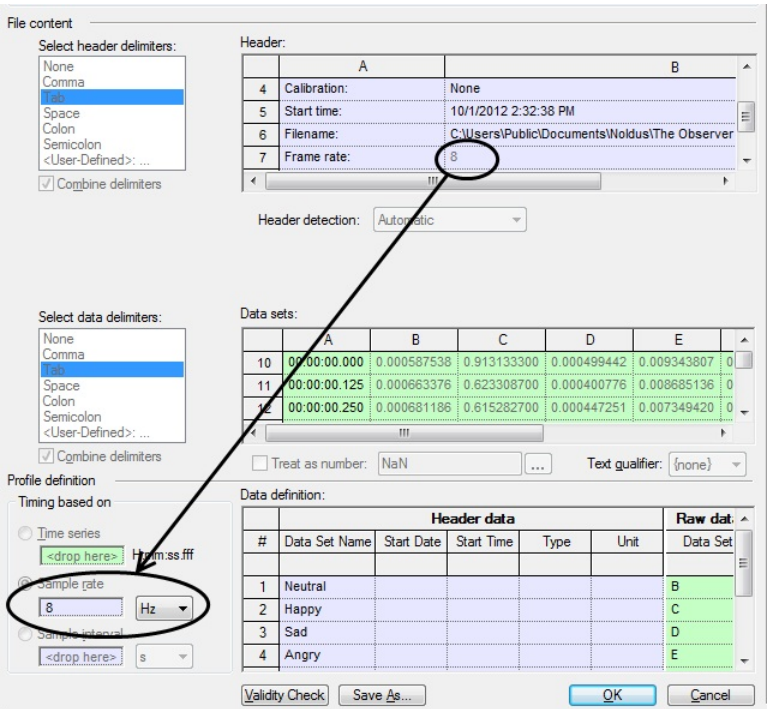



***Figure 5.6*** *Example of a sample rate in the Header that is assigned to the* ***Sample rate*** *box in the Timing based on group.*

**c** 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 one of the green cells in the column with time stamps and drag this to the Time series box (Figure 5.7).

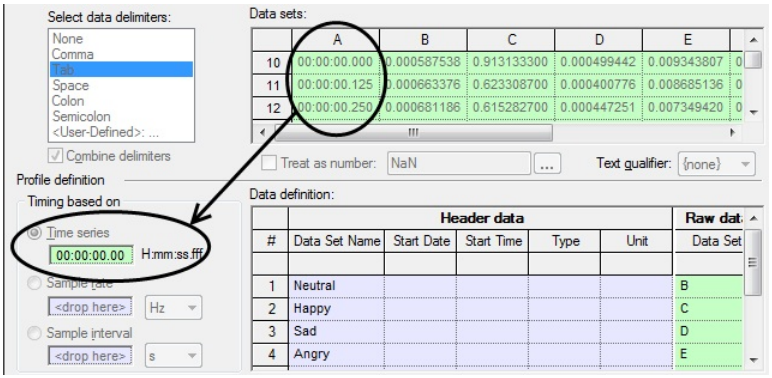
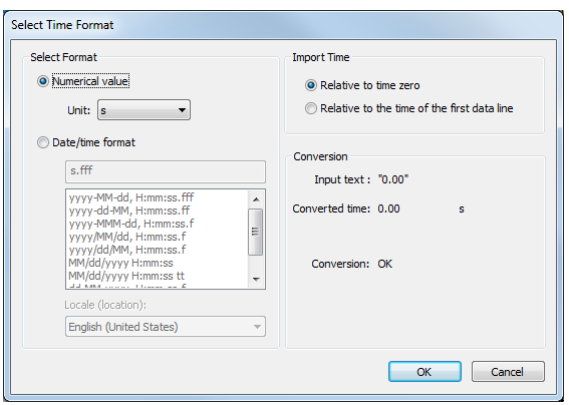



***Figure 5.7*** *Part of the Import Profile Definition window. In this example, the Data sets sheet contains a column with time stamps. The contents of this column is assigned to the Time series box in the Timing based on group. The format of the Time series is Numerical value - seconds.*

- The **Select Time Format** window opens. If the time matches one of the predefined formats, The Observer automatically selects one. Converted time shows the converted time and Conversion is OK. Click **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 number representing millisecond (see the next picture). If Conversion is OK, then click **OK**.




- 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 sample 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 greyed out when your time stamps contain the date the file was created. In this case the option **Relative to time zero** is used.

The column with time stamps now appears grayed. You can drag-and-drop only one column at a time.

7. Next you can define the Data set(s).

   A Data set consists of time-ordered values of a variable, e.g. EEG, heart rate, body temperature. A data file can contain more than one Data set.

8. Drag one of the green cells under Data Sets in the File content section to one of the empty cells in the Raw data - Data Set column. As a result, the letter of the original column appears in the cell and the column under Data Sets in the File content section is greyed.

   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).

9. Drag the first two columns with data to the first two rows of the **Raw data** column in the **Data definition** group. Next, the **Validity Check** button becomes active. When you click this **Validity Check** button, The Observer automatically assigns the other columns from the Data sets group to the remaining rows in the Data Definition group.

   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 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, B, and C and pressing the **Validity Check** button works. The columns D, E, F, and G are then automatically added to the other rows. Dropping A, and C and pressing the **Validity Check** button also works, the columns E and G are automatically added. However, dropping A, C, and D does not work, because there is an empty column between A en D, but not between C and D. Pressing the **Validity Check** button then gives an error message.

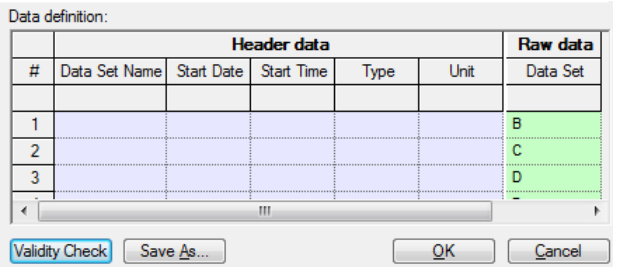



*Figure 5.8 The Data definition sheet in the Import Profile Definition window. In this example, the Raw Data column shows the letters of the columns with data sets from the Data sets sheet.*

**10.** Next, you can assign information to the Header Data part of the Profile definition section.

**a** **Dataset Name** - You can drag the name of the Data sets under Header (the top lilac window) in the File content section to the Dataset Name column under Data definition (the bottom lilac window) in the Profile definition section.

The Dataset Name in the original location is greyed. You can return the Dataset Name to its original cell by selecting the **Dataset Name** in the **Data definition** field and pressing delete.

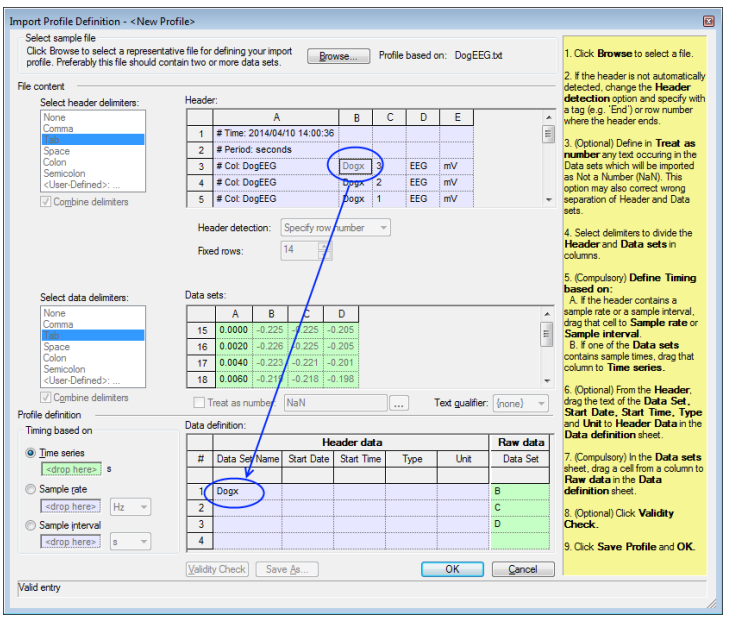
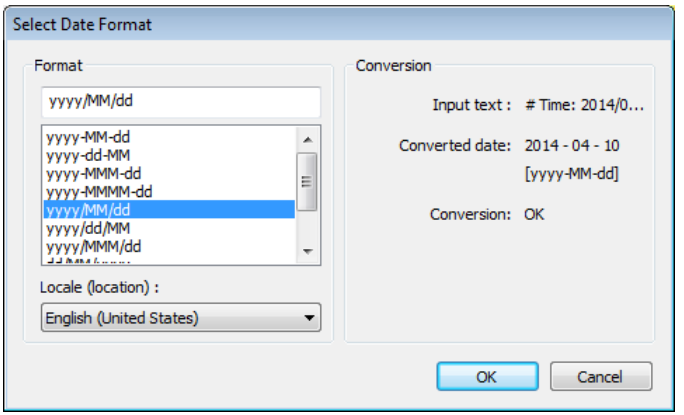



*Figure 5.9 The **Import Profile Definition** window. In this example, one of the **Data Set Names** is moved from the **Header** to the **Data definition sheet**.*

b **Start Date** - Select the date under Header in the File content section and drag it to the Start Date column under Data definition.

If the date matches one of the predefined formats, The Observer XT automatically selects one in the Select Date Format window. In that case it says **Conversion: OK** in the Conversion section. Click **OK** to proceed.

You can also define a date format yourself. For example, your date in the header is formatted as: 15032005 (March 15 2005). This date format does not match a predefined format. In the format box, type 'dd' for the numbers representing 'day', 'MM' for month and 'yyyy' for 'year'. Behind Converted date is now the correct date and Conversion shows OK. Click **OK** to set the format.




**Start time** - select the start time under Header in the File content section and drag-and-drop it to the Start time column under Data definition.

In the **Select Time Format** window a predefined format is selected automatically. Click **OK** if this is the right one. If not, type in a new format in the **Format** box. Click **OK**.

c **Type** - Drag-and-drop the type of measurement from the **Header** part of the **File content** section to the **Type** column in the **Data definition** part, in the **Profile definition** section.

d **Unit** - Drag-and-drop the unit of measurement from the **Header** part to the **Unit** column in the **Data definition** section.

11. When all the information is in the **Import Profile Definition** sheet, click the **Save As** button.

Type a profile name in the **Profile Name** box of the **Save Import Profile** window. You can add a description of the import profile in the small **Description** window. Click **OK**.

This import profile has the extension *.eip and is saved in the specified Destination folder.

12. Click **OK** to close the **Import Profile Definition** window.

    In the Import Profiles window the newly created import profiles is now in the list of import profiles.

13. Close the Import Profiles window by pressing the **Close** button.

14. In the **Import External Data** window, the new import profile is now selected in the list of **Files of type** list. If not, click the drop-down button and select the newly created import profile.

15. Locate the external data file and select the filename. Follow the instructions starting from 4 (page 173) to import the external data.

***Missing data***

In The Observer XT 12.5, it is possible to import external data with missing samples.

However, there are some prerequisites.

1. The external data must be sampled with time stamps that vary 10% from being equidistant.

   Example 1 – Timestamps 1.05, 1.99, 3.08 can be used and will be converted into 1, 2, and 3.

   Example 2 – Timestamps 1.0 1.5 , 3.0, 4.0 cannot be used.

2. The time series should have at least one decimal more than the resolution of the sample rate. So with a sample rate of 1 Hz, the time stamps should be in seconds with one decimal.

3. The file should not contain entire empty rows.

4. In the **Import profile definition** window, drop the column with the time information in the **Time series** cell (see step c on page 178). Do not use the **Sample rate**, or **Sample interval** option.

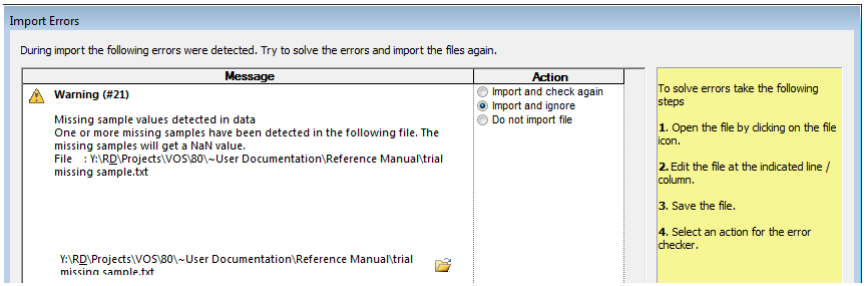
5. If the file does not contain a column with time stamps, the data sets should not contain missing rows. Otherwise the data behind the missing rows will be shifted forward and will be associated to the wrong timestamp.

If your Data set contains missing samples indicated by non-numeric symbols, you need to specify this symbol in the **Import profile definition** window (see **Creating a new Custom Import Profile** on page 176).

- Select the **Treat as number** checkbox.
- 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>**, click **OK** enter this text after a comma (,).
- If text is identified by a character, select this from the **Text qualifier** list.

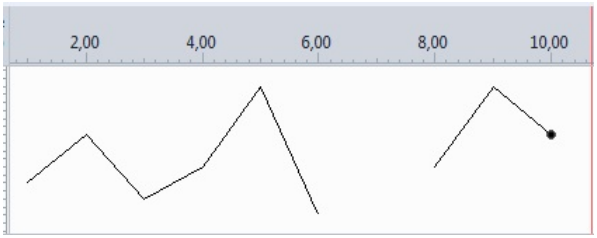
A missing sample is converted to a NaN symbol.

When you import a data set with missing samples, you will get the following warning.




Choose **Import and ignore** and click **OK**.

In previous versions missing samples were converted into a zero. In The Observer XT 12.5 the missing samples are converted into a NaN value, which are not present in the visualization and are ignored in the analysis. In the example below, the sample at timestamp 7 is missing.




Please note that missing samples may indicate that something is wrong with the setup of your DAQ system

### *Editing a Custom Import Profile*

If you want to import an external data file that is very similar to, but not exactly the same as, another data file for which you already have an Import Profile, you can edit the existing Import Profile.

1. In the **Import External Data** window, click the **Custom Import Profiles** button.
2. Select the **Import Profile** from the list in the **Import Profiles** window and click **Edit**.

   In the **Select Sample File** group you see the original sample file behind **Profile based on**.

3. Click **Browse** in the **Select Sample File** group to select the new external data file and click **Open**.
4. Follow the instructions 4-8 under "Create a new Import profile" above.
5. Click **Save Profile As** when you are finished filling in the Data definition sheet.
6. Type in the name for the Import Profile.
7. Click **OK**.
8. Close the **Profile Definition** window.
9. Close the **Import Profiles** window. Make sure you select the right import profile.
10. Select the external data file and click **Open** to finish import.

## HEADER DETECTION

When you create a Custom Import Profile to import an external data file, The Observer XT usually automatically detects header and data information in the file. In some cases, however, the format of the file prevents The Observer from automatically detecting header and data. For these cases, new Header detection methods have been added to the Import Profile Definition window.

The methods for Header detection are:

- **Automatic** – This method is selected by default and works most of the time.
- **Specify tag** - If automatic detection does not work, you can specify the line (with either nominal or numerical information) that indicates the end of the header part of the file. If necessary, you can also specify the number of rows between this 'header end line' and the data.
- **Specify row number** - If automatic detection does not work but the data file always has the same number of rows in the header, you can specify the number of header rows.

### *Specify tag*

Select this method if the external data file has a variable number of header lines rows and header and data are always separated by the same 'header end line'.

Example - The header always ends with a line containing the following text: "[Data]". After this header end line there is always an empty line before the data starts. So, in the End tag box you enter: "[Data]" and in the Extra rows box you enter a value of '1'.

***Specify row number***

Select this method if the contents of the header information is variable but the header always has the same number of rows. So, in the **Fixed rows** box, you enter the appropriate number of rows.

# 5.3 Synchronizing logged events and external data

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.

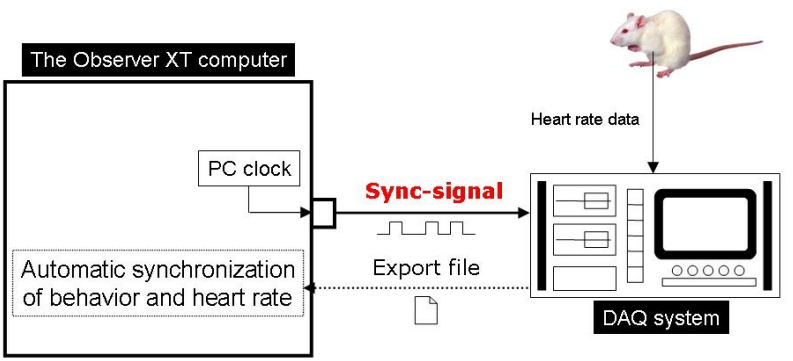



***Figure 5.10*** *Schematic overview of the setup for automatic synchronization of observational and external data.*

You have two options for the synchronization of event data and external data:

- If your DAQ system can receive the synchronization signal, you should preferably use Automatic synchronization (see below).
- Otherwise, you can use Manual synchronization (see page 190).

## AUTOMATIC SYNCHRONIZATION

The automatic synchronization of external data and event log data involves three steps:

- Select DAQ co-acquisition when your Observer XT computer can be connected to your DAQ system.
- The Observer XT sends a synchronization signal to the DAQ system.
- Import the external data.

### *Settings for live scoring with external data acquisition*

1. Click **Project Setup** in the Project Explorer.
2. Select **Live Observation**. The Devices window opens. Select **DAQ Settings**. Double-click the field next to it or click the **Edit Settings** button at the bottom of the table. This opens the **DAQ Hardware Settings** window.
3. Under **Predefined Settings**, select the profile corresponding to your DAQ system or create a new one (see below).
4. Click **OK**.

### *Creating a new DAQ Hardware Settings profile*

1. In the DAQ Hardware Settings window, click the **New (Insert)** button or click in the **Predefined Settings** window and press **<Insert>** on your keyboard.

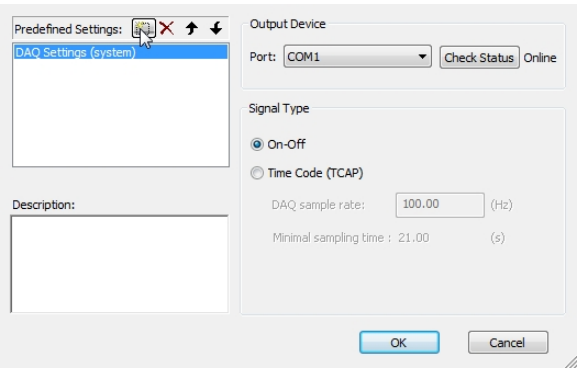



***Figure 5.11*** *The DAQ Hardware Settings window.*

2. A new field appears at the bottom of the list in the Predefined Settings window. Type the name of the new profile.
3. Under **Output Device**, select how you want your Observer XT PC to be connected to the DAQ system. You can choose one of you PC's COM ports.

The selected device sends the synchronization signal to the DAQ system.

The synchronization signal is an analog signal which is fed into the 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 Output Device is the port through which the synchronization signal, via a custom Noldus cable, is sent to the DAQ system. You can select one of the RS232 COM ports that sends out the synchronization signal.

---

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.

---

If the COM port is Offline, check that other programs (also those not running) are not controlling that port. Change the port settings in those program or uninstall them when not necessary. When you use a USB-to-COM converter, search for the COM port from the list that is Online.

---

You can also connect a your 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 of step 3 on page 187. Select **On-Off** in step 4 below. Contact your Noldus sales representative if you are interested in this option.

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4. 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 (see the note above).
   - **Time Code (TCAP)** in all other cases. If you choose **Time Code**, type in the **Sample rate** of your DAQ device in the corresponding field. As you enter the sample rate, the program calculates the Minimal sampling time in seconds, which depends on how much time The Observer XT needs to send the complete synchronization signal to the DAQ device with that sample rate. (see Time Code in the next pages for more information).
5. Click **OK**.

***Notes***

- The information of the synchronization signal is stored in the external data file. In the **Import External Data** window, the Data Set has a small clock icon, if it has been correctly identified.

- See Importing external data (page 173) to import these external data and synchronization information.
- When you import the external data, you need to import both the Data Set with the external data and the XT synchronization information. This way the associated Event Log is automatically synchronized with the external data.

  Name your synchronization data as 'sync' or use 'sync' as the type of Unit. The Observer XT automatically recognizes your synchronization data upon import.
- When in your Project Setup **DAQ co-acquisition** is selected, the **Synchronization Settings** button in the second Import External Data window becomes active. Click the **Manual import** button in the first **Import External Data** window to open the second window. In the **Synchronization Settings** you can set values for a number of parameters that determine how the information from the synchronization signal is extracted from the imported DAQ data.

  The information in the synchronization signal is sampled by the DAQ system. On import into The Observer XT some digital signal processing takes place to deal with noise, signal distortion, spikes etc.
- Click on **Synchronization Settings** to open the **Synchronization Settings** window. Here you can set values for the following parameters with default values between brackets:
  - **Number of offset values (10)** - corresponds to the number of discrete samples of the DAQ system containing synchronization information. These offset values are used for the calculation of average offset and gain. A higher value increases the accuracy of synchronization, but also increases calculation time.
  - **Smoothing factor (1)** - corresponds to the number of samples over which an average is calculated. A higher value reduces spikes on the signal, but also reduces the time accuracy of the synchronization.
  - **Signal-to-noise-ratio (20)** - determines the tolerance for detecting high-low signal transitions. A higher value increases this tolerance, but also increases the chance of detecting false transitions.
  - **Number of samples prescan TCAP (180000)** - corresponds to the maximum number of samples used for auto-detection of a time code in the DAQ samples. For example, 180 seconds at 1 kHz or 30 minutes at 100 Hz.

  Click in the boxes to set a value for each of the parameters. Click **Defaults** if you want to return to the default values or click **OK** to finish. In most cases, you do not need to adjust the Synchronization Settings.

## MANUAL SYNCHRONIZATION

Manual synchronization of logged events and associated external data can be facilitated during the logging of events in the following ways:

- You can start a live observation and the acquisition of external data at exactly the same time. As a result, the imported external data have the same starting point and a similar duration as the associated event log.
- You can have a specified interval between the start of event logging and data acquisition. For example, you switch on your DAQ system and start your observation exactly 10 seconds after that.
- When you record events in a digital video file for later logging, you can either film pushing the button which marks the start of external data acquisition or you can mark the start of external data acquisition by a visual cue or sound signal. Simultaneously, you log this cue or signal as an event in The Observer. When you log events from the video file afterwards, the visual/sound signal determines the start of your observation.
- You can create a peak in the external data signal by, for example, swiping a magnet past the sensor and simultaneously log this as an event in The Observer. Afterwards, you can synchronize the event log and the external data by aligning the peak and the scored event.

### *Carrying out Manual synchronization*

There are three methods for manual synchronization:

- You can use **Numerical offset** (see below) if you know how many seconds the observational and external data are out of sync.
- You can use **Manual offset** (see page 192) for visual synchronization. This can be used 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 observe an animal's reaction to a sudden encounter with an unfamiliar object and at the same time monitor its heart rate. The encounter is characterized by a sudden increase in heart rate. This peak in heart rate can be used as an offset point for the observational and physiological data.
- You can set the start time or end time in the Import External Data window upon import.

  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 your file.

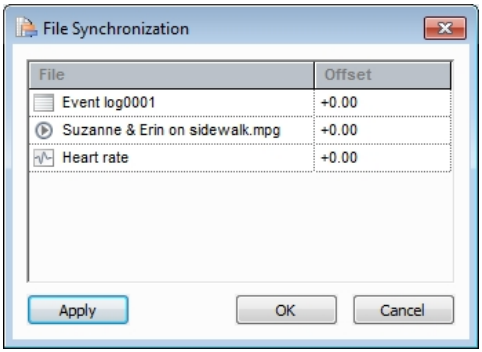
*Numerical offset*

1. Import the external data file and link it to an Observation (see Import external data, page 173).

   If your external data file does not have a start date/time, the start position of the external data file is set at the start of the event log. If your external data file does have a start date/time, the start position is at the start of the external data file.

2. Open the Observation to which you linked the external data.

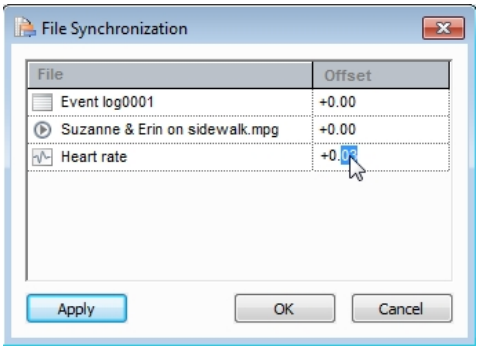
3. On the component tool bar, click the **Offset** button and select **Numerical Offset** to open the **File Synchronization** window.




4. You can now set the start (Offset) of either the Physiological Data or the Event Log.

   Example - You started your observation 3 seconds before you started acquisition of external Heart Rate data.

   - Click the numbers representing the seconds in the **Offset** column of the Heart rate row.




   - Type '03' in the time stamp and click **Apply** to set the time to 3 seconds

The result is that when you play back the event log and external data (see Playing back observation data on page 114), the External Data window starts running 3 seconds after the Event Log Data (see Figure 5.12).

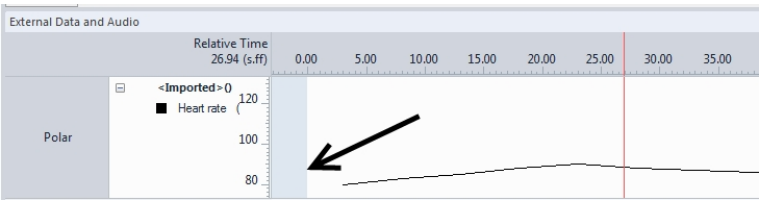



***Figure 5.12*** *Part of the External Data window. The arrow indicates the start of the observation. The offset of the external data is set to 3 seconds.*

### *Manual offset*

1. Import the external data file and link it to an Observation, Event Log or Subject (see Import external data, page 173).

   By default, the start of both the event log and external data file are used as the point of synchronization.

2. Open the Observation to which you linked the external data. By default all available windows open.

   Make sure the Event log, Playback control, Video or Audio Files and Visualize Data window are open. Observer windows can be displayed by selecting them from the View Settings list at the top-right corner of your screen.

   A blue line in the Start row of the Event log and a vertical line in the External Data window indicate the position in both files.

   When Observer XT is not in Offset mode, clicking on a behavior in the Event Log window will move the vertical line in the External data window to a new position. When you place your cursor on the marker at the top of the vertical line in the External Data window, a double moving-arrow appears. With this double arrow you can move the red line; this makes the gray bar in the Event log window jump to another behavior.

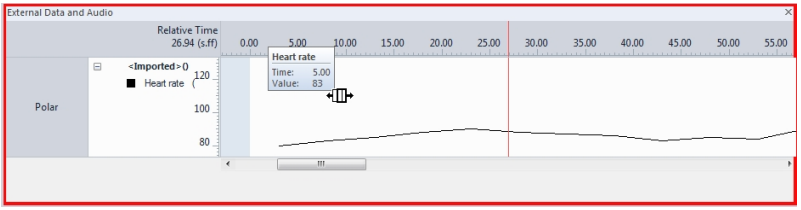
3. In the component tool bar, click the **Offset** button and click **Manual offset**.

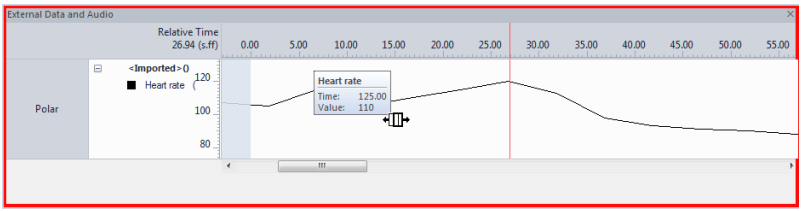
   The **Synchronize** window appears. This window shows instructions how to set the Offset in a video, audio file or external data window.

4. Click **Start Synchronization**.

5. Click in the **External Data** window; the border of this window turns red and the cursor becomes an offset-icon. Keep the left mouse-button pressed to drag the graph window to the left and the right.




- You synchronize the external data and the start of the Event log by dragging the external data graph to a position where the peak is at the vertical line (i.e. the offset of the observation).




- Click the **Offset** button in the component tool bar to finish synchronization.

If a specific behavior in the video coincides with a specific peak in the external data (for example, an animal jumps and shows a corresponding peak in heart rate), do the following:

**a** In the **Videos** window, go to the specific behavior by using the controls in the Playback Control window or by moving the slider in the Videos window.

**b** Click the **Offset** button in the component tool bar, click in the **External Data** window and move the external data graph so that the specific peak coincides with the vertical line, i.e. the location of the specific behavior in the Videos window.

**c** Click the **Offset** button again to finish synchronization.

# Chapter 6

# Selecting Data for Analysis

# 6.1 Why select data?

There are four good reasons why you may want to select data before carrying out the real analysis (for example, visualizing data or calculating statistics).

### ANALYZE SPECIFIC EVENTS IN GROUPS

- **Example 1** – Visualize behaviors of the group *Play type* as one behavior.

**Solution** – Merge the data, then run the analysis. See page 206.

### ANALYZE SOME OBSERVATIONS, SUBJECTS OR EVENTS, NOT OTHERS

- **Example 1** – Calculate the average duration of speech of the subject *Child*, not the subject *Mother*.
- **Example 2** – Visualize data in observations of female subjects, not males.
- **Example 3** – Calculate the rate of occurrence of events of the group *User Error*, not others.

**Solution** – Filter the data, then run the analysis. See page 210.

### ANALYZE EVENTS THAT OCCURRED IN SPECIFIC TIME INTERVALS

- **Example 1** – Visualize the data from 1 minute to 10 minutes of observation.
- **Example 2** – Calculate the number of times the child smiled when the state event *Play* was active.
- **Example 3** – Calculate statistics of events when the heart rate was higher than 60 beats per minute.

**Solution** – Select intervals by manual selection (example 1; see page 221), select intervals by state events (example 2; see page 218) or select intervals by external data (example 3; see page 235), then run the analysis.

## ANALYZE 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.

**Solution** – Define Time bins, then run the analysis. See page 236.

The terms **Subject**, **Behavior**, **Modifier**, and **Independent Variable** listed in this chapter may not be the same as those on your screen. This depends on what terms you have specified in your project's Terminology Preferences (see page 93).

## DEFINITIONS

### *Merging*

Merging or grouping means that two or more behaviors or modifiers are analyzed as one entity. For example, group the behaviors *Left wrist extension* and *Right wrist extension* to calculate the overall rate of *wrist extension* occurrence.

### *Filtering events*

Filtering events means that you choose a subset of elements to be displayed or used in quantitative analyses. You can filter observations, event logs, subjects, behaviors and modifiers. You can also filter data indirectly, by choosing the values of independent variables (see page 86). For example, filter the subjects with the value of variable *Age class =1*.

### *Selecting intervals*

Selecting intervals means that you analyze time intervals based on an event (or a combination of events) scored for one or more subjects. Furthermore, you can select time intervals based on values of external data. Analysis is done on the intervals in which the event (or combination of events) occurs and/or the external data had the specified values.

### *Time bins*

Time bins means that you choose to divide the observation in two or more intervals of equal length. Analysis is done for all events in those intervals.

---

You can combine two or more selection criteria, for example Select interval *Task 1* and Filter events *User Error*, and *Negative emotion* for analysis (see page 54).

---

# 6.2 The Data Selection screen

To start data selection:

1. Do one of the following:
   - From the **Analyze** menu, choose **Select Data**, then **New Data Profile** (or press **Ctrl+Alt+F7**).
   - In the Project Explorer, right-click the Data Profiles folder and select **New Data Profile**.
   - Click the **New** button on the Data profile tool bar.


2. In the **New Data Profile** window, type the name you want to give to the new profile or accept the default name and click **OK**.

**Result** – Two more objects appear on your screen: the **Components** pane (next to the Project Explorer) and the **Data Selection** pane (on the right; see Figure 6.1).

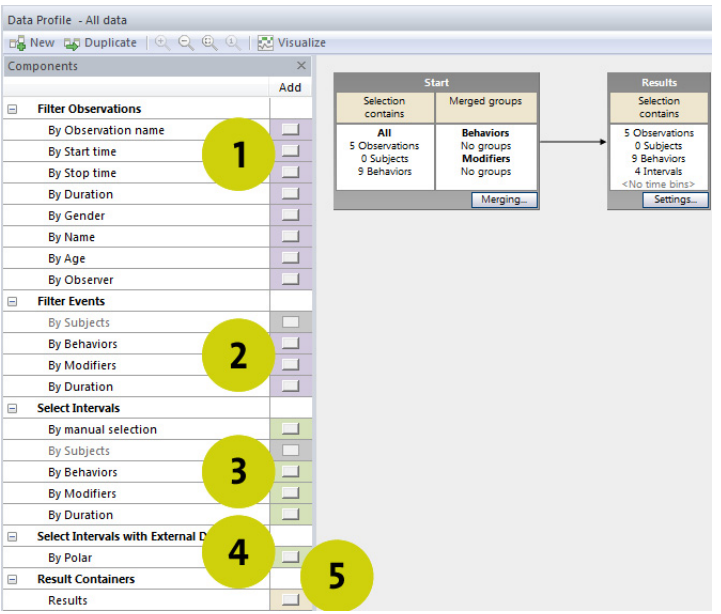



***Figure 6.1*** *The Data Selection screen with the Components pane (left) and the Data Selection window (right). In the Components pane:* ***1*** *– Buttons for filtering observations,* ***2*** *– Button for filtering events,* ***3*** *– Buttons for selecting intervals,* ***4*** *– Button for selecting intervals with external data,* ***5*** *– Button for creating additional Result containers.*

### *What is a Data Profile?*

A data profile is a collection of settings that specify which data you selected for analysis. You can create as many data profiles as you want, containing different selection criteria.

The **Data Selection** pane shows the content of the currently open data profile (You find the name of the open data profile on the title bar of The Observer XT).

You can open and edit one data profile at a time.

### *The Components pane*

The Components pane has the following groups of buttons:

- **Filter Observations** – Allows you to filter observations and event logs. It also allows you to filter observations by independent variables (including system variables) associated with those observations (1 in Figure 6.1).
- **Filter Events** – Allows you to filter events according to the name of subjects, behaviors or their modifiers. You can also filter subjects by means of the independent variables associated with those subjects (2 in Figure 6.1).

  If the scope of an independent variable is Subject (see page 90), the variable is listed under Filter Events, otherwise it is listed under Filter Observations.
- **Select Intervals** – Allows you to select intervals by manual selection, intervals based on subjects, behaviors, modifiers, or duration (3 in Figure 6.1).
- **Select Intervals with External Data** – Allows you to select intervals based on values or ranges of external data (4 in Figure 6.1).
- **Result Containers** – Allows you to create multiple selections in the same data profile, by inserting additional Results boxes (5 in Figure 6.1) (see page 245)

If you do not see the **Components** pane, select **Components** with **View Settings** on the far-right side of the tool bar.

### *The Data Selection pane*

By default, the **Data Selection** pane contains two boxes connected by an arrow:

- The **Start** box (left) containing all the observations currently stored in your project. The **Start** box does not make any data selection except for merging data (see page 206).
- The **Results** box (right), containing the data used for analysis. The **Results** box shows the number of selected Observations, Subjects, Behaviors and Intervals.

Since there is no selection box between the two, all event data in your project are used for analysis. This is the default selection sequence. It is now up to you to add selection boxes to refine your selection.

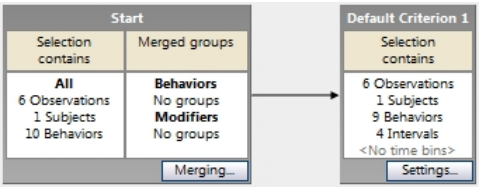



***Figure 6.2*** *The* ***Start*** *box (left) and the* ***Results*** *box (right). In this example, the Start box contains 6 Observations, 1 Subject and 10 behaviors.*

---

The name of the **Results** container is shown in the analysis results, so you always know which data selection the results come from. To display the name of the **Results** container in an analysis result, make sure that **Result Container** is selected in the **Layout** page of the analysis settings window (see page 349 for an example about calculating statistics).

---

You can auto-arrange the boxes from the Data Profile by selecting the option **Snap to Grid** in **View Settings**. The grid becomes visible if you select the option **Show Grid** in **View Settings**.

## CREATING YOUR OWN DATA SELECTION

To refine your data selection and focus on a smaller data set, insert selection boxes between the Start and the Results box and connect them, so the data are progressively filtered while they 'flow' from the first to the last box (you can view each intermediate box as a sieve that reduces the amount of data).

1. In the **Components** pane, click the button next to the criterion you want to use (see 1 in Figure 6.3).
2. A new window opens on your screen, listing all values of the chosen criterion. Choose the values that specify your selection (see 2 in Figure 6.3).

   **Example** – To filter behaviors, click the button next to **By Behaviors** under **Filter Events**. Choose the behaviors you want to analyze.
3. Click **OK**. A new box appears in the Data Selection window. Drag the box over the arrow that connects the pre-existing boxes. When the arrow turns white, release the mouse button (see 3 in Figure 6.3).

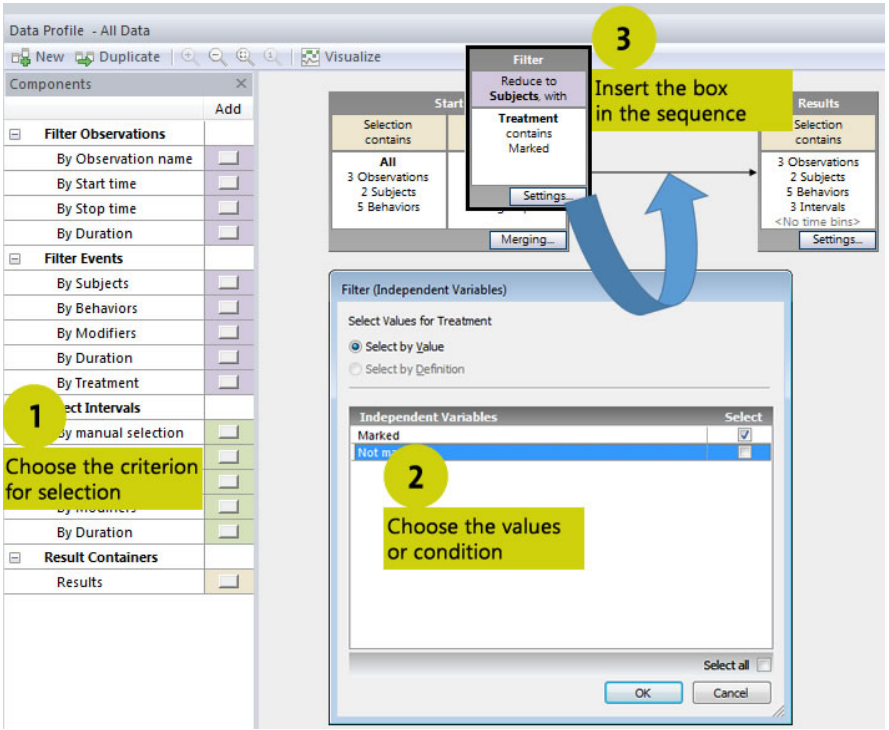



***Figure 6.3*** *Visualization of the basic steps you must follow to select data. See the text for details.*

### *Creating complex data selections*

You can create complex data selections by inserting two or more selection boxes in the sequence (more details on page 240).

- **Example 1** – In a study of parent-child interaction, the age of the child and the age of the mother have been entered as User-defined independent variables. You want to analyze data for children ages between 3 and 5 years old and mothers older than 30.

  **Solution** – Under **Filter Observations by Independent Variables**, click the button next to *Age of Child*. Choose the appropriate age values and insert the Filter box in the sequence. Next, click the button next to *Age of Mother*. Choose the appropriate age values and insert the Filter box in the sequence.

- **Example 2** – In a usability study, the type of task has been scored as a state behavior. You want to analyze the events *User Error* and *Confusion* when the test participant was performing *Task 1*.

  **Solution** – Under **Select Intervals**, click the button next to **By Behaviors**, select *Task 1* and insert the **Interval** box in the sequence. Next, under **Filter Events** click the button next to **By Behaviors**, select *User Error* and *Confusion* and insert the **Filter** box in the sequence.

- **Example 3** – In an open-field test in which exploratory behavior is measured, the heart rate of an animal is also recorded. You want to analyze events when the heart rate was above a certain value.

  **Solution** – Under **Select Intervals with External Data**, click the button next to **By Heart Rate**. Select **External data is Higher than** and enter the appropriate value. Click **OK** and insert the **Interval** box in the sequence.

---

The order of boxes in a data selection sequence is important! For more information, see page 246.

The maximum number of selection boxes is 128 and of Results boxes is 32. This is to prevent long calculation times.

---

### *Merging and Time bins*

To define analysis groups and time bins, you do not use the buttons in the **Components** pane.

To group or merge data, click the **Merging** button in the **Start** box. For details, see page 206.

To define time bins, click the **Settings** button in the **Results** box. For details, see page 236.

### *Zooming in and out*

You can zoom in and zoom out the Data Selection window with the following icons on the tool bar:

- **Zoom in** icon, **Zoom out** icon, **Zoom to fit** icon, **Reset zoom** icon.

  You can also use **Ctrl+scrollwheel** to zoom in and out.

### *Creating a screenshot of the data selection*

When you click the camera icon at the right-hand side of the tool bar, the complete data selection is saved to an image file (*.png, *.emf, *.jpg, *.bmp, *.gif).

## WORKING WITH SELECTION BOXES

This section contains procedures about how to work with selection boxes, not the procedures for selecting data. For the actual selection procedures, see page 206, page 210, page 221, page 218, page 236.

### *Selecting boxes*

You can select a box by clicking its colored border. As a result, a black border appears around the box. To select multiple boxes, hold the **Ctrl** key and click the boxes you want to select. To select all boxes in the Data Selection window, press **Ctrl+A**.

### *Moving a selection box*

1. Click the colored border of the box.

   As a result, a black border appears around the box and the mouse cursor changes to a four-headed arrow.


2. Drag the box to the position you want.

### *Moving a group of selection boxes*

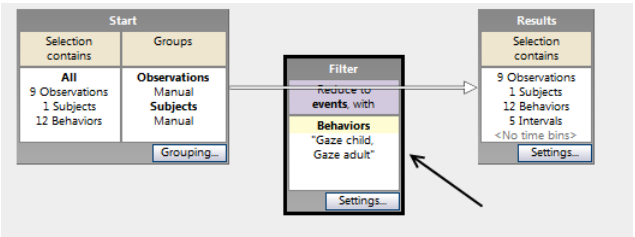
1. Draw a box around the boxes you want to move or click on the boxes you want to select while holding the **Ctrl** key.

   As a result, a black border appears around the selected boxes and also the selected, connecting arrows turn black. The mouse cursor changes to a four-headed arrow.

2. Drag the boxes to the position you want.

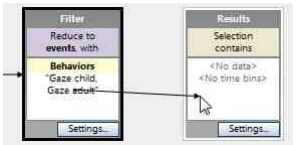
### *Inserting a box in a data selection sequence*

1. Drag the box between two pre-existing boxes, until the connecting arrow turns white.




2. Release the mouse button. The new box is inserted.

### *Connecting two selection boxes*




1. Point to the center of the first box, press and hold the left mouse button and drag toward the center of the other box.
2. Release the mouse button when the cursor has reached the center of the other box.

   As a result, the two boxes are connected.

You cannot create connections:

- From the Results box to any other box.
- From any box to the Start box.

### *Copying a selection box*

You can copy a selection box within the same Data Profile, not to another Data Profile. You cannot copy the arrows.

### *Deleting a selection box*

1. Click the title of the box so the mouse pointer changes to a four-head arrow.
2. Press **Delete**.

You cannot delete the Start box. You can delete a Results box only if another one is present in the Data Selection window.

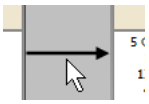
If you delete in a box within a sequence, the arrows connecting the adjacent boxes are lost. You must then re-connect the adjacent boxes (see the previous page).

### *Deleting a group of selection boxes*

1. Draw a box around the boxes you want to delete or click on the boxes you want to select while holding the **Ctrl** key.
2. Press **Delete**.

You cannot delete the **Start** box. You can delete a **Result** box only if another one has been inserted in the Data Selection window. If you delete a box within a sequence, the arrows connecting the adjacent boxes are lost. Therefore, you must re-connect the adjacent boxes (see above).

### *Deleting a connecting arrow*



1. Click the connecting arrow you want to delete. As a result, the arrow turns bold.
2. Press **Delete**.

### *Changing the selection criteria in a selection box*

Follow the instructions below when you have inserted a selection box in a sequence, and you want to restrict/widen your selection. For example, you have filtered observations by *Drug dose =0.001* and *0.005* in the first instance, and you want to remove *0.005*.

1. Locate the box that specifies the selection criteria you want to change. Tip: You find the name of the name of the criterion in the central area of selection boxes.
2. Click the **Settings** button in the bottom-right corner of the box.
3. Select the appropriate values in the window that appears.

### *Creating a new Results box*

Create multiple Results boxes everytime you want to display analysis results obtained from different data sets.

**Example** – You want to calculate statistics of the behavior *Driver speed* in two different periods, *Looking at left mirror* and *Looking at right mirror*. Those phases reflect two independent intervals, therefore you must create two selection sequences, each ending in a separate **Results** box. When you run the analysis, results are shown for both intervals and readily compared.

1. Do one of the following:
   - In the **Components** pane, click the button next to **Results**.
   - Select a Results box, press **Ctrl+C** and next **Ctrl+V**.

2. Type a new name / accept the suggested one, or click the **Settings** button to change the name of the new **Results** box.

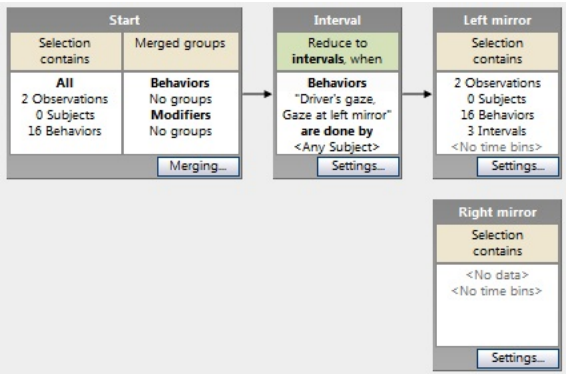



***Figure 6.4*** *An example of creating multiple data selections. Top: a sequence selecting an interval according to "Gaze at left mirror". Bottom: a second Results box "Right mirror" has been added.*

3. Build your data selection sequence as usual. In the example below, two selection criteria have been defined in such a way that statistics are shown for *Gaze at left mirror* and *Gaze at right mirror* independently.

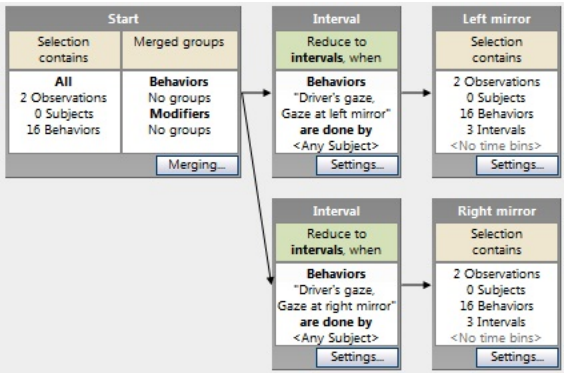



***Figure 6.5*** *An example of two independent selection criteria from the same data set.*

### *Changing the Results box name*

The **Results** boxes are named automatically as you create them: **Results 1**, **Results 2**, etc. If you want to change that name, click the **Settings** button in the box and type in the new name.


# 6.3 Selecting data - Merging

## WHAT IS MERGING?

**Merging** in The Observer XT 12.5 is the same as **merged Grouping** in The Observer XT 11 or earlier versions.

In The Observer XT 12.5, you cannot group observations or subjects with the Start box in the data profile (see below). You can group observations or subjects in the Behavior analysis (**Collapsing Category elements** on page 313) For grouping of observations for visualization, see Chapter 7.

The aim of merging or grouping is 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 and calculate the total frequency.
- Treat the behavior modifiers *Manipulative*, *Imaginary* and *Constructive* as one and calculate the total duration.

---

**!** When you import a project that was made with The Observer XT 11 or earlier versions, which contains a Data Profile with grouping, the grouping is automatically reset upon opening the project in The Observer XT 12.5. If you want to use summed grouping with The Observer XT 12.5, you should export the data and do the summed grouping, for example, in Excel.

---

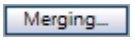
The elements are truly merged on the time line and counted as one. Consider the following example (see also the figure below). Behaviors A and B both have a duration of 5 seconds and they overlap for 1 second. After merging, the frequency of the merged behavior is 1 and its duration is 9 seconds.


Another example is the merging of behavior modifiers. The top part in the picture below shows three occurrences of Behavior *Walk*, each with a duration of 3 sec, scored with consecutive 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).


## MERGING PROCEDURE IN SHORT

1. Make sure that your data profile is open. If not, create a new data profile or open an existing one (see page 248).

2. Click the **Merging** button in the Start box.



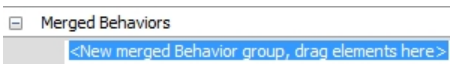

3. In the **Merge Elements** window, click the tab for the elements you want to group.

   The **Behaviors** tab shows the Behavior groups and their elements.

   The **Modifiers** tab shows the Modifier groups and their (nominal or numerical) elements.

4. To create a merged group:

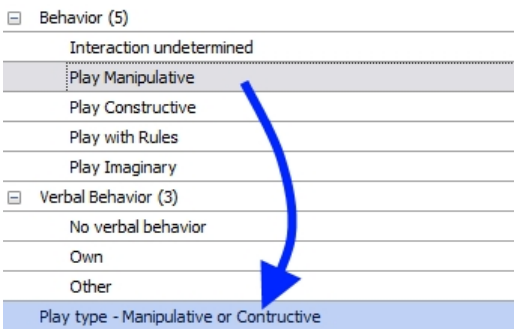
   a For Behaviors, click the **Add** button at the bottom.
   A new line appears at the bottom of the list marked with a folder icon.

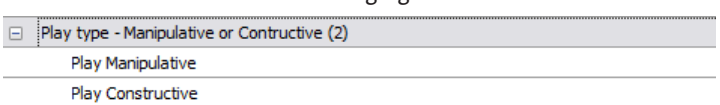

   For Modifiers, select the Modifier group name in which you want to merge Modifiers (see also **NOTES ABOUT MERGING** on page 209).

   b Type in the name you want to give to the group, and press **Enter**.

   c Drag an element you want to include in the group to the group line, until the line is highlighted.




   **Result** – the element is placed in the group. Repeat the step above to add more elements. See also the Notes on merging below.




5. If necessary, repeat the steps above to create more merged groups. Click **OK** to confirm the groups.

## NOTES ABOUT MERGING

***Behaviors***

- You can merge Behaviors from different Behavior groups into one Merged group.
- Adding a Behavior to a Merged group means that it is removed from its original Behavior group.
- You cannot place a Behavior in more than one Merged group.
- When you merge Behaviors with modifiers into a new Behavior, this new Behavior does not have any modifiers.
- The number in brackets next to each group indicates the number of elements in that group.
- To remove a Merged Behaviors group, select the group name and click the **Remove** button at the bottom. To removed all Merged groups in one of the tabs at once, click the **Reset to default** button.

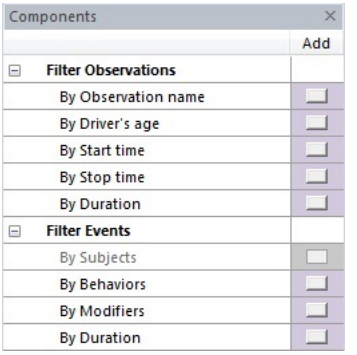
***Modifiers***

- You can only merge Modifiers from the same Modifier group.
- To remove a Merged Modifiers group, select the group name and click the **Remove** button at the bottom. To removed all Merged groups in one of the tabs at once, click the **Reset to default** button.
- If you create a Merged group of numerical modifiers, this group is considered as nominal. If you want to calculate the frequency distribution of numerical modifiers, create one group per value, then start a Behavior Analysis and calculate the Total number (see page 301).

***Effects of changes in the coding scheme on grouping***

- **If you add an element to the coding scheme** – The element is added to the **Merge Elements** window at the appropriate level, however it is not automatically part of any analysis group.
- **If you delete an element in the coding scheme** – The element is deleted from the **Merge Elements** window.

# 6.4 Select data - Filtering




## WHAT IS FILTERING?

The aim of filtering is to pick out the data that will be subject to analysis (visualization or statistical analysis). You can filter the data directly (for example, choose a specific subject or behavior), or indirectly according to the value of independent variables (for example, filter the observations with subject age less than 10).

Below you will find all the possible filtering methods. Remember that you can use just one filter method, or combine more in one data profile.

### *Filtering methods*

You can filter data (see the buttons in the blue area of the Components pane on your screen):

- **By choosing the observations/event logs/subjects to analyze**:
  - Directly, by the **Observation name** (see page 212).
  - Indirectly, by values of Independent Variables (for example, the observation's start time, or the age of the subject) (see page 213).

  **Result** – Analysis is done on the observations you have selected or those matching the values of the independent variables you have selected.

  Whether analysis is done on observations, event logs or subjects depends on the scope of the User-Defined Variable (see page 90).

- **By choosing the events to analyze**:
  - By Subjects (see page 214).
  - By Behaviors (see page 215).
  - By Modifiers (see page 216).
  - By Duration (see page 217).

  **Result** – Analysis is done on all the events that contain those subjects, behaviors and modifiers. You can also select events longer or shorter than a given duration (see **FILTER BY DURATION** on page 217).

***How do I combine two or more filtering criteria?***

Simply filter more element types and connect the corresponding boxes. See page 240 for more information.

## FILTERING PROCEDURE IN SHORT

1. Make sure that a data profile is open. If not, create a new data profile or open an existing one (see page 248).
2. Locate the item in the **Components** pane (See figure on page 210) that you want to use for filtering data, and click the corresponding button in the blue area.
3. In the **Filter** window that opens, choose the values of the independent variable, the observations or the coding scheme elements you want to analyze, and click **OK**.

   For example, click the button next to **By Behaviors** if you want to analyze a subsample of events. Click the button next to **By Gender** if you want to analyze observations referring to one gender, not the other (*Gender* must be defined as independent variable).

   See the next sections for details on the different criteria for filtering.
4. A new box appears in the **Data Selection** window. Drag the box to the desired position between the **Start** and the **Results** Box, so it is connected to other boxes (see page 204 for how to connect selection boxes).
5. Repeat steps 2 to 4 to make more complex selections.

See page 240 for information on how to create a complex data selection.

If you want to edit an existing selection box instead of creating a new one, click the **Settings** button in that box.

To make sure you analyze all items, click the **Select all** check box. To select quickly one or few items, click **Select all** until all boxes are cleared, then select the items you want to analyze.

If you create an unwanted Filter box, click its title and press **Delete**. To copy a Filter box, click its title, press **Ctrl+C** and then **Ctrl+V**.

## FILTER OBSERVATIONS

Aim – Choose observations or event logs directly from a list. Without any other filtering or interval criterion, all events scored in the filtered observations or event logs are considered for analysis.

1. Under Filter Observations, click the button next to **By Observation name**.

   **The Filter (Observations)** window displays listing the observations and event log files currently present in your project (see Figure 6.6).

2. Select the observations and event logs you want to analyze. By default, all observations and event logs are selected.
   - Event logs are listed under the observation they belong to.
   - If you select an observation, all event logs in that observation are selected automatically.
   - If you de-select an observation, all event logs in that observation are de-selected automatically.
   - If you select at least one event log, the observation it belongs to is selected automatically.
   - If you de-select all event logs in one observation, that observation is de-selected automatically.

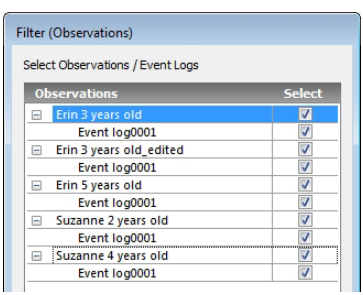



***Figure 6.6*** *The* ***Filter (Observations)*** *window.*

3. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

## FILTER BY INDEPENDENT VARIABLE VALUES

**Aim** – Filter observations according to the values of one or more Independent Variables, either System Variables or User-defined Variables.

All System Independent Variables (Start Time, Stop Time, Duration) have Observation as scope (see page 90). Therefore, you can only filter observations, not event logs or subjects by values of System Independent Variables.

Each User-Defined Variables has a scope (Observation, Event Log Data, or Subject; see page 90). Depending on its scope you can filter observations, event logs or subjects according to the values of the selected User-Defined Variable.

**Example 1** – If the scope of the variable Temperature is Observation, selecting values of Temperature results in selecting those observations (therefore, all events in them) corresponding to the Temperature values you have selected.

**Example 2** – If the scope of the variable Subject Experience is Subject, then selecting values of Subject Experience results in selecting events for those subjects corresponding to the values of Subject Experience you have selected.

---

**!** If you want to filter data by User-defined Variable values on a Subject level, make sure that you enter a value for that Variable for each Subject in the Independent Variable List. If you do not do this, you might get a wrong selection.

---

1. Under **Filter Observations**, click the button next to **By <Independent Variable name>**.

   The Filter (Independent Variables) window displays. The Filter window shows the range of values of that Independent Variable available for filtering.

2. Choose one of the following:
   - If you want to filter observations according to specific variable values, select **Select by Value.** The **Filter** window lists the values of the variable available for filtering.
   - If you want to filter observations according to a range of variable values, select **Select by Definition**. The **Filter** window shows two fields, **From** and **To**.

     The **Select by Definition** option is not available for variables of type Text and Boolean (see page 88).

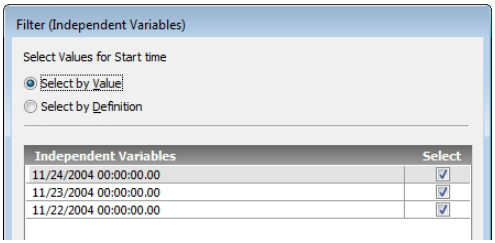



***Figure 6.7*** *The* ***Filter (Independent Variables)*** *window for System Variable Start Time.*

3. If you have chosen **Select by Value**, select the values you want.

   If you have chosen **Select by Definition**, type the lowest value of the range under **From**, and the highest value under **To**.

4. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

5. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

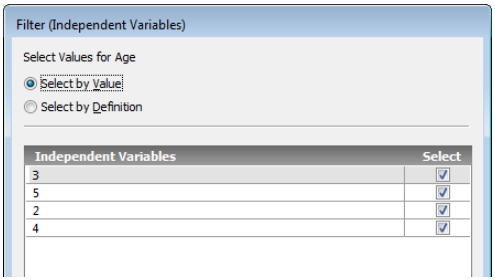



***Figure 6.8*** *The* ***Filter (Independent Variables)*** *window for the User-defined Variable 'Age of twins'.*

## FILTER BY SUBJECTS

**Aim** – Choose subjects directly from a list. Without any other filtering or interval criterion, all events scored for those subjects are considered for analysis.

1. Under **Filter Events**, click the button next to **By Subjects**.

The **Filter (Subjects)** window displays listing the subjects currently present in your coding scheme.

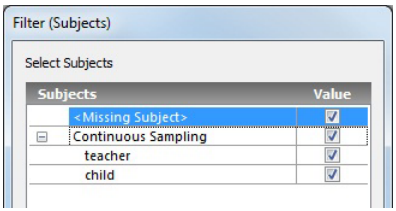



***Figure 6.9*** *The* ***Filter (Subjects)*** *window.*

2. Select the subjects you want to analyze. By default, all subjects are selected.
3. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

---

If you create a new subject in the coding scheme, and then re-open the data profile, the new subject is not selected automatically. The subject is analyzed if there is no Subject filter in your Data Profile.

---

## FILTER BY BEHAVIORS

**Aim** – Choose behaviors directly from a list. Without any other filtering or interval criterion, all behaviors of that type scored are considered for analysis.

1. Under **Filter Events**, click the button next to **By Behaviors**.

   The **Filter (Behaviors)** window displays listing the behaviors currently present in your coding scheme.

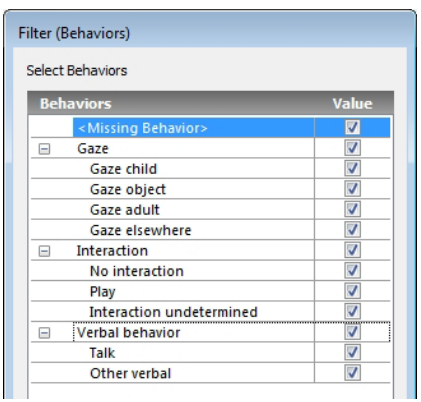



***Figure 6.10*** *The* ***Filter (Behaviors)*** *window.*

2. Select the behaviors you want to analyze. By default, all behaviors are selected.

   To filter behavior Modifiers, see page 216.

3. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

***Notes on filtering Behaviors***

- Each behavior and behavior group is listed in a separate row (please note that here by groups we mean groups defined in the coding scheme, not groups in data selection).
- If you select a behavior group and de-select one or more behaviors forming that group, you analyze only the data scored for the selected behavior.
- If you de-select a behavior group, the behaviors forming that group are also de-selected.

---

If you de-select a behavior or behavior modifier group, the group name is not visualized nor analyzed.

---

- If you re-select a behaviors group, make sure that the behaviors you are interested in are selected, and those you want to ignore are de-selected.
- If you create a new behavior in the coding scheme and then re-open the data profile, the new behavior is not selected automatically. You must select the new behavior in the **Filter** window if you want to consider it for analysis.

## FILTER BY MODIFIERS

**Aim** – Choose modifiers directly from a list. Without any other filtering or interval criterion, all modifiers of that type scored are considered for analysis.

1. Under **Filter Events**, click the button next to **By Modifiers**.

   The **Filter (Modifiers)** window opens.

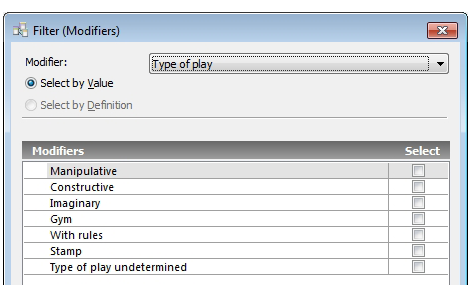
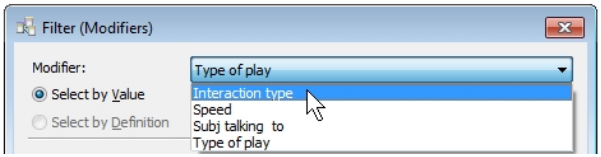



***Figure 6.11*** *The* ***Filter (Modifiers)*** *window.*

2. Select a **Modifier group** from the **Modifier** list.




3. Select the Modifiers you want to analyze.
4. Repeat steps 2 and 3 to select Modifiers from other Modifier groups.
5. Click **OK**. Insert the box at the required position in the sequence between the **Start** box and the **Results** box.

## FILTER BY DURATION

You can select events that are longer or shorter than a given duration. For example, if you observe aphids, you can 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.

To do so:

1. Insert a **By behaviors** (see page 215) or **By modifiers** (see page 216) box with the event of interest in the sequence between the **Start** box and the **Results** box. If you do not choose to do so, you apply the minimum or maximum duration to all events. See page 240 for more information on combining selection boxes.
2. Under **Filter Events**, click the button next to **By Duration**.

   The **Select Events (Duration)** window opens.

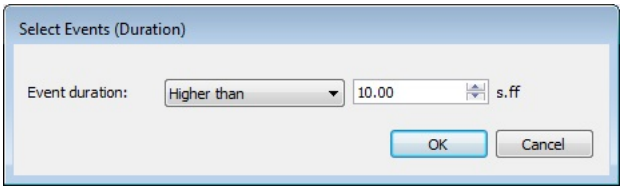
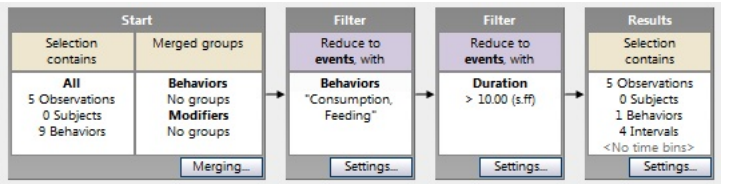


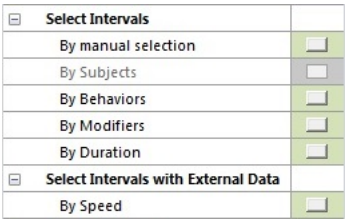

***Figure 6.12*** *The* ***Select Events (Duration)*** *window.*

3. Select a duration and from the list select **Higher than**, **Higher or equal to**, **Lower than**, or **Lower or equal to**. In the example above, select *Higher than 10 s*.

4. Click **OK**. Insert the box after the other filter boxes in the sequence between the **Start** box and the **Results** box.




# 6.5 Select data - Intervals




## WHAT IS SELECTING INTERVALS?

With selecting intervals you analyze events that occur in time periods defined by an event or a combination of events (interval conditions).

*Example* – You want to analyze the events 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.

### *Criteria for selecting intervals*

You can select intervals by **Manual selection**, by **Subjects**, **Behaviors, Modifiers, Duration**, and **External data**:

- **Manual selection** (see page 221) – Analysis is done on the events occurring in the defined time interval. The start and stop of the interval can be based on time, any event, or the value of external data.

**Example** – You define an interval that starts when a child starts running, and ends when its heart rate exceeds 110 beats per minute. Analysis is done on all events occurring in this interval.

- **Subjects** (see page 231) – Analysis is done on the events occurring in the time intervals covered by any event by the subjects selected.

  **Example** – If you select intervals by the subject *Mother*, analysis is done on the events occurring in the time intervals when *Mother* was scored as a subject, no matter which behavior was scored.

- **Behaviors** (see page 228) – Analysis is done on the events occurring in the time intervals defined by the behaviors selected.

  **Example** – If you select intervals by the state behavior *Zone 1,* analysis is done on the events occurring when the state *Zone 1* was active.

- **Modifiers** (see page 233) – Analysis is done on the events occurring in the time intervals defined by the modifiers selected.

  **Example** – If you select an interval by the modifier *Parallel play*, analysis is done on the events occurring when the modifier *Parallel play* was active.

- **Duration** (see page 234) – To select those intervals that are longer or shorter than a given duration. Use this interval criterion in combination with selecting intervals by a behavior or modifier.

  Example – If you select intervals with a duration **Lower or equal than 30 s** in combination with selecting intervals by the behavior *Smiling*, analysis is done over the time intervals during which the subjects were smiling maximally 30 s.

- **External data** (see page 234) – Analysis is done on the events occurring in the time intervals defined by the external data values selected.

  **Example** – If you select intervals by skin temperature in the index finger with a range between 36.5 and 37.5 degrees Celsius, analysis is done on the events occurring when the temperature was within that range.

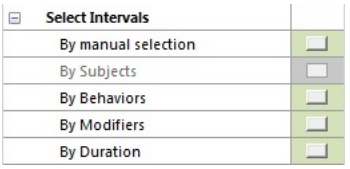
***Selecting complex intervals***

**Example** – Analyze all events that occurred when the rat was in *Zone 1* OR *Zone 2*, AND the light was on.

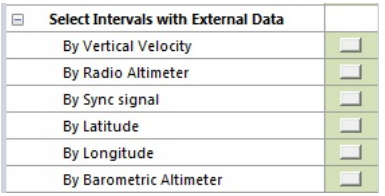
You can define and combine interval criteria. See page 240 for more information.

## INTERVAL PROCEDURE IN SHORT

1. Make sure that a data profile is open. If not, create a new data profile or open an existing one (see page 248).
2. In the **Components** pane, do one of the following:
   - Under **Select Intervals**, click the button next to **By Manual selection, By Behaviors**, **By Subjects** or **By Modifiers**, or **By Duration**.




   - Under **Select Intervals with External Data**, click the button next to the appropriate external data signal.




3. In the **Select interval** window that opens, choose the selection criteria you want to use to define the intervals and click **OK**.

   See the next sections for more details and how to select items.
4. Insert the **Interval** box in the sequence between the **Start** and the **Results** box, (see page 204 for how to connect selection boxes).
5. Repeat steps 2 to 4 to make more complex selections.

If the observation was suspended, defining an interval based on a state event that was active at the moment you suspended the observation may lead to incorrect intervals. This is because suspend/resume creates extra stop and start events for that behavior, respectively. 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 you want to edit an existing selection box instead of creating a new one, click the **Settings** button in the box.

If you create an unwanted **Interval** box, click its title and press **Delete**.

To copy an **Interval** box, click its title, press **Ctrl+C** and next **Ctrl+V**.

## SELECT INTERVALS BY MANUAL SELECTION

The aim of selecting intervals manually is to analyze events in time periods from a Begin point to an End point. Both Begin and End points can be:

- A time (for example, one minute after the start of the observation).
- An event (for example, the start of *Task 1*).
- When an external data value becomes higher/lower than a set value, for example, when the heart rate becomes higher than 100 bpm.

You can combine time, events or external data to define, for example, the following:

- From time t to event E.
- From event E to when the external data becomes lower than value x.
- From when the external data becomes lower or equal to value y to time t.

You can also combine time and events in a single Start or Stop point. For example: From 1 minute after the event *Start Test* to 1 minute before the event *Stop Test*.

For time intervals the left border is used in the analysis and the right border is not used (see page 328 for details).

***How are intervals applied?***

- Manually selected intervals are defined for each observation independently:
  - If you define intervals based on time, and observations have different durations, then the time periods subject to analysis can differ between the two observations.

    Example – Define an interval from the start of the observation to 10 minutes. If an observation lasts 12 minutes, the first 10 minutes are analyzed. If an observation lasts 9 minutes, analysis is done on 9 minutes.
  - If you define intervals based on events, and events occur at different times in two observations, then the time periods subject to analysis differ between the two observations.

    **Example** – Define an interval from the start of the observation to the event *Correct Answer*. If *Correct Answer* occurs at five minutes in observation 1 and at 10 minutes in

observation 2, then the time period analyzed for observation 2 is twice as long as for observation 1.

- 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*. If this event occurs at 5 minutes in one event log and at 10 minutes in another event log in that observation, then data are analyzed from 0 to 10 minutes for both event logs.

- If the time t exceeds the duration of the observation or the event E does not occur in the observation, the interval is not defined, and analysis not done for that observation.

***How many intervals in an observation?***

The number of intervals defined per observation depends on what you specify as Begin and End:

- **From time t1 to time t2** – This defines one interval per observation. Analysis is done between the two times.
- **From time t to event E** – This defines one interval per observation. Analysis is done on events occurring between time t and the first occurrence of E. Other occurrences of E do not define intervals.
- **From time t to when the external data becomes higher/lower than value x** – This defines one interval per observation. Analysis is done on events occurring between time t and the first time the external data becomes higher/lower than value x. Subsequent occurrences of when the external data becomes higher/lower than value x do not define intervals.
- **From event E to time t** – This defines one interval. Analysis is done on events occurring between the first occurrence of event E and time t. Other occurrences of E do not define intervals.
- **From event E to when the external data becomes higher/lower than value x** – This defines one or more intervals. Analysis is done:
  - From the first occurrence of E to the first time the external data becomes higher/lower than value x.
  - From the first occurrence of E after the external data became higher/lower than value x above, to the next time the external data becomes higher/lower than value x, and so on.
- **From event E1 to event E2** – This defines one or more intervals. Analysis is done:
  - From the first occurrence of $E_1$ to the first occurrence of $E_2$.
  - From the first occurrence of $E_1$ after the $E_2$ above, to the next occurrence of $E_2$, and so on.

**Example** – The behavior of male sticklebacks has been recorded when they were presented with females of different size classes. You want to analyze the time from the moment when Female 1 was presented (scored as *Female 1*) to the occurrence of male *Display*.

The first interval is considered from 0.00 *Female 1* to 0:50 *Display* (see Figure 6.13). The second interval goes from 1:12 *Female 1* to 1:52 *Display*. The instance of *Female 1* at 0:30 is not considered as a starting point of an interval, because it occurs before the ending point of a previous interval (0:50 *Display*).

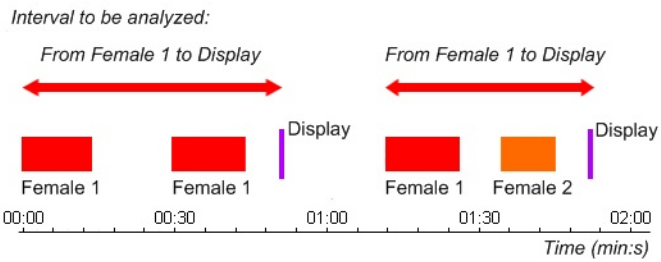



***Figure 6.13*** *An example of selecting intervals: From 'Female 1' to 'Display'. The second occurrence of 'Female 1' is ignored as it occurs before 'Display'.*

- If you define an interval using the same event type ("From $E_1$ to $E_1$"), each interval generated will have its begin and end based on the same instance of the event. For example, your data include two point events *P* at 3 s and 5 s. If you define an interval "From 3 s before P to 3 sec after P", this results in an interval going from 0 s to 8 s, merging the intervals 0 - 6 s (for the first event *P*) and 2 - 8 s (for the second event *P*).

- **From when the external data becomes higher/lower than value x to when the external data becomes higher/lower than value y** – This defines one or more intervals. Analysis is done:
  - From the first time the external data becomes higher/lower than value x to the first time external data becomes higher/lower than value y.
  - From the next time the external data becomes higher/lower than value x to the next time the external data becomes higher/lower than value y, and so on.

## INTERVALS BY MANUAL SELECTION: PROCEDURE

1. Make sure that your data profile is open. If not, create a new data profile or open an existing one (see page 248).

2. Under **Select Intervals**, click the button next to **By Manual selection**. The **Select Intervals (Manually)** window opens.

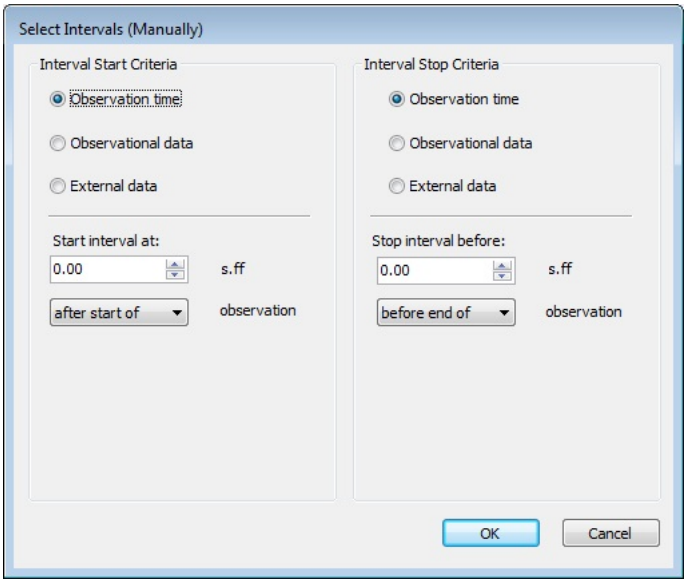



***Figure 6.14*** *The* ***Select Intervals (manually)*** *window.*

3. Under **Interval Start Criteria**, select the point marking the begin of the interval to be analyzed.
   - Select **Observation time** if the start of your interval is the start/stop of the observation +/- a certain time, for example, *At the start of the observation*, *One minute from the start of the observation* or *Five minutes before the stop of the observation*. Type this time in the appropriate field (hh:mm:ss), and select the option that you require (after start/before stop).
   - Select **Observational Data** if the start of your interval is a scored event +/- a certain time, for example, *At the start of Task 1*, *One minute after the event Intruder in Arena* or *Five minutes before the stop of the state Test 2*. Type this time in the appropriate field (hh:mm:ss), then choose the **before/after** and **start/stop** option and select the event you require (subject, behavior and modifiers if applicable).
   - Select **External data** if the start of your interval is an external data value +/- a certain time, for example, *At the moment the heart rate becomes higher than 100 beats per minute (bpm)* or *1 minute before the heart rate becomes lower than to 65 bpm*. Type the time in the appropriate field (mm:ss:ff), choose the **before/after** option, select the external data, select one of the Becomes **lower/higher** options and enter the external data value.

4. Under **Interval Stop Criteria**, select the point that marks the end of the interval to be analyzed.
   - Select **Observation time** if the end of your interval is the start/stop of the observation +/- a certain time, for example, *10 minutes after the start of the observation*.
   - Select **Observational Data** if the end of your interval is a scored event +/- a certain time, for example, *At the stop of Task 1*, *One minute after the event Intruder out of Arena*. Type this time in the appropriate field (hh:mm:ss), then choose the **before/after** and **start/stop** option and select the event you require (subject, behavior and modifiers if applicable).
   - Select **External data** if the end of your interval is an external data value +/- a certain time, for example, *5 minutes after the heart rate became higher than 100 bpm*. Type the time in the appropriate field (mm:ss:ff), choose the **before/after** option, select the external data, select one of the **Becomes lower/higher** options and enter the external data value.
5. Click **OK**. Insert the **Interval** box in the selection sequence between the **Start** box and the **Results** box.

If the observation was suspended, defining an interval based on a state event that was active at the moment you suspended the observation may lead to incorrect intervals. This is because suspend/resume creates extra stop and start events for that behavior, respectively. For example, if you suspended the observation when *Play* was active and then define an interval from the start of the observation to the stop of *Play*, the resulting interval will be from the start of the observation to the suspend time, not the time that you actually score the stop of *Play*.

---

If you want to analyze an interval starting from the start of an observation, leave 00:00:00 selected.

---

***Manual intervals based on external data***

The manual interval based on external data is generated as follows:

1. The Start point at which the external data becomes higher than/higher or equal to or lower than/lower or equal to the set value is determined.
2. The offset (before or after) specified in **Start interval at** field is applied.
3. The End point at which the external data becomes **higher than/higher or equal to** or **lower than/lower or equal to** the set value is determined.
4. The offset (before or after) specified in **Stop interval at** field is applied.
5. Steps 1 to 4 are repeated until the end of the observation.

**Example** – You have measured a subject's heart rate with values ranging between 60 and 120 bpm. You want to generate intervals from the point at which the heart rate becomes

higher than 100 and next, after the heart rate has dropped below, becomes higher than 80 again. To do this, make the following settings in the **Select Intervals (Manually)** window:

- Under **Interval Start Criteria**, select **Start interval at** *00:00:00*, **after** *Heart rate* **Becomes higher or equal to** *100*.
- Under **Interval Stop Criteria**, select **Stop interval at** *00:00:00*, **after** *Heart rate* **Becomes higher or equal to** *80*.

See Figure 6.15 below for a visualization of the selected interval.

---

If either the Interval Start Criteria or the Interval Stop Criteria is not met in the observation, no interval is selected. So if the observation ends before the interval stop criteria are met, no interval is selected.

If the external dataset has missing samples, these missing samples are not taken into account in both the start and the stop of the interval. The first valid sample determines the start or stop of the interval.

In the analysis, the left borders of the time intervals are used and the right borders are not used (see page 305 for details).

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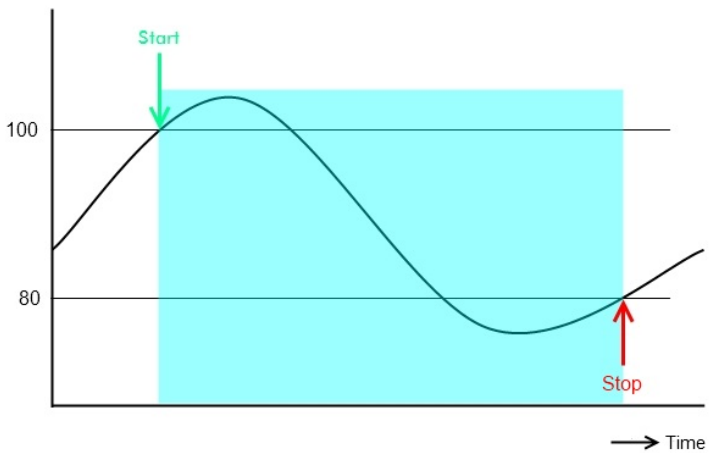



***Figure 6.15*** *Example of* ***Select Intervals by Manual selection*** *based on external (heart rate) data. The arrow labeled 'Start' shows the start of the interval when the heart rate* ***Becomes higher or equal to*** *'100' bpm. The arrow labeled 'Stop' shows the end of the interval when the heart rate* ***Becomes higher or equal to*** *'80'.*

***The difference between 'Selecting intervals by manual selection based on external data' and 'Selecting intervals with external data (page 235)'***

With **Selecting intervals with external data** you select a static interval with a set upper and/or lower limit whereas with **Selecting intervals by Manual selection** the range of the interval is dynamic.

**Example** – You have measured a subject's heart rate with values ranging between 60 and 120 bpm. You want to generate intervals when the heart rate was between 80 and 100 bpm. To do this, you Select Intervals By heart rate (see **SELECT INTERVALS BY EXTERNAL DATA** on page 235) with a range between **Higher or equal to** '80' and **Lower or equal to** '100' (also see Figure 6.16).

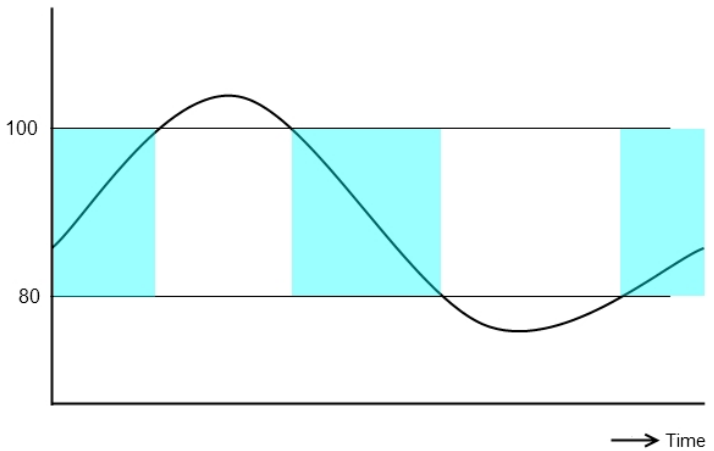



***Figure 6.16*** *Example of Selecting intervals with external data. The shaded areas indicate the intervals based on the external data range between 80 and 100 bpm. Compare this figure with Selecting intervals by Manual selection based on external data in Figure 6.15.*

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 **Visualizing external data** on page 263.

***Selecting complex events***

- If the event that marks the begin/end of an interval includes specific modifiers, specify these in the appropriate field.

**Example** – You want to define an interval ending when the level of aggression scored as a numerical modifier of the event *Aggression* reaches 2 or 3. In the **Behavior** field, specify *Aggression*. Next, from the list that becomes available below select *Aggression level* (the modifier group). Click the button next to the modifiers to choose the values of the modifier group.


The data are analyzed up to the first occurrence of aggression level = 2 or 3. It is not possible to use a combination of different modifier groups to define the start or the stop of the intervals.

- If you want to analyze data at the intersection of two or more intervals, define one Interval box for each interval definition, and line up those boxes in a sequence (see also page 245).
- For more information on multiple selections, see page 240.

## SELECT INTERVALS BY BEHAVIORS

**Aim** – Analyze data as long as one or more state events occurred. Optionally, you can specify whether to consider a specific subject that performed those behaviors, or any subject (see below).

Example – To analyze all time segments when the subject is not playing, select intervals by *No Play* behavior:

1. In the **Components** pane, under **Select Intervals**, clicking the button next to **By Behaviors**.

   The Select Intervals (Behaviors) window appears listing all behaviors currently defined in your coding scheme.

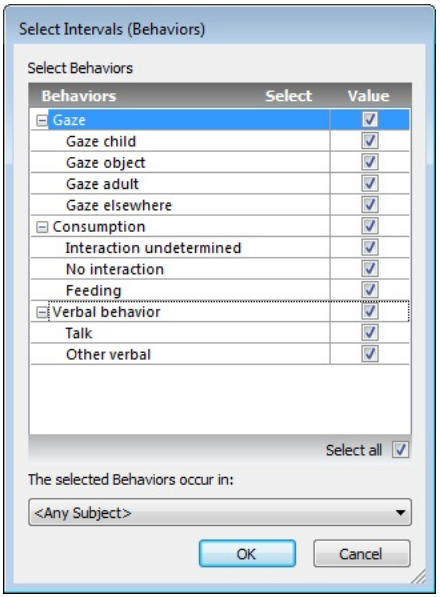



***Figure 6.17*** *The* ***Select Intervals (Behaviors)*** *window.*

2. Select the behaviors you want to use as interval criteria.

   For Selecting Intervals by Modifiers, see **SELECT INTERVALS BY MODIFIERS** on page 233.

3. From the **The selected Behaviors occur in** list at the bottom, choose the subjects that form the criteria together with the behavior selected in the previous step:
   - **<Any Subject>** – Select this item if you want to consider the time intervals as long as the behaviors occurred, independent on what subject performed those behaviors.

     **Example** – To select the time intervals when either subject *Large Cricket* or *Small Cricket* was in the center of the arena, select the behavior *Center of Arena* and then **<Any Subject>**.
   - **<All Subjects>** – Select this item if you want to consider the time intervals as long as the behaviors occurred for all subjects simultaneously.

     **Example** – To select the time intervals when both subjects *Large Cricket* and *Small Cricket* were in the center of the arena, select the behavior *Center of Arena* and then **<All Subjects>**.
   - **<Individual subject>** – Select one of the subjects in the list if you want to consider the time intervals as long as the behaviors occurred for that subject.

     **Example** – To select the time intervals when the subject *Large Cricket* was in the center of the arena, select the behavior *Center of Arena* and then *Large Cricket*.

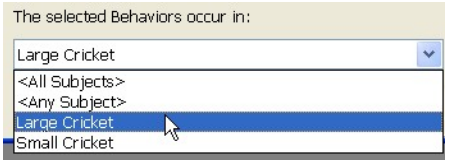



***Figure 6.18*** *Choose a subject from the list if you want to consider the time segments when the selected behavior was scored for that subject.*

4. Click **OK**. Insert the **Interval** box in the place of the sequence you require between the **Start** box and the **Results** box.


***Figure 6.19*** *An example of selecting intervals by behaviors. A - Event Plot of all data scored in an observation. B - Event Plot of the data in the intervals selected by Play behaviors (red bar in the event plot). The events occurring at the same time as Play behavior are selected for analysis. The semi-transparent area on the left indicates that the behaviors inside this area are not part of the data selection.*

### *Notes*

- **Selecting intervals by a subset of subjects** – If you want to select intervals based on the behaviors performed by a subset of subjects, not just one or all, you need to create multiple selection conditions (see page 240).

  **Example** – To select intervals based on the behavior *Eye contact* scored for subjects *Mark* and *Derek*, select the behavior *Eye contact* and, from the **The selected Behaviors occur in** list, select *Mark*. Then, repeat the selection procedure and in a new **Interval (Behaviors)** box select *Eye contact*, then from the **The selected Behaviors occur in** list select *Derek*. Next, combine the two **Interval** boxes (see page 240).

- Each behavior and behavior group is listed in a separate row (please note that here by groups we mean groups in the coding scheme, not groups in data selection).

- If you re-select a behavior group, make sure that the behaviors you are interested in are selected, and those you want to ignore are de-selected.

- If you create a new behavior in the coding scheme and then re-open the data profile, the new behavior is not selected automatically. You must select the new behavior in the **Select Intervals (Behaviors)** window if you want to include it in the selection criterion.
- Selecting a certain combination of behaviors and subjects in the Interval (Behaviors) window is the same as selecting the same combination in the Interval (Subject) window (see page 231). First, select the subject in the upper part of the window, then the behavior from the list at the bottom.

## SELECT INTERVALS BY SUBJECTS

**Aim** – Analyze data as long as one or more subjects were scored. Optionally, you can specify whether to consider a specific behavior performed by those subjects, or any behavior (see below).

1. In the **Components** pane, under **Select Intervals**, click the button next to.

   The **Select Intervals (Subjects)** window appears (Figure 6.20).

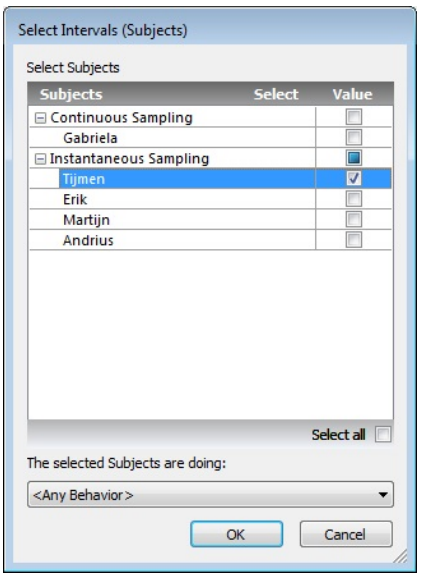



***Figure 6.20*** *The* ***Select Intervals (Subjects)*** *window.*

   The **Select Intervals (Subjects)** window lists all subjects in your coding scheme. Select all subjects you want to use as selection criteria. For example, if you select *Suspect 1* and *Investigator 1,* the time segments when either subject was scored are considered for analysis. By default, all subjects and subject groups are selected.

2. From the **The selected Subjects are doing:** list at the bottom, choose one of the following:
   - **<Any Behavior>** – Select this item if you want to consider all the time intervals when the subjects selected were scored, independent on their behavior.
   - **<Individual behavior>** – Select one of the state behaviors in the list if you want to consider all the time intervals when the subjects selected were performing that behavior.

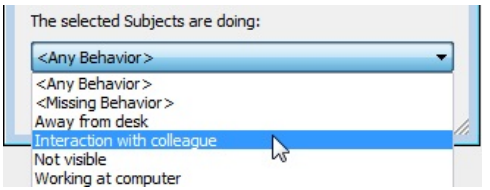



***Figure 6.21*** *Choose a behavior from the list if you want to consider the time segments when the subjects were performing that behavior.*

If is not possible to select intervals by behaviors without duration, but you can define intervals starting or ending a defined time before/after a a behavior without duration (see page 221).

If you want 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 in the Data Selection window (see page 240).

**Example** – To select intervals by the subject *Test participant* when performing behaviors *Task 1* or *Task 2*, select the subject *Test participant* and, from the **The selected Subjects are doing** list, select *Task 1*. Then, repeat the interval procedure and in a new Select Intervals (Subjects**)** box select *Test participant*, and from the **The selected Subjects are doing** list select *Task 2*. Next, combine the two Interval boxes (see page 240).

3. Click **OK** and insert the **Interval** box at the required position in the sequence between the **Start** box and the **Results** box.

***Notes***

- Each subject and subject group is listed in a separate row (please note that here by groups we mean groups in the coding scheme, not groups in data selection).
- If you re-select a subject group, make sure that the subjects you are interested in are selected, and those you want to ignore are de-selected.
- If you create a new subject in the coding scheme and then re-open the data profile, the new subject is not selected automatically. You must select the new subject in the **Select Intervals (Subjects)** window if you want to include it in the selection criterion.
- 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. First select the behavior in the upper part of the window, then the subject from the list at the bottom of the window (see above).

## SELECT INTERVALS BY MODIFIERS

**Aim** – Analyze data when a Modifier has a certain value. For example, to analyze all time segments when *Interaction type* was *Parallel*, select intervals by the *Parallel* Modifier value in the Modifier group *Interaction type*.

1. In the **Components** pane, under **Select Intervals**, clicking the button next to **By Modifiers**.

   The **Select Intervals (Modifiers)** window appears listing all Modifier groups currently defined in your coding scheme.

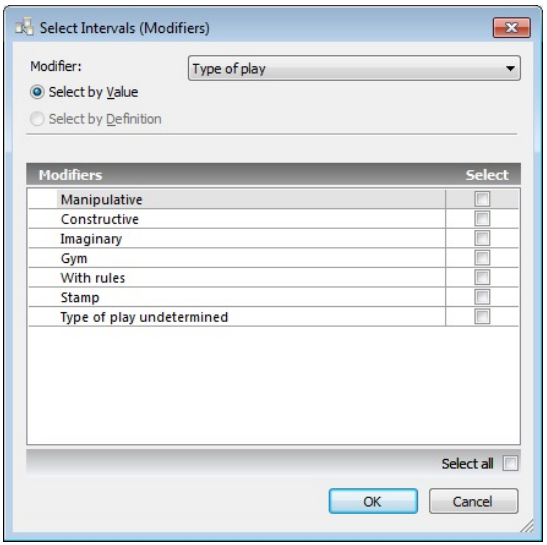



***Figure 6.22*** *The* ***Select Intervals (Modifiers)*** *window.*

2. First select a **Modifier group** from the Modifier list and then select the **Modifier values** from that group you want to use as criteria to define the intervals.

---

You can only select Modifier values from one Modifier group per Interval box. See **Rule 1b – Filtering by multiple modifiers** on page 243 how to select intervals based on multiple modifiers from different Modifier groups.

Any Multiple Modifier value selected in a Modifier group results in selection of the connected behavior (OR logic).

---

## SELECT INTERVALS BY DURATION

**Aim** – Analyze intervals that have a minimum or maximum duration. For example, to analyze those intervals when the behavior *Smiling* occurred for at least 30 seconds. First create an interval criterion for the behavior or modifier of interest. Then add an interval criterion **By duration**.

---

Always use the **Select intervals by duration** option in combination with the **By Behavior** or **By Modifier** option. Adding only a **By duration** interval box in the sequence between the Start box and the Result box selects entire observations with that minimum or maximum duration. See page 240 for more information on combining selection boxes.

Always place the **By duration** interval box after the interval boxes with the other selection criteria.

---

1. Insert a **By behaviors** (see page 228) or **By modifiers** (see page 233) box with the event of interest in the sequence between the **Start** box and the **Results** box.
2. Under **Select intervals**, click the button next to **By Duration**.

   The **Select intervals (Duration)** window opens.

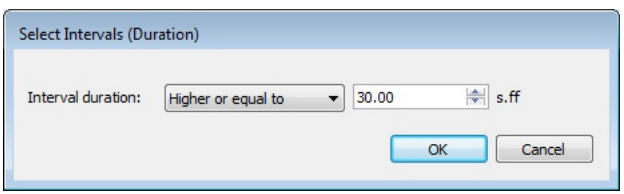
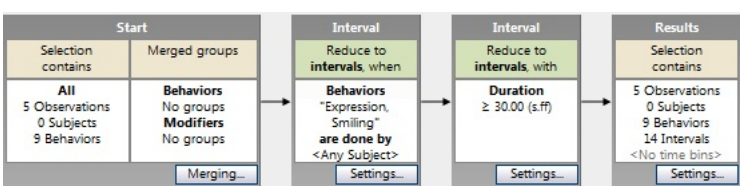



***Figure 6.23*** *The* ***Select intervals (Duration)*** *window.*

3. Select a duration and from the list select **Higher than**, **Higher or equal to**, **Lower than**, or **Lower or equal to**. In the example above, select *Higher or equal to 30 s*.
4. Click **OK**. Insert the box in the sequence after the boxes with the other selection criteria.

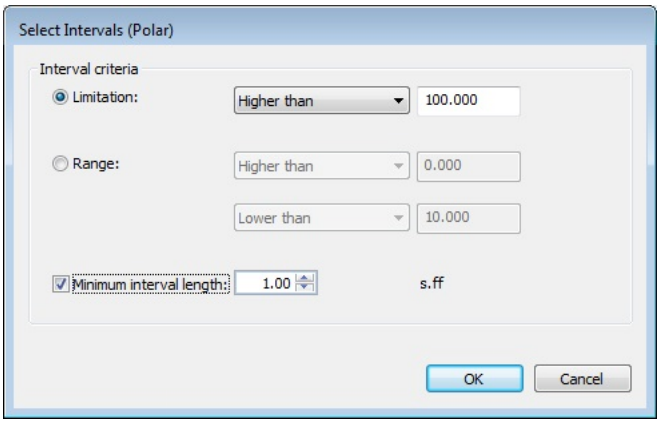


## SELECT INTERVALS BY EXTERNAL DATA

**Aim** – Analyze data when external data values are above/below a specific value (for example, heart rate above 100 bpm) or when external data is within a specific range of values (for example, skin temperature between 36 and 37.5 degrees centigrade).

1. In the **Components** pane, under **Select Intervals with External Data**, click the button next to the appropriate **By <external data signal>**.

   The **Select Intervals (external data signal)** window appears (see figure below).




2. You can now select:
   - **External data is Lower than / Lower or equal to / Higher than / Higher or equal to** – if you want to analyze events when the external data signal was above or below a specific value. Choose one of the above-mentioned options from the list and enter a value.
   - **External data is Higher than / Higher or equal to and Lower than / Lower or equal to** – if you want to analyze events when the external data signal was within a specific range. To set the lower limit, select one of the above-mentioned options from the top list and enter a value. To set the upper limit, select one of the above-mentioned options from the bottom list and enter a value.

3. In the **Minimal interval length** field, enter a duration.

   By setting the **Minimal interval length**, you can avoid the selection of many, short intervals when the signal is noisy around the selected external data values. When the **Minimal interval length** is '0' seconds, no minimal interval length is used. By default, the **Minimal interval length** is '1' second.

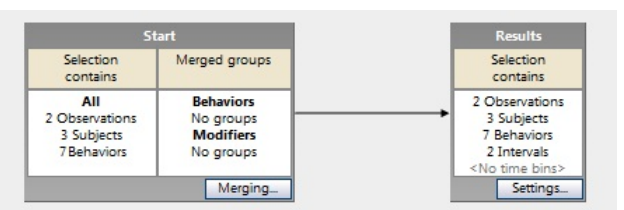
4. Click **OK** and insert the **Interval** box at the required position in the sequence between the **Start** box and the **Results** box.

***Notes***

- On the **Interval** box, the external data values are displayed with three decimals, but for the actual selection of external data the original values are used.
- When you delete an external data signal in the Independent Variable List, the corresponding **Interval** box is deleted from the Data Profile.
- 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 s. See also **Visualizing external data** on page 263.
- An interval based on external data should contain at least two samples. If only one falls within the set range, no interval is created.
- If the external dataset has missing samples, these missing samples are not taken into account in both the start and the stop of the interval. The first valid sample determines the start or stop of the interval.
- In the analysis, the left borders of the time intervals are used and the right borders are not used (see page 305 for details).

# 6.6 Selecting data -The Results box

The **Results** box shows the result of the data selection. When your project contains 2 observations and you defined 3 subjects and 7 behaviors in the Coding Scheme, both the Start box and the Result box show 3 subjects and 7 behaviors. The **Results** box also shows 2 intervals, one for every observation.

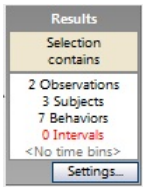


### *Filtering*

When you filter over subjects, behaviors, modifiers, or duration, 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, you create time intervals based on the selected data. No subjects, behaviors, or modifiers are filtered out, so this number remains unchanged in the **Results** box. The number of intervals is changed, 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 Result box shows **0 intervals** in red.




## TIME BINS

### *What are time bins?*

The aim of time bins is 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 is determined by the program.

If you do not define time bins, the whole observation is analyzed, unless your data profile specifies intervals (see page 218).

In the analysis, the left borders of the time intervals are used and the right borders are not used (see page 305 for details).

### *The difference between Time bins and other intervals*

- With Time bins, you analyze data in regular time segments. Each observation is split in such a way that no data is excluded.
- When you use intervals as well, the time bins are 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).

## DEFINING TIME BINS IN SHORT

1. Make sure that a data profile is open. If not, create a new data profile or open an existing one (see page 248).
2. Click the **Settings** button on the **Results** box.

   The **Result Container Settings** window appears.

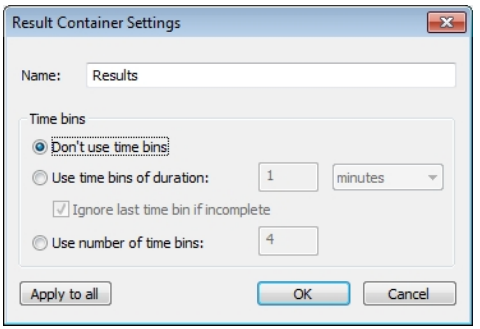



***Figure 6.24*** *The* ***Result Container Settings*** *window.*

3. Select **Use Time bins** and select one of the following:
   - **Duration** – if you want to specify a fixed interval length.
   - **Nr of Time Bins** – If you want to specify a fixed number of intervals to analyze.

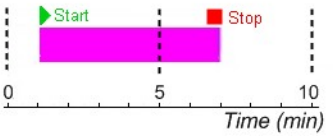
     Enter the length of the interval (in hours, minutes, or seconds; choose the time unit from the list) or the number of intervals.
4. If the duration of the observation/event log is not an exact multiple of the interval length, the last time bins will be incomplete. Select the **Ignore last Time Bin if incomplete** option if you do not want to analyze this last interval.

   **Example** – You have defined a fixed duration of 10 minutes, but your observations last around 35 minutes. You can choose to analyze only the first three complete 10-minutes intervals and ignore the last, five-minutes interval.
5. Click **OK**.

   The **Results** box shows the duration of the time bins. For example, 'Time bins: 10 minutes'.

***Notes***

- Make sure that the total number of time bins is less than 1000. Also, make sure that you define time bins after you have recorded all your observations.
- Consider the following case where a state behavior occurs across two five-minutes time bins (marked by dotted lines):



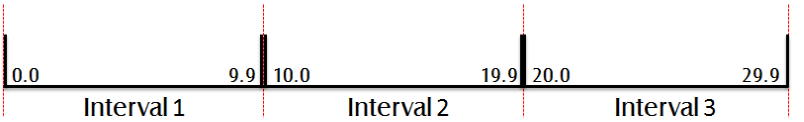

  Although the behavior occurs once, it is counted once in the first interval and once in the second interval.

- If your observations contain two or more event logs, the time bins are defined across event logs beginning from the start time of the observation. This means that if an event log starts later than another, the time bins defined before the start of the late event log do not show results for that event log.
- If your data profile contains two or more result containers (see an example on page 245), you can choose whether to apply the time bins to the current **Results** box only, or to all of them.

  By default, time bins are applied to one **Results** box.
  - To apply the time bins to all results containers, click **Settings** in the **Results** box in which time bins are applied, and click the **Apply to All** button.
  - To apply different time bins to different results containers, repeat the procedure above for each **Results** box.

***Intervals and Time bins***

The border of two connecting intervals can only be used for analysis in one of the two intervals. Otherwise the data for this data point would be duplicated. The Observer XT uses the left borders of the time intervals, while the right borders 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.



# 6.7 Complex data selections

Selection boxes can be combined in a variety of ways to create complex data selections. For example, select intervals by the behavior Playing, AND Filter the behavior Talk to parent. This way you analyze Talking to parent when the subject was playing. Below you find a few basic rules to combine selection boxes.

See page 246 for information on the correct order of selection boxes.

### *A very general rule – AND, OR and Multiple results logic*

- **AND logic** – When you line up boxes in a sequence, the data in the **Results** box satisfy all criteria defined by the boxes.

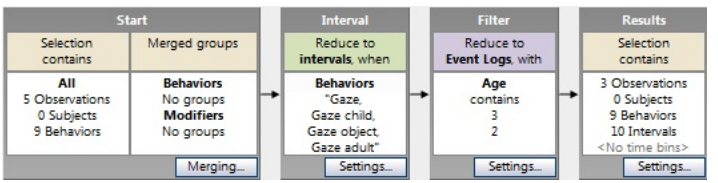



***Figure 6.25*** *The data selected in this example are those scored when the Behavior Gaze was active (second box), AND for the observations with the value of the Independent variable Age = 2 and 3 years (third box).*

- **OR logic** – When you split a sequence in two or more branches, the data in the **Results** box satisfy either one or the other selection criterion (see Figure 6.26).

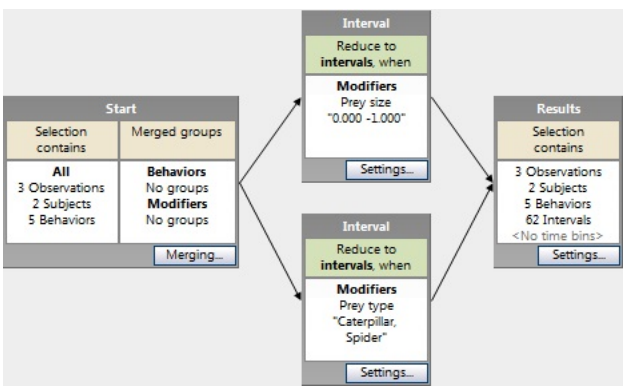



***Figure 6.26*** *The data selected in this example are those scored when the behavior Modifier Prey size was between 0.0 and 1.0 or when Behavior Modifier Prey type was Caterpillar or Spider.*

- **Multiple results boxes** – When you split a sequence in two or more branches and those end in different **Results** boxes, there will be as many analysis results as **Results** boxes, each referring to its own selection criterion.

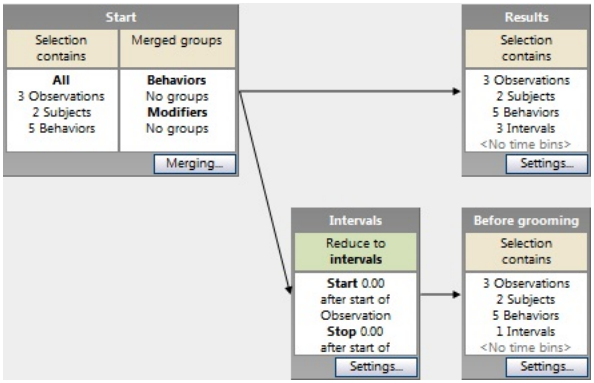



***Figure 6.27*** *The data selected in this example are* ***Results****, containing all data in the project (no filtering, no intervals), and* ***Before Grooming****, containing the data scored from the start of each observation to the event 'Grooming'. Analysis is done on both data sets, and results indicate which* ***Results*** *box they refer to (either* ***Results*** *or* ***Before Grooming****).*

### *Rule 1 – Filtering by multiple values of the same variable or element type*

To create a filter using multiple values of the same independent variable or multiple elements of the same type, specify them in one **Filter** box.

**Example 1** – Your project contains a number of observations made at different subject ages (5, 6 and 10 years). We assume here that *Age* has been entered as user-defined variable. You want to analyze observations made on subjects five and six years old.

**Example 2** – Your project contains data of a number of behaviors. You want to analyze all the *Agonistic* behaviors carried out by the *Marked* (see Figure 6.28).

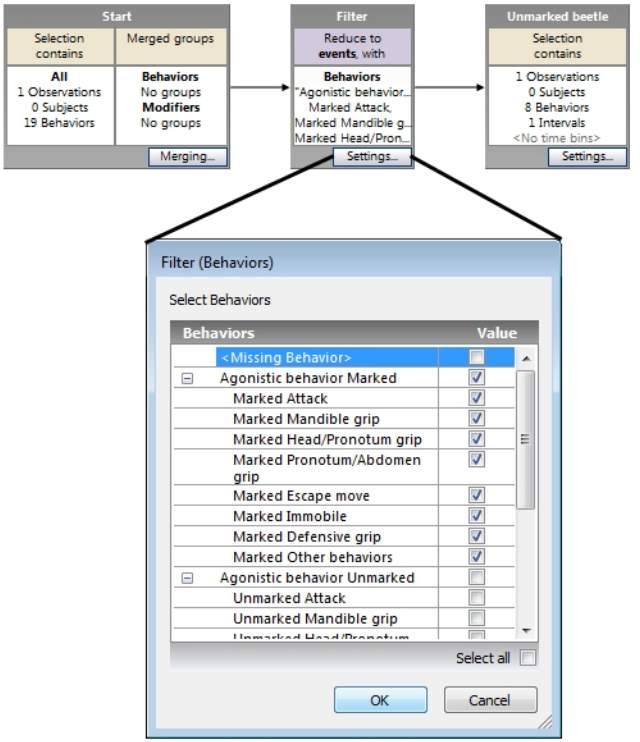



***Figure 6.28*** *Edit a Filter box to refine filtering based on one independent variable or type of elements of the coding scheme.*

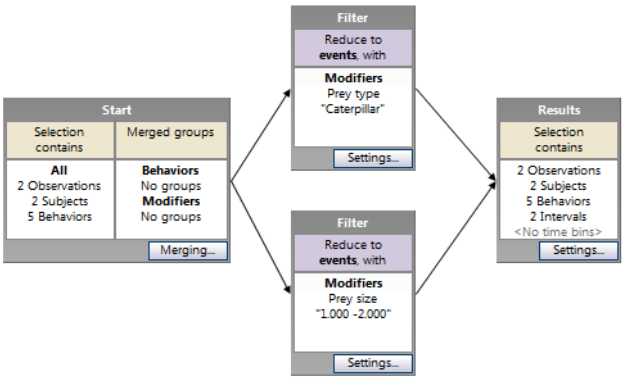
***Rule 1b – Filtering by multiple modifiers***

This is a special case of Rule 1.

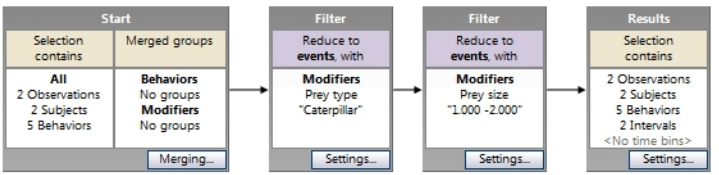
If you want to filter events with at least one of the modifiers you are interested in, select those modifiers in one Filter box.

**Example** – The behavior *Feeding* is attached to two modifier groups: *Prey type* (with values *Caterpillar*, *Spider*, and *others*) and *Prey size* (with values 1, 2, 3).

To filter events with either *Prey type = Caterpillar* OR *Prey size = 1.0-2.0*:



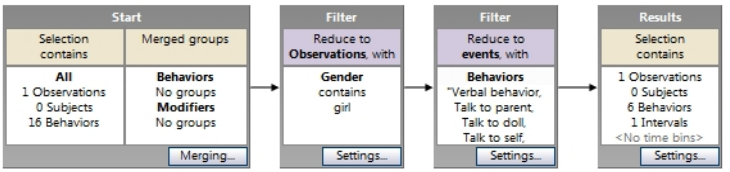

It is also possible to select events that contain a specific combination of modifiers. For example, *Prey Type = Caterpillar* AND *Prey size = 1.0 - 2.0*:




**Rule 2** – Filtering by multiple variables or element types

To create a filter using multiple independent variables or elements (observations, subjects, behaviors, external data), create one **Filter** box per variable/element type, and line up the boxes between the **Start** box and the **Results** box.

**Example** – In a parent-child interaction study, you want to calculate statistics of a few behaviors for the observations of *Boys* and for verbal behaviors. We assume here that *Gender of child* was defined as an independent variable.




### *Rule 3 – Defining intervals based on multiple subjects/behaviors not occurring simultaneously (OR logic applied)*

To define intervals based on multiple subjects or behaviors in such a way that data is considered for analysis when at least one subject/behavior occurred, specify those subjects/behaviors in the same **Interval** box.

**Example** – In a study of social interaction between children and a parent, the gaze direction of the children is scored. You want to analyze the data when a child was either looking at the other child or at the parent.

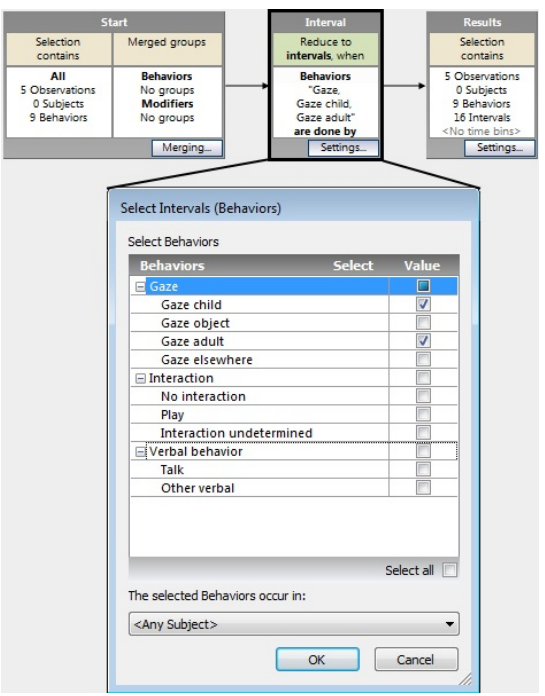



***Figure 6.29*** *Select the events in the same* ***Interval*** *box to analyze the time segments when either one or the other event occurred.*

### *Rule 4 – Defining intervals based on multiple subjects/behaviors occurring simultaneously (AND logic applied)*

To define intervals based on multiple subjects or behaviors in such a way that data is considered for analysis when all subjects/behaviors occurred simultaneously, select each subject/ behavior in a separate **Interval** box, then line up the boxes between the **Start** box and the **Results** box.

**Example** – In a study of mother-child interaction, the duration of specific phases is coded as state events. You want to calculate statistics on various behaviors recorded during the phase coded as *Episode 1* AND, within that phase, when the behavior *Play* was scored for the subject *Child*.

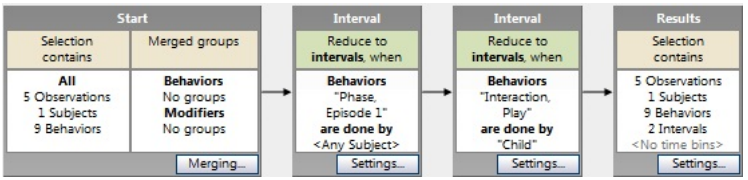



***Figure 6.30*** *Select the events in different* ***Interval*** *boxes to analyze the time segments when the events occurred at the same time.*

If you want to analyze the time when one or more state events are active for all of the subjects in each observation simultaneously, you can insert just one **Interval** box that specifies the behavior for the interval, and select **<All Subjects>** from the **The selected Behaviors occur in** list.

### *Rule 5 – Selecting independent data sets in the same Data Profile*

To show results for different data selections, connect each selection sequence to a separate Results box.

**Example** – In a study of mate choice in fish, the position of the male relative to three females has been recorded as state events (*Next to Female 1*, *Next to Female 2*, *Next to Female 3*). You want to calculate statistics on various behaviors recorded when the male was next to each individual female. Statistics will be shown for each female in a separate section of your report.

Given that each interval condition (position of the male) should lead to a separate result, it must be connected to a separate **Results** box.

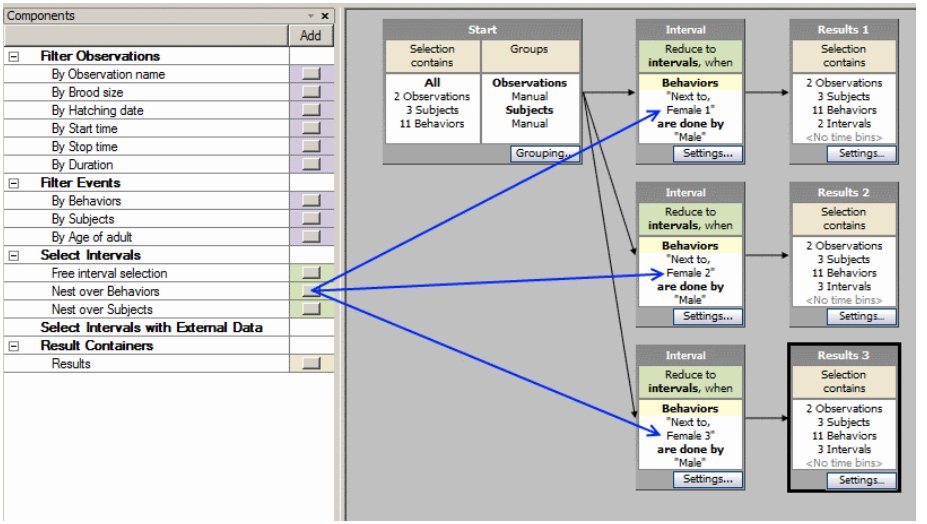



***Figure 6.31*** *If you want different data selections to produce separate results in your analysis, connect each selection criterion to a separate* ***Results*** *box. To create additional* ***Results*** *boxes, click the button next to* ***Results****.*

---

If you wish to calculate the statistics for when the male was next to any female, select the three events *Next to Female 1*, *Next to Female 2* and *Next to Female 3* in the same **Interval** box. You do not need to create separate **Results** boxes.

---

## 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 data profile is made of several sequences, please check them carefully according to what is stated below.

### *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 Speech behaviors, and another Filter (Behaviors) box for Facial Expression behaviors.

  ...Then the selection only works if the elements you have filtered in one box are also selected in the previous box.

---

If you want to create a filter based on different Subjects or Behaviors, make sure that those elements are selected in one box. If you want to create a filter based on Modifiers from different Modifier groups, make sure to create a separate Filter box for each Modifier group.

---

***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 *Child*, and one **Filter (Behaviors)** to filter the behavior *Emotion*, and one **Interval** box to select the time from the start of *Mother out of Room* to the end of the observation.

...Then the selection will only work if the **Interval** box is placed before the **Filter** box.

This is because a **Filter** box placed before an **Interval** box may filter out the subjects and behaviors specified in the **Interval** box.

---

As a general rule, insert the **Interval** boxes immediately after the **Start** box and then insert the **Filter** boxes, ending with the **Results** box.

---

The correct sequence in the example above is:

- The **Start** box.
- The **Interval** box.
- The **Filter** boxes.
- The **Result** box.

# 6.8 Managing your data profiles

### *Viewing all data profiles*

You can view all the data profiles in your project by opening the **Data Profiles** folder in the Project Explorer:

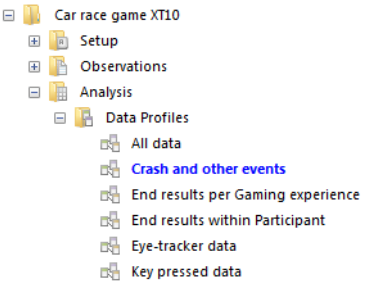



***Figure 6.32*** *Data profiles in the Explorer. The active data profile "Crash and other events" is highlighted.*

### *Creating a new data profile*

1. Do one of the following:
   - From the **Analyze** menu, choose **Select Data**, then **New Data Profile** or press **Ctrl+Alt+F7**.
   - In the Project Explorer, right-click the **Data Profiles** folder and select **New**.
   - Click the **New** button on the Data Profile tool bar.


2. In the **New Data Profile** window, type the name you want to give to the new profile or accept the default name and click **OK**.

### *Opening an existing data profile*

In previous versions of The Observer XT, you had to open an existing data profile to activate that data profile, so analysis is done on the data specified in that profile. See Activating an existing data profile below, if you just want to activate a data profile without opening it.

1. Do one of the following:
   - From the **Analyze** menu, choose **Select Data**, then **Open Data Profile**. In the **Open Data Profile** window, select the data profile you want to open, and click **OK**.

     This window lists the data profiles saved in your project (you can view them in the Project Explorer). The profile marked with an asterisk indicates the currently open data profile.
   - In the Project Explorer, right-click the **Data Profile** and select **Set as Current**.

The active data profile is highlighted in the **Data Profiles** folder of the Project Explorer.

To open the data profile currently active, from the **Analyze** menu, select **Select Data**, then **Show Current Data Profile**, or press **Alt+F7**.

***Activating a data profile***

In the Project Explorer, simply click the data profile you want to activate.

***Editing and saving a data profile***

1. Open the data profile (see above). The **Data Selection** window displays showing the content of the data profile.
2. To add filters and interval conditions, follow the instructions on page 200.

   To change an existing filter/interval condition, click the **Settings** button on the bottom of the corresponding selection box in the **Data Selection** window. In the window that appears, edit your selection criteria and click **OK**.

   If you create an unwanted **Filter** or **Interval** box, click its title and press **Delete**.

   To delete a selection box, see the instructions on page 204.

   To delete a connecting arrow, see the instructions on page 204.

   For general information on how to work with selection boxes, see page 203.
3. To save the data profile, from the **File** menu, select **Save Project**.

***Resetting 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.

1. Make sure the data profile you want to reset is open on your screen. If another data profile is open, open the data profile you want to reset (see above).
2. From the **Analyze** menu, select **Select Data**, then **Reset Current Data Profile**.

   If you have selected **Data Selection: reset Data Profile** in the **Warnings** tab of the project's **Preferences** window (see page 94), The Observer shows a warning message. Click **Yes** if you want to reset the data profile.

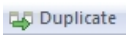
You cannot undo a data profile reset.

***Renaming 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.

***Copying and pasting a data profile***

To copy an existing data profile, right-click a Data Profile and select **Duplicate,** or click the **Duplicate** button on the tool bar.




***Deleting a data profile***

Deleting a data profile does not result in deleting your data. It removes the data selection settings.

To delete a data profile, right-click it in the Project Explorer under **Data Profiles** and select **Delete**.

Alternatively, do one of the following:

- From the **Analyze** menu, choose **Select Data**, then **Delete Data Profile**.
- In the Project Explorer, right-click the **Data Profiles** folder and select **Delete**.

This window lists the data profiles saved in your project (you can view them in the Project Explorer). The profile marked with an asterisk indicates the currently open data profile.

You cannot restore a deleted data profile.

# 6.9 What next?

Please make sure that when you start the analysis the data profile you want to use as data source is selected in the Project Explorer.

In the Project Explorer, click the **Analyses** folder. The **Analyze** tab in the overview window appears.

- To visualize data, create episode selections and highlights video clips – See Chapter 7.
- To calculate statistics – See Chapter 8.
- To carry out lag sequential analysis – see Chapter 9.
- To carry out reliability analysis – see Chapter 10.
- To export observational and/or external data – See Chapter 11.

# Chapter 7

# Visualizing Data

# 7.1 Before you start

This chapter describes the functions of data visualization in The Observer XT. Before carrying out quantitative analysis of your data, you can look at it by means of the Visualize function. You can also create an Episode Selection based on certain events or Data Selection criteria and generate a media file from the original video that contains the selected episodes.

Prior to visualizing data, you can create a data profile by selecting the data to be visualized (see Chapter 6). If you do not create a selection profile, The Observer visualizes all events and external data included in an observation.

The terms **Subject**, **Behavior** and **Modifier** listed in this chapter may not be the same as those on your screen. This depends on what terms you have specified in your project's **Terminology Preferences** (see page 93).

## WHAT IS DATA VISUALIZATION?

When you visualize data, The Observer XT produces an event plot in which events and external data are plotted horizontally against a time axis (elapsed time). Each multi-colored bar represents a sequence of behaviors. Each event type is plotted in its own color. State events are represented by horizontal bars whose length is proportional to the state's duration. Point events are vertical segments. Video files, audio files and external data files are synchronized with the observational data (see the example below).

You can visualize observations when it either contains events (or when the data active 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 itself are only visualized when they are scored together with an event.

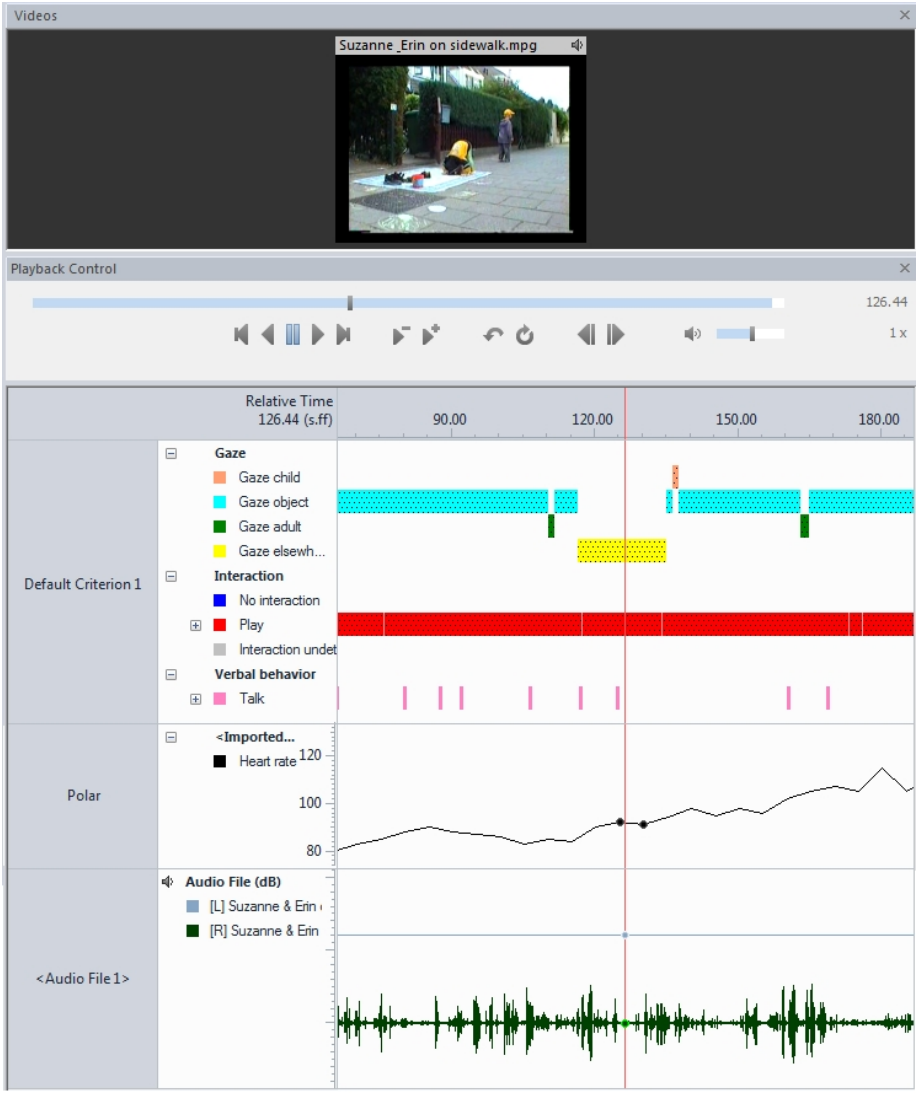



***Figure 7.1*** *An example of visualization of event data (coded manually with The Observer XT), video, audio and imported external data (see Chapter 5).*

## WHAT IS AN EPISODE SELECTION?

An Episode Selection (see page 273) is a summary of events from your observations. You can select specific events manually (for example, by dragging them from the event log) or according to a criterion specified in the data profile. Events are organized in sequences called episodes. You can view an Episode Selection as a book, where episodes are chapters and events are single paragraphs.

If you have scored observations from video or audio, you can play back the video corresponding to the episodes selected. If you like, you can have different episodes separated by a transition.

Furthermore, you can generate a media file from the original video, based on the episodes included in your Episode Selection. This way, you create a new media file that contains the scenes you are interested in. You can also add subtitles and transitions with text. You can then use this media file in presentations, to create behavior libraries, etc.

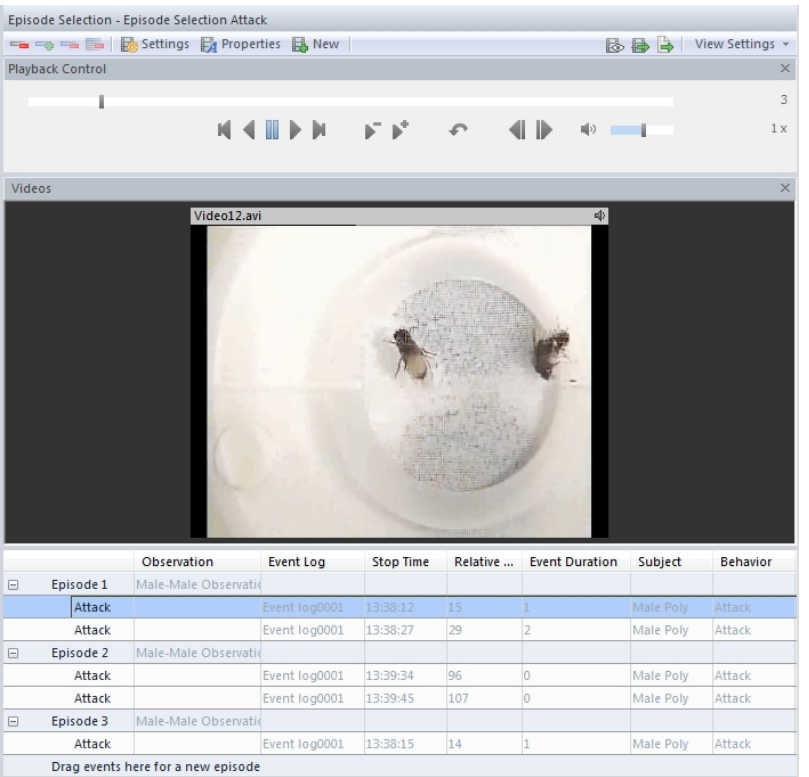



***Figure 7.2*** *An example of Episode Selection. Right-click an event and select* ***Play*** *to view the corresponding scene.*

# 7.2 Making an Event Plot

You can visualize data from one or more observations. See the procedure below how to visualize a single or multiple observations.

## PROCEDURE

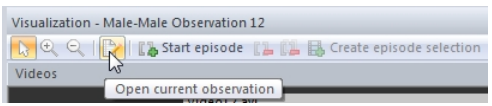
1. Make sure that the data profile you want to use as a source of data is highlighted in the Project Explorer (under **Data Profiles**). If your data profile is not highlighted, right-click it and select **Set as Current**.

### *Visualizing a single observation*

2. Do one of the following:
   - When the observation is open, click the **Visualize current observation** icon in the tool bar. 
   - In the Project Explorer, right-click the observation you want to visualize and select **Visualize**.

     When you select an Event line before you visualize the observation, the video will be positioned at that moment in the visualization.

   To go back to the observation, click the **Open current observation** button on the tool bar. The Event log will open with the cursor at the time where the hairline was in the time event plot.




### *Visualizing multiple observations simultaneously*

3. If your project contains two or more valid observations, do one of the following:
   - From the **Analyze** menu, select **Visualize Data** or press **Alt+F8**.
   - In the Project Explorer, under **Analyses**, click **Visualization**.
   - In the Project Explorer, click the **Analyses** folder. In the overview window, click **Visualize Data**.

   The **Visualize Data** window appears. Select the observations you want to visualize, and click **OK**.

4. A few windows appear on your screen depending on which data are in your observation:
   - The **Visualization** window, showing one or more plots: an event plot (with colored bars for Continuous Sampling data and colored dots for Instantaneous Sampling data) for each event log and subject in the observation, and a x-y plot for each audio file, audio from video and external data file linked to that observation.
   - One or more **Video** windows, showing the video files linked to that observation (this applies if you have scored data from video files).
   - The **Playback Control** window, with which you can play back the data (see page 141), or edit the data (see page 120).
5. You can now do the following (optional):
   - Play back the data (see below).
   - Customize the event plot, for example change the order of the plots, or change the colors of bars or dots (see page 267).
   - Edit the data (for example, to correct scoring errors; to do so, re-open the observation, see page 120).
   - Export the event plot (see page 266).

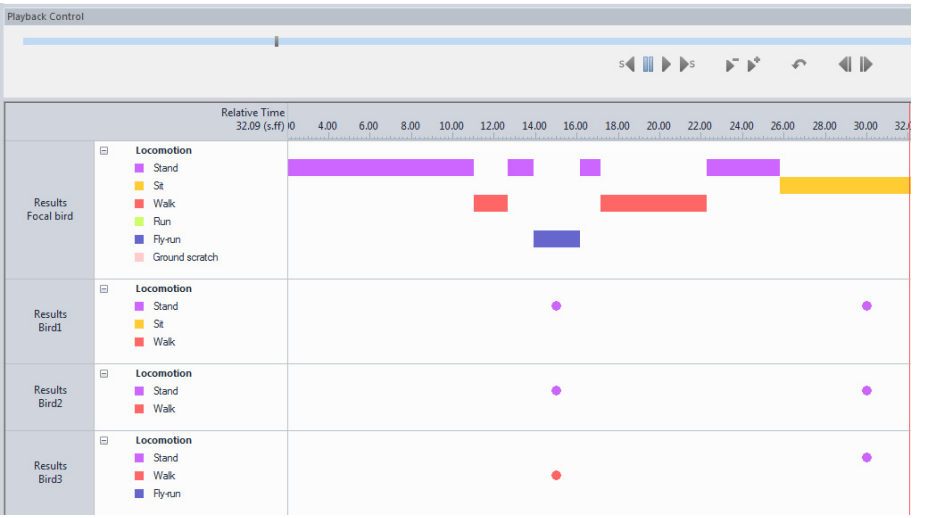



***Figure 7.3*** *The* ***Visualization*** *window showing four behavioral data plots. The plot at the top shows the behavioral data scored using* ***Continuous Sampling*** *for the focal animal. The other plots show the behavioral data scored using* ***Instantaneous Sampling*** *for three other animals.*

***Notes***

- If your observation contains two or more event logs or subjects, these are visualized in separate event plots (see below).
  - 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 add or remove a variable in the **Independent Variable List** (see page 86), the corresponding object (for example, a **Physiological Data** window if the variable refers to external data files) is displayed or removed, respectively.
- If you cannot visualize an observation, it could be due to the observation containing errors. See page 120 for information on how to correct errors in the data. Alternatively, the active data profile does not contain data for that observation.
- If you need to re-synchronize the different data files, re-open the observation and change the offset (see page 127).

## INTERPRETING THE EVENT PLOT

The event plot always shows the data selected in the active data profile. If the plots do not correspond to the data you expected, it may be that you selected another data profile.

- The hairline in the plot corresponds to the current position of the hairline in the event log. The hairline is fixed in the middle of the plot area.
- If the hairline is at the start of the observation, a transparent light blue area is shown to the left of the observation start to indicate that this area is not part of the observation. A similar area is also shown to the right of the observation end.
- If the observation has been suspended, the same transparent light blue area is used to mark those parts.
- 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.

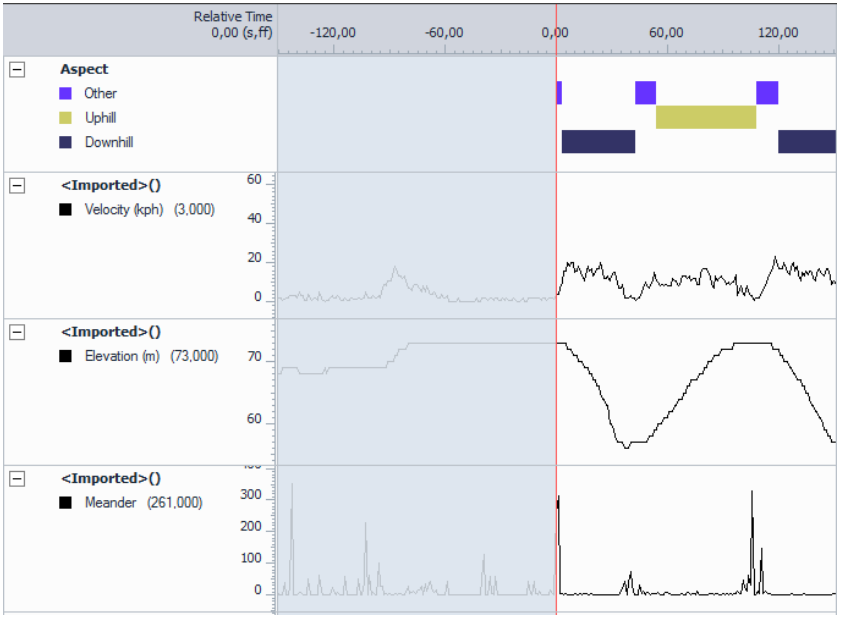
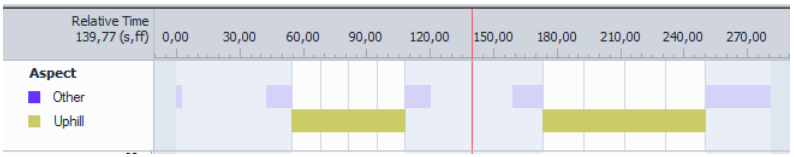



***Figure 7.4*** *An example of a plot with the hairline at the start of the observation. External data acquisition was started before the start of the observation.*

- Use the scroll bar at the bottom to run through the visualization. You can also click anywhere in the visualization, hold the mouse button and drag the background.
- When the cursor is kept still above a colored bar, a tool tip will be shown with 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).
- Events that are filtered out are not visualized.
- When you select intervals by events, the selected intervals are shown with a white background. The non-selected intervals are shown semi-transparent enabling you to see the excluded data in these intervals.
- If you have merged behaviors, these are visualized under a new group **Merged Behaviors**. The modifiers of merged behaviors are not visualized.
- If you have merged modifiers, these are visualized under the Behavior, with the name of the merged group.

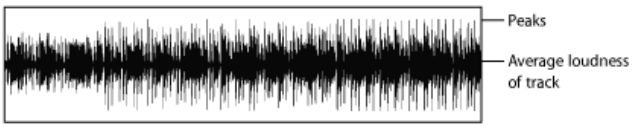
- If you define intervals and time bins, then time bins are visualized per interval. If you select the option **Use number of time bins** in the data profile, then the time bin length will vary with the interval length (see the screenshot below).




- If your Data Profile contains more than one Result container, intervals and time bins are shown in the corresponding plot (note that the grey column in the plot shows the name of the Results container).
- For more information on data selection, see Chapter 6.

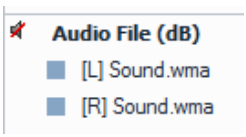
### *Visualization of audio*

Audio files and audio streams from video are visualized as waveforms:




The peaks are short, loud bursts of sound. In spoken dialogue, letters like P, T and K at the beginning of words can result in peaks if the person speaking is close to the microphone. In music, peaks occur at the very beginning of sounds from percussive instruments such as drums. 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.

The audio plot shows two channels (left and right) for stereo signals, and one channel for mono signals. The first audio signal you add to an observation is not muted, additional audio files are muted (Indicated by the red line through the speaker icon). Click the icon to make the sound audible.



With the master volume control in the Playback Control you can adjust the volume for all media files. This volume control works independent from the Windows volume control. By default, the volume control is hidden. To show it on the Playback Control, open the **Setup** menu and select **Project Settings** and then the **Playback control options**. Select the checkbox in front of **Show volume control**. Click the icon on the Playback control to mute/unmute all the media files. Use the slider to increase/decrease the volume.

- The title of the audio plots is **Audio file (dB)** for audio files and **Video File (dB)** for audio imported from a video file. Contrary to audio files, the audio waveforms from a video is not an independent variable. Only audio files imported into an observation are shown as independent variables in the first column of the plot grid:


  The first plot is for the audio file Z1775.wav, and is marked with the **<Audio File 1>** independent variable. The second plot is for audio imported from the video file Baby talk 023.mpg. This audio is not labeled as an independent variable.

- The Observer XT only supports audio files with a maximum of 2 audio channels. If an audio/video file contains more channels, only the first two are visualized.
- Synchronization between audio from video files and the corresponding and video images is within 2 frames (80 ms for PAL, 67 ms for NTSC).
- You can change the color of the audio plot by clicking the colored square in front of the audio file name or by clicking the audio waveform.
- To hide some audio waveforms, not others, from **View Settings** select **Show audio**. Choose the video file name that you want to view and click **Apply**.
- You can see the value of a data point in the audio plot by visualizing the data points: in the **View Settings**, select **Data Points**. When you move the hairline to the right of a data point, the data point becomes bigger and its value appears behind the name of the audio file (see Figure 7.5). Values are shown in dB. These are dBFS, Decibel Full Scale, which is commonly used for digital signals.
- You can visualize audio for each video file allowed by your license. For example if you have a **Media Files** add-on license, you can visualize two video files and the two corresponding audio waveforms (plus two audio files).

- Whether audio can be visualized depends on its format inside the video file. See the Observer XT Service Manual for a list of audio formats supported. Audio formats other than those supported may be visualized, depending on the audio decoders installed on your computer.
- If your Data Profile contains more than one Result container, audio data are plotted only once. If the Result containers specify different intervals, the boundaries between intervals are shown as vertical lines in the audio plot.

***Visualizing external data***

External data imported into The Observer XT usually consists of discrete samples. In the visualization in The Observer XT, the samples are connected by a line. However, the external data points are not interpolated and do not become continuous. For data selection and analysis, the discrete samples are used. Because of the latter, in the visualization it sometimes seems as if the selected samples do not exactly match the selection made in a data selection.

Note: If your Data Profile contains more than one Result container, external data are plotted only once. If the Result containers specify different intervals, the boundaries between intervals are shown as vertical lines in the external data plot.

*Example of Selecting intervals based on Polar heart rate data* – In the sample project Parent-Child interaction, 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. Figure 7.5 below shows part of the visualization based on the above-mentioned data profile. The selected data (heart rate > 100) are shown with a white background, the unselected intervals (heart rate < 100) have a blue background. For this example, the horizontal line indicating the 100-bpm threshold have been added to the plot in an image editing program.

At the end of the selected interval in Figure 7.5 (the white area), it looks as if a heart rate value of <100 bpm is included in the selection. However, the line that connects the last sample (value: 98) and the previous sample (value: 102), 'belongs' to the sample with value '102'.

---

You can see the value of external data in the event plots by visualizing the data points: in the **View Settings**, select **Data Points**. When you move the hairline to the right of a data point, the data point becomes bigger and its value appears behind the name of the external data plot (see Figure 7.5).

By hovering over a data point with the mouse pointer, a small window pops up, showing the external data label, the time stamp and the value of the corresponding data point.

---

The data point at the end of an interval is not included in the selection.

At the start of the second interval, it looks as if a heart rate value >100 bpm is not included in the selection. The 100-bpm line crosses the line which connects sample with value '98' and sample with value '102'. The latter one is the first sample included in the interval.

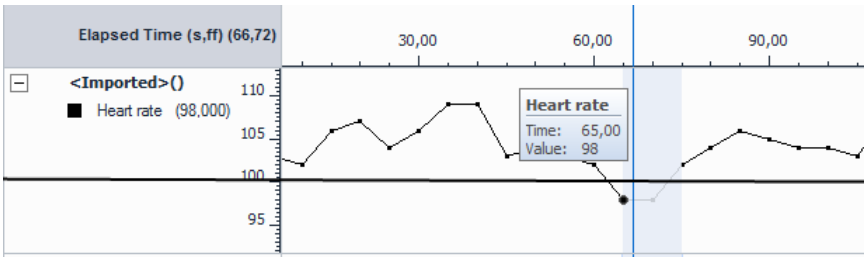



***Figure 7.5*** *Example of an event plot of data selection of external data. For an explanation, see the text above.*

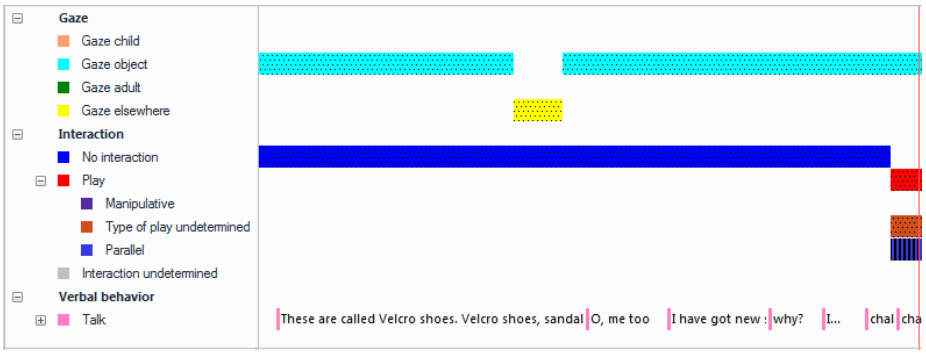
### *Visualizing numerical modifiers*

Numerical modifiers are shown as one colored bar with the name of the modifier group. The height of this bar is 20 pixels (identical to the height of behavior bars and nominal modifier bars). The numerical modifier values are indicated by the height of the darker-colored area within the bar (see the screenshot 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

### *Visualizing comments*

By default, comments are not shown in the time event plot. If you entered comments in your event log and want to visualize them in the time event plot, click the **View Settings** button on the tool bar and select **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.




### *Playing back the data*

1. Move the data to the point where you want to start playing back the data.

   If you want to start from the earliest time among all data sets of your observation, click the **Jump to begin** button in the **Playback Control** window or press **Ctrl+Up-arrow key**.

2. You can select the speed at which you want to play back the data by selecting a playback speed from the list (see page 141).

3. Click the **Play** forward button or press **Ctrl+9**.

   To play frame by frame, click the **Step frame forward** button or press **Ctrl+right-arrow** key.

   For instantaneous sampling, go to the next sample by clicking the **Next sample** button or press the **Ctrl+Shift+Down-arrow** key. This button is not available when you have selected Continuous Sampling in the Project Setup.

   For instantaneous sampling, go to the previous sample by clicking the **Previous sample** button or press the **Ctrl+Shift+Up-arrow** key. This button is not available when you have selected Continuous Sampling in the Project Setup.

   For information on the other playback buttons, see page 141.

When you play back data, all data files are played synchronously. If you need to change the synchronization point between different data, see Edit data (see page 141).

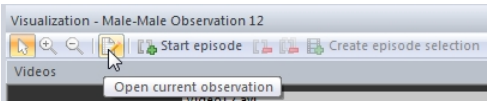
### *Creating Episode selections*

You can select time fragments in the Event plot and create Episode selections from these fragments. See **Method 4 – Creating an Episode selection from Visualization** on page 278 for a detailed procedure.

### *Editing the event data*

If you want to edit the event data, for example when you want to add events or correct a scoring error, do the following:

1. If you have only one observation visualized, click the click the **Open current observation** button on the tool bar. The cursor will be positioned at the time where the hairline was in the time event plot.




   If you visualized more observations, click the observation you want to edit in the Project Explorer under **Observations**. The observation opens on your screen.

2. Edit the data as explained on page 120.

   In The Observer XT, you can only edit observational data, not external (physiological) data.

3. To save the data, from the **File** menu, select **Save Project**. To return to the event plot, click the **Visualize current observation** button on the tool bar or right-click the observation in the Project Explorer and select **Visualize**.

### *Exporting the Event Plot*

You can export an Event Plot by creating a screenshot.

1. Make sure the part of the Event Plot you want to export is visible on your screen.
2. Click the camera button on the Component tool bar.
3. Choose the location and picture format.
4. Accept the default file name or enter another one and click **OK**.

The screenshot only contains the part of the Event Plot that is visible on your screen.

---

You can also copy the Event Plot and paste it into another program. Make sure that the Event Plot is open on your screen. From the **Edit** menu, select **Copy** or press **Ctrl+C**. In the other program, from the **Edit** menu, select **Paste**, or press **Ctrl+V**.

---

To export the Event Plot as a table:

1. Click the **Export visualization data** button on the Component tool bar.

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**.

If you selected data before creating the plot, only the time intervals specified in the Data Profiles are exported. For more information, see **Exporting observational data** in Chapter 11.

---

**!** 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 Section 11.3 on page 411 for more information.

---

## CUSTOMIZING THE EVENT PLOT

***Summary***

- Zooming in and out (see below).
- Specifying the time mode (see page 269).
- Specifying the time format (see page 269).
- Showing/hiding events (see page 270).
- Sorting plots within an event plot (see page 270).
- Showing/hiding plots, video, audio, and comments (see page 271).
- Changing colors (see page 272).
- Changing the vertical range in a plot (see page 273).

It is not possible to make changes in an event plot if the project is read-only, for example:

- 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).

***Zooming in/out***

To change the level of detail of your plots you can zoom in or out.

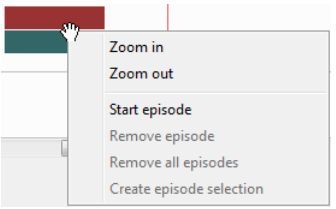
If your event plot includes only event data (colored bars), you can zoom in/out the data relative to time (that is, change the time interval shown on the X-axis).

If your event plot also includes external data, you can zoom in/out relative to time (X-axis), or the amplitude (Y-axis), or both time and amplitude.

**To zoom in/out relative to time:**

Do one of the following:

- Right-click the plot and select **Zoom in** or **Zoom out**.




- Click the **Zoom in** or **Zoom out** button on the tool bar.

  Result – When you move the mouse pointer over the time axis, it changes to a magnifying lens icon (with + or –).

  **a** Click the plot one or more times to reach the desired zoom level.

  **b** To return to the normal mouse pointer, click the mouse pointer on the tool bar.

- In the **View Settings**, select **Time span** and select the desired length of the X-axis.

---

You can also press **Ctrl+.** or **+** (to zoom in) or **Ctrl+,** or **–** (to zoom out). With these shortcut keys you immediately zoom in or out along the time line.

If your mouse has a mouse wheel, you can zoom relative to time by using the mouse wheel while you keep the **Ctrl**-key pressed.

---

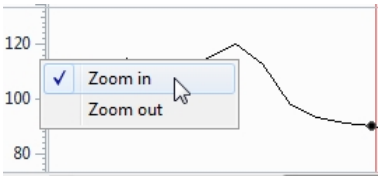
The time scale changes for all the plots.

Every time you click the plot with the pointer as a magnifying glass or click **Ctrl +.** or **Ctrl +,** the plot is enlarged/reduced by a factor of 2, respectively. The scale changes accordingly.

If you have selected the option **Show frame numbers while observing from videos** in the **Time formats** tab of the **Project Settings** window, frame numbers are shown in the Event Plot. If you zoom in too much, it may happen that there are more tick marks with data labels on the time axis of the Event Plot than there are actual video frames. If this is the case, the same frame number is shown several times on the time axis.

**To zoom in/out relative to amplitude** (only for external data and audio):

1. Do one of the following:
   - Right-click the Y-axis scale of the plot you want to zoom in/out and select **Zoom In** or **Zoom Out**.




   - Click the **Zoom in** or **Zoom out** button on the tool bar.

   **Result** – The mouse pointer changes to a magnifying lens icon (with + or –).

2. Click the Y-axis scale of the plot one or more times to reach the desired zoom level.
3. To return to the normal mouse pointer, click the mouse pointer on the tool bar.

Every time you click the plot with the pointer as a magnifying glass, the plot is enlarged/reduced by a factor of 2, respectively, and the scale changes accordingly.

The amplitude scale changes only for the plot that you clicked.

---

You can also press **Ctrl+Shift+.** (to zoom in) or **Ctrl+Shift+,** (to zoom out). With these shortcut keys you immediately zoom in or out in all the external data and audio plots.

---

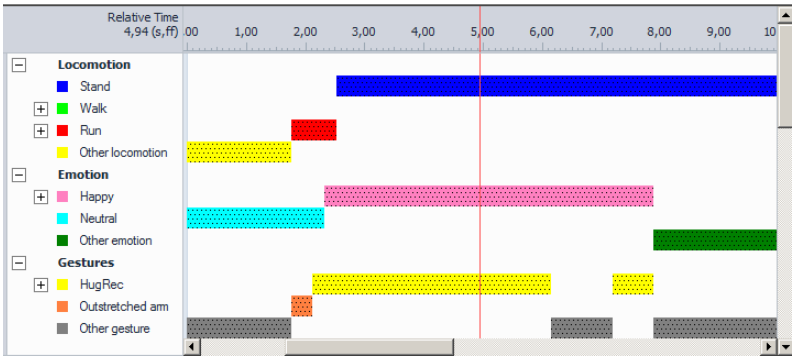
***Specifying the time mode and time format***

1. From the **Setup** menu, select **Project Settings**, then click **Time formats** in the left pane.
2. To set the time mode, in the **Time formats** list, select **Absolute** if you want to have absolute (clock) time displayed. If you want to include the date in your time stamps, select the check box **Show date with absolute times**. Select **Relative** if you want to have elapsed time displayed.
3. To set the time format, click the **Edit** button next to the option you have chosen to specify the format in detail.
4. Click **OK** when done.

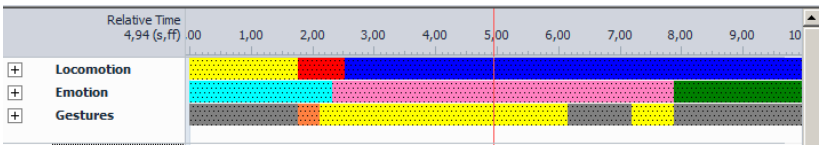
For more information, see page 60.

### *Showing and hiding 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.



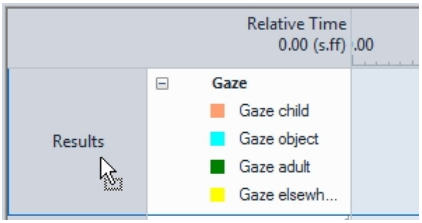

- Once in an event plot, single behaviors cannot be hidden anymore. To do so, you must first remove those behaviors from the data profile (see Chapter 6).
- If events in a group are mutually-exclusive and exhaustive, once you collapse them they form a complete multi-color bar.
- If events in a group are of start-stop type, once you collapse them they may result in gaps (for the time when no state event was scored), or overlaps (when more state events were active simultaneously).

### *Sorting plots in an Event Plot*

You can change the order in which plots are displayed by moving them up and down in the event plot.

1. Click the header (left-most cell) of the plot you want to move. The header shows the name of the result box in the data profile and the subject name (for event log data) and the external data/audio label (for external data/audio plots).

**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.

### *Showing and hiding plots, video, audio, and comments*

You can choose what plots to display in the event plot by selecting the appropriate option in the View Settings on the far-right side of the tool bar.

**Plots**

1. If you want to show/hide event plots, click the **View Settings** button and select **Events**.

   Result – A list of check boxes appears. Each item corresponds to a specific combination of result container, event log and subject (see Figure 7.6). If your coding scheme contains no subjects, the combinations are formed by result containers and event logs.

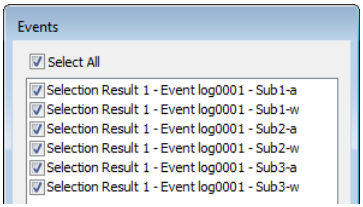



***Figure 7.6*** *An example of the options shown, if* ***Events*** *is selected in the* ***View Settings****.*

2. To hide a plot, clear the corresponding box. To show a plot, make sure that the corresponding box is selected.

**Video**

1. In the **View Settings**, select **Videos**.

   **Result** – The videos that are linked to the observation that is visualized are shown.

2. To hide the videos, deselect **Videos**.

**Audio**

1. In the **View Settings**, select **Show Audio**.

   **Result** – The audio files that are linked to the observation that is visualized are shown.

2. To hide the audio plots, deselect **Show Audio**.

**Comments**

1. In the **View Settings**, select **Show comments.**

   **Result** – The comments that are entered in the observations are shown in the time event plot.

2. To hide the comments, deselect **Show Comments**.

***Changing the color of event bars or dots***

1. Do one of the following:
   - In the Event Plot, click the colored square in front of the appropriate behavior or modifier.
   - In the Event Plot, click the appropriate bar or dot.
   - In the coding scheme, right-click the **Behaviors** panel and select **Show all columns**. Double-click the **Color** cell for the behavior whose color you want to change.
2. In the **Value Color** window, select a new color in one of the following ways:
   - Click a color in the **Basic Colors** section.
   - Click a color in the palette and change its luminosity with the slider on the right (optional).
   - Type in the **HSL** values.
   - Type in the **RGB** values.
3. Click **OK**.

***Changing the color of lines in external data/audio plots:***

1. Do one of the following:
   - Click the colored square in front of the external data/audio name.
   - Double-click the external data/audio plot whose color you want to change.
2. In the **Color** window, choose a new color in one of the following ways:
   - Click a color in the **Basic Colors** section.
   - Click **Define Custom Color**, click a color in the palette and change its luminosity with the slider on the right (optional).
   - Type in the **HSL** values.
   - Type in the **RGB** values.
3. Click **OK**.

***Changing the vertical range of a plot***


1. In the left-most column, point to the lower separation line, so the mouse pointer turns to a double-arrow.
2. Drag to the desired position (down to have a larger plot, up to have a narrower plot).

If the height of the plot becomes smaller than the range of the behaviors (or external data/audio values), use the scroll bar on the right margin of the plot to view the data.

# 7.3 Creating an Episode Selection

## FOUR WAYS OF CREATING AN EPISODE SELECTION

You can create an Episode Selection in four ways:

- Method 1 – Create a **Blank Episode Selection** (that is, an Episode Selection containing no events) and then fill it by dragging and dropping events from one or more event log data files (see page 274). Default, there is a blank Episode Selection in your project (see the Project Explorer under Episode Selections).
- Method 2 – Create an **Episode Selection from a single event log file**, that is, let The Observer create an Episode Selection containing all events you scored in a specific event log (see page 275).
- Method 3 – Create an **Episode Selection from the Current Data Profile**, that is, let The Observer create an Episode Selection containing all events selected in the currently active data profile (see page 276).
- Method 4 – Create and **Episode Selection from the Visualization**, that is select the start and end of an episode in the event plot and create an episode selection from the selected intervals.

***What is the difference among the four methods?***

The difference only lies in the starting point.

- In Method 1, the Episode Selection is initially empty, and it's up to you to fill it with data. Choose this method if you want to insert few, very specific events in your Episode Selection.
- In Method 2, the Episode Selection is automatically filled up with the data scored in one event log. Choose this if you want to make an Episode Selection from just one event log.

- In Method 3, the Episode Selection is automatically filled up with the data you have selected in the data profile. Choose this method if you want to create an Episode Selection reflecting a specific data selection (for example, an interval condition).
- In Method 4, you select fragments of your observation based on time. This means that the Episode selection does not necessarily start and end with a start and end of an event, but can contain event fragments.

You can always edit the episode selection after you have created it, for example by adding or removing events, etc. (see page 282).

***Important assumptions***

In order for you to be able to create an Episode Selection, the following conditions must be met:

- You have scored events in one or more observations.
- Your event log files should not contain any errors. You can check this by opening an event log and clicking the **Check Event log** icon. 
- If you want to view the events selected in a certain data profile (see Chapter 6), that data profile must be active (that is, highlighted in the Project Explorer under **Data Profiles**).

When you have created an Episode Selection and subsequently open an observation and continue scoring, these new events are not included in the Episode Selection. Create a new Episode Selection after you have finished your observation.

## PROCEDURE

Choose one of the following methods (see above for an explanation of the difference between the methods):

***Method 1 – Creating a blank Episode Selection***

1. Do one of the following:
   - From the **Analyze** menu, select **Episode Selection**, then **New**.
   - Press **Ctrl+Alt+F9**.
   - In the Project Explorer, under **Analyses**, click **Episode Selection** under **Episode Selections**.
   - In the Project Explorer, under **Analyses**, right-click **Episode Selections** and select **New**.

   Result – The **Event Log** window and the empty **Episode Selection** window appear.

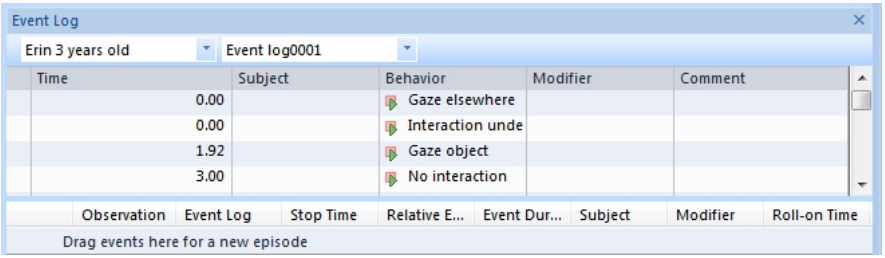



***Figure 7.7*** *The* ***Event Log*** *window and the empty* ***Episode Selection*** *window.*

2. Add events by dragging and dropping them from the Event Log to the Episode Selection window. To do so, click the number of the event row so the entire row becomes highlighted, then drag it to the Episode Selection window. For more information on how to edit the Episode Selection, see page 282.

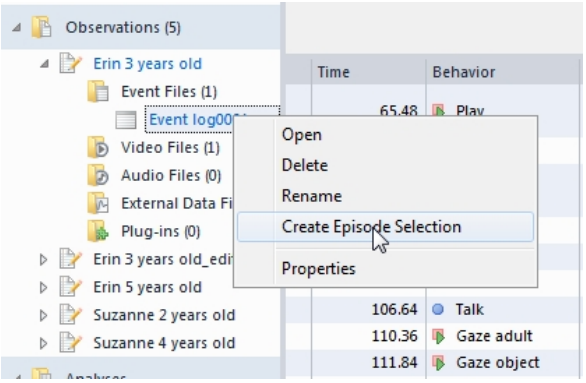
If the observation is associated with video files, a **Video** window opens for each association (that is, each time a video file is associated with a subject, event log file or observation). Audio files associated with an observation are not visualized.

### *Method 2 – Creating an Episode Selection from a single event log file*

1. 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. Event logs are indicated by the icon below.

   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.



2. The **Episode Selection** window and the **Event Log** window appear. The **Episode Selection** window lists 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.

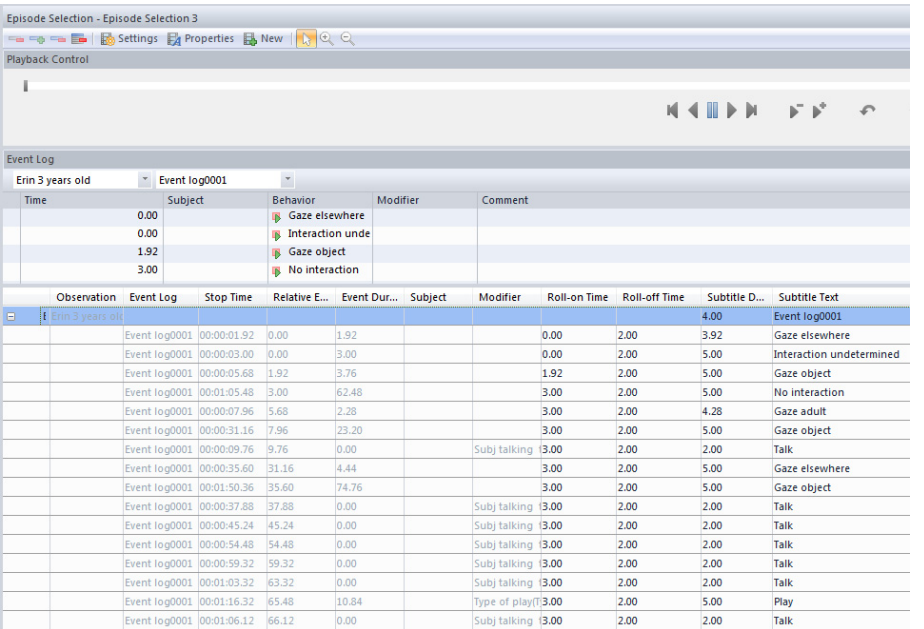



***Figure 7.8*** *The **Episode Selection** window filled in with the data of an event log file. The original event data are shown in the **Event Log** window (above).*

### *Method 3 – Creating an Episode Selection from the current data profile*

1. Make sure that the data profile you want to use as a source of data is highlighted in the Project Explorer (under Data Profiles). If your data profile is not highlighted, click it. For more information on data profiles, see Chapter 6.

2. Do one of the following:
   - From the **Analyze** menu, select **Episode Selection**, then **New From Current Data Profile**.
   - Press **Ctrl+Shift+F9**.
   - In the Project Explorer, right-click **Episode Selections**, and select **New from Current Data Profile**.

   Result – The **Episode Selection** window and the **Event Log** window appear. The **Episode Selection** window lists all events selected in the currently active data profile (see Figure 7.9).

Episode Selection - Episode Selection 1

Settings | Properties | New

Event Log

Erin 3 years old | Event log0001

| Time | Subject | Behavior | Modifier | Comment |
|---|---|---|---|---|
| 0.00 | | Gaze elsewhere | | |
| 0.00 | | Interaction unde | | |
| 1.92 | | Gaze object | | |
| 3.00 | | No interaction | | |
| 5.68 | | Gaze adult | | |
| 7.96 | | Gaze object | | |
| 9.76 | | Talk | Self | These are called Velcro shoes. Velcro shoes, sandals |
| 31.16 | | Gaze elsewhere | | |
| 35.60 | | Gaze object | | |
| 37.88 | | Talk | Other child | O, me too |
| 45.24 | | Talk | Other child | I have got new shoes, new ones |
| 54.48 | | Talk | Other child | why? |

| Observation | Event Log | Episode Selection Time | Start Time | Stop Time | Relative Event Time | Event Duration | Behavior | Modifier |
|---|---|---|---|---|---|---|---|---|
| Erin 3 years old | | | | | | | | |
| | Event log0001 | 7.00 | 00:01:05.48 | 00:01:16.32 | 65.48 | 10.84 | Play | Type of play(Type of |
| | Event log0001 | 17.84 | 00:01:16.32 | 00:01:57.68 | 76.32 | 41.36 | Play | Type of play(Manipu |
| | Event log0001 | 59.20 | 00:01:57.68 | 00:02:14.36 | 117.68 | 16.68 | Play | Type of play(Type of |
| | Event log0001 | 80.88 | 00:02:14.36 | 00:02:53.44 | 134.36 | 39.08 | Play | Type of play(Manipu |
| | Event log0001 | 119.96 | 00:02:53.44 | 00:02:56.32 | 173.44 | 2.88 | Play | Type of play(Type of |
| | Event log0001 | 127.84 | 00:02:56.32 | 00:03:44.84 | 176.32 | 48.52 | Play | Type of play(Manipu |
| | Event log0001 | 176.36 | 00:03:44.84 | 00:04:15.08 | 224.84 | 30.24 | Play | Type of play(Type of |
| | Event log0001 | 211.60 | 00:04:15.08 | 00:04:50.00 | 255.08 | 34.92 | Play | Type of play(Manipu |
| Erin 5 years old | | | | | | | | |
| | Event log0001 | 254.28 | 00:00:01.76 | 00:00:50.40 | 1.76 | 48.64 | Play | Type of play(Type of |
| | Event log0001 | 302.92 | 00:00:50.40 | 00:01:01.88 | 50.40 | 11.48 | Play | Type of play(Manipu |
| | Event log0001 | 314.40 | 00:01:01.88 | 00:01:07.28 | 61.88 | 5.40 | Play | Type of play(Type of |
| | Event log0001 | 324.80 | 00:01:07.28 | 00:01:32.32 | 67.28 | 25.04 | Play | Type of play(Manipu |
| | Event log0001 | 349.84 | 00:01:32.32 | 00:02:36.36 | 92.32 | 64.04 | Play | Type of play(Type of |
| | Event log0001 | 418.88 | 00:02:36.36 | 00:03:44.84 | 156.36 | 68.48 | Play | Type of play(Stamp), |

***Figure 7.9*** *The* ***Episode Selection*** *window displaying the events selected in the active data profile.*

If the observation is associated with video files, a **Video** window opens for each association (that is, each time a video file is associated with a subject, event log file or observation). Audio files associated with an observation are not visualized.

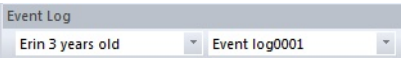
If your data profile includes two or more observations, events are placed in separate episodes (indicated by light-blue title rows). If your data profile includes observations with two or more event logs, the events from the event logs are placed in one episode.

If your data profile includes intervals defined by *interval conditions* (see **Select Data - Intervals** in Chapter 6), events belonging to different intervals are placed in separate episodes (indicated by light-blue title rows). If the same event is included in two or more intervals defined by different interval conditions, the event is repeated in the Episode Selection, each instance in a separate episode.

3. Edit your Episode Selection, for example add events by dragging and dropping them from the **Event Log** window, or remove events. For more information on how to edit the Episode Selection, see page 282.

*General notes*

- Within each episode, event lines are numbered beginning from 1. Events are ordered chronologically in an episode.
- The Event Log window has two lists from which you can select an observation and an event log within an observation. The Event Log window shows the content of one event log file at a time.




- If you do not see the **Video** window on your screen, make sure that **Video Window** is selected with **View Settings** on the Component tool bar. If this does not solve the problem, it may be that The Observer does not find the videos in the usual location.

  **a** Click the observation name in the Project Explorer.

  **b** A window appears. Select the video file and click **Open**.

  **c** Re-open the Episode Selection (click the Episode selection in the Project Explorer).

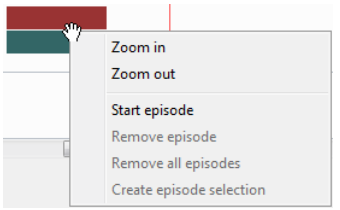
  You can also open the **Independent Variable List** and in the **Video** column browse to the correct location.

- In the **Episode Selection** window, each event is represented by one line. The line representing a state event contains information about the state's duration.
- Events within one episode can only be selected from the same observation.

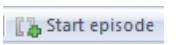
*Method 4 – Creating an Episode selection from Visualization*

You can select fragments from your observation in the time-event plot that is created when you visualize your observations. You can create an Episode selection from these fragments. A big difference between this method and the three methods above is that this way you can select event fragments, based on time. With the three methods above it is only possible to select entire events. Each episode selected with this method represents one video segment from one observation. Episodes defined with this method cannot overlap.

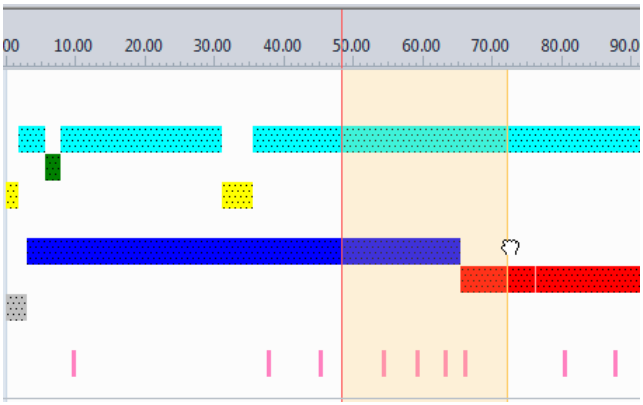
1. Scroll the video to the position where you want to start the Episode Selection. Then do one of the following.
   - Right-click the Event plot and select **Start episode**.



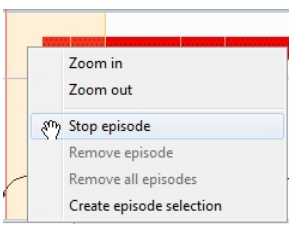

   - Click the **Start episode** button on the tool bar.



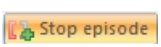
2. Move the slider, or click and drag the Event plot. The selected area is shown in orange in the Event plot.



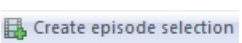

3. When you made your selection, do one of the following:
   - Right-click the Event plot and select **Stop episode**.




   - Click the **Stop episode** button on the tool bar.



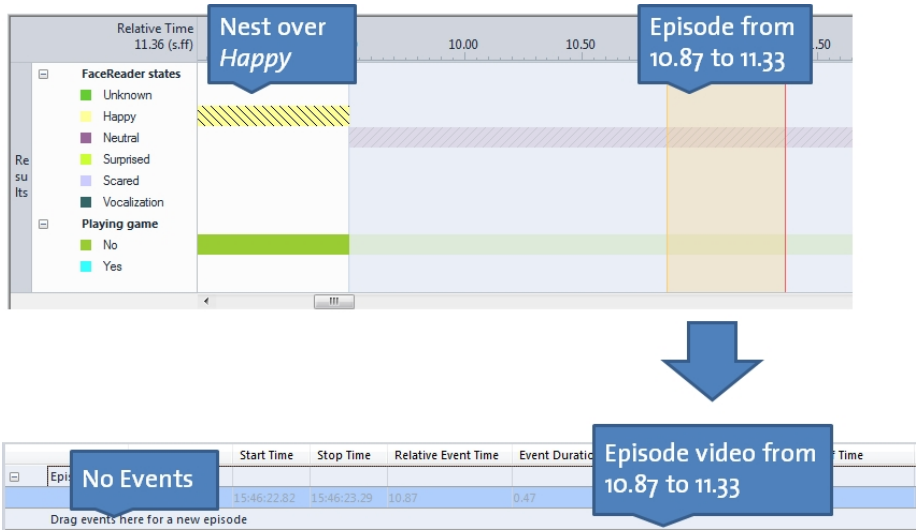

4. Optionally select more areas of interest. When done, do one of the following.
   - Right-click the Event plot and select **Create Episode selection**.
   - Click the **Create Episode selection** button on the tool bar.




The Episode selection window now opens with the events or event fragments in the selected time intervals.

### *Selecting episodes outside data selection criteria*

If you created a data profile, the data that fall outside the selection criteria are displayed in grey in the visualization. If you select Episodes that fall (partly) within the area in grey 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 an episode***

To remove the latest created area of interest, click the **Remove episode** button on the tool bar, or right-click the Event plot and select **Remove episode**.

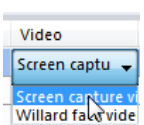
To remove all areas of interest, click the **Remove all episodes** button on the tool bar, or right-click the Event plot and select **Remove all episodes**.

---

All episodes are removed when you exit an Event plot. When you leave the Visualization window, when you selected episodes, The Observer XT will show a warning that all episodes will be removed.

---

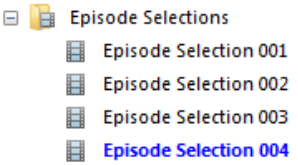
## EPISODE SELECTION AND VIDEO




If the observation is associated with a video file, this video is shown in the **Video** 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 **Video** window. Select which video to use for the episode video in the in the **Video** column of the episode selection.

This video is used for the episode video (see **Generating an Episode video** on page 290). You can only select one video for each Episode. Audio files associated with an observation are not visualized.

## SAVING 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. You can check this in the Project Explorer, in the Episode Selections folder.

You can rename an Episode Selection by right-clicking it in the Project Explorer and selecting **Rename**.

When you save your project, each Episode Selection is saved to a separate file with extension *.esr, within your project's **Episode Selections** folder.

## CUSTOMIZING THE EPISODE SELECTION SCREEN

**Why customize the screen?** – During the editing of your Episode Selection you may want to show some windows, not others. For example, you may want to show the External Data window in order to check what values of heart rate the selected episodes correspond to. You can customize your screen with View Settings (see below). You can also customize the appearance and content of the Episode Selection window. For example, show the **Comment** column in the Episode Selection window (see page 287).

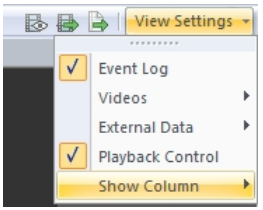



***Figure 7.10*** The ***View Settings*** *for the Episode Selection.*

- **Event Log** – Select this if you want to display the **Event Log** window.
- **Videos** – Select this if you want to display the content of the video files, each in its own Video window.

  If the events in your Episode Selection are associated with more than one video, you can select which video you want to include in the preview for that event. With **View Settings**, select **Videos**, and make sure the checkbox in front of **Video window** is selected. Then select one of the options:

- **Show all videos per Episode** – The **Videos** window shows 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. This is the video that is used to generate the episode video. 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. This is the video that is used to generate the episode video.

- **External Data** – Select this if you want to display the **External Data** window. A window with check boxes appears in which you can select which External data 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.

  **External Data** is only available if you have the extra module for external data acquisition.
- **Playback Control** – Select this if you want to display the Playback Control buttons. See page 141 for details about the Playback Control functions.
- **Show column** – Select which columns you want to show in the Episode Selection. For more information see page 287.

# 7.4 Editing the Episode Selection

Before you can edit an Episode Selection, it must be opened. If that is not the case, open the Episode Selection by doing one of the following:

- In the Project Explorer, under **Episode Selections**, click the Episode Selection you want to open.
- From the **Analyze** menu, click **Episode Selection** and then click **Open**. Select the Episode Selection you want to open and click **OK**.

***Adding events***

1. In the **Event Log** 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).

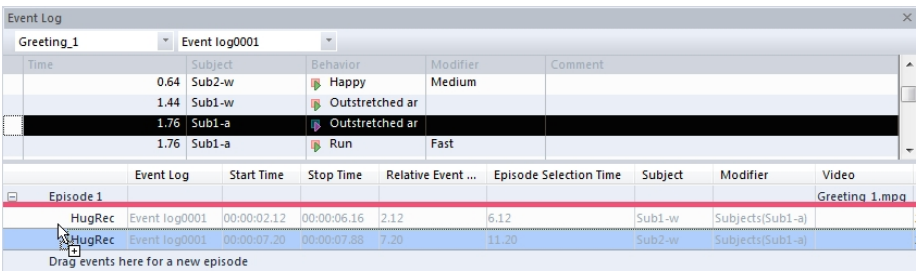
Result – The **Event Log** window lists all events scored in that event log, independent of the current data selection.

2. Click the left-most cell of the event line you want to add to the Episode Selection. The event line is highlighted. Release the mouse button.

3. Drag the line to the Episode Selection window:

   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.

In the following example, the event 'Outstretched arm' is placed in the same episode as the two other events. The event 'Outstretched arm' just needs to be dragged to Episode 1: the event will appear as first event in Episode 1, because events are sorted chronologically.




### *Add multiple events from the Event Log*

1. Click the leftmost cell of the first event line you want to add, so the event line is highlighted.

2. If you want to add multiple successive events, press **Shift** and click the leftmost cell of the last event line you want to add. If you want to add multiple, non-adjacent events, press **Ctrl** and click the leftmost cell of each event line you want to add.

   Result – The group of event lines becomes highlighted.

3. Drag to the **Episode Selection** window.

### *Removing events from the Episode Selection*

1. Right-click the event line in the **Episode Selection** window.

2. Select **Delete event,** or click the **Delete event** button on the tool bar.

3. The event is deleted. The remaining events in the **Episode Selection** window are re-numbered accordingly.

Removing events from the Episode Selection does not affect events in the **Event Log** window.

To select multiple adjacent event lines in the **Episode Selection** window, click the first line, hold **Shift** down and click the last event line. Next, right-click and select **Delete event**.

To select multiple non-adjacent event lines in the **Episode Selection** window, hold **Ctrl** and click the event lines you want to delete. Next, right-click and select **Delete events**.

## DEFINING EPISODES

### *Inserting a transition in the Episode Selection*

**What is a transition?** – A transition is a label that you can insert to distinguish events or groups of events. In the Episode Selection, a transition is indicated by a light-blue title row. The group of event lines between two consecutive transition rows is called an **Episode**. In the example of Figure 7.11, the Episode Selection contains three transitions, one at the start and one for each new observation. The three transitions define three episodes. An episode is therefore defined by a transition plus one or more event lines immediately following the transition title row. The episode ends at the next transition title row.

| | Observation | Event Log | Relative E... | Event Dur... | Subject | Behavior | Comment | Roll-off Time | Subtitle Dura... | Subtitle Text | Episode Selection Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Erin 3 years old | | | | | | | | 4.00 | Play behavior | |
| | | Event log0001 | 65.48 | 10.84 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 76.32 | 41.36 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 117.68 | 16.68 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 134.36 | 39.08 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 173.44 | 2.88 | | Play | | 2.00 | 4.88 | Play | 0.00 |
| | | Event log0001 | 176.32 | 48.52 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 224.84 | 30.24 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 255.08 | 34.92 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | Erin 5 years old | | | | | | | | 4.00 | Play behavior | |
| | | Event log0001 | 1.76 | 48.64 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 50.40 | 11.48 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 61.88 | 5.40 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 67.28 | 25.04 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 92.32 | 64.04 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 156.36 | 68.48 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 224.84 | 10.72 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 235.56 | 34.44 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 270.00 | 20.00 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | Suzanne 2 years | | | | | | | | 4.00 | Play behavior | |
| | | Event log0001 | 64.12 | 9.12 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 73.24 | 23.04 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 96.28 | 3.12 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 99.40 | 6.80 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 106.20 | 6.04 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 112.24 | 6.04 | | Play | | 2.00 | 5.00 | Play | 0.00 |
| | | Event log0001 | 118.28 | 5.84 | | Play | | 2.00 | 5.00 | Play | 0.00 |

***Figure 7.11*** *An example of an Episode Selection with three transitions.*

A transition title row can also be viewed as a time segment between two episodes, like a transition in video editing. You can specify a certain duration for each transition row (see page 296).

**When do I need to insert a transition?** – Transitions are not mandatory. You need them every time you want to have different episodes (or single events) separated by a time interval, perhaps with an introductory title. This can be useful when you play the Episode Selection (see page 289), or the episode video (see page 290)

To insert a transition:

1. Click the first event line in the Episode Selection that you want to have in the episode.
2. Right-click and select **Insert transition** (or press **Ctrl+I**), or click the Insert transition button on the tool bar.

   Result – A light-blue transition row is added immediately before the event selected.

### *Renaming an episode*

You can rename the Episode title row by double-clicking the name.

## MOVING EVENTS AND EPISODES IN THE EPISODE SELECTION

### *Moving an event to another episode*

1. Click the leftmost cell of the event line you want to move, so the event line is highlighted.
2. Drag the event line to the row below the transition title row of the episode to which you want to move the event. A red line appears below the transition title row.
3. Release the mouse button to add the event. The events in the episode are re-numbered and ordered chronologically.

You cannot move an event to a new position within the same episode, because events in an episode are ordered chronologically.

### *Moving an episode*

You can move episodes in an Episode Selection to change the order they are played back.

1. Click the transition title (light-blue row) for the episode you want to move (Episode A), so the event line is highlighted.
2. Drag to the row before the appropriate transition title (light-blue row of Episode B). The new position of Episode A is indicated by a red line.

   For example, if you have three episodes and therefore three transitions labeled Episode 1, Episode 2 and Episode 3, to move Episode 1 before Episode 3, drag the light-blue row of Episode 1 to the row before the light-blue row of Episode 3.
3. Release the mouse button. Episode A is moved to its new position, before Episode B.

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.

## DELETING TRANSITIONS AND EPISODES FROM THE EPISODE SELECTION

To delete a transition, right-click it and select **Delete transition,** or click it and click the **Delete transition** button on the tool bar.

When you delete a transition, the events in the episode are moved to the previous episode.

Deleting a transition does not affect the events in the **Event Log** window.

After deleting a transition, you may need to re-name some of the remaining episodes. To do so, double-click the name of the transition row for that episode and type in the new name.

To delete an entire episode right-click the episode's transition row and select **Delete episode,** or click the transition row and click the **Delete episode** button on the tool bar.

## COPYING EPISODES AND EVENTS

### *Copying an episode*

To copy an entire Episode A:

1. Right-click Episode's A transition row and select **Copy**.
2. Right-click the episode below which you want to add Episode A and select **Paste**.
3. Episode A will be copied and added to the Episode Selection.

### *Copying an event*

You cannot copy an event within the same episode.

You can copy an event to another episode:

1. Click an event line in the Episode Selection.
2. Press the **Ctrl** key.
3. Drag the event line to the appropriate episode. A red line appears below the episode's transition row.
4. Release the mouse button to copy the event. The events in that episode are re-numbered and ordered chronologically.

You can also use the following method:

1. Right-click the appropriate event and select **Copy**.
2. Right-click any position in the episode to which you want to add the event and click **Paste**. The event will be added to the episode. The events in that episode are re-numbered and ordered chronologically.

## CUSTOMIZING THE EPISODE SELECTION

At this point we assume that your Episode Selection is complete and includes only the events you want to visualize, or generate an episode video from. You can customize the Episode Selection in a variety of ways:

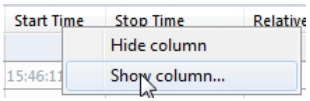
- Show columns in the Episode Selection window (see below).
- Hide a column in the Episode Selection window (see page 288).
- Edit the contents of the cells. Note: Only columns that are not grayed out can be edited (see page 289).
- Sort the columns of the Episode Selection (see page 289).

### *Showing columns*

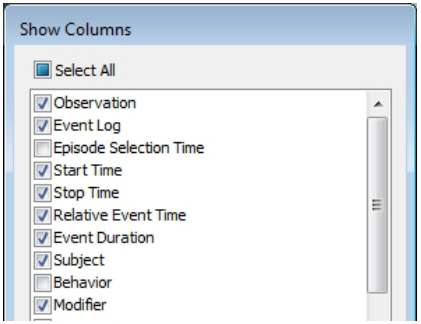
The **Episode Selection** window may include more information than you currently view. This additional information can be displayed by adding more columns to the table.

To show more columns:

1. Right-click one of the column headers and select **Show column**.




2. In the **Show columns** window, select the boxes for the columns you want to visualize and clear the ones for the columns you do not want to view, and click **OK**. See below for more information on the single items.

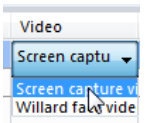


You can edit the content of some columns. Only columns that are not grayed out can be edited.

The **Video**, **Subtitle Text**, **Subtitle Duration** and **Roll-on/Roll-off time** columns are not available in the Basic version of The Observer XT, because the basic version does not contain video.

- **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.

  The terms **Subject**, Behavior and Modifier may not be the same as those on your screen. This depends on what terms you have specified in your project's Terminology Preferences (see page 93).
- **Modifier** – The behavior 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.

  The Roll-On/Roll-Off time has a limit of 9 hours, 59.999 minutes.
- **Subtitle Text** (editable) – The text that appears during playback of the media file generated from the Episode Selection. 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 display of the subtitle text of events and transitions. For transitions, the default duration is 4 seconds. For events it is 2 seconds.

### *Hiding a column*

Right-click the column header and select **Hide column**. Note that you cannot hide the leftmost (numbered) column.

*Editing the cell contents*

1. Double-click the cell you want to edit.
2. Type in the text.
   - For **time/duration** cells – Click one of the numbers (s.dd) and use the arrow keys to change it to the desired value or type in the value.

*Sorting the columns of an Episode Selection*

You can sort the columns of the Episode Selection by dragging and dropping the column header to any position.

# 7.5 Playing the Episode Selection

Click the playback buttons to play an Episode Selection. Segments of video and external data are played synchronized with the events highlighted in the Episode Selection.

Make sure that with **View Settings** on the Component tool bar, the option, **Videos** and subsequently **Video Window** is selected. Also select **Playback Control** and (if applicable) **External Data**.

For information about the Playback Control functions, see page 141.

The event lines in the Episode Selection window currently played are highlighted in blue.

With the **Step forward** and **Step backward** buttons you can jump to the next/previous event in the Episode Selection.

*Playing the Episode Selection*

Right-click the line of the event where you want to start, and select **Play**.

*Playing a Point event*

By definition, events scored with Instantaneous Sampling have no duration (see page 73). The Stop Time of these events is equal to the Start Time. 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). By default, the **Roll-On Time** for all events is 3.0 seconds and the **Roll-Off Time** is 2.0 seconds.

*Changing the Roll-on/Roll-off times for all events*

- On the tool bar, click the **Settings** button.


3. Select the **Duration** tab. Click on one of the numbers in the **Roll-On** or **Roll-Off Time** box and use the arrow keys to change it or type in the desired value.

4. Select **Apply to all**.
5. Click **OK** or press **Enter**.

See page 294 for more information.

### EXPORTING THE EPISODE SELECTION

You can export Episode Selections to ASCII (text) files. If your observation includes external data, these are exported together with the Episode Selection in separate ASCII files. You can export the episode selection that is currently active, or all episode selections.

- Exporting the currently active Episode Selection:
  - a Click the **Export Selected Data** button on the tool bar.
  - b Type in a file name in the **File base name** field, choose a destination location from the **Save in** list, choose the type of text file and list separator and click **Export**.
- Exporting all Episode Selections:
  - a From the **Analyze** menu, select **Episode Selection**, then click **Export**.
  - b Type in a file name in the **File base name** field, choose a destination location from the **Save in** list, choose the type of text file and list separator and click **Export**.

Episode Selections are saved as <base name> - Episode Selection 001(1).txt, <base name> - Episode Selection 002(1).txt, etc. Associated physiological data are saved as <base name> - Episode Selection 001 - physiological data 001(1).txt, etc.

If you have set roll-on and roll-off times, the external data samples within these intervals are also exported.

## 7.6 Generating an Episode video

You can generate a video file from your selection of video episodes that you specified in the Episode Selection. Note that the format of the video file generated depends on the video compressor (codec) you choose, not the format of the original video file (see page 292).

If you have a Basic version, you cannot generate media files from within The Observer XT.

---

**!** The Observer XT only supports generating media files in standard definition (SD) (704 x 576 Pal, 704 x 480 NTSC). At higher resolutions the video generation may not be stable.

---

## PROCEDURE

1. To first preview the video file from the Episode Selection, open the **Analyze** menu and select **Episode Selection** and then **Preview Episode Video**. Alternatively, click the **Preview episode video** button on the Episode Selection tool bar.

   A **Preview** window opens showing the video scenes selected. The **Preview** window closes after the end of the selection has been reached. To close it manually, click this button.

2. To create the video file, open the **Analyze** menu, select **Episode Selection**, then click **Generate Episode Video** or, when an Episode Selection is open press **Ctrl+Shift+G,** or press the **Generate episode video** button on the tool bar.

   The **Generate Episode Video** window appears.

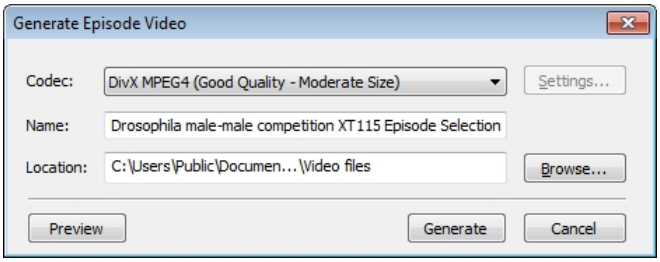



*Figure 7.12 The **Generate Episode Video** window.*

3. In the **Codec** field, select a Video codec from the list. We recommend to use DivX MPEG4. See 'Which codec should I use' on page 292 for more information about the options.

4. In the **Name** field, either type in the name of the resulting video file or accept the default one. Next, click the **Browse** button and navigate to the location where you want to save the video file.

   By default, the output video file is named as the Episode Selection used to generate it, and is stored in the Video Files folder. The default path is:

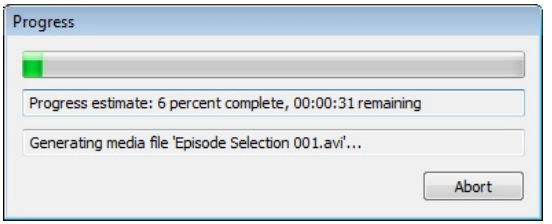
   C:\Users\Public\(Public) Documents\Noldus\The Observer XT\Video Files.

   You can change the path in the **Preferences**. From the **File** menu, choose **Preferences** and then **Files locations** in the left pane.

5. Click **Preview** if you want to view the resulting video, without generating a media file (optional).

   A **Preview** window opens showing the video scenes selected. The **Preview** window closes after the end of the selection has been reached. Click this button to close it manually.

6. Click **Generate** to generate the media file. A **Progress** window appears.




If you want to cancel the operation, click **Abort**.

7. After the video file has been generated and stored on disk, the **Progress** window shows **the** message 'Generate video file finished successfully'. Click **Close** to exit the **Progress** window and the **Generate Episode Video** window.

***Video codecs***

What is a Video Codec? – Codec stands for Compression Decompression. It is software that decompresses the original video file and recompresses it to create the new video file.

The format of the video file generated depends on the video compressor you choose, not the format of the original video file.

Which Codec should I choose? –

- **DivX MPEG4** – Choose this codec if you want to create MPEG-4 files of good quality and moderate size (with extension *.avi). This is the default and recommended codec. The file size of DivX MPEG4 videos is 0.5- 3 GB per hour.
- **DV AVI** – Choose this codec if your research requires superior quality. Be aware, however, that DV AVI files are generally very big (12.5 GB per hour), so make sure you have enough disk space on your PC.
- **Other** – If you select Other, a list of other codecs available on your computer is shown.

Please note that the quality of the generated video file depends on the quality of the original video. If your original video is an MPEG-4 video it does not make sense to choose DV AVI as the codec to generate a highlight video clip.

**Video Codec Settings** – By clicking **Settings** next to **Video codec** in the **Generate Episode Video** window, a **Configure/Configuration** window appears. In this window you can specify a number of settings (video format: PAL or NTSC, resolution etc.) that influence the quality of the resulting video file. The settings are codec-dependent. For some codecs, a **Settings** window is not available. For more information, see the documentation provided by the manufacturer of the codec.

## SUBTITLES

You can add subtitles to the Episode video. Please note that you cannot show subtitles when you play the Episode Selection (see page 289).

By default, subtitles are shown for all events. The text shown is that in the **Subtitle Text** column of the Episode Selection.

To select what to show as subtitles do one of the following:

- Open the **Analyze** menu and select **Episode Selection** and then **Settings**.
- Click the **Settings** button on the tool bar.


The **Episode Selection Settings** window opens (Figure 7.13).

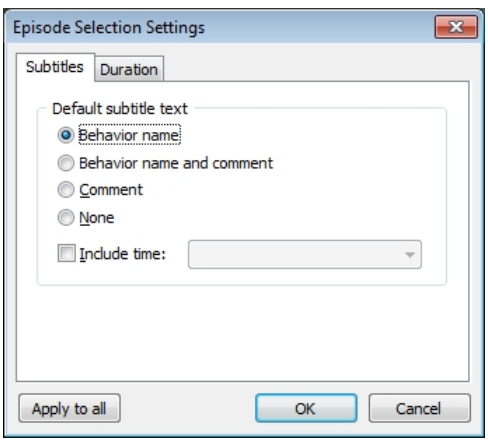



***Figure 7.13*** *The* ***Episode Selection Settings*** *window.*

Click the **Subtitles** tab and select one of the following options for the subtitle text:

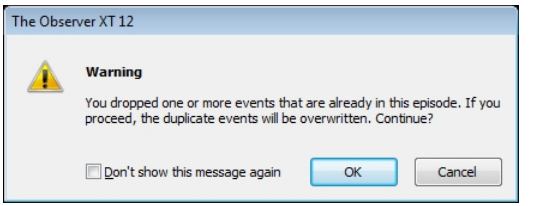
- **Behavior name** – To display the content of the **Behavior** column.
- **Behavior name and comment** – To display the content of both the **Behavior** and **Comment** columns.
- **Comment** – To display the text in the **Comment** column for each event.
- **None** – To not display subtitles.
- **Include time** – To display the time corresponding to the event/transition. Next, select one of the two time formats from the list:
  - **Absolute** – For example, 12:35:06.
  - **Relative** – Time from the start of the event log, for example 00:02:34.

  You can change the time format in the **Project Settings** (see **TIME FORMATS** on page 60).

- **Apply to all** – Click this button to overwrite the text in the **Subtitle Text** column of the episode selection. If you edited the subtitle text and you want to keep this text, then do not click this button. In that case, the setting only applies to events you later add to the episode selection.

---

The episode video can display subtitles of point events and state events at the same time. However, If two or more events of the same type start at the same time, only the subtitle for the one that comes first in the Episode selection will be shown. This is likely to happen when you select episodes in the time event plot, because all events that are active at the start of the episode will have the same start time in the episode selection.To show the subtitle of another event with the same time stamp, click the other events in the episode selection and drag them to below the event you want to show. The Observer XT will show the following warning:




Click **OK**. The event you want to show will now be the first of the ones with the same time stamp and its event name will be shown as subtitle in the episode video.

Alternatively, set the duration of the subtitles shorter, so that one ends the one of the still active event will be shown.

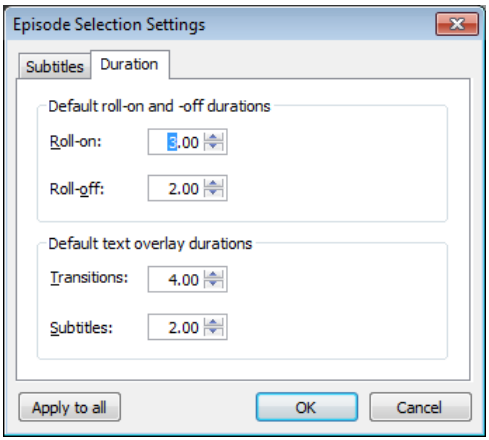
---

***Subtitle duration***

Durations are shown in the format defined in the **Project Settings**. To change the format, from the **Setup** menu, select **Project Settings** and then **Time formats**. For more information, see page 60.

To change the subtitle duration:

1. Click the **Duration** tab in the **Episode Selection Settings** window.




2. Set the duration in the **Subtitles** field. The default value is 2.0 s. Please note that the duration of a subtitle cannot exceed the duration of the event plus roll-off time.

   Example 1 – a state event has a duration of 5 seconds, and a roll-off time of 2 seconds. The subtitle duration can be maximally 7 seconds.

   Example 2 – a point event has a roll-off time of 2 seconds. The subtitle will only last for 2 seconds. Increase the roll-off time to increase the subtitle duration. See page 296 how to change the roll-off time.

3. Click the **Apply to all** button to apply the values in the **Duration** tab to all the rows in the Episode selection and overwrite the current values. If you want to keep the values for the current events and transitions in your episode selection and want these settings only to apply to events/transitions you add later, then do not click this button.

### *Subtitle layout*

To change the appearance and the position of the subtitles, click the **Properties** button on the tool bar, or open the **Analyze** menu and select **Episode selection** and then **Properties**. Open the **Subtitles** tab.

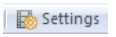
For the color you can choose between two options:

- **Use coding scheme colors** – If you choose this option the subtitles will be shown in the color of the behaviors which are listed in your episode selection. See page 307 for changing the color of behaviors.
- **Use single color** – If you select this option, you can select one color for all the subtitles.

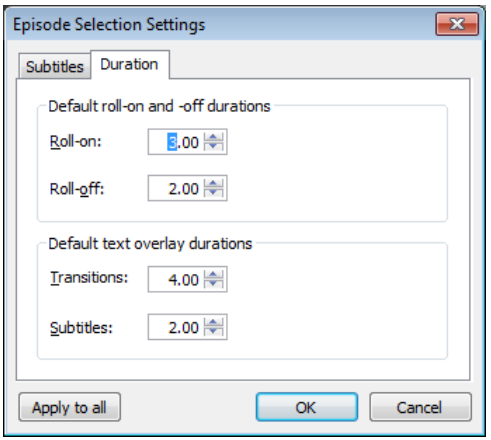
## TRANSITIONS

To change the transition duration:

1. Click the **Settings** button on the tool bar, or open the **Analyze** menu and select **Episode Selection** and then **Settings.**




2. Click the **Duration** tab in the **Episode Selection Settings** window.




3. Change the time in the **Transitions** field.

4. Click the **Apply to all** button to apply the values in the **Duration** tab to all the rows in the Episode selection and overwrite the current values. If you want to keep the values for the current events and transitions in your episode selection and want these settings only to apply to events/transitions you add later, then do not click this button.

### *Transition layout*

To change the appearance of the transition text, click the **Properties** button on the tool bar, or open the **Analyze** menu and select **Episode selection** and then **Properties**. Open the **Transition** tab and select the appearance.

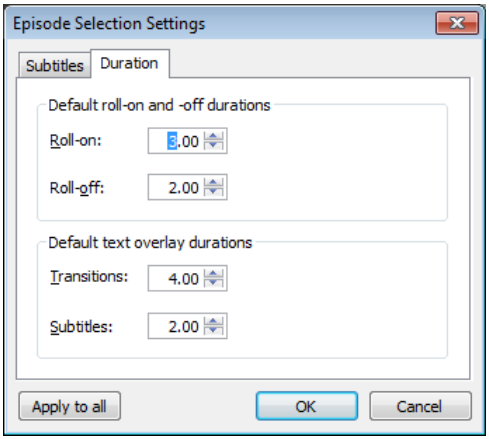
## ROLL-ON AND ROLL-OFF TIME

Durations are shown in the format defined in the **Project Settings**. To change the format, from the **Setup** menu, select **Project Settings** and then **Time formats**. For more information, see page 60.

To change the duration of roll-on, or roll-of time:

1. Click the **Settings** button on the tool bar, or open the **Analyze** menu and select **Episode Selection** and then **Settings**.


2. Click the **Duration** tab.




3. Change the time in the Roll-on, or Roll-off field.

4. Click the **Apply to all** button to apply the values in the **Duration** tab to all the rows in the Episode selection and overwrite the current values. If you want to keep the values for the current events and transitions in your episode selection and want these settings only to apply to events/transitions you add later, then do not click this button.

# Chapter 8

# Calculating Statistics

# 8.1 Before you start

The terms **Subject**, **Behavior**, **Modifier**, and **Independent Variable** listed in this chapter may not be the same as those on your screen. This depends on what terms you have specified in your project's **Terminology Preferences** (see page 93).

In The Observer, the term statistics refers to descriptive statistics, which provide a numerical summary of the properties of the observed frequency distribution. You can calculate the following descriptive statistics:

***Behavior Analysis***

With **Behavior Analysis**, you calculate statistics for events scored in the observations.

See page 319 for a description of the Behavior Analysis statistics.

**Example 1** – Calculate the average duration and standard deviation of the behavior *Play* for the subject *Child*.

**Example 2** – Calculate the number or times the subject *Test participant* requested help.

***Numerical Analysis***

With **Numerical Analysis**, you can calculate statistics for numerical modifiers (see page 80) and external data in the observation. Note that you can also use numerical modifiers as categories (see one of the notes below).

See page 326 for a description of the Numerical statistics.

**Example** – Calculate the average value of the numerical modifier *Speed*. If this modifier was scored 3 times, with values 10, 20 and 25, then the result will be (10+20+25)/3 = 18.33.

For both types of analysis, before calculating statistics you can restrict the data to analyze by creating a data profile (see Chapter 6). If you do not select data, The Observer calculates statistics on all events and external data in all observations in your project.

***Modifier combinations***

- **Analyzing Modifier combinations** – If behaviors are attached to modifiers, you can analyze modifiers:
  - 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. If you want to do so, make sure that you keep the **Show combined modifiers** option selected in the analysis settings (see page 303).
  - 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 in the analysis settings.
- **Analyzing numerical modifiers as categories** – It is possible to analyze a numerical modifier as a category, for example to calculate the number of times that the modifier '0.1' was scored. To do so, make sure that your numerical modifiers are included in the Data profile and carry out Behavior Analysis.

---

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 Behavior Analysis and analyze the numerical modifiers as categories, this may result in many cells in the analysis result. This can especially happen if you have numerical modifiers with several decimals, or if you have imported external data as numerical modifiers. The maximum number of columns and rows is 1000 x 1000. If the number of numerical modifiers exceeds 1000, The Observer XT will show a warning and no numerical analysis is carried out. You can reduce the number of cells with a Data Selection.

---

# 8.2 Procedure overview

1. Make sure that the data profile specifying the data you want to analyze is set to active, that is, highlighted in bold and blue in the Project Explorer.

---

To activate a data profile, click it's name in the Project Explorer. For more information on how to select data, see Chapter 6.

You can specify the format of time in your results. From the **Setup** menu, select **Project Settings**, then **Time formats** in the left pane. Select the time format you require (see page 60 for more information).

---

2. Do one of the following to display the Analysis Settings window:
   - From the **Analyze** menu, select **Behavior Analysis** or **Numerical Analysis**, then **New**.
   - In the Project Explorer, click the **Analyses** folder. In the overview window, click **Analyze Data**, in the window that appears, click **Behavior Analyses** or **Numerical Analyses**.
   - In the Project Explorer, under **Analysis**, click **Behavior Analyses** and then **New Behavior Analysis** or click **Numerical Analyses** and then **New Numerical Analysis**.

3. A table appears with question marks. To show the results, click the **Calculate** button on the tool bar. By default the following items are present in the table.
   - **For Behavior analysis and continuous sampling** – Mean, Total duration, Rate per minute (observation duration), Total number. See **STATISTICS FOR BEHAVIOR ANALYSIS** on page 319 for available statistics and details about the statistics.
   - **For Behavior analysis and instantaneous sampling** – Proportion (all samples), Scored samples. See **For Instantaneous Sampling** on page 325 for available statistics and details about the statistics.
   - **For Numerical analysis** - Minimum, Maximum, Mean, Total duration. If you scored with instantaneous sampling, the column Total duration contains the missing value symbol "-", because instantaneous samples do not have a duration. See **STATISTICS FOR NUMERICAL ANALYSIS** on page 326 for available statistics and details about the statistics.

   The table with statistical results also contains the columns **Duration**, **Start time** and **Stop time** that contain details about the observation.

### *Changing the missing values symbol or number of decimals*

To change the missing value symbol, or the number of decimals, click the **Settings** button on the tool bar. Select the following:

- **Show missing values as** – Choose the character you want to have displayed for missing values in the statistics result
- **Number of decimals** – Choose the number of decimals for the non-time values.

### *Changing the table layout*

1. To specify what to show on rows or columns, click the **Layout** button on the tool bar. Select the element category you want to view on rows, columns and separate sheets. Clear the selection for any element type you do not want included in the table.

   De-selecting one of the categories (except External data and Independent Variables) equals to calculating the results for the elements summed. For example, if **Subjects** is not selected, all subjects in an observation are treated as one. See also **Collapsing Category elements** on page 313.

**Result Container** specifies the name of the Results box in your data profile (see page 200). If your data profile contains two or more of such boxes, you cannot de-select this option. You can rename the Result boxes in the data selection.

---

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.

**Example** – If you select **Statistics** under **On Sheets**, each type of statistic will be shown in its own sheet. To place statistics on the columns of the results table, click **Statistics**, then click the arrow button pointing to the **On Columns** box.

---

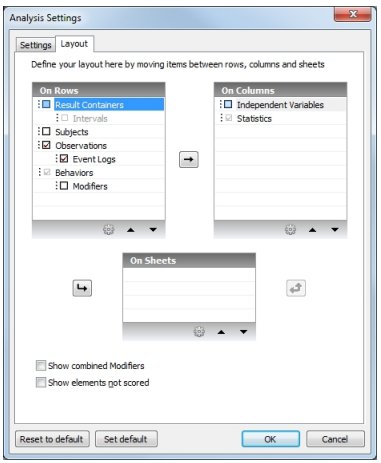



***Figure 8.1*** *The* ***Analysis Settings*** *window for behavior analysis.*

2. **Sort the table** (optional) – You can sort the table by the main categories by changing their position within each box (top= highest hierarchical level) with the **Up** or **Down** button at the bottom of the box.

3. **Select the elements you want to view in the table** (optional) – Click the category name and click the **Settings** button.

   The **Category** window appears. Select the elements you want to view in the table.

4. Select the following:
   - **Show combined Modifiers** – Make sure this option is selected if you want to have results for all combinations of modifiers. By default this option is selected.

     **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.

Note that 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.

- **Show elements not scored** – Select this option if you want the result to include the elements of the coding scheme that you have not scored in some observations, or if they are not present in intervals created in your data profile. For those elements, the cells in the result will contain zeros or the missing value symbol.

### *Selecting statistics*

To select the statistics, click the **Statistics** button on the tool bar and make your selection. It is also possible to select statistics in the **Layout** window (see above). To do so, select the statistics, and then the **Settings** button.

Select the statistic you want to view in the table. For a detailed description of the statistics, see page 316.

### *What next?*

- See page 306 for how to read your statistics result.
- See page 311 for how to customize your result.
- See page 438 for how to save and export your result.

### *Saving your analysis settings*

You can save the settings specified in the steps above by clicking the **Set Default** button in the **Analysis Settings** window. If this window is gone, click **Settings** on top of the result window.

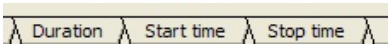
### *Applying settings to a new analysis*

If you are about to run a new analysis and want to recall the settings you have specified earlier, click the **Reset to Default** button in the **Analysis Settings** window. The new settings are applied. Click **OK** to update the results.

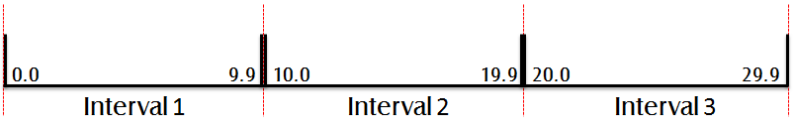
### *Notes*

- If the active data profile does not contain any data, the menu items and buttons for the analysis are not available.

- An element category is not available on the **Layout** page if it does not occur in your coding scheme or is filtered out in the current data profile.
- Make sure that if you select statistics for numerical modifiers or external data, you also select at least one item in the corresponding category.
- The **Show combined Modifiers** option is not available if you choose **Numerical Analysis**. In that case, numerical modifiers are analyzed separately, that is, each group will produce a numerical result.
- In the **Layout** page, you cannot de-select behaviors and move behaviors without moving their modifiers.
- If you put two or more categories **On Sheets**, each sheet will contain the statistics related to a combination of those elements. For example, if you select **On Sheets** for both **Observations** and **Statistics**, each sheet is labeled with the name of an observation and a statistic.
- If you select **Independent Variables** under **On Sheets**, a separate sheet for each variable is appended to the result. In the example below, **Statistics** and **Independent variables** have been placed under **On Sheets**. As a result, each statistic and independent variable gets its own sheet.




- 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.
- **Formats** – The number of decimals under **Analysis Settings** refers to non-time values in the statistics result. For example, the mean rate per minute. If you want to specify the decimals of time values, see Specifying the time format on page 316.
- **Missing values** – Missing values are shown for:
  - Statistics for events not scored.
  - Statistics for events that were scored or external data that was acquired, but not included in the active data profile.
  - Statistics that cannot be calculated, for example the duration of point behaviors (which do not have duration by definition).
- **Time Intervals and Time bins** – 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. In general, the Observer uses the left borders (start) of the time intervals, 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 stop of the observation** – Events scored at the exact stop of the observation are not included in the analysis. This is the case for events scored with continuous sampling. Instantaneous samples cannot be scored at the exact stop of the observation.

# 8.3 The statistics result

The statistics result is created when you click **Calculate** button on the tool bar, and updated every time you choose options in the **Layout**, **Settings** or **Statistics** window and click **OK**.

Depending on what you have selected under **On Sheets** in the **Analysis Settings** window, the analysis result has one or more pages, each containing a table. For example, if you have selected **Observations** in the **On Sheets** box, each page refers to one observation.

For information on saving and exporting your results, see page 438.

## READING THE STATISTICS RESULT

### *The data*

In each sheet, you can distinguish two main groups of white cells:

- **Statistics** – Cells containing a statistic for a combination of results container, observation, event log, subject, behavior and modifier (see A in Figure 8.3).

  Please note that the statistics are rounded. The Observer takes more decimals into account than are shown in the results table.

| Result Containers | Intervals | Behaviors | Total duration |
|---|---|---|---|
| Talk to self | 37,792-42,189 | Functional use | - |
| | 115,954-125,074 | Functional use | - |
| | 142,465-148,465 | Functional use | - |
| | 189,878-195,401 | Functional use | 1,452 |
| | 463,836-468,972 | Functional use | 1,454 |

| Result Containers | Behaviors | Total duration |
|---|---|---|
| Talk to self | Functional use | 2,906 |

| Result Containers | Intervals | Behaviors | Total duration |
|---|---|---|---|
| Talk to self | 37,79-42,19 | Functional use | - |
| | 115,95-125,07 | Functional use | - |
| | 142,47-148,46 | Functional use | - |
| | 189,88-195,40 | Functional use | 1,45 |
| | 463,84-468,97 | Functional use | 1,45 |

| Result Containers | Behaviors | Total duration |
|---|---|---|
| Talk to self | Functional use | 2,91 |

| Result Containers | Intervals | Behaviors | Total duration |
|---|---|---|---|
| Talk to self | 37,8-42,2 | Functional use | - |
| | 116,0-125,1 | Functional use | - |
| | 142,5-148,5 | Functional use | - |
| | 189,9-195,4 | Functional use | 1,5 |
| | 463,8-469,0 | Functional use | 1,5 |

| Result Containers | Behaviors | Total duration |
|---|---|---|
| Talk to self | Functional use | 2,9 |

***Figure 8.2*** *An example of the effect of rounding in the Behavior Analysis depending on how many decimals are displayed. The top row shows the results in three decimals, the middle row in two decimals and the bottom row in one decimal, with different results for Total duration.*

- **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 (see B in Figure 8.3). See the note about missing values on page 325.

The position of the two areas depends on whether the elements are placed in rows, columns and sheets (see page 311). For example, if Variables are placed on the columns, the Variables area (B) is displayed on the right side of the statistics. If the Variables are placed on Sheets, a number of sheets are added where each of them contains the values of an independent variable associated to an observation, event log or subject.

### *The headers*

- **Main** (in blue) – The names of the main categories (Data selection **Result Containers**, **Intervals**, **Observations**, **Event Logs**, **Subjects**, **Behaviors** and their **Modifiers**, and **Variables**; see C in Figure 8.3).
- **Secondary** (in black) – Show the single element values, for example the name of the behaviors (see D in Figure 8.3).

Calculate | Settings | Layout | Statistics | Charts | View Settings

| Independent Variables / Behaviors / Statistics | Result Containers | Observations | Touch wall | | | | Age | Gaming experience |
|---|---|---|---|---|---|---|---|---|
| | C | | D | | | | | |
| | | | Mean | Total duration | Rate per minute | Total number | | |
| | Results | Participant 1 test 1 | 1.12 | 67.02 | 18.39 | 60 | 31 | Low |
| | | Participant 1 test 2 | 0.84 | 85.64 | 16.33 | 102 | 31 | Low |
| | | Participant 2 test 1 | 0.27 | 10.91 | 13.64 | 40 | 30 | Very high |
| | | Participant 2 test 2 | 0.39 | 26.80 | 15.24 | 69 | 30 | Very high |
| | D | Participant 3 test 1 | 0.27 | A 7.07 | 13.72 | 26 | B 27 | High |
| | | Participant 3 test 2 | 0.47 | 35.58 | 19.44 | 75 | 27 | High |
| | | Participant 4 test 1 | 0.81 | 23.48 | 13.51 | 29 | 26 | Average |
| | | Participant 4 test 2 | 0.81 | 61.53 | 19.77 | 76 | 26 | Average |
| | | Participant 4 test 3 | 0.72 | 39.75 | 12.56 | 55 | 26 | Average |

***Figure 8.3*** *An example of statistics result. A - Cells containing statistics. B - Cells containing the values of independent variables. C - Main headers (for example, Observations, Behaviors, etc.). D - Secondary headers (list the single values of the elements under a certain main header)*

**Header rows and columns are placed in a hierarchical way** - Elements of a certain level are always below (if placed in columns) or to the right (if placed in rows) of the header of higher level. For example:

Observations may contain one ore more Event logs. In the picture below, Observation0002 includes three event log files. The statistics are shown for each event log.

| Observations | Event Logs | |
|---|---|---|
| | | |
| | | Duet |
| Observation0001 | Event log0001 | 11 |
| Observation0002 | | 12 |
| | Event log0002 | 3 |
| | Event log0003 | 1 |

Since Observation0001 and Observation0002 have both an event log named Event log0001 (though it is different data), this name is written only once (“merged”) in the table.

A behavior may be associated with several modifier values. In the picture below, statistics are shown for each value of a modifier associated to the behavior *Navigation*:

| | Observations | | | | | |
|---|---|---|---|---|---|---|
| Behaviors | | Navigation | | | | |
| Modifiers | | Restart | Trial | Online help | Test leader | Helpdesk |
| | Session 1 | - | 5 | 1 | - | 1 |
| | Session 2 | 1 | 4 | 3 | 4 | - |
| | Session 3 | - | 5 | 4 | 2 | 1 |

If you add or remove a variable in the Independent Variables List (see page 86), the corresponding variable is displayed or removed, respectively.

### *Understanding <Result Containers>*

The **Result Containers** column or row shows the name of the Result boxes specified in the currently active data profile. If you have specified more than one Results box (see page 200 for an example), each name corresponds to the name of a **Results** box. Statistics are calculated for each data set.

### *Understanding 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. The format is:

- For live observations, the actual time of start and end.
- For observations from video or audio files, the time elapsed since the start of the observation.

---

If you want to view intervals, make sure that **Result Containers** and **Intervals** are selected in the **Layout** page of the **Analysis Settings** window.

---

### *Understanding <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 event with no subject, or when you scored comments only. You can only calculate the frequency, rate per minute and latency of **Missing Behaviors** and no durations. This is because durations are only calculated for State behaviors that are defined in the Coding Scheme.

| | | |
|---|---|---|
| 0.00 | **Start** | |
| 1.64 | Child | Fussy noise |
| 6.92 | | Emotion |
| 10.72 | Parent | Negative |
| 13.60 | Child | Fussy noise |
| 22.28 | Parent | Negative |
| 26.72 | | Emotion |
| 26.72 | | Emotion |
| 33.60 | Parent | Negative |
| 35.72 | | Emotion |
| 35.72 | Parent | Negative |

The statistic for that event is shown in the cell corresponding to the behavior row/column and the **<Missing Subject>** column/row.

| | Observations | Behaviors | |
|---|---|---|---|
| Statistics | | | Total number |
| Subjects | | | <Missing Subje |
| | Observation 1 | Negative | - |
| | | Fussy noise | - |
| | | Emotion | 2 |

### *Understanding <Any Subject>, <Any Behavior>*

You can hide the **<Missing Subject>** column/row by selecting **Subjects** with **View Settings** at the far-right on the Component tool bar. In the **Subjects** window that appears, deselect the check box behind **<Missing Subject>**.

The **<Any Subject>** rows/columns show the statistics of events scored for any subject in that event log/observation. In the table below, the highlighted cell contains the total duration of the behavior *Out* for **<Any Subject>**, which equals the sum of the behavior *Out* for the subjects *Male* and *Female*.

| Observations | Subjects | | |
|---|---|---|---|
| | | | |
| | | In | Out |
| Nest 235 Day 6 | Female | 658.42 | 921.22 |
| | Male | 123.90 | 1455.74 |
| | <Any Subject> | 782.33 | 2376.96 |
| Nest 275 Day 12 | Female | 227.60 | 1604.98 |
| | Male | 89.20 | 1745.50 |
| | <Any Subject> | 316.81 | 3350.48 |

The **<Any Behavior>** rows/columns show the overall statistics of any behavior selected in the data profile. In the example below, the **<Any Behavior>** cell contains the total duration of all behaviors.

| | Subjects | |
|---|---|---|
| Statistics | | Total duration |
| Behaviors | | <Any Behavior> |
| Modifiers | | |
| | Female | 2048.80 |
| | Male | 1579.64 |

- The percentage statistics of **<Any Behavior>** can be greater than 100%. This occurs because the percentage of <Any Behavior> is the sum of the percentages of each behavior taken separately. If two or more behaviors overlap with each other, the sum does not reflect the actual time segment covered by the behaviors. For example, if A lasts from 0 s to 60 s, and B from 20 s to 80 s, and the observation duration is 100 s, then the sum of the percentages is 60%+60%= 120% even if neither A or B covers the entire observation. To have a correct result, merge behaviors in a Data Profile (see page 206).
- The statistics for **<Any Subject>** and **<Any Behavior>** are independent of which behaviors you select to display in the **Category** window (see step 6 on page 303). For example, if you de-select a few behaviors in the **Category** window, the total duration of **<Any Behavior>** is no longer the sum of the durations of the behaviors shown in the table.

***Editing the result***

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 (see page 440) and then edit it in that program. You can alter the layout of the statistics result (see page 302).

***Saving a result***

To save a result, click the **Archive** button on the tool bar of the result window.

To re-open a saved result, from the **Analyze** menu, select **Behavior Analysis** or **Numerical Analysis**, then **Open Archive**. For more information on saving, opening and exporting results, see page 438.

***Printing a result***

To print a result, from the **File** menu, select **Print**. We advise you to select the Landscape mode prior to printing. Do this in the printer settings or properties.

## CUSTOMIZING YOUR RESULT

If you like you can change the decimal symbol, from e.g. point to comma. In the **Control Panel**, select **Clock, Language and Region**, click **Region and Language** and open the tab **Formats**. Select a language or click **Customize** and change the decimal symbol.

Changing your regional settings does not take effect until you restart The Observer XT.

You can customize the following in the Analysis Results:

- **Select and sort elements within a Category** (see below) – Select Categories and their elements to display in the Analysis Results.

  To change the position of the main Categories relative to each other, see page 302.

- **Collapse Category elements** (see page 313) – You can collapse rows and columns for Category elements and display the results as if those elements were grouped.
- **Hide/show single row and columns** (see page 315).
- **Specify the time format** (see page 316).

### *Selecting and sorting a Category*

You can select and sort elements within the following categories: **Result Containers**, **Observations**, **Subjects**, **Behaviors**, **Statistics** and **Independent Variables**.

To select and sort one of the Categories:

1. Do one of the following:
   - Select the Category with **View Settings** on the Component tool bar.
   - Click the **Layout** button on the tool bar, make sure that the category is selected and then double-click that option.
   - To open the **Statistics** Category, you can also click the Statistics button on the tool bar. 
2. Next, you can do the following:
   - Select the Category elements you want to display in the Analysis Results, de-select the Category elements you want to ignore.

     De-selecting elements in this window does not result in removing those Result boxes from the data profile.
   - To change the order of display, click the Category element you want to move so it becomes highlighted and then click the **Up** or **Down** button.
3. Click **OK** to refresh the Analysis Results.

### *Notes*

- De-selecting a Category element does not result in removing the element in a data profile.
- **Results Containers** – If you de-select **Result** boxes in the **Analysis Settings** window, intervals are hidden in the **Analysis Results**.
- **Observations** – You cannot remove single event logs from observations, or sort them in the result. To remove results for event logs, remove those event logs from the data profile.
- **Subjects** – Select **<Any Subject>** if you want to display statistics for events independent of the subject. Select **<Missing Subject>** if you want to calculate the statistics for the missing subject (for example, events for which you only scored the behavior).

- **Behaviors** – Select **<Any Behavior>** if you want to display statistics for events independent of the behavior. Select **<Missing Behavior>** if you want to calculate the statistics for events in which the behavior was not scored. You can only calculate the frequency, rate per minute and latency of **Missing Behaviors** and no durations. This is because durations are only calculated for State behaviors that are defined in the Coding Scheme.
- **Statistics** – The number and type of statistics displayed depend on whether you have chosen **Behavior Analysis** or **Numerical Analysis** (see page 300).
- **Intervals** – If you defined intervals in your data profile and want to have statistics for each interval separately, make sure you select the check box in front of **Intervals**.

***Collapsing Category elements***

Collapsing Category elements allows you to lump the statistics for different Categories. For example, calculate the total number of times an event was scored across all observations.

---

Do not group categories if you want to calculate statistics for the external data. Doing so may give unexpected results.

To calculate overall results, you can also group data (see page 245).

---

1. Do one of the following:
   - With **View Settings** on the Component tool bar, select **Rows/Columns/Sheets** and de-select the category you want to collapse.
   - Click the **Layout** button on the tool bar, and de-select the option for the category you want to collapse.
2. Click **OK** to refresh the **Analysis Results**.

You cannot collapse results for **Result Containers** and **Behaviors**. To analyze behaviors as a group, merge them first in the data profile (see page 206).

To collapse statistics for modifiers, click the **Layout** button and clear the appropriate **Modifiers** option.

**Example 1** – Collapsing observations. In the result below, statistics are displayed per observation. For example, the total duration of each behavior.

Calculate Settings Layout Statistics Charts

| | Observations | Subjects | | |
|---|---|---|---|---|
| Statistics | | | Total duration | |
| Behaviors | | | In | Out |
| | Nest 235 Day 6 | Female | 658.42 | 921.22 |
| | | Male | 123.90 | 1455.74 |
| | Nest 275 Day 12 | Female | 227.60 | 1608.10 |
| | | Male | 90.20 | 1745.50 |

After de-selecting **Observations**, statistics are collapsed into one group, and the **Observations** header is removed. Now the total duration is the duration of each behavior across all observations.

Calculate Settings Layout Statistics Charts

| | Subjects | | |
|---|---|---|---|
| Statistics | | Total duration | |
| Behaviors | | In | Out |
| | Female | 886.03 | 2529.32 |
| | Male | 214.10 | 3201.24 |

If your observations contain multiple event logs, you can collapse all event logs within each observation, and still show observations separately. To do so, click **Layout** and select **Observations** and de-select **Event Logs**.

**Example 2** – Collapsing modifiers. In the example below, statistics are displayed per modifier of the behavior named *Navigation*.

Calculate Settings Layout Statistics Charts

| | Observations | | | | | | |
|---|---|---|---|---|---|---|---|
| Statistics | | Total number | | | | | |
| Behaviors | | Navigation | | | | | |
| Modifiers | | Helpdesk | No solution | Online help | Restart | Test leader | <Any Modifier> |
| | Session 1 | 3 | 2 | 6 | 3 | 3 | 17 |
| | Session 2 | 2 | 4 | 7 | 1 | 3 | 17 |
| | Session 3 | 2 | 2 | 2 | 2 | 1 | 9 |

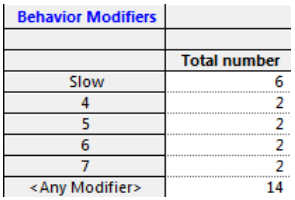
Click **Layout** and in the **Analysis Settings** window clear the **Modifiers** option under **Behaviors**. After clicking **OK**, statistics are now collapsed into one group for each behavior and the **Modifiers** header is removed. Now the total number of occurrences of *Navigation* is shown.

Calculate Settings Layout Statistics

| | Observations | |
|---|---|---|
| Statistics | | Total number |
| Behaviors | | Navigation |
| | Session 1 | 17 |
| | Session 2 | 17 |
| | Session 3 | 9 |

### *Merged numerical modifiers*

**Behavior Analysis**

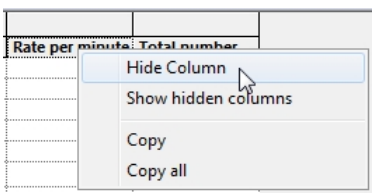


| Behavior Modifiers | |
|---|---|
| | |
| | Total number |
| Slow | 6 |
| 4 | 2 |
| 5 | 2 |
| 6 | 2 |
| 7 | 2 |
| <Any Modifier> | 14 |

If you merge part of your numerical modifiers in a data profile and carry out a **Behavior Analysis**, 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, and 7. Furthermore, you have created a group *Slow*, which contains the modifiers 1,2, and 3. If you carry out a **Behavior Analysis**, you get the results for the group *Slow*. In addition, you get the results for the modifiers that are not part of the group (see picture below).

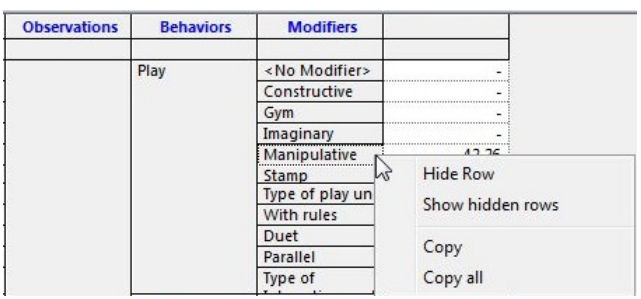
Merging numerical modifiers makes a nominal group, which means you cannot carry out a numerical analysis on the group to calculate for example mean, maximum and minimum values.

### *Hiding and showing rows and columns*




To hide rows and columns of your statistics result, point the mouse to the header of the row or column that you want to remove, right-click and select **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, point the mouse to the header of one of the remaining rows/columns, right-click and select **Show hidden rows** or **Show hidden columns**.

***Specifying the time format***

You can customize the format of the time values displayed in the analysis result.

1. From the **Setup** menu, select **Project Settings**, then **Time formats** in the left pane.
2. To set the time mode, select **Absolute** or **Relative** from the **Project time format** list.
3. To set the time format, click the **Edit** button for the time mode you selected in the previous step.

   This way you also set the time formats for the lag sequential analysis and reliability analysis.

   See page 60 for more information.
4. Click **OK** twice. Next, re-open the analysis.

# 8.4 Statistics available

The Observer offers a range of statistics that are important to behavioral researchers. For an extensive description of these statistics, see, for example, Zar, J.H., Biostatistical Analysis, Pearson Education, 2007.

The statistics available depend on the type of analysis you are performing.

***Behavior Analysis***

If you choose **Behavior Analysis**, the following statistics are available:

For **Continuous Sampling**:

- Minimum – See page 319.
- Maximum – See page 319.
- Mean – See page 319.
- Total duration – See page 319.
- Standard deviation – See page 320.
- Standard error – See page 320.
- Rate per minute (observation duration) – See page 320.
- Rate per minute (interval duration) – See page 321.
- Rate per minute (observation duration) – See page 320.

- Rate per minute (interval duration) – See page 321.
- Rate per minute (analyzed observation duration) – See page 321
- Rate per minute (analyzed interval duration) – See page 321.
- Total number – See page 321.
- Percentage (observation duration) – See page 322.
- Percentage (interval duration) – See page 322.
- Percentage (observation duration) – See page 322.
- Percentage (interval duration) – See page 322.
- Percentage (analyzed observation duration) – See page 322.
- Percentage (analyzed interval duration) – See page 322).
- Latency – See page 323.
- $25^{th}$ percentile – See page 323.
- Median – See page 323.
- $75^{th}$ percentile – See page 323.

For **Instantaneous Sampling**:

- Proportion (all samples) – See page 325.
- Proportion (scored samples) – See page 325.
- Scored Samples – See page 325.
- Total number (all samples) – See page 325.
- Total number (scored samples) – See page 325.

For **Intervals**:

- Minimum interval – See page 325.
- Maximum interval – See page 325.
- Number of intervals – See page 325.
- Interval duration – See page 325.
- Total interval duration – See page 325.
- Analyzed interval duration – See page 325.
- Analyzed observation duration – See page 325.

***Numerical Analysis***

If you choose **Numerical Analysis**, the following statistics are available:

- Minimum (both for numerical modifiers and external data) – See page 327.
- Maximum (both for numerical modifiers and external data) – See page 327.
- Mean (both for numerical modifiers and external data) – See page 327.
- Total duration – See page 329.
- Total value – See page 329.
- Mean (per minute) – See page 329.
- Number of samples (only for external data) – See page 327.
- Number of valid samples (only for external data) - See page 327.
- 25$^{th}$ percentile – See page 327.
- Median – See page 327.
- 75$^{th}$ percentile – See page 327.

You can calculate statistics for Numerical Modifiers only if you have defined a modifier group as Numerical (see page 80).

---

**Calculating frequencies of Numerical modifiers** – If you want 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. Make sure that the numerical modifiers are included in the data profile.

---

***Note on normally-distributed data***

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 is not normally distributed. For instance, a mean of values '1', '10' and '10' is not meaningful.

## STATISTICS FOR BEHAVIOR ANALYSIS

See also important notes on page 325.

### *Merged data*

If you have grouped or merged data in the data profile, the analysis results show the merged results. If you have merged data by de-selecting a category in the Layout-page of the Analysis Settings window (see page 302), see below under each specific statistic how the number and duration are calculated.

### *For Continuous Sampling*

- **Minimum** – The shortest duration of each behavior with duration, selected for analysis.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the minimum duration is the shortest duration across the events in that category.

- **Maximum** – The longest duration of each behavior with duration, selected for analysis.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the maximum duration is the longest duration across the events in that category.

- **Mean** – The total duration divided by the total number of each behavior with duration, for each observation/event log selected for analysis:

  $$\overline{D} = \frac{\sum D}{N}$$

  Where D is the duration of the individual behavior, and *N* is the number of times the behavior occurs.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), D and N are summed across all elements in that category.

  It depends on your sample size how close the calculated mean is to the mean μ of the entire population of events. If your data are not normally distributed the statistic mean is less meaningful. Since behavioral data are often not normally distributed, we recommend you check whether they are with a statistical package.

- **Total Duration** – The sum of the duration of all behaviors with duration selected for analysis, for each observation and event log. Duration is the observed time between the start and the end of a state.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total duration is the summed duration of the events in that category.

- **Standard deviation** – The sample standard deviation of duration of behaviors selected for analysis.

  The standard deviation of a sample expresses to what extent the individual measurements of durations depart from the overall mean. It is defined as the square root of the average of the squared differences between each individual value D of the sample and their mean D.

  $$s = \sqrt{\frac{\sum\left(D - \overline{D}\right)^2}{N-1}}$$

  The formula above is equal to

  $$s = \sqrt{\frac{N\sum D^2 - \left(\sum D\right)^2}{N\left(N-1\right)}}$$

  Where D is the duration of the individual behavior, D the mean duration, *N* the number of occurrences of the behavior.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), D and N are summed across all elements in that category.

- **Standard error** – The standard error of the mean (s.e.m.) is the measure of the amount of error in the prediction of the duration of a particular event from a mean of a sample of size *N* drawn from the population of all possible events.

  $$s.e.m. = \frac{s}{\sqrt{N}}$$

  Where *s* is the standard deviation of a sample, and *N* is the number of occurrences (sample size).

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), D and N used to calculate s and the standard error are summed across all elements in that category.

- **Rate per minute (RPM)** –

  The general formula of Rate per minute is:

  Rate per minute = (Total number of occurrences / Duration in seconds) * 60.

  The value of **Rate per minute** depends on whether you calculate it over the entire **observation duration**, the **analyzed duration** or the selected **intervals duration**.

  - **Rate per minute (observation duration)** – The mean number of occurrences of a behavior (either with or without duration) per minute over the total duration of the observation:

    *RPM (observation) = Total number of occurrences * 60 / Duration of Observation (sec).*

If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total number of events and the total duration across the elements in that category are used to calculate the mean rate.

**Example** – If a behavior was scored 5 and 10 times in two observations of five minutes, then the rate will be 1 and 2, respectively. If you de-select Observations in the Layout page, the mean rate is:

*5+10 occurrences divided by 5+5 minutes = 1.5.*

- **Rate per minute (interval duration)** – The mean number of occurrences of a behavior (either with or without duration) over the total duration of the interval considered. The interval is the one you specified in the active data profile:

  *RPM (interval) = Total number of occurrences * 60 / Interval Duration (sec).*

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the rate are summed across all elements in that category.

- **Rate per minute (analyzed observation duration)** – The mean number of occurrences of a behavior (either with or without duration) over the total of the analyzed duration. This excludes the time filtered out by data selection and the time the observation was suspended.

  *RPM (Analyzed observation duration) = Total number of occurrences * 60 / Analyzed Duration (sec)*

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the percentage are summed across all elements in that category.

- **Rate per minute (analyzed interval duration)** – The mean number of occurrences of a behavior (either with or without duration) over the total duration of the interval considered. The interval is the one you specified in the active data profile. This excludes the time the observation was suspended:

  *RPM (analyzed interval) = Total number of occurrences * 60 / Analyzed Interval Duration (sec).*

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the rate are summed across all elements in that category.

- **Total number** – The number of times the selected event occurs in the observation or event log.

  If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total number is the number of times the event occurs in all elements in that category.

- **Percentage** –

  The general formula of Percentage is:

  *Percentage = Duration of event * 100 / Duration in seconds.*

  The value of **Percentage** depends on whether you calculate it over the entire observation duration, the analyzed duration or the selected intervals duration.

  - **Percentage (observation duration)** – The percentage of time of an event type (or group of) calculated over the total duration of an observation:

    *Percentage = Duration of event * 100 / Duration of Observation (sec).*

    If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the percentage are summed across all elements in that category.

    **Example** – In two observations of 10 minutes each, the behavior *Play* is scored for 8 minutes in the first and 7 minutes in the second. When deselecting **Observations** in the **Analysis Setting** window, the percentage is (8+7) /(10+10) = 75%.

  - **Percentage (Interval duration)** – The percentage of time an event type (or group of) calculated over the total duration of the interval considered. The interval considered is the one specified in the active data profile:

    *Percentage (interval) = duration of event * 100 / Interval duration.*

    If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the percentage are summed across all elements in that category.

  - **Percentage (analyzed observation duration)** – The percentage of time of an event type (or group of) calculated over the total analyzed duration of an observation. This excludes the time filtered out by data selection and the time the observation was suspended.

    *Percentage (Analyzed duration) = duration of event * 100 / Analyzed duration*

    If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the percentage are summed across all elements in that category.

  - **Percentage (analyzed Interval duration)** – The percentage of time an event type (or group of) calculated over the total duration of the interval considered. The interval considered is the one specified in the active data profile. This excludes the time the observation was suspended.

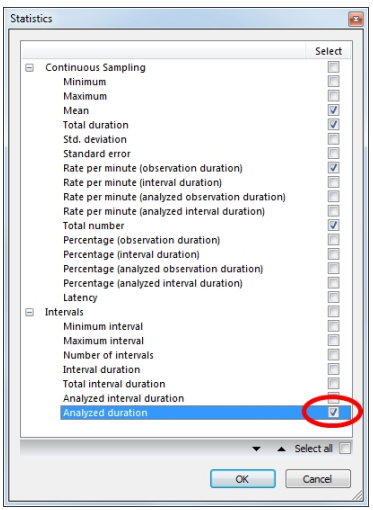
    *Percentage (analyzed interval) = duration of event * 100 / analyzed interval duration.*

    If you have grouped data by de-selecting a category in the **Layout** page of the **Analysis Settings** window (see page 302), the total durations of the events and the observations used to calculate the percentage are summed across all elements in that category.

- **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.

  When you want 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, create an interval 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 Duration**.




- **25th percentile** – Twenty-five percent of the events of this type has this duration or lower. For more details see Figure 8.5. The 25th percentile is also called the first quartile.
- **Median** – Fifty percent of the events of this type have this duration or lower. See Figure 8.5 for an explanation. The Median is the same as the 50th percentile or 2nd quartile.
- **75th percentile** – Seventy-five percent of the events of this type have this duration or lower. See Figure 8.5 for an explanation. The 75th percentile is also called the 3rd quartile.

### Calculation of percentiles

The concept of percentiles is explained in Figure 8.4. 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 Figure 8.4. 75% Of the events has a duration of 4 s or lower.

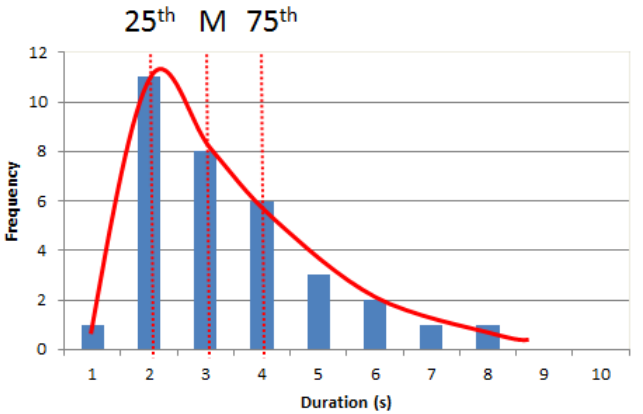



***Figure 8.4*** *The 25th, 50th (Median=M), and 75th percentile.*

Figure 8.5 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*

***Figure 8.5*** *How the 25th percentile, Median (50th percentile) and 75th percentile are calculated. For the Nth percentile, N percent of the events of this type has this duration or lower.*

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 total interval duration minus the time that the observation was suspended.
- **Analyzed observation duration** – The observation duration, minus the time filtered out by the active data profile, minus the time that the observation was suspended.

To analyze each interval separately, select the check box in front of Intervals in the **Layout** page of your **Analysis settings**.

*Notes*

- **Missing values** – Missing values (-) are given for events that did not occur in the corresponding observation or interval, or for events that have no duration (see page 73) when the statistic describes a duration (Mean, Total duration, Minimum, Maximum, Standard deviation, Standard error, Percentage (observation duration) and Percentage (interval duration).

- If your data profile contains intervals or time bins:

  Defining intervals or time bins in the data profile (see Chapter 6) may result in an interval boundary being somewhere in the middle of an event (Figure 8.6). An event is counted twice, once for the first interval and once for the next. When calculating the statistics, the **Total number** statistic is the number of occurrences that an event overlaps with an interval or time bin. This means that when you define intervals or time bins the total number shown in the result may be greater than the 'true' number of occurrences of that event.

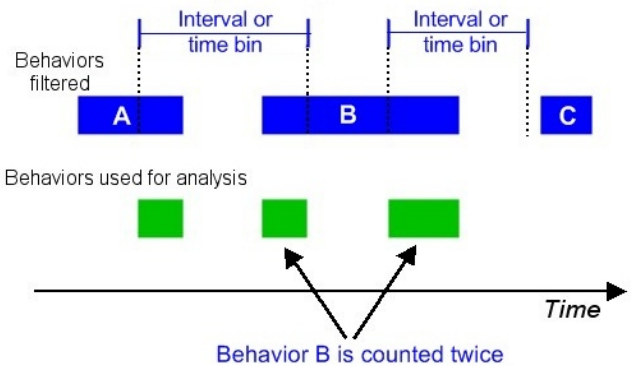



***Figure 8.6*** *When you define intervals or time bins, an interval or time bin boundary (dotted line) may be placed in the middle of an event (filled bars; see for example the behavior indicated by B). In such a case the* ***Total number*** *is the number of unique combinations between events and intervals/time bins. Behavior B is counted twice as it occurs in different intervals or time bins.*

- If you have suspended an observation:

  If you have suspended an observation (see page 149), the time when the observation is suspended is not considered for analysis. For example, if your observation lasted 5 minutes and it was suspended for 1 minute, then the observed time is 4 minutes. The observed time is used for example to calculate the rate per minute.

## STATISTICS FOR NUMERICAL ANALYSIS

The statistics listed below are available for numerical modifiers and external data values. For calculating the statistics for grouped data, see the note for the specific statistic in Behavior Analysis Statistic on page 319). To analyze each interval separately, select the check box in front of **Intervals** in the **Layout** page of your analysis settings.

- **Minimum** – The lowest value of a numerical modifier scored.

  To calculate the lowest value of external data, select **Minimum** under **External data**.

- **Maximum** – The highest value of numerical modifier scored.

  To calculate the highest value of external data, select **Maximum** under **External data**.

- **Mean** – The arithmetic mean of the values of a numerical modifier scored.

  **Example** – If you have defined the modifier group Face Score as Numerical with values ranging from 1 to 5 and you scored values 3, 4, 4, 5 during an observation, then the mean reported is 4.

  To calculate the arithmetic mean of the values of external data, select **Mean** under **External data**.

- **Number of samples (only for External data)** – 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 (only for External data)** – 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).

- **$25^{th}$ percentile** – Twenty-five percent of the modifiers of this type has this value or lower. For more details see **Calculation of percentiles** on page 323, with the difference that the percentiles in numerical analysis represent modifier values instead of durations. The $25^{th}$ percentile is also called the first quartile.

  To calculate the $25^{th}$ percentile of the values of external data, select **$25^{th}$ percentile** under **External data.**

- **Median** – Fifty percent of the modifiers of this type has this value or lower. For more details see **Calculation of percentiles** on page 323, with the difference that the percentiles in numerical analysis represent modifier values instead of durations. The Median is the same as the $50^{th}$ percentile or $2^{nd}$ quartile.

  To calculate the median of the values of external data, select **Median** under **External data.**

- **$75^{th}$ percentile** – Seventy-five percent of the modifiers of this type has this value or lower. For more details see **Calculation of percentiles** on page 323, with the difference that the percentiles in numerical analysis represent modifier values instead of durations. The $75^{th}$ percentile is also called the $3^{rd}$ quartile.

  To calculate the $75^{th}$ percentile of the values of external data, select **$75^{th}$ percentile** under **External data.**

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 the value of the statistics.

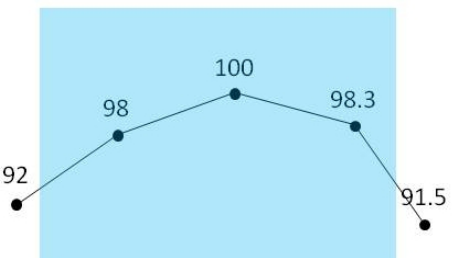
Do not group categories (see **Collapsing Category elements** on page 313) if you want to calculate statistics for the external data. Doing so may give unexpected results.

***Examples of calculation of External data statistics***

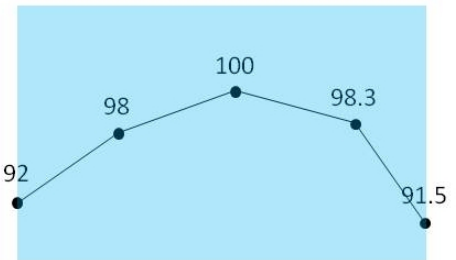
The calculation of statistics for external data is based on the actual sample points; the external data is not interpolated.

The first sample point that coincides with the start of an interval is included in the analysis, the last sample point that coincides with the end of the interval is not included in the analysis.

**Example 1** – You have an observation with external data. In a data profile, you create intervals based on observation time / event log data. As a result (see the visualization below), one of the intervals contains a number of sample points. For this interval, the numerical statistics values of the external data are:
**Minimum** = '98', **Maximum** = '100', **Mean** = '98.77', **Number of samples** = '3'.




**Example 2** – You have the same observation with external data as in the previous example. In a data profile, you create an **Interval by Manual selection** with External data values **Higher or equal to** '92'. As a result, an interval contains a number of sample points (see the visualization below). For this interval, the numerical statistics values for the external data are:
**Minimum** = '92', **Maximum** = '100', **Mean** = '97.07', **Number of samples** = '4'.




- **Total Duration** – The total duration of the time when the numerical modifier was scored. This corresponds to the sum of the duration of the state behaviors associated to the numerical modifier.

  **Example** – The modifier Score contains five possible values, 1 to 5. After scoring the value 2 for 1.5 minutes, and the value 4 for 3 minutes, the statistics results show the total duration of Score 4.5 minutes in the row/column Score, and the total duration of the single values in the corresponding row/columns.

- **Total value** – The sum of the values of a numerical modifier scored.

  The total value for a numerical modifier does not correspond to the Total number of a behavior or non-numerical modifier.

  **Example** – You have scored a numerical modifier four times, with values 12, 13, 18, 17. The total value is 60, while the total number (of occurrences) would be 4.

- **Mean (per minute)** – The sum of the values of the numerical modifier, weighted by their duration (that is, the time the state behavior associated with each value was active), divided by the total duration of the state behavior associated.

  **Example** – The numerical modifier *Aggression level* was associated with a state behavior scored a number of times with values 1 (for a total of 10 seconds), 2 (for 15 seconds), and 3 (for 5 seconds. Since the total duration of the associated behavior is 30 seconds, the **Mean** is [(1*10) + (2*15) + (3*5)]/30 = 1.83.

The mean is therefore calculated for events with duration only, not for events without duration. If a numerical modifier is associated with an event without duration, the mean is zero.

### INDEPENDENT VARIABLES

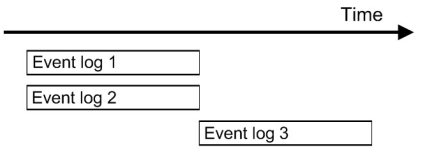
In the **Layout** window of your **Behavior**, or **Numerical Analysis**, double-click **Independent variables** to select them. If you want the observation **Start-time**, **Stop time**, or **Duration**, select the check box in front of these independent variables. In addition, the following options are available:

- **User defined** – Select this check box if you want to calculate the effect of your used defined independent variables. For example if you want to see whether there is a difference in behavior between males and females. Also select the check box in front of Independent Variables in your analysis layout tab. You get separate analysis results for each independent variable. If you de-select the check box the data are grouped.
- **System variables** – Select this check box if you want to show the system defined variables **Start time**, **Stop time** and **Duration**.

# 8.5 Analyzing observations containing multiple event logs

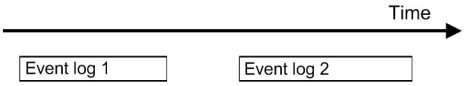
There are two possibilities:

- **Event logs overlap in time within an observation** – There is no gap between start and stop of different event logs in the same observation.




  Choose this option also when the stop time of an event log is the same as the start time of another event log (see below).

- **Event logs do not overlap in time** (see page 333)



## EVENT LOGS OVERLAPPING IN TIME

This section applies to those cases when there is no gap between event logs within an observation (see the first picture on the previous page).

How do you want to analyze the event logs in each observation?

- As separate data sets, so each event log produces one result – See below.
- As one data set, so all event logs within an observation are collapsed in one result – See page 332.

### *Event logs as separate data sets*

In the Project Explorer under **Analysis**, click **Behavior Analysis**. Click **Layout** and make sure that both **Observations** and **Event Logs** are selected. Next, click **OK**.

- If you have not defined intervals and time bins in your data profile:
  - **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 duration of the event log, excluding the time that the observation was suspended and the time filtered out by data selection.
- 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 and the time filtered out by data selection.
  - **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** page of your analysis settings.

**Percentage (interval duration)** 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***

In the Project Explorer, under **Analyses**, click **New Behavior Analysis**. Click **Layout** and make sure that (1) **Observations** is selected, and (2) **Event Logs** is NOT selected. Next, click **OK**.

- If you have not defined intervals and time bins in your data profile:
  - **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.

    If there is much overlap between event logs and the same event type is scored in different event logs, **Rate** is overestimated. For example, two event logs of one minute each are completely overlapping and each contains four instances of *Play*. When analyzing event logs as one data set, **Rate** is (4+4) events / (1 minute) = 8 instances per minute, while in each event log it would be 4/minute.

    If there is much overlap between event logs and the same event type is scored in different event logs, **Percentage (observation duration or analyzed duration)** may exceed 100%. For example, two event logs of one minute each are completely overlapping, and each contains the event *Play* scored for 40 seconds and 30 seconds respectively. When analyzing event logs as one data set, **Percentage** is (30+40 s) / 60 s = 117%, while in each event log *Play* cannot be more than 100%.

  - **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 and the time filtered out by data selection.

- 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**.

  > **Percentage (interval duration)** 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 and the time filtered out by data selection.
  - **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. 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**.

## EVENT LOGS NOT OVERLAPPING IN TIME

This section applies to those cases when there is a gap between event logs within an observation (see the second picture on page 330).

How do you want to analyze the event logs in each observation?

- **As separate data sets, so each event log produces one result** – See below.
- **As one data set, so all event logs within an observation are collapsed in one result** – See page 334.

### *Event logs as separate data sets*

In the Project Explorer under **Analyses**, click **New Behavior Analysis**. Click **Layout** and make sure that both Observations and Event Logs are selected. Next, click OK.

- If you have not defined intervals and time bins in your data profile:
  - **Total number and duration statistics** – They 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 time line set by data selection, excluding the time that the observation was suspended.

---

Keep **Intervals** selected in the **Layout** page of your **Analysis settings**.

---

- 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. To analyze each interval separately, keep Intervals selected in the Layout page of your analysis settings.
  - **Rate per minute (analyzed observation duration), Percentage (analyzed observation duration)** – These are based on the time line set by data selection, excluding the time that the observation was suspended.
  - **R ate 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.

---

**Percentage (interval duration)** 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, use Percentage (observation duration).

---

To analyze each interval separately, select the check box in front of **Intervals** in the **Layout** page of your **Analysis settings**.

***Event logs as one data set***

In the Project Explorer under **Analyses**, click **New Behavior Analysis**. Click **Layout** and make sure that (1) **Observations** is selected, and (2) **Event Logs** is NOT selected. Next, click **OK**.

- If you have not defined intervals and time bins in your data profile:
  - **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, excluding the gaps between event logs.
  - **Rate per minute (analyzed observation duration), Percentage (analyzed 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 gaps between event logs, AND the time filtered out by data selection and the time that 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 by the total duration of the intervals. To analyze each interval separately, keep Intervals selected in the Layout page of your analysis settings.

---

If two or more intervals have been defined, you can get unexpected results in the calculation of the **Rate** in the following cases:

- If one or more event logs partly fall outside some intervals. Since the **Rate** is calculated over the entire duration of all intervals, the duration also includes intervals that fall outside these event logs. So the **Rate** is underestimated. To correct for this, click **Layout** and de-select **Intervals**.
- If the same events occur in the same intervals in different event logs. If you select **Intervals** in the **Layout** tab, the events are summed. This may result in a **Percentage (interval duration)** higher than 100%. If you deselect **Intervals** in the **Layout** tab, the events are Merged. If the same event occurs at the same time in different event logs these are only counted once. So the **Rate** is underestimated. To correct for this, select **Event log** in the **Layout** tab.

---

**Percentage (interval duration)** 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 interval is longer than the event logs. If you want to calculate the percentage relative to the event logs only, define an interval that only includes the event logs.

---

- **Rate per minute (analyzed observation duration), Percentage (analyzed 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 gaps between event logs AND the time filtered out by data selection and 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 gaps between event logs AND 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** page of your **Analysis settings**.

# 8.6 Creating charts

From the analysis results, you can create charts to visually inspect your results.

In order to create a chart, you must have analysis results in your project, either archived or currently open on your screen.

The procedure for creating charts is as follows:

1. Do one of the following:
   - In the Project Explorer, click **New Behavior Analysis** or **New Numerical Analysis** to display the data you want to use to create a chart.
   - From the **Analyze** menu, select **Behavior Analysis** or **Numerical Analysis** and select **Create Chart**. Select one of the archived results. This option is only available if you have archived analysis results.
2. If necessary, change the layout of the analysis results sheet (see below), so the data is sorted appropriately for the type of chart you want to create.
3. Select the data in the analysis results sheet (see SELECTING DATA on page 339), click the **Charts** button in the tool bar and select the type of chart (see SELECTING A CHART TYPE on page 339).
4. Next, you can:
   - Add or remove series from the chart (page 340).
   - Edit the chart (page 339).
   - Save the chart within The Observer XT (page 341).
   - Export the chart as an image (page 342).
   - Print the chart (page 343).

## CUSTOMIZING THE ANALYSIS RESULTS SHEET

Depending on the type of chart you want to create and how you want to display your data, you might need to change the layout of the analysis results sheet.

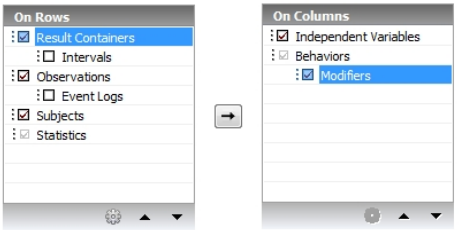
### *What layout do I need?*

The Observer XT uses the data in rows in the analysis results sheet for the **Series** values and the row headers closest to the data are used for the **Horizontal Axis (Categories)** names. Furthermore, the column headers closest to the data are used for the **Legend (Series)** names.

To create this layout, make sure that in the **Layout** tab of the **Analysis settings** window:

- **Behaviors (and Modifiers)** are **On Columns**;
- Groups you want to compare are **On Columns**.
- **Statistics** are **On Rows**.
- **Behaviors (and Modifiers)** or groups are at the bottom in the order of categories **On Columns** (see Figure 8.7 for an example).

For more details about how to customize the layout of the Analysis Results see page 311.




| Statistics | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | Play | |
| | Constructive | Duet | Gym | Imaginary | Manipulative | Parallel | Stamp |
| Mean | 26.84 | 16.46 | 0 | 0 | 32.70 | 30.60 | 68.48 |

***Figure 8.7*** *Example of* ***Analysis settings*** *layout (top-picture) and the corresponding analysis results (bottom-picture).*

The resulting chart for the mean values for the different types of *Play* behavior (based on the layout as displayed in Figure 8.7) is shown in Figure 8.8 below.

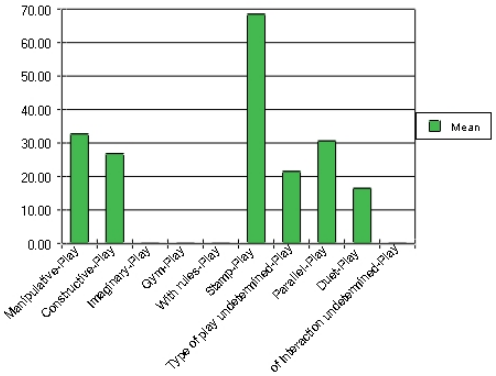



***Figure 8.8*** *Example of a bar chart in The Observer XT. The chart is based on the data layout as depicted in Figure 8.5.*

**Example 1** – You have three observations which contain event data of the same group of five animals. The observation were carried out in three consecutive weeks. You have used Instantaneous sampling as the observation method. You want to create a bar chart with the statistic for locomotion averaged per group, per observation. To do this, use the following Layout in the Analysis Settings:

- **On Columns** – Behaviors.
- **On Rows** – Statistics, Observations (at the bottom in the order).

Do not select the Instantaneous Sampling Subjects in the Analysis settings Layout tab. As a result, the statistics are averaged per observation and not displayed per animal.

**Example 2** – You have observed groups of children containing only boys or girls. *Type of group* (boy, girl) is a user-defined Independent Variable. You want to display the play behavior of the groups based on the *Type of group*. First, in the data selection, you need to create two Results boxes, one containing the boy groups, the other one the girl groups. Next, use the following **Layout** in the **Analysis settings**:

- **On Columns** – **Behaviors**.
- **On Rows** – **Statistics**, **Result Containers** (at the bottom in the order).

Do not select the Instantaneous Sampling Subjects in the Analysis settings Layout tab. As a result, the statistics are averaged per *Type of group* and not displayed per group.

## SELECTING DATA

To create a chart:

1. Select values in one or more adjacent columns in the analysis results as follows: click the top-cell of a column with the mouse, keep the mouse-button pressed and move it to the bottom-cell of the same or an adjacent column.

---

To select multiple, non-adjacent columns, press the **Ctrl**-button and select the columns as described above.

---

## SELECTING A CHART TYPE

2. Next, click the **Charts** button to select a chart.

   You can select one of the following:
   - **Column** chart – with five different methods to display multiple series.
   - **Line** chart – with or without markers.
   - **Pie** chart – 2D or 3D.
   - **Scatter** chart.

3. Click **OK** to create the chart.

You cannot change the chart type of an existing chart. If you want to change the chart type, you need to create a new chart.

If you close the **Chart** window by using the close button, you get the option to save the chart. If you click **No**, the chart is deleted. See page 341 for how to save a chart.

## EDITING A CHART

### *Adding Series*

1. In the **Chart** window, click **Select Data**. 
2. In the **Select Data** window, click **Add**. 
3. In the **Add Series** window, in the **Series Values** box, click the **Select Range** button. 
4. In the analysis results sheet, select the values as described in **SELECTING DATA** on page 339.

5. Click **Select Range** again.

   The header of the column is now automatically added in the Series name box. If you want, you can change this name.

6. Click **OK** to add the series.

   Go back to step 1 to add another series.

7. Click **Close** when you are done adding series.

***Removing Series***

1. In the **Chart** window, click **Select Data**.
2. In the **Select Data** window, select the **Legend (Series)** name and click **Remove**.

***Editing Category names***

1. In the **Chart** window, click **Select Data**.
2. Click a Horizontal Axis (Categories) name and click the **Edit** button (or press **F2**).

***Formatting a chart***

To change the format of a chart, in the **Chart** window, click **Format**.

In the **Chart Properties** window, the menu on the left shows the Chart Properties items. Simply click on a item or sub-item to select it. The pane on the right shows the options for the selected item or sub-item.

---

You can immediately see the effect without closing the **Properties** window by clicking the **Apply** button at the bottom-right.

---

The main items are:

- **General** – in which you have the following options:
  - **Chart Title** – Display the chart title, you can enter a title and select the font type, size, color and position of the chart title.
  - **Legend** – Display the Legend (Series) name and select the font type, font size and position of the legend. You can also select to **Show the legend without overlapping the chart**.
  - **Data Labels** – Display the value for each data point in the chart.
  - **Smoothing** – Smooth-line charts are similar to line charts. The main difference is that the line segments between the successive data points are not straight lines but interpolated cubic splines.

- **Axes** – in which you have the following options:
  - **Vertical** – Under **Axis title**, you can choose to display the axis title, you can enter a title and you can select the font type, size and color. Under **Scale**, you can set the scaling of this axis to **Auto** or setting the Minimum and Maximum manually by selecting **Fixed** and entering the minimum and maximum. Under **Gridlines**, you can choose to display major and minor gridlines. For the major gridlines, enter a value (for example, a value of '10' displays a major grid line at every external data value '10'). For the minor grid line, enter the number of lines you want to display between two major gridlines.
  - **Horizontal** – The Horizontal axis has the same options as the Vertical axis.
- **Series** – For each series (listed under Series), you have the following options:
  - **Fill** – You can choose between **Solid fill** and **Pattern**. Depending on what you select here, you can next choose a **Color** and/or a **Pattern**. You can also select the **Transparency** of the chart.
  - **Borders** – Display borders and also select the border **Color**, **Style** and **Weight**.
  - **Trendline** – You can add a linear trendline for column charts (except stacked and 3D charts), line charts and scatter plots. You can add a trendline for each series separately by selecting the option **Display linear trendline**. Optionally, you can specify the name of the trendline and its line style (color, style and weight).

## SAVING A CHART

You can save a chart in the corresponding Analysis Results:

1. In the Chart window, click **Save Chart in Archive**.

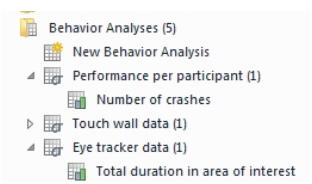
   

   If the analysis results have not been saved in an archive yet, **Save archive** window appears in which you can save the Analysis Results.

2. In the **Analysis Chart** window, you can type in the name of the chart you want to save.

3. Click **OK** to save the chart.

   The chart is added to the corresponding archived analysis result in the Project Explorer.



If you have saved a chart in the active analysis results, the program closes the active analysis results and opens the newly created analysis result. If you want to create multiple charts in the active analysis results, make sure you first open the archived analysis results.

***Opening a chart***

To open an archived chart, in the Project Explorer, click an archived chart.

***Deleting a chart***

To delete an archived chart, in the Project Explorer, right-click an archived chart and select **Delete**.

***Renaming a chart***

To rename a chart, in the Project Explorer, right-click an archived chart and select **Rename** and enter a new name.

***Notes***

- Make sure that the Analysis Results name and the Chart name do not contain any of the following characters: \ / : ; * ? " < > |.
- You can create multiple charts in an archived Analysis Results.
- If the legend overlaps with the chart, make sure to select the option **Show the legend without overlapping the chart** in the **General** item, under the Legend sub-item of the Chart Properties (see the previous page).

## EXPORTING A CHART

You can export a chart to the clipboard. Make sure the **Chart** window is active, press **Ctrl+C** and press **Ctrl+V** to paste it into another program.

You can also export a chart to disk as a graphics file:

1. In the **Chart** window, click **Export**.
2. Enter a **File name** and select a image type from the **Save as type** list: JPEG (*.jpg), Portable Network Graphics (*.png), Windows Bitmap (*.bmp), Tagged Image File Format (*.tiff).
3. Click **Save**.

## PRINTING A CHART

To print a chart:

1. In the **Chart** window, click **Print**. 
2. In the **Print preview** window, make the necessary changes and press the **Print** button.

# Chapter 9

# Lag Sequential Analysis

# 9.1 Before you start

The terms Subject, Behavior, Modifier and Independent Variable in this chapter may not be the same as those on your screen. This depends on what terms you have specified in your project's Terminology Preferences (see page 93).

## WHAT IS LAG SEQUENTIAL ANALYSIS?

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?

The first event of the pair is called **Criterion** and the second **Target**. Depending on what direction in time you choose (positive or negative), you can calculate how often the event A is followed by B, or how often A is preceded by B, and in relation to other behaviors (see Time lag below).

## STATE LAG VS. TIME LAG ANALYSIS

Transitions between events can be of two ways (Figure 9.1):

- 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. This is **State lag** sequential analysis. 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.
- Transitions between events within a specific time window, independent of how many events are between them. This is **Time lag** sequential analysis. You can calculate transitions for example from an event to those events occurring in the next 10 seconds. Since there may be more than one Target event in that 10-s window, Time lag analysis generates multiple transitions from the same Criterion (see Figure 9.1).

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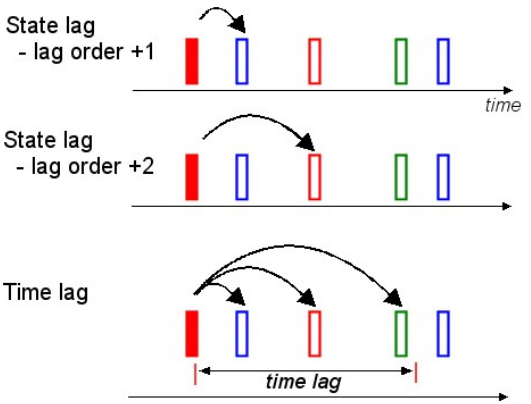


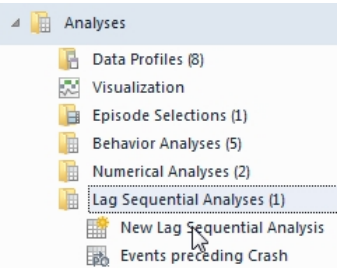

***Figure 9.1*** *State lag sequential analysis versus Time lag sequential analysis. This is a very general example - events may have duration or not, and may belong to the same or different behavior groups. For time lag analysis, a time lag is defined for each criterion event. Filled squares: criterion events (for simplicity, only the first event in the sequence is considered as Criterion). Arrows: transitions.*

# 9.2 Procedure overview

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.

   To edit a profile, click it in the Project Explorer and make the necessary changes. For more information on how to select data, see Chapter 6.

2. Do one of the following:
   - From the **Analysis** menu, select **Lag Sequential Analysis**, then **New**.
   - In the Project Explorer, click the **Analyses** folder. In the overview window of The Observer XT that appears, select **Analyze data**. In the window that opens click **Lag sequential analysis**.
   - In the Project Explorer under **Analyses**, click **Lag Sequential Analyses** and then **New Lag Sequential Analysis**.




**Result** – A table with question marks appears. Click the **Calculate** button on the tool bar to perform the analysis. By default, the table contains a State lag analysis with frequencies.

### *Changing the Settings*

1. To change the lag sequential analysis settings, click the **Settings** button on the tool bar. The **Settings** window opens (see Figure 9.2). Under **Lag Type** select one of the following (see page 346 for information on lag type):
   - **State Lag** – To perform state lag sequential analysis.
   - **Time Lag** – To perform time lag sequential analysis.

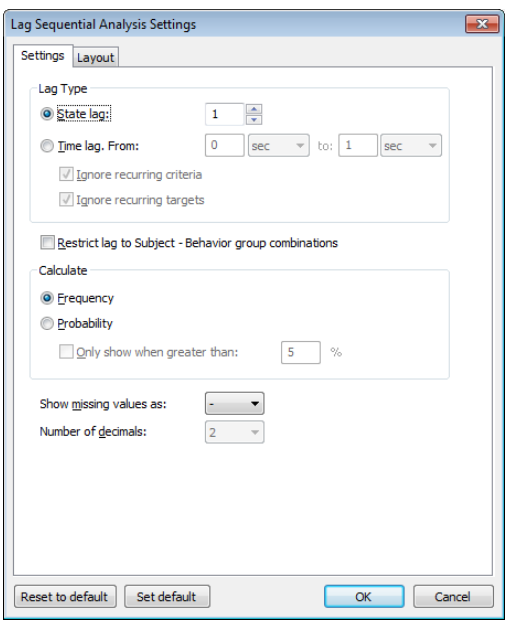



***Figure 9.2*** *The* ***Settings*** *page of the* ***Lag Sequential Analysis Settings*** *window.*

2. If you have selected **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. Go now to step 6.

3. If you have selected **Time lag**, enter the limits of the time window (see an example in Figure 9.1). 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. Change the time unit if necessary (available: ms, sec, min, hr).

   You have the following options:
   - **Ignore recurring criteria** – Select this option if you want to exclude instances of a criterion event that occur in the same time lag. For more information, see page 355.
   - **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. For more information, see page 355.

4. Select **Restrict lag to Subject-Behavior group** if you want 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.

5. Under **Calculate**, select one of the following:
   - **Frequency** – Select this option if you want to calculate the number of transitions from the criterion event to the target event. Frequencies are computed for each combination of criterion event and target event.
   - **Probability** – Select this option if you want to calculate the probability of transitions. The transition probability is the number of transitions for a particular combination of criterion event and target event divided by the total number of transitions from that criterion event. The sum of the transition probabilities for each criterion event equals 1. For information on how to read probabilities in the results, see page 357.

   Select the **Only show when greater than** option if you want to show only the transition probabilities that are greater than a specific threshold. Enter this threshold (1 - 100%) in the corresponding field.

6. Select the following:
   - **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 **Probability** under **Calculate**.

### *Layout*

1. To change the table layout, click the **Layout** button on the tool bar. In the **Layout** window that opens (Figure 9.3) you 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.
   - Under **Criterion**, select the element types that you want to view on the rows.
   - Under **Target**, select the element types that you want to view on the columns.
   - Under **On Sheets**, select the element types you want to view in separate sheets.

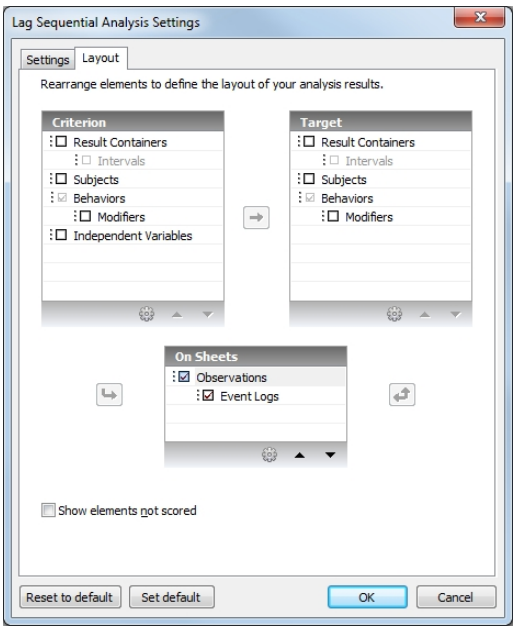



***Figure 9.3*** *The* ***Layout*** *page of the* ***Lag Sequential Analysis Settings*** *window.*

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. The maximum number of columns and rows is 1000 x 1000. If the number of numerical modifiers exceeds 1000, The Observer XT will show a warning and no Lag Sequential Analysis is carried out. You can reduce the number of cells with a Data Selection.

To move a category to a different box, click its name and then click the appropriate arrow button, or drag it to that box.

**Example** – If **Observations** is selected under **On Rows** or **On Columns**, this will produce a single, very large transition matrix. To have a transition matrix for each observation, click **Observations**, then click the arrow button pointing to the **On Sheets** box.

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**.

2. **Sort the matrix** (optional) – You can sort the matrix by the main categories by changing their position within either the **Criterion** box or the **Target** box (Top = highest hierarchical level). To do so, select an item you wish to move and click the appropriate **Up** or **Down** button at the bottom of the list.



   Alternatively, drag the category that you want to place to a higher level to a category that you want to place to a lower level.

3. **Select elements within a category** (optional) – If you want to remove some items in a category, click that category and then click the settings button.

   De-select the option for the item you do not want to show in the matrix.

   De-selecting an entire category in the **Layout** page equals to calculate the results for the elements summed up (but see a note on event logs below). For example, if **Subjects** is not selected, all subjects in an observation are treated as one.

   You can:

   - Put independent variables either on rows or columns.

You cannot:

- De-select behaviors.
- Put subjects, behaviors, and modifiers on only one side of the matrix (**Criterion** or **Target**). Once you select them on one side, they are selected on the other side too.
- Put subjects, behaviors and modifiers on the sheets.
- Change the hierarchy between elements on one side. If you do so, it is changed on the other side.

4. **Additional options** – Select the following:
   - **Show not scored elements** – 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 zeroes or the missing value symbol (see step 8). If you keep this option cleared, the matrix lists the elements scored in at least one observation.
   - **Show intervals as** – If you have defined intervals of time bins in your data profile (see Chapter 6), you can split your transition matrix in more parts, each corresponding to an interval or time bin. Select one of the options **Intervals only**, **Time bins only** or **Intervals and Time bins** according to how you want to split the matrix. If your data profile does not contain Intervals or time bins, any option has no effect on your result.

***What next?***

- See page 360 for how to customize your result.
- See page 440 for how to export your result.

## MORE DETAILS AND OPTIONS

***Transition with start and stop events***

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.

***Analyzing transitions across 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.

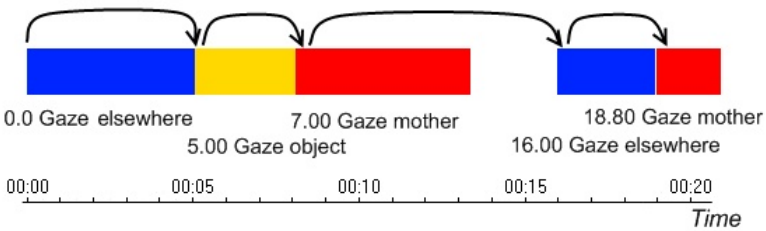
To calculate transitions like for example from event *Game starts*, scored in the event log "Event log 0001", to event *Happy*, scored in the event log "FaceReader States" imported from FaceReader, follow an alternative procedure:

1. In your data profile, define Intervals by manual selection (page 221). Under **Begin Interval**, specify the event you want to use as a criterion (in the example above *Game starts*). 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).
2. Calculate statistics with this data profile. Make sure that you include the **Total number** as a statistic (see page 301). This is the number of times that a behavior occurs in the intervals specified. It provides results similar to time lag sequential analysis.

### *Defining the State lag*

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 lag order 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).




- Entering **+1** as **State lag** results in the following transitions to be counted (see the arrows in the picture above):

  From [no event] to 0.0 Gaze elsewhere, from 0.0 Gaze elsewhere to 5.00 Gaze object, from 5.00 Gaze object to 7.00 Gaze mother, from 7.00 Gaze mother to 16.00 Gaze elsewhere, from 16.00 Gaze elsewhere to 18.80 Gaze mother, from 18.80 Gaze mother to [no event].

  Transitions are also counted when a criterion is found but not the target, or the other way round. In the example above, from [no event] to 0.0 Gaze elsewhere, and from 18.80 Gaze mother to [no event]. See page 358 for details.

- Entering **-3** as **State lag** results in the following transitions to be counted:

  From 7.00 Gaze mother (first event available for counting backward with lag -3) to [no event], from 16.00 Gaze elsewhere to 0.0 Gaze elsewhere (third previous event), from 18.80 Gaze mother to 5.00 Gaze object, from [no event] to 7.00 Gaze mother.

  If the state lag is negative, it is easier to count transitions from the end to the begin of a sequence.

  If there is a gap between events, the program does not count transitions from an event to the gap that follows. See also page 358 for special cases.

***Defining the Time lag***

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 5 sec** next to **Time lag** results in the following transitions (in the picture, horizontal arrows indicate the 5-s time lag for each event):

From [no event] to 0.0 Gaze elsewhere, from 0.0 Gaze elsewhere to [no event] (this because no event is found in the 5-s lag), from 5.00 Gaze object to 7.00 Gaze mother, from 7.00 Gaze mother to [no event], from 16.00 Gaze elsewhere to 18.80 Gaze mother, from 18.80 Gaze mother to [no event].

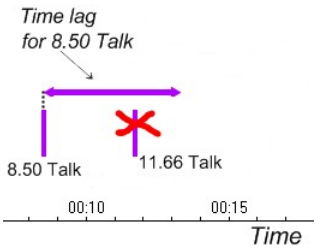
Note that:

- Transitions are also counted when no event is found in the time lag, (in the example above, see the transition from 0.0 Gaze elsewhere to [no event]), or at the start and end of the observation. In the example above, from [no event] to 0.0 Gaze elsewhere, and from 18.80 Gaze mother to [no event]. See page 358 for details.
- 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. See also page 358 for special cases.
- 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.

### *Ignoring 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.

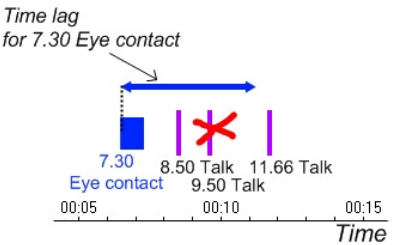



If the time lag is at least partly negative, the recurring criteria are ignored that occur within a time interval around the focal criterion whose length is twice as long as the longest side of the time lag. For example if the time lag is set to from -10 s to +5 s, selecting **Ignore recurring criteria** 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.

### *Ignoring 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 I**gnore 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.

### *Lag sequential analysis 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.

### *Saving your analysis settings*

You can 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.

### *Applying 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. The new settings are shown in this window.

### *Miscellaneous*

- If you cannot visualize results for an observation, it could be due to the observation containing errors (see page 147).
- To re-run the analysis with different settings or matrix layout, click the **Settings** or **Layout** button, make the necessary changes and click **OK**.
- If an element category does not occur in your coding scheme or is filtered out in the current data profile, it is grayed out in the **Layout** page of the **Analysis Settings** window.
- **Result Containers** in the **Layout** page of the **Lag Sequential Analysis Settings** window specifies the name of the result containers in your data profile (see page 200). If your data profile contains two or more result containers, you cannot clear this selection. If you want to have some of the result containers, not others, in the result, in the **Layout** page double-click **Result Containers** or click **Result Containers** and then the cog button, then clear the selection for the result containers you want to ignore.

- **Intervals and time bins** – If you choose **Intervals and time bins** from the **Show intervals as** list, results are calculated only for the time segments where intervals and time bins overlap. This means that the result may refer to portions of the observation different from the original intervals you have specified.

# 9.3 The Lag Sequential Analysis result

The lag sequential analysis result is created when you click **Calculate** on the Lag Sequential analysis tool bar (see page 347). For more information on saving and exporting analysis results, see page 438.

Depending on what you have selected under **On Sheets** in the **Lag Sequential Analysis Settings** window, the lag sequential analysis result has one or more pages, each containing a matrix. For example, if you have selected **Observations** in the **On Sheets** box, each matrix refers to one observation.

If your observations contain two or more event logs, you can choose to display separate matrices for those event logs, or lump the result in one matrix. To show the results separately, keep **Event Logs** selected under **Observations**. To lump the results, clear the selection for **Event Logs**.

## READING THE RESULT MATRIX

In the result matrix each row represents a criterion event and each column a target event. Each cell (see **B** in Figure 9.4) contains, depending on what you have chosen in your analysis settings (step 7 in the procedure of page 347):

- 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. This is calculated by F/T, Where F is the number of transitions from that criterion to that target (**Frequency**, see above), and T is the total number of transitions from that criterion to any target, that is the sum of the cell contents for that row if you had chosen **Frequency**.

The independent variables appear in the results if the corresponding option is selected in the **Layout** page of the **Analysis Settings** window (see page 350).

You can zoom the result matrix in and out. To do so, hold the **Ctrl** key down and move the mouse wheel.

Lag Sequential Analysis

Calculate | Settings | Layout

| Behaviors | Modifiers | Independent Variables | | | | | |
|---|---|---|---|---|---|---|---|
| Behaviors | | | Gaze child | Gaze object | Gaze elsewhere | Play | |
| Modifiers | | | <No Modifier> | <No Modifier> | <No Modifier> | Constructive; D | Constructive; Parallel |
| | | Age | 4 | 4 | 4 | 4 | 4 |
| | | Gender | female | female | female | female | female |
| | | Observer | LL | LL | LL | LL | LL |
| | | Duration | 587.20 | 587.20 | 587.20 | 587.20 | 587.20 |
| | | Start time | 00:00:00.00 | 00:00:00.00 | 00:00:00.00 | 00:00:00.00 | 00:00:00.00 |
| | | Stop time | 00:09:47.20 | 00:09:47.20 | 00:09:47.20 | 00:09:47.20 | 00:09:47.20 |
| Gaze child | <No Modifier> | | 0 | 0 | 0 | 0 | 0 |
| Gaze object | <No Modifier> | | 0 | 0 | 3 | 0 | 0 |
| Gaze elsewhere | <No Modifier> | | 0 | 5 | 0 | 0 | 0 |
| Play | Constructive; Duet | | 0 | 0 | 0 | 0 | 1 |
| | Constructive; Parallel | | 0 | 0 | 1 | 0 | 0 |
| | Manipulative; Duet | | 0 | 0 | 0 | 0 | 0 |
| | Manipulative; Parallel | | 0 | 0 | 0 | 0 | 1 |
| | Stamp; Parallel | | 0 | 0 | 1 | 0 | 0 |
| | Type of play undetermined; Duet | | 0 | 1 | 2 | 0 | 0 |
| | Type of play undetermined; Parallel | | 0 | 3 | 3 | 0 | 0 |
| Interaction und | <No Modifier> | | 0 | 2 | 1 | 0 | 0 |
| Talk | Other child | | 1 | 7 | 5 | 1 | 0 |
| | Self | | 0 | 1 | 1 | 0 | 0 |
| | Somebody else | | 0 | 0 | 1 | 0 | 0 |
| Other verbal | <No Modifier> | | 0 | 2 | 1 | 0 | 0 |
| X0 | | | 0 | 0 | 1 | 0 | 0 |

*Figure 9.4 An example of a lag sequential analysis result.* ***A*** *- Cells containing the values of independent variables.* ***B*** *- Cells containing counts or probabilities of transition.* ***C*** *- Main headers for categories (for example, Observations, Subjects, Behaviors, etc.* ***D*** *- Secondary headers for the elements within a category.*

### *Understanding Xo and Yo*

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 **Xo** (last row) or **Yo** (last column).

- **Xo** 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 *Xo* 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 *Xo* to *Answer*.

  You can find **Xo** transitions at the intersection of the **Xo** row and the column of the target event.

- **Yo** 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 *Yo*. Note: when at least one event is found within a time lag, the gap is not considered, so the transition from *Play music* to *Yo* is not counted. Instead, the transition from *Play music* to that event is counted.

  You can find Yo transitions at the intersection of the row of the criterion event and the Yo column.

  **Xo** and Yo 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 – **Xo** and **Yo** do not indicate transitions from/to samples not scored. In lag sequential analysis, samples not scored are ignored (see page 356).

### *Editing the result*

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 (see page 438) and then edit it in that program.

### *Saving a result*

To save a lag sequential analysis result, click the **Archive** button on the tool bar of the result window.

To re-open a saved result, from the **Analyze** menu select **Lag Sequential Analysis**, then **Open Archive**. For more information on saving, opening and exporting results, see page 438.

### *Closing a result*

To close a statistics result, simply open another screen in The Observer. Please note that the result is not saved automatically.

To return to your analysis, click the analysis in the Project Explorer.

### *Printing a result*

To print a result table, from the **File** menu select **Print**. We advise you to select the **Landscape** mode prior to printing.

### *Time formats*

If your result includes time values, for example when you have selected to show **Intervals** or **Independent Variables** in the **Layout** page of the settings window (page 357), some of the cells contain time values. You can specify the format of time from the **Setup** menu, selecting **Project Settings** and **Time formats**. For more information, see page 60.

### *Applying Windows regional settings*

If you want to apply new Windows regional settings, for example when changing the decimal symbol, restart The Observer and then run the analysis.

## CUSTOMIZING YOUR RESULT

To customize your result, click the **Layout** button in the **Result** window. After you made the necessary changes, click **OK** in the **Lag Sequential Analysis Settings** window to refresh the result.

For more information on customizing tables, see also page 311.

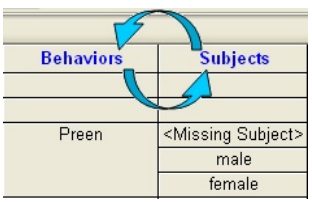
### *Summary*

- Sorting categories in the matrix (see below).
- Selecting and sorting elements within a category (see page 361). **Note**: To remove elements within a category from your results, you can also use the data profile's **Filter** function (see Chapter 6).
- Collapsing elements within a category to view overall results (see page 361). This option allows you to lump events for different observations, event logs, intervals, subjects and modifiers. For example, calculate the transitions from Play independent of the modifier Type of Play.

  To calculate overall results, you can also merge data (see page 206).
- Hiding and showing rows and columns in the matrix (see page 362).

### *Sorting categories in the matrix*

For example, put the **Subjects** at a level higher than the **Behaviors**, so each subject will be shown with the list of behaviors it was scored with.



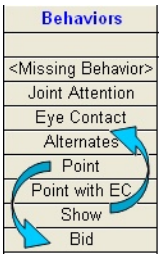

1. Click the **Layout** button on top of the result window. Under **Criterion**, click the category that should be sorted first. For example, if you want to sort **Behavior** first, then **Subjects**, click **Behaviors**.

2. Click the **Up** or **Down** button at the bottom of the **Criterion** box until that category lies above those you want with lower priority. Next, click **OK**. Click **OK** in the **Lag Sequential Analysis Settings** window to refresh the result.

To make the matrix more readable, make sure that in the **Criterion** box **Modifiers** is just below **Behaviors**.

### *Selecting and sorting elements within categories*

For example: changing the order of behaviors in the matrix.




1. Do one of the following:
   - With **View Settings** on the far-right side of the tool bar, select the category whose elements you want to sort.
   - Click the **Layout** button on the tool bar, make sure that the category is selected in the **Criterion** or **Target** box. Double-click the category, or click the category and then the Settings button.

   A window appears listing the elements selected for that category.

2. To add or remove subjects from the result, select the boxes under **Select** corresponding to the subjects you want to display, and de-select those you want to ignore.

   De-selecting subjects in the **Category** window does not result in removing them from your data profile.

3. To change the order of display, click the element you want to move and click the **Up** or **Down** buttons to move it to the desired position.

4. Click **OK**. Click **OK** in the **Lag Sequential Analysis Settings** window to refresh the result. The element changes its position accordingly, in both rows and columns of the matrix.

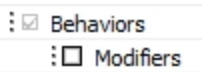
For more information about selecting and sorting elements in a result table, see page 311.

### *Collapsing elements in the matrix*

Follow this procedure if you want to calculate transitions with elements of a category being grouped.

**Example** – The type of play has been coded with modifiers. Instead of having transitions calculated for each combination behavior*modifier, you want to collapse modifiers in one row/column. This way the program does not discriminate between two events made of the same behavior but different modifiers.

1. Click the **Layout** button on the tool bar.
2. Under **Criterion**, clear the selection for the category whose elements you want to collapse.




3. Click **OK** in the **Lag Sequential Analysis Settings** window to refresh the result.

If you de-select **Event Logs**, event logs are still analyzed separately. See page 352 for how to analyze transitions across multiple event logs in each observation.

You can also collapse the results for multiple observations and subjects. To do so, open **View Settings** on the far-right side of the tool bar and click **Criterions/Targets/Sheets**. De-select the category you want to collapse.

### *Hiding/showing elements*

Hiding and showing elements in the matrix does **not** change the frequency nor the probability of transition for other elements. If you want to make new calculations by adding or removing elements, you must add/remove elements in the data profile before running the analysis.

# Chapter 10

# Reliability Analysis

# 10.1 Before you start

The terms Subject, Behavior, Modifier and Independent Variable in this chapter may not be the same as those on your screen. This depends on what terms you have specified in your project's Terminology Preferences (see **TERMINOLOGY** on page 93).

## WHAT IS RELIABILITY ANALYSIS?

In The Observer XT, Reliability Analysis assesses the extent to which measurements are precise and consistent. Precision indicates how free the measurement is from random errors. Consistency indicates the extent to which repeated measurements of the same event produce the same results.

Within The Observer XT, two or more observations can be tested on reliability. The outcome of reliability analysis tells you how the two data sets are similar to each other.

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.

Examples of typical applications of reliability are:

- **Checking your own consistency (intra-observer reliability)** – At the beginning of a study, you make a video of your study subjects, and code it with The Observer. 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.
- **Training observers (inter-observer reliability)** – If a new student joins your research group, he/she has to adopt the coding scheme used in your research. After 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.

## HOW ARE EVENTS COMPARED BETWEEN OBSERVATIONS?

In The Observer XT 12.5, four different methods for reliability analysis are available:

- **Frequency/Sequence** (this method was also available in The Observer XT 7.0 and later) - This method compares events with and without duration and instantaneous sampling

events between two observations and takes into account both the frequency and the sequence of events.

- **Duration/Sequence** - This method compares events with duration between two observations. It does not take into account events without duration and instantaneous sampling events.
- **Frequency** - This method compares the total number of occurrences of each event with and without duration or instantaneous sampling event. The duration or sequence of events is not taken into account.
- **Duration** - This method compares the total duration of each event with duration between two observations. The frequency or sequence of events is not taken into account.

***Which method should I choose?***

- The **Frequency/Sequence** method can be used as a detailed indicator of the correspondence between two observations when timing of the events is important.
- Use the **Duration/Sequence** method when you want to know to what extent two observers scored the same events with the same durations.
- Use the **Frequency** method when you want to compare observations and timing and sequence of events are not important in your study. This method is suited for observations with a relatively high rate of transitions between events.
- Use the **Duration** method when you want to compare the duration of events between observations and timing and frequency of events are not important in your study.

Observations are made of events in a time series. Whether events in two observations are scored as an agreement or as a disagreement depends on whether the subject, behavior and modifiers in those events are the same but also on your settings. The program considers each event selected for analysis and searches for a matching event in the other observation within a defined tolerance window. You can set the tolerance window in such a way that if the same event is found within the tolerance window, it is scored as an agreement, otherwise as a disagreement. For more information, see page 379.

Only the events selected in your active data profile will be compared to quantify agreement. If you run reliability analysis with the default data profile, all events in your observations will be used for comparison (depending on you Reliability Analysis Settings, see page 367).

If you do reliability analysis on behavior groups that are not mutually exclusive and exhaustive, or behavior groups which only include events without duration, the gaps between events might give unexpected results. See **Reliability analysis and gaps** on page 396 for more information about reliability analysis when you have gaps between events or when an observation is suspended.

# 10.2 Procedure overview

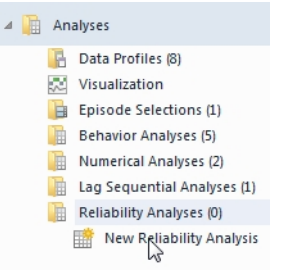
1. Make sure that the data profile specifying the data you want to analyze is active, that is, highlighted in blue in the Project Explorer.

   To activate a data profile, right-click it in the Project Explorer and select **Set as Current**. For more information on selecting data, see Chapter 6.

   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.

   When you select intervals, only the behaviors in the interval are taken into account in reliability analysis.

2. Do one of the following:
   - From the **Analyze** menu, select **Reliability Analysis**, then **New**.
   - In the Project Explorer, click the **Analyses** folder. In the overview window that appears, select **Analyze data** and next **Reliability Analysis**.
   - In the Project Explorer, double-click the **Analyses** folder to expand it. Click **Reliability Analysis** and, next, click **New Reliability Analysis**.

   The **Reliability Analysis Settings** window appears.

3. In the **Pairs** tab, add the pairs of observations you want to compare.

   See **PAIRS TAB** on page 367 for details.

4. In the **Settings** tab, select the **Comparison method** and additional settings.

   See **SETTINGS TAB** on page 370 for details.

5. Click **OK** to start calculation of the reliability statistics.

   The results of the selected Comparison method are shown in the Reliability Analysis results sheet (see page 381). Depending on the method you selected, the Statistics view, Confusion matrix and Comparison List are displayed.

6. Optionally, you can save your reliability results to an archive or export them to an Excel or text file.

***What next?***

- See page 386 for how to customize your result.
- See page 438 for how to save and export your result.

# 10.3 Reliability analysis settings

## PAIRS TAB

In the **Pairs** tab, pairs of observations can be selected for comparison.

***Selecting pairs***

To add an observation to the list with **Observation Pairs**, do one of the following:

- Click on an observation in the list with Observations and click the **Add>>** button.
- Double-click an observation.

Add as many pairs as you want.

Optionally, you can filter observations based on their observation name. For example, you have a large number of observations with the observation day (Day1, Day2, etc.) in the Observation name. In the **Filter Observations** box, type the name of the observation day. As a result, the list of observations only shows the observations with that observation day in the name (see Figure 10.1 for an example). To reset the filter, click the '**x**' icon at the right of the **Filter Observations** box.

Note:

- If your observations contain two or more event logs, you must select single event logs for comparison. See the note on page 379.
- 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 page 147).

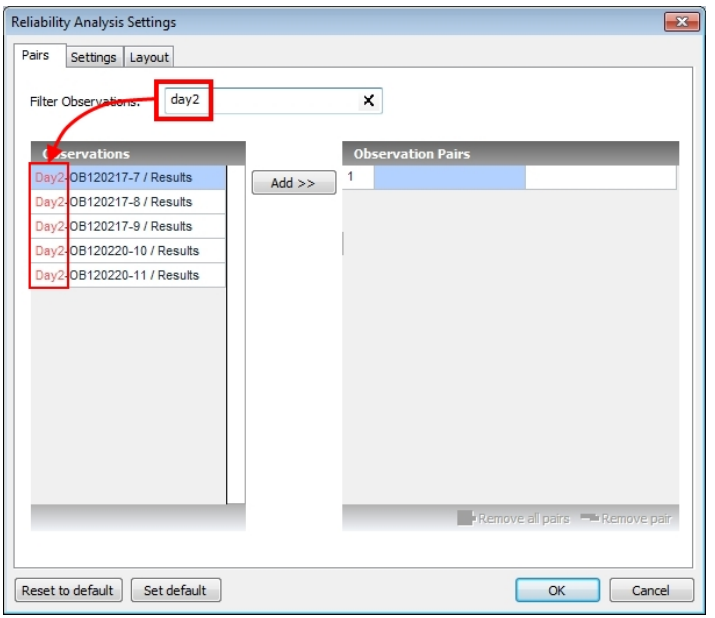
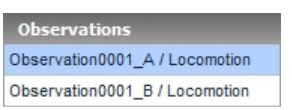



***Figure 10.1*** *Filtering observations in the Pairs tab of the* ***Reliability Analysis Settings*** *window. In this example, observations with "day2" in the name are filtered.*

- If your data profile contains more than one result container (see page 205), you need to specify one of them for each observation. The lists show all the combinations of observations and result containers. Make sure that you select the combination you require, for example Observation 0001_A / Locomotion.



- 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").

| Pair | Observation A | Observation B |
|---|---|---|
| 1 | Observation 1A / Results | Observation 1B / Results |
| 2 | *Click to add Observation* | *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.

### *Replacing observations*

You can replace observations in a pair by doing the following:

1. In the **Observation Pairs** list, click on the observation you want to replace. The observation name becomes highlighted in blue.
2. In the **Observations** list, double-click on the observation you want to add or select the observation and click the **Add>>** button.

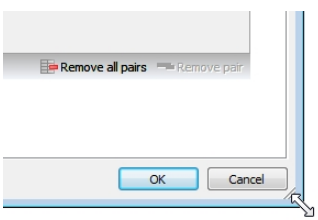
### *Removing pairs*

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.

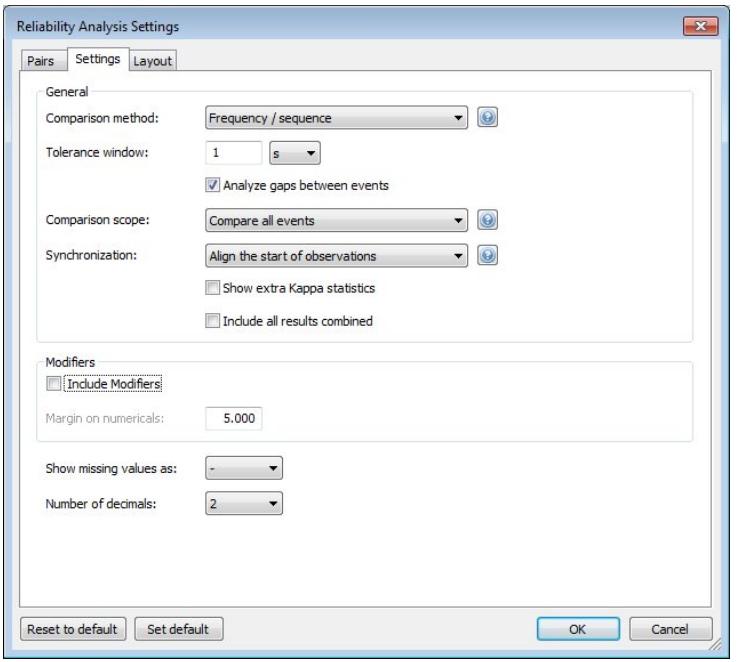
### *Resizing the Observation Pairs list*

If you have long observation names, the full name might not be completely visible in the **Observation Pairs** list. You can resize the **Reliability Analysis Settings** window to make long observation names visible.




Alternatively, when you hover over the observation name with the mouse pointer, however, a tool tip displays the complete observation name.

## SETTINGS TAB




Below you find details about the settings. Tip: click on one of the **Quick help** buttons to read more about an option or setting.

### *Comparison method*

Select one of the following comparison methods from the list:

- **Frequency/Sequence** - This method calculates to what extent the scored frequency of events with or without duration and instantaneous sampling events is comparable between observations. It takes into account the timing of the events. For details about the calculation for the Frequency/Sequence Comparison method, see **How the Frequency/Sequence reliability analysis algorithm works** on page 376.
- **Duration/Sequence** - This method calculates to what extent the scored duration of events with duration is comparable between observations. It takes into account the timing
  of the events.

Example -
Observation 1: 0.0 John-Play, 10.0 John-Run, 12.0 John-Sit.
Observation 2: 0.0 John-Sit, 2.0 John-Play, 12.0 John-Run.

In both observations the behavior John-Play lasts 10 seconds. However, the overlap of John-Play in the two observations lasts 8 seconds (from 2.0 to 10.0 seconds), the non-overlap is 4 seconds. The Duration/Sequence method, therefore, results in an Agreement of 8 seconds and a Disagreement of 4 seconds.

- **Frequency** - This method compares the total scored frequency of each event with and without duration or instantaneous sampling event between observations regardless of whether the events were scored at the same time.
- **Duration** - This method compares the total scored duration of each event with duration between observations regardless of whether the events were scored at the same time.

***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) 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***

With the option **Analyze gaps between events**, 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 (see Figure 10.2).

**Analyze gaps between events** is only available if you select **Frequency/Sequence** or **Duration/Sequence** as a comparison method. By default, this option is selected.

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If you do reliability analysis on behavior groups that are not mutually exclusive and exhaustive, or behavior groups which only include events without duration, the gaps between events might give unexpected results. We advise you to de-select **Analyze gaps between events**.

See **Reliability analysis and gaps** on page 396 for more information about reliability analysis when you have gaps between events or when an observation is suspended.

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The example in Figure 10.2 shows the effect of including gaps in the reliability analysis. The figure shows two observations scored with two events with duration, *A* and *B*, which cannot occur at the same time, but the behavior group is *not exhaustive*. Similar effects can also be seen with behaviors in a behavior group type with behaviors that can overlap.

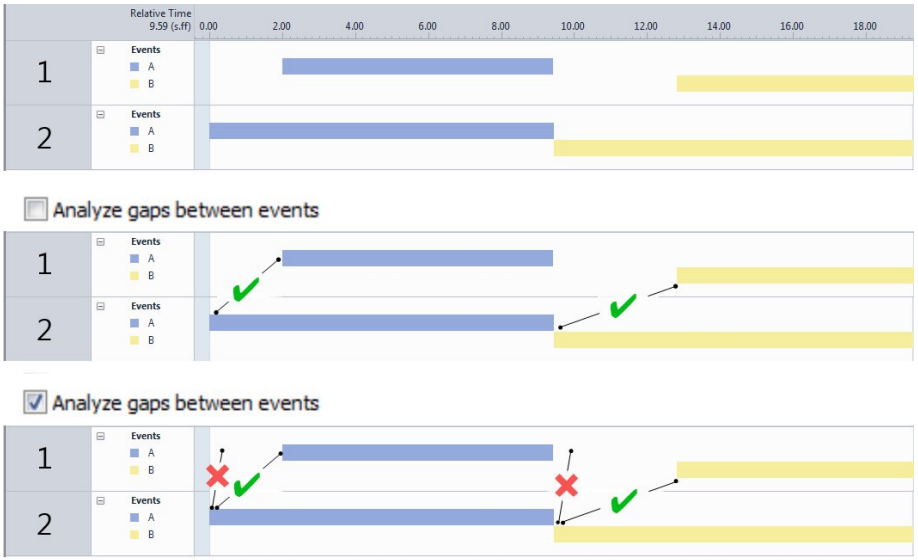



***Figure 10.2*** *A simple example of the effect of selecting/deselecting the* **Analyze gaps between events** *option. Top — The time-event plots of two observations. Observation 1 contains two gaps between events. Middle — Pairing of events when* **Analyze gaps between events** *is not selected. Reliability analysis results in two agreements between events of the same type (A - A, and B - B).*
*Bottom — Pairing of events when* **Analyze gaps between events** *is selected. Besides the agreements found between A-A and B-B, the gaps present in Observation 1 are paired with the events in the Observation 2, resulting in two disagreements.*

### *Comparison scope*

Here you can select the following:

- **Compare all events (default)** – Select this option if you want to compare all the events no matter whether one observation is longer than the other.

- **Compare time based intersection** – Select this option if two observations are of different 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 stops at 30 minutes and the other at 35 minutes. The result is that the second data file will be longer then the other. If you select **Compare time based intersection**, The Observer compares the events in both observations from 0 to 30 minutes and ignores the extra 5 minutes in the second observation.

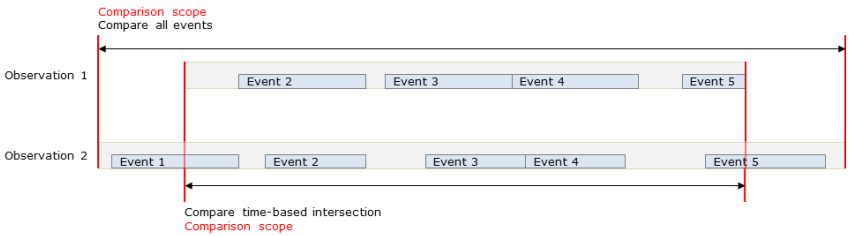
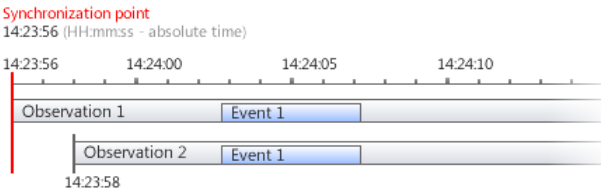



***Figure 10.3*** *Schematic representation of the Comparison scope: Compare all events (at the top) and Compare time-based section (at the bottom).*

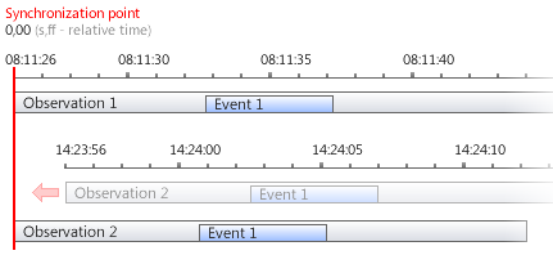
### *Synchronization*

Here you can select the way two observations in a pair are aligned:

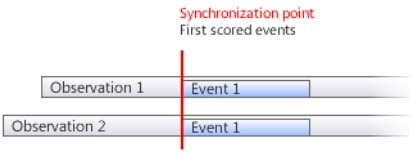
- **Use absolute start times (clock times)** – Select this option if your observations were scored live, and you want to align them according to their 'true' start time (for example, 14h 23min 56s).



- **Align the start of observations** – Select this option if you coded from video and started your observations at exactly the same time point. The absolute observation start times (for instance 10h 37min 05s and 11h 02min 34s) are ignored. This is the default option if your observations do not have video files.




- **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** – With this option selected, the observations are aligned with the video. Choose this option if, 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 obtained by summing up the agreements and disagreements from two or more pairs of observations (see **Combining multiple pairs of observations** on page 375), although those two values are often correlated.

### *Combining multiple pairs of observations*

Select **Include all results combined** to get an additional row in the R**eliability 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 |

***Figure 10.4*** *Part of the Reliability Analysis results sheet. This example shows the result of the combined results in the bottom row.*

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**, behavior modifiers are included in the events to compare.

If some of the modifiers are numerical, 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 note **ANALYZING MODIFIERS** on page 380.

### *Show missing values as*

Choose the character you want to have displayed for missing values in the confusion matrix.

### *Number of decimals*

Choose the number of decimals for the reliability statistics and significance. You can choose 2 or 3 decimals.

***Saving your analysis settings***

The **Reset to default** and **Set default** buttons apply to the **Settings** tab and **Layout** tab.

You can save the settings specified in your analysis by clicking the **Set default** button. If this window is gone, click **Settings** on top of the result window and click **Set default** in the window that appears.

***Applying 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 new settings are applied. Next, click **OK** to run the analysis.

### LAYOUT TAB

In the **Layout** tab, select **Show not scored elements** if you want the result to include the event types that were not scored in any observation.

If the option is selected, the matrix of agreements and disagreements (see page 386 for an example) will be larger. The cells corresponding to not scored events will contain the missing value symbol.

If the option is not selected (default), only the event types that were scored in at least one observation are included in the result.

## 10.4 How the Frequency/Sequence reliability analysis algorithm works

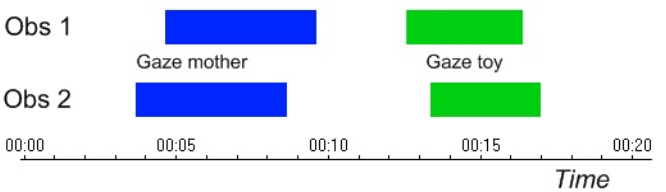
This section describes how the algorithm works for the Frequency/Sequence Comparison method.

For each pair of observations selected in the Pairs tab of the Reliability Analysis Settings window, The Observer analyzes the two observations in five runs. In each run, the program scans the events on a single time line, from the start to the end, switching from one observation to the other according to the timing.

In some cases the program analyzes the stop of events. For more information, see **Understanding Gaps** on page 384.

- **Run 1** – Find matches between 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.

  See the example below.



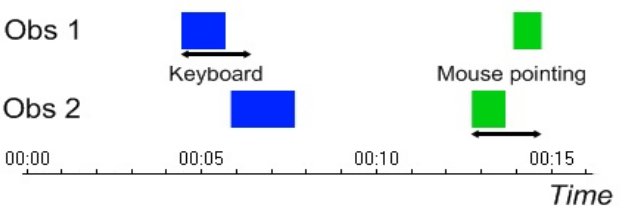

  The following agreements are scored:

  ✔ 4.50 Gaze mother (Obs 1) - 3.60 Gaze mother (Obs 2)
  ✔ 12.5 Gaze toy (Obs 1) - 13.40 Gaze toy (Obs 2)

- **Run 2** – Find matches between 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.

  Note – 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 (see **Reliability analysis and gaps** on page 396 for more information), The Observer XT treats such gaps as <Gap "Behavior name"> and find matches between them just like events. For more information, see page 74 and page 396.

  In the example below a Tolerance window of 2 seconds is used.



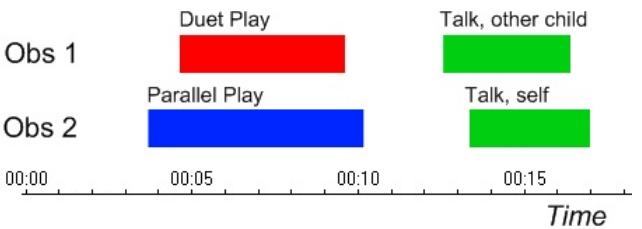
The onset times of 'Keyboard' and 'Mouse pointing' differ by less than the tolerance window (indicated by the arrows in the figure above). The following agreements are scored:

✔ 4.50 Keyboard (Obs 1) - 5.70 Keyboard (Obs 2)
✔ 13.9 Mouse pointing (Obs 1) -12.7 Mouse pointing (Obs 2)

- **Run 3** – Find disagreements: events not yet linked within the 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 that has yet to be scored as agreement/disagreement. 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 in run 1 or 2.

  Stop times are compared indirectly, see the note about stop times in Run 2.

  In the example below a Tolerance window of 2 seconds is used.




  The following disagreements are scored:

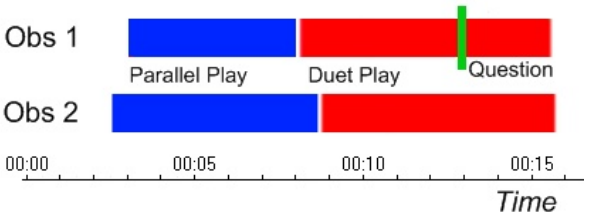
✘ 4.50 Duet Play (Obs 1) - 4.60 Parallel Play (Obs 2)
✘ 12.60 Talk, other child (Obs 1) - 13.4 Talk, self (Obs 2)

- **Run 4** – Find disagreements: any event within the 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, 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.

  Stop times are compared indirectly, see the note about stop times in Run 2.

- **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, they are scored as 'Window Error' (see page 386).




The following disagreement is scored:

✘ 12.90 Question (Obs 1) - 8.70 Duet Play (Obs 2)

Note that 8.70 Duet Play (Obs 2) was paired to 8.00 Duet Play (Obs 1) during Run 1. This is one of the frequent cases in which an event produces one agreement and one or more disagreements.

***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.

# 10.5 Notes about reliability analysis

***For Observer 5 users***

The algorithm for reliability analysis is essentially the same as the one in The Observer 5. The only differences are:

- In The Observer 5, an event could be scored as agreement with one or more events in the other observation. In The Observer XT, an event can be scored as agreement with only one event in the other observation. If other events in the second observation are close to the event in the first observation, these are scored as disagreements.

- In The Observer 5, only the start, not the stop of a Behavior is considered for analysis, because the stop of one behavior coincides with the start of another one. In The Observer XT, any stop of a behavior that is not immediately followed by the start of another one (like when you score stop codes for Start-Stop behaviors), the stop event is analyzed as <Gap "Behavior name">, where "Behavior name" is the name of the behavior just stopped.
- In contrast to The Observer 5, in The Observer XT an observation can have multiple event logs and multiple Results containers in the data selection. These are taken into account in the reliability analysis.
- In contrast to The Observer 5, in The Observer XT you can define numerical modifiers, which can be considered in the reliability analysis (see **Modifiers** on page 375).

***Analyzing 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.

***Choosing 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 Result 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 Chapter 6) 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.

# 10.6 The reliability analysis result

The reliability analysis result is created when you click **OK** in the **Reliability Analysis Settings** window (page 366). The result has a number of views (Statistics, Confusion Matrix, Comparison List), depending on the Comparison method you used.

The reliability analysis result consists of three different views, visible one at a time:

- Statistics (see below).
- Confusion Matrix (see page 382)
- Comparison List (see page 387)

The result is not automatically saved to your computer's hard disk!
To save the result, click the **Archive** button (see page 438).

To edit a result, first export it to another program (see page 440).

## STATISTICS VIEW

Statistics | Confusion Matrix | Comparison List

| Pair | Observation A | Observation B | Agreement |
|---|---|---|---|
| 1 | Erin 3 years old_A / Default Criterion 1 | Erin 3 years old_B / Default Criterion 1 | 49 |
| 2 | Suzanne 2 years old_A / Default Criterion 1 | Suzanne 2 years old_B / Default Criterion 1 | 73 |
| 3 | *Click to add Observation* | *Click to add Observation* | |

***Figure 10.5*** *Part of the Statistics view in the* ***Reliability Analysis results*** *sheet.*

To show the Statistics view, click the **Statistics** button (see the figure above, top-left corner) in the tool bar. The following statistics are calculated:

- **Number of Agreements**.
- **Number of Disagreements**.
- **Index of concordance**.
- **Percentage of agreements**.
- **Cohen's Kappa** and its statistical significance (p-value).
- **Kappa Max**.
- **Pearson's Rho** and its statistical significance (p-value).
- **Prevalence Index**.

- **Confidence Interval low**.
- **Confidence Interval high**.

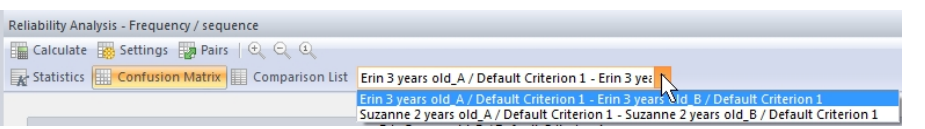
The statistics are derived from the Confusion matrix. For more information on their computation, see page 390.

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 page 393), 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 page 376).

## CONFUSION MATRIX

To display the confusion matrix, click the **Confusion Matrix** button in the tool bar. The Confusion Matrix displays the observation pair that is selected in the **Statistics** view. If you have multiple observation pairs, you can select another pair from the list on the tool bar.

If you selected the option **Include all results combined** in the Settings tab (see page 384), there is an additional pair: Observations A combined - Observations B combined.




The confusion matrix (Figure 10.6) shows a matrix of events from the two observations under comparison.

Statistics | Confusion Matrix | Comparison List | Erin 3 years old_A / Default Criterion 1 - Erin 3 yea

| Erin 3 years old_A / Default Criterion 1 | Erin 3 years old_B / Default Criterion 1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Behaviors** | Gaze child | Gaze object | Gaze adult | Gaze elsewhere | No interaction | Play | Interaction undetermined | Talk | Other verbal | **No Records** | **Window Error** | **Total** |
| Gaze child | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Gaze object | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| Gaze adult | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Gaze elsewhere | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| No interaction | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Play | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 8 |
| Interaction undetermined | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Talk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 24 |
| Other verbal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **No Records** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Window Error** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 3 | 9 | 3 | 4 | 1 | 8 | 1 | 24 | 0 | 0 | 0 | 53 |

***Figure 10.6*** *The Confusion Matrix view in the Reliability Analysis results sheet.*

### *Matrix layout*

This matrix has one row and one column for each combination of Subject and Behavior, plus their Modifiers scored in those observations.

### *Cell values*

The values of the confusion matrix can be understood as follows:

- Light blue cells along the diagonals contain counts of agreements of events that differ in numerical modifiers by less than the margin (see page 371).

| 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: **No Records**, **Window Error** (see below).
  - 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 not scored elements** in the **Layout page** of the Reliability Analysis Settings window (see page 376), 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 page 375), the confusion matrix of the Combined results page sums up all agreements and disagreements from all pairs of observations.

***Understanding <Gap "Behavior name">***

<Gap "Behavior name"> is added to rows and columns in the Confusion Matrix in the following cases:

- When no behavior is scored at the start of the observation.

  ➔ A <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.

  ➔ A <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 (see an example in the picture of page 388).

- When the behavior group type is set to Behaviors cannot occur at the same time and contains both events with and without duration, and you only have scored events without duration.

  ➔ A <Gap "Behavior group name"> state for is added at the start of the observation, ending at the end of the observation.

If you selected the option **Analyze gaps between events**, The Observer considers the start of such a gap for comparison and links them to an event in the other observation, resulting in an agreement (if there also is a gap for the same behavior group) or a disagreement in all other cases. With **Analyze gaps between events** you assess the co-occurrence of no events, not only the events you have scored.

For combined continuous and instantaneous sampling, a gap is not added when continuous sampling is temporarily suspended to allow scoring of a sample.

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See also **Reliability analysis and gaps** on page 396 for more information about reliability analysis when you have gaps between events or when an observation is suspended.

---

***Understanding 'No Records'***

Rows and columns named No Records show the occurrences of events in one observation that cannot be paired with any event in the second observation. This happens in the following cases:

- There is no data from the same behavior group in the other observation. In the Comparison List, such instances are shown as <Nothing scored in combination>.

- When you have selected **Compare all events** from the Comparison scope list in the **Settings** tab of the Reliability Analysis Settings window (see page 372), 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 (see page 373).

---

Where do I find the events marked by **No Records**?

The **No Records** row shows the disagreements between events in observation 2 (above the diagonal) and <Nothing scored in combination> in the Comparison List (see page 22).

The **No Records** column shows the disagreements between events in observation 1 (left of the diagonal) and <Nothing scored in combination>.

---

***Understanding 'Window Error'***

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 set in the **Reliability Analysis Settings** window (see page 371).

---

Where do I find the events marked by Window Error?

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 (you can check this in the comparison list; see page 22).

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.

---

***Customizing the matrix***

To obtain a smaller matrix containing fewer event categories:

- Do not select the option **Show not scored elements** in the **Layout** tab of the Reliability Analysis Settings window (see page 376).
- Filter data in the data profile (see Chapter 6), then run the analysis.

## COMPARISON LIST

To show the comparison list of a pair of observations, select the pair from the list next to the Comparison List button. The Comparison List lists all agreements and disagreements of the compared observations. It contains from left to right:

- The **Run** number of the reliability analysis algorithm (see **How the Frequency/Sequence reliability analysis algorithm works** on page 376). 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, click the **View Settings** button at the right of the tool bar and select **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.

If you select **Include all results combined** for multiple comparisons (see page 375), the Comparison List of the combined results lists the events from all the observation pairs, ordered according to the list of Observation Pairs in the Pairs tab of the Reliability Analysis Settings window.

### *Symbols*

- **Green triangle** – Marks starts of events with duration (mutually exclusive and start-stop), including the <Gap "behavior name">.
- **Blue circle** – Marks events without duration.
- **Green check mark** – Marks an agreement between an event in the two observations.
- **Red cross** – Marks a disagreement between an event in the two observations.

### *Specifying the time format*

By default, the Comparison List shows the event times as time elapsed from the point where the two observations are aligned. If you want to change the format, do the following:

1. From the **Setup** menu, select **Project Settings**, then **Time formats** in the left pane.
2. To set the time mode, select **Absolute** or **Relative** from the **Project time format** list.
3. To set the time format, click the **Edit** button for the time mode you selected in the previous step. See page 114 for more information.

4. Click **OK**. Restart reliability analysis and display the Comparison List. The time and date format are applied to all the rows in the Comparison List.

**Applying Windows regional settings** – If you want to apply new Windows regional settings, for example when changing the decimal symbol, restart The Observer and then run the analysis.

***Top rows: Observation start and Synchronization point***

- **Observation start** – Marks the observation start time relative to the point where the program starts comparing the data files (Synchronization). It is shown in the format you specify in the Time formats tab of the Project Settings window (see above). Please note:
  - If you have selected **Use the start of observations** from the Synchronization list (see page 373) 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 (see page 373) and there are no events starting at 0:00:00.000, the comparison starts later than 0:00. Therefore, Observation start is negative (for example, -0:00:5.30 if the first event starts occurs at 5.30 s).
  - If you have started observing from a point in a media file later than 0:00, and you select **Align video start time** from the Synchronization list (see page 373), Observation start shows the start of the observation relative to the video start time (for example, 0:01.00.000 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. It is shown in the format you specify in the Time formats tab of the Project Settings window (see the previous page). By default, synchronization point is 0:00:00.000.

***Understanding <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. You can find such instances in the confusion matrix under No Records (see page 385).

***Understanding <Gap "Behavior name">***

Gaps in the observations are only analyzed when the option **Analyze gaps between events** has been selected (see page 371).

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.

It is also possible to get an agreement between a pair of <Gap "Behavior name">:

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.00 | 8.29 | <Gap Run> | ✔ | 0.00 | 9.00 | <Gap Run> |

In this example, no event from the mutually exclusive behavior group 'Locomotion' was scored at the start of both observations. The two <Gap Run> states overlap, therefore they result in an agreement (see run 1 in the algorithm, page 377).

- If your Comparison list includes lots of pairings between <Gap "Behavior name"> and events without duration, it means that the behavior group in which point the events are scored is of type in which behaviors cannot occur at the same time. We advise you to de-select **Analyze gaps between events** (page 371).
- For combined continuous and instantaneous sampling, <Gap "behavior name"> is not added when continuous sampling is temporarily suspended to allow scoring of a sample.

***Understanding multiple occurrences of the same event***

Sometimes you may find an event in one observation 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 (overlap = Agreement) and 0.00 Walk in observation 2 (no overlap and outside Tolerance window of 1 sec = 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 page 377). All other associations are scored as disagreements, no matter if the event type is the same.

***Understanding 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 page 375).

If numerical modifiers have been defined as predefined (see page 80), scoring modifiers that differ by more than the margin value result in a coding error, not a modifier error in the confusion matrix.

### *Editing a result*

You cannot edit the content of the Reliability Analysis Results sheet. If you want to make any changes to the result, export it to another program like Excel (see page 440) and then edit it in that program.

### *Saving a result*

To save a result, click the **Archive** button on the tool bar 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 tool bar or, from the **Analyze** menu, select **Reliability Analysis**, then **Open Archive**. For more information on saving, opening and exporting results, see page 438.

### *Closing a result*

To close a result, simply open another window in The Observer XT. Please note that the result is not saved automatically.

To return to your analysis, click the item under Reliability Analysis in the Project Explorer.

### *Printing a result*

To print a result, click the button corresponding to the page you want to print and from the **File** menu, select **Print**.

## 10.7 Reliability statistics

### *Agreements*

The number of times the two observations showed a match between events. It is the sum of the values in the diagonal of the confusion matrix.

### *Disagreements*

The number of times the two observations showed a disagreement between events. It is the total of the values in the off-diagonal cells, including Window Error, Modifier Error and No Records in the Confusion matrix (see page 382).

### *Index of concordance*

The proportion of agreements between events, 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, calculated as (Agreements/(Agreements+Disagreements) * 100%). The values range between 0 (no agreements) and 100 (full agreement).

***Cohen's Kappa (κ)***

An overall measure of agreement, 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 page 375), 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

$$p_c = \frac{\sum_i \left( \sum_j a_{ij} \right) \left( \sum_j a_{ji} \right)}{\left( \sum_i \sum_j a_{ij} \right)^2}$$

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 κ of zero means that there is no agreement beyond chance, and a κ 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:

$$z = \frac{\kappa}{\sqrt{\frac{p_c}{(\sum_i \sum_j a_{ij})(1 - p_c)}}}$$

A one-tailed test on this score is carried out, and the probability is shown next to κ. 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, see http://en.wikipedia.org/wiki/Cohen%27s_kappa.

***Kappa max***

A maximum value of Kappa is achieved when there is full agreement between two observations. The Kappa max is calculated as follows:

$$\kappa_{max} = \frac{A_{max} - A_e}{1 - A_e}$$

$$A_{max} = \frac{\sum_i min\,(\sum_j a_{ij}, \sum_j a_{ji})}{n}$$

$$A_e = \frac{\sum_i (\sum_j a_{ij})(\sum_j a_{ji})}{(\sum_i \sum_j a_{ij})^2}$$

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. 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 page 375). 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 $\rho$ represents the linear relationship between two variables. If $\rho$ is squared, the resulting value $\rho^2$ 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).

Cohen's *Kappa* and Pearson's *Rho* do not measure the same thing! 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, Rho is high, but agreement is low (Kappa will even be negative!).

***Significance of Rho***

To test the significance of $\rho$, 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 $\rho$.

The test of significance of $\rho$ 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 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:

$$PI = \frac{\sum_{j,a_{jj} \neq a_{max}} \frac{a_{max}}{a_{max} + a_{jj}}}{n_c - 1}$$

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:

$$\varepsilon(\kappa) = \sqrt{\frac{A_0(1 - A_0)}{n(1 - A_e)^2}}$$

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:

$$u(\kappa) = \kappa - 1.96 \times \varepsilon(\kappa)$$
$$v(\kappa) = \kappa + 1.96 \times \varepsilon(\kappa)$$
$$P\big(u(\kappa) < \kappa < v(\kappa)\big) = 95\%$$

### *Extra Kappa statistics*

Three extra statistics are available if you selected the option **Show extra Kappa statistics** in the Reliability Analysis Settings (see page 374). 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 **Combining multiple pairs of observations** on page 375), although those two values are often correlated.

# 10.8 Reliability analysis and gaps

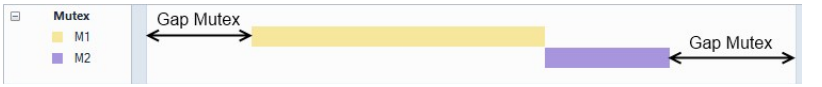
A gap in an observation is the time interval in which no event was scored for a specific behavior group. This can occur

- In groups of mutually exclusive, non-exhaustive behaviors (page 396).
- In start-stop behaviors.
- When suspending an observation

## MUTUALLY EXCLUSIVE, NON-EXHAUSTIVE BEHAVIORS

### *Definition of a gap*

In the following example, a gap occurs before the start of M1, and another after the end of M2 for the group 'Mutex'. Note that you do not see gap names when you make time-event plots. You will see these names in the Reliability Analysis' Comparison List




Note that 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.

### *Examples for mutually exclusive behaviors*

The figure below shows the visualization of two observations, A and B with events (M1, M2) from a mutually exclusive non-exhaustive behavior group named *Mutex*. The lines with arrows indicate the gaps in both observations.

*Example 1* - **Frequency/sequence** method for mutually exclusive non-exhaustive events


Observation A contains two gaps.

When you *de-select* **Analyze gaps between events** in the **Settings** tab of the **Reliability Analysis Settings** window, only the start of behaviors are considered for linking.


Two agreements (✔) and one disagreement (✖) are obtained in the Comparison List:

- Agreement: 0.00 sec **M1** (in observation A) - 0.00 sec **M1** (in observation B).
- Disagreement: 1.34 sec **M1** (A) - 0.00 sec **M1** (B).
- Agreement: 5.07 sec **M2** (A) - 5.27 sec **M2** (B).

When you select **Analyze gaps between events**, the comparison of observations A and B results in two agreements (✔) and three disagreements (✖):


- Agreement: 0.00 **M1** sec (in observation A) - 0.00 sec **M1** (observation B).
- Disagreement: 0.42 sec **<Gap Mutex>** (A) - 0.00 sec **M1** (B).
- Disagreement: 1.34 sec **M1** (A) - 0.00 sec **M1** (B) (this is a disagreement because 0.00 sec **M1** (in B) was already in agreement with another **M1** event in A).
- Agreement: 5.07 sec **M2** (A) - 5.27 sec **M2** (B).
- Disagreement: 6.67 sec **<Gap Mutex>** (A) - 5.27 sec **M2** (B).

*Example 2* - **Duration/sequence** based method for mutually exclusive non-exhaustive events


For this method, in this example it does not matter whether you include gaps in the analysis. The results of the comparison of observations A and B are an Agreement of 5.55 sec and a Disagreement of 2.73 sec:


Agreement – The two occurrences of **M1** in observation A completely overlap with the occurrence of **M1** in observation B: Agreement = 0.42 (✔) + 3.73 (✔) sec = 4.15 sec. The occurrence of **M2** in observation A overlaps with **M2** in observation B, except for the first 0.2 sec: 1.6 (✔) - 0.2 (✖) = 1.4 sec. This results in a total Agreement of 4.15 + 1.4 = 5.55 sec.

Disagreement – For **M1** in observation B, there is nothing scored at the start of observation A for a duration of 0.92 sec (✖). At the end of **M1** in observation B, in observation A **M2** is scored for a duration of 0.2 sec (✖). At the end of **M2** in observation B, nothing is scored in observation A for 1.61 sec (✖). This results in a total Disagreement of 2.73 sec.

## START-STOP BEHAVIORS

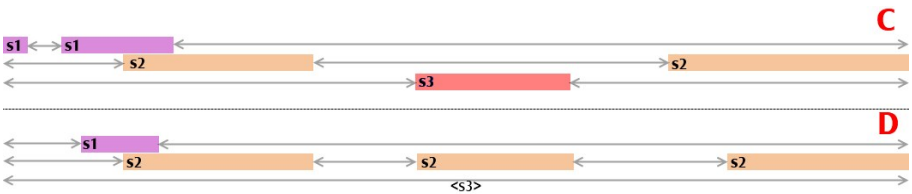
### *Definition of a gap*

In the example below, the group is named "Start-stop group" and the behavior names are S1 and S2. A gap occurs before the start of S1, a second gap after the end of S1, and a third gap before the start of S2. Note the difference with the example above: the gaps are named according to the corresponding behavior, not the group. Each behavior determines its set of gaps.

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.

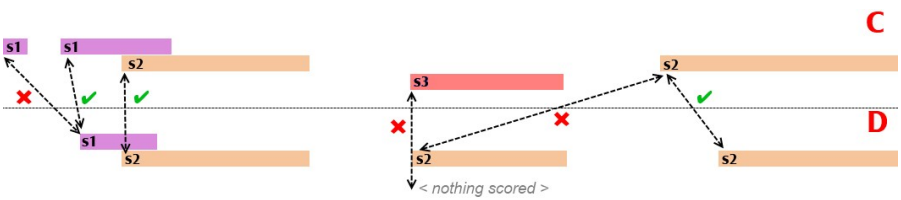
***Examples for start-stop behaviors***

The figure below shows the visualization of two observations, C and D with events (**s1**, **s2** and **s3**) from a behavior group in which behaviors can overlap. The lines with arrows indicate the gaps between behaviors. Note that event **s3** was only scored in observation C and not in observation D. As a result, observation D contains a gap for behavior **s3** throughout the observation (marked with **<s3>** in the figure below).



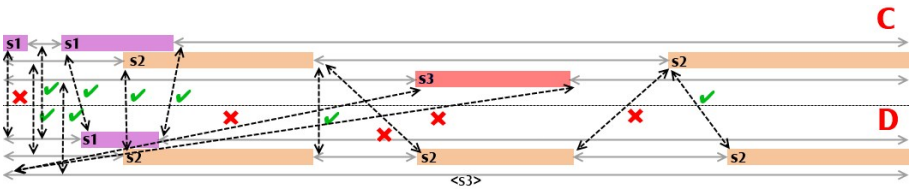

*Example 1* - **Frequency/sequence** method for start-stop events

When you *de-select* **Analyze gaps between events** in the **Settings** tab of the **Reliability Analysis Settings** window, you obtain three agreements (✔) and three disagreements (✘):



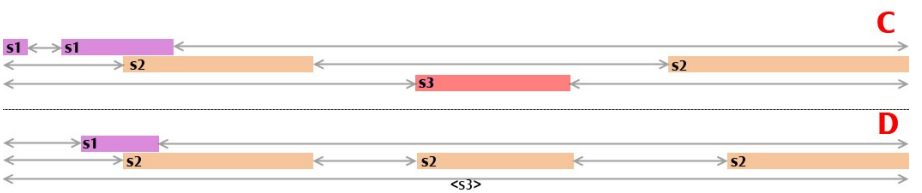

- Disagreement: 0.00 sec **s1** (observation C) - 1.50 sec **s1** (observation D).
- Agreement: 1.13 sec **s1** (C) - 1.50 sec **s1** (D).
- Agreement: 2.30 sec **s2** (C) - 2.30 sec **s2** (D).
- Disagreement: 7.88 sec **s3** (C) - **<nothing scored in combination>** (D).
- Disagreement: 12.71 sec **s2** (C) - 7.93 sec **s2** (D).
- Agreement: 12.71 **s2** (C) - 13.85 sec **s2** (D).

When you *select* **Analyze gaps between events** in the **Settings** tab of the **Reliability Analysis Settings** window, the comparison of observations C and D results in 8 agreements (✔) and 5 disagreements (✖):

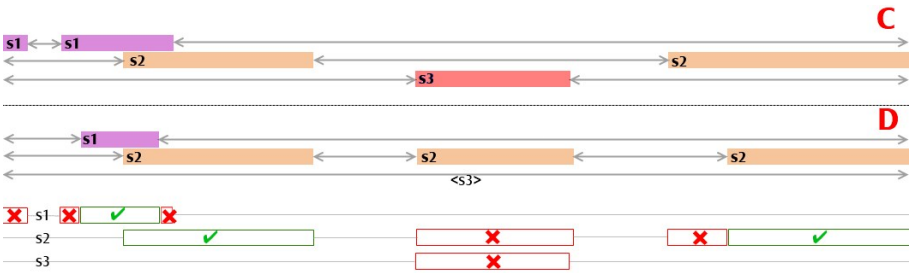



- Disagreement: 0.0 sec **s1** (C) - 0.0 sec **<Gap s1>** (D).
- Agreement: 0.0 sec **<Gap s2>** (in observation C) - 0.0 sec **<Gap s2>** (in observation D).
- Agreement: 0.0 sec **<Gap s3>** (C) - 0.0 sec **<Gap s3>** (D).
- Agreement: 0.49 sec **<Gap s1>** (C) - 0.0 sec **<Gap s1>** (D).
- Agreement: 1.13 sec **s1** (C) - 1.5 sec **s1** (D).
- Agreement: 2.3 sec **s2** (C) - 2.3 **s2** (D).
- Agreement: 3.27 sec **<Gap s1>** (C) - 3.0 sec **<Gap s1>** (D).
- Agreement: 5.93 sec **<Gap s2>** (C) - 5.93 **<Gap s2>** (D).
- Disagreement: 5.93 sec **<Gap s2>** (C) - 7.93 sec **s2** (D).
- Disagreement: 7.88 sec **s3** (C) - 0.0 **<Gap s3>** (D).
- Disagreement: 10.85 **<Gap s3>** (C) - 0.0 **<Gap s3>** (D).
- Disagreement: 12.71 sec **s2** (C) - 10.92 sec **<Gap s2>** (D).
- Agreement: 12.71 sec **s2** (C) - 13.85 sec **s2** (D).

*Example 2* - **Duration/sequence** based method for start-stop events



When you *de-select* **Analyze gaps between events** in the **Settings** tab of the **Reliability Analysis Settings** window, comparison of observations C and D results in an Agreement of 8.62 sec and a Disagreement of 8.23 sec:




- Agreement – **s1** in observation D overlaps with **s1** in observation C for 1.50 sec (first ✔ in the picture). The first occurrence of **s2** in observation D overlaps with **s2** in observation C for 3.63 sec (✔). The third occurrence of **s2** in observation D overlaps with **s2** in observation C for 3.49 sec (last ✔). This results in a total Agreement of 8.62 sec.
- Disagreement – The first occurrence of **s1** in observation C has no overlap with **s1** in observation D for 0.49 sec (first ✖ in the picture). The second occurrence of **s1** in observation C has no overlap with **s1** in observation D for 0.64 sec (second and third ✖ in the picture together). The second occurrence of **s2** in observation D has no overlap with **s2** in observation C for 2.99 sec (fourth ✖). The occurrence of **s3** in observation C has no overlap with **s3** in observation D for 2.96 sec (fifth ✖). The second occurrence of **s2** in observation C has no overlap with **s2** in observation D for 1.14 sec (sixth ✖). This results in a total Disagreement of 8.23 sec.

When you *select* **Analyze gaps between events** in the **Settings** tab of the **Reliability Analysis Settings** window, the comparison of observations C and D based on the Duration/sequence method results in an Agreement of 43.79 sec and a Disagreement of 8.23 sec. The larger Agreement is due to the fact that all the overlapping gaps in the observations are now also taken into account in the calculation. You can check this in the Confusion matrix:

**<Gap s1>** - Total overlap of 14.71 sec between observations C and D.

**<Gap s2>** - Total overlap of 6.09 sec between the two observations.

**<Gap s3>** - Total overlap of 14.37 sec between the two observations.

## WHEN SUSPENDING AN OBSERVATION

The interval during which the observation was suspended is treated as a gap. However, such a 'suspend-resume' gap leads to a different result in reliability analysis than a regular gap (when no behavior is scored from a mutually exclusive non-exhaustive group or a start-stop group). 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, however, counts two occurrences of behavior A: one before suspend, and one after resume.

Consider for example the figure below. It shows part of the visualization of an observation which was suspended and resumed; behavior s1 was active before and after suspend-resume. In the reliability analysis, this is counted as two occurrences of behavior **s1** as if **s1** was scored again after resuming the observation.

# Chapter 11

# File management

# 11.1 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.

There is a difference between Import/Export and Open/Save. Open/Save means that when you open a file of a certain type you continue to work with that specific type of file. Import/Export implies a conversion from a certain format to another type of format.

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**!** You should carry out all your file management in The Observer Project Explorer. If you delete, move or rename files using the Windows Explorer, The Observer may not be able to find the files again (because Observer files contain references to other files).

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File types that can be managed in The Observer XT are:

- **Project files** (*.vop, or *.opp from previous Observer versions) – see below.
- **Project backup files** (*.vpb) – See page 408.
- **Template projects** (*.tool barotb) – See page 407.
- **Observational Data** (*.odx from The Observer XT 8, 9 or 10, *.odf from previous versions, or other observational data in text format) – See page 411 and page 424.
- **External data** – See Chapter 5.
- **European Data Format files** (*.edf; *.bdf) – See page 435.
- **Media files** (*.avi, *.mpg, *.mpeg) – See page 436.
- **Analysis Results** including **charts** (*.arx, or *.arm from previous versions) – See page 438.
- **Episode Selections** (*.esr) – See page 441.
- **Independent Variables** – See page 444.

# 11.2 Projects

A project is based on your research question and contains different elements. These elements (Setup, Observations, Data Profiles, Episode Selections, Analysis) are visible in the Project Explorer.

The different elements (Setup, Observations, Data Profiles and Analysis) and their items can be opened either from the menu or by clicking an element or item in the Project Explorer.

## CREATING A NEW PROJECT

You can create two types of projects:

- **A new blank project** – This empty project contains no settings.
- **A project from a template** – This existing template project contains settings that can be re-used in the new project.

### *Creating a new blank Project*

1. To open a new project:
   - In The Observer XT startup window, under **Create a new project**, click **New blank project**.
   - From the **File** menu, select **New Project** (or press **Ctrl+N**).
2. Type in a **new Project file name** and click **OK**.

   The Project file is saved in a Project directory with the same name.

   A Project file name cannot contain any of the following characters: \ / : ; * ? " < > | .

### *Creating a new Project from a template*

1. To open a new project based on an existing template project:
   - In The Observer XT startup window, under **Create a new project**, click **New project from template**.
   - From the **File** menu, select **New Experiment From Template**.
2. In the **New Project From Template** window, click the **Select** button to select a template project (*.otb) from the Template folder (see “Saving a Project as a Template” below).

   You can still open a a template project (*.otx) from a previous version of The Observer XT (11/12) or a read-only project (*.vpx) from The Observer XT 8/9/10 in this window. Make sure you have copied the otx or vpx file to the **Template** folder or browse to the file.

3. Type in a **new Project file name** and click **OK**.

   The Project file is saved in a Project directory with the same name.

   A Project file name cannot contain any of the following characters: \ / : ; * ? " < > | .

See also “Creating a multiple coding station configuration” on page 409.

## SAVING A PROJECT

You have the following options to save a project in The Observer XT:

- **You can save a project with all its settings and data** (*.vop file) – See “Saving a Project” below.
- **You can save a project with all its settings and data under a different name** (*.vop file) – See “Renaming/Copying a Project” below.
- **You can also save a project as a template** (*.otb file) – A template project 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. See “Saving a Project as a template” below.

  The templates (*.otb) replace the templates and read-only projects (*.otx and *.vpx) from previous versions of The Observer XT.

### *Saving a Project*

To save a project, select **File** and **Save** or press <**Ctrl+S**>.

You can use auto-save to temporarily save a Project:

1. From the **File** menu, select **Preferences**.
2. In the **Auto recovery** tab, 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 select Save Project from the File menu. 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.

### *Renaming/Copying a Project*

You can rename or copy a project by saving it under a different name. From the **File** menu, select **Save Project As** and type in the new name of the Project.

Make sure the new project name does not contain any of the following characters:
\ / : ; * ? " < > |.

*Saving a Project as a template*

1. From the **File** menu, select **Save Project as Template**.
2. Type in the name of the template project or use the current name.
3. Click the **Save options** button to open the **Save Template Options** window:
   - **Include Independent Variables** – When you select this option, the Independent Variables are included in the template project.
   - **Include hardware and software devices** – When you select this option, the hardware and software in the Devices list are contained in the template 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** – Optionally, you can type in additional information about the template project.
4. Click **OK** twice to save the template project.

---

See also "Creating a multiple coding station configuration" on page 7.

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*Opening a Project*

1. Select **File**, **Open Project** or press <**Ctrl+O**>. In the **Open project - Select file** window, browse to the folder where the project is stored. Open the folder with the same name as the project.
2. Under **Files of type**, keep **The Observer XT Project (*.vop)** selected and select the *.vop file. Next, click **Open**.

   If you want to open a project from a backup file (*.vpb), see page 408 for more information.

   If you open a project created in The Observer XT 11.0, it is automatically updated to an Observer 11.5 project. This then can no longer be read in The Observer XT 11.0. The Observer XT 11.5 automatically creates a backup (*.vpb) copy of the project in the Projects folder which can be opened in The Observer XT 11.0.

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.

### *Backing up a Project*

Follow this procedure 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.

1. Open the project and from the **File** menu, select **Make Backup** (or press <**Ctrl+B**>).
2. Select the following (optional):
   - **External data** (selected by default) – Keep this option selected if you want 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 to the project's External folder if necessary. 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.

   If necessary, change the file name and file location.
3. Click **Save**. Close the **Information Message** window.

The backup file contains a zipped copy of the Project folder and all its content (subfolders and files) and of the log file. References to media files and external (physiological) data outside of the Project folder and Preferences are always saved in the backup file.

To make you aware of the importance of creating backup files, a message appears after you saved and closed your project ten times asking whether you want to make a backup of the project. Click **OK** to make a backup or **Cancel** to close the project.

---

The actual media files are not stored in the backup file. If you want to save these too, you should copy them to the Project folder before creating the backup file.

If you want to quickly copy observations, references to media files and external data, export them as ODX (see page 10).

You should store the backup file on a secure medium (CD, DVD, external hard disk or network drive), in a separate location.

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### *Restoring a Project*

Follow this procedure to open a project from a backup file:

1. From the **File** menu, select **Restore Backup** (or press <**Ctrl+R**>).
2. Locate and select the backup file (*.vpb) you want to restore and click **Open**.

The Project directory and all associated files in the project are now restored.

If your backup file includes external data and import profiles (see the options on the previous page), these are copied to the External project folder (page 447) and the Profiles folder (page 447), 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). You can copy this file to the External project folder (see page 447 for its location).

Note that In The Observer XT 12.5 the space bar is not accepted as a key code. If your backup file from previous Observer XT versions contains key codes with “space” (for example “a b”), the space is automatically removed at import.

## CREATING A MULTIPLE CODING STATION CONFIGURATION

A multiple coding station configuration is a way to collect and manage data from a number of coding stations that run the Coder license version of The Observer XT. You define a project with a coding scheme on the main Observer XT computer and save this as a template project. Each coding station receives a copy of this template project, where you can score events but not change the coding scheme (because of locked project settings). You can then import the observations from the coding stations in The Observer XT on the main computer (see Figure 11.1).

To create a main project and copy it to the coding stations, do the following:

1. On the main Observer XT computer, create a project (see page 405) and define a coding scheme.
2. From the **File** menu, select **Save Project as Template**. See **Saving a Project as a template** on page 407 for details.
3. Copy the template project to each coding station (see Figure 11.1).

   If the computers are on a network, you can do this with the Windows Explorer. Otherwise, use, for example, a USB stick. Make sure that The Observer XT 12.5 is installed on those PCs. 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.

4. On a coding station, start The Observer XT and from the **File** menu, select **New Project From Template**. If the project is stored in the templates folder, the correct location is selected automatically. Otherwise browse to the correct location. Click the **Select** button and open the template project (*.otb):
   - If you open a template project in the Coder License version of The Observer XT, the suggested name for the new project is '[name of template project] - sub'.
   - If you open the template project in a Full License version of The Observer XT, you can type in a name for the new project.
5. Click **OK**. The new project opens. Repeat steps 4-5 for all coding stations.

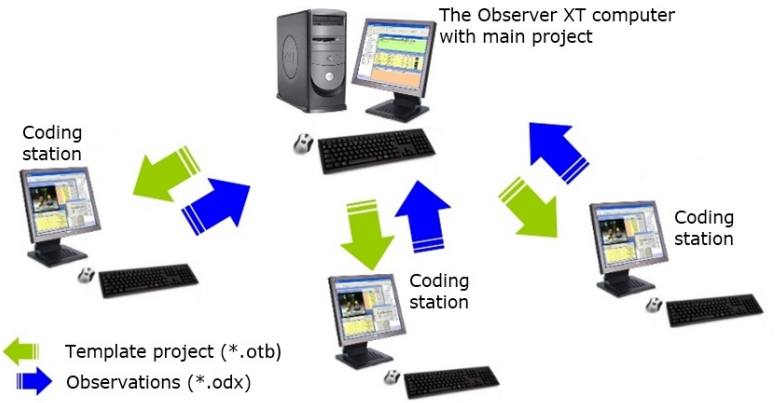


***Figure 11.1*** *A multiple coding stations configuration.*

The Project Setup, Coding Scheme and Independent Variables in the new project are locked (indicated by a lock icon in the Project Explorer).

You can only unlock the template project in a Full License version of The Observer XT: from the **Setup** menu, select **Unlock Configuration**, or right-click the **Setup folder** in the Project Explorer and select **Unlock Configuration**. We recommend to both keep the main project and template project locked, to make sure the settings stay the same!

To retrieve data (ODX files) from the coding stations, do the following:

1. On each coding station, export the observations as ODX files. From the **File** menu, select **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 have unique names (for example: Coding Station 1 File 0001.odx).
2. Copy the ODX file from each coding station to the main PC (see Figure 11.1).

3. Open the main project and from the **File** menu, select **Import Observational Data** (more details on page 424).

The observations are imported in the main project, including the observational data, the independent variable values and the coding scheme (see page 424 for details).

If your coding scheme or data contain special characters like ü or ç, before opening the *.otb and *.odx files make sure that your Windows Regional Options support those characters. Open the **Control Panel** and **Region and Language**. In the **Administrative** tab and click **Change System Locale** and choose your preferred language. Next, close and restart The Observer XT.

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See also an important note on time formats on page 61.

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# 11.3 Exporting observational data

You can export logged events and related data by exporting observations. You can export observational data to:

- **The Observer XT** – To transfer event data from one project to another with The Observer XT data files (*.odx) (see below).
- **Microsoft Excel** – To export event data including external data to a Microsoft Excel workbook (*.xlsx) for further analysis (see page 413).
- **Other software** – To export event data including external data to other software for further analysis via text files (*.txt). Also use this option if you want to export part of your event data selected in a data profile (see page 414).

## EXPORTING DATA TO OBSERVER XT DATA FILES (*.ODX)

When you work with several researchers on the same project, you may need to export your data and import them into The Observer on a different computer. Follow this procedure to export observational data as ODX files (with extension *.odx) that can be imported to a project (see page 424).

1. To export event data to Observer XT ODX files, you have the following options:
   - To export multiple observations at once, from the **File** menu, select **Export** and **Observational Data**. In the **Export Observational Data** window, select **The Observer XT**. In the **Export Observational Data** window, select the observations you want to export.
   - To export a specific observation, right-click that observation in the Project Explorer and select **Export Observational Data** and next **The Observer XT**.
2. Under **Export** options, choose 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.
   - **Create separate file per observation** – If you have multiple observations and you select this option, each observation is exported to a separate ODX file. Otherwise, all observations are exported to a single ODX file.
3. Click **OK**.
4. In the **Save As** window, if necessary, change the file name and file location and click **Save**.

***Notes on ODX export***

- **What an ODX file contains** – 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.
- **Default names** – If you export one observation, the suggested name is the name of the observation. If you export two or more observations, the name is formed by the first and the last observations you have selected in step 1.
- **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. For more information, see page 424.
- **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.

- If The Observer cannot find a media file or external data file in the project, a message is shown on opening of the observation linked to them. For media files, browse to the location on your PC where the file is stored. For external data, copy the data file (with extension *.pbi) to the folder which should contain the external data (see page 447).

## EXPORTING DATA TO EXCEL FILES (*.XLSX)

1. To export event data to an Excel file, you have the following options:
   - To export multiple observations at once, from the **File** menu, select **Export** and **Observational Data**. In the **Export Observational Data** window, click **Microsoft Excel**.
   - To export a specific observation, right-click that observation in the Project Explorer, and select **Export Observational Data** and **Microsoft Excel**.
   - To export event data selected in the currently active Data Profile (indicated in blue and bold in the Experiment Explorer), from the **Analyze** menu, select **Select Data**, **Export Selected Data** and then **Microsoft Excel**.
   - To export event data selected in a specific Data profile, in the Project Explorer, right-click the **Data Profile**, select **Export Data Profile** and **Microsoft Excel**.
2. In the Export Observational Data window, in the Observations tab, select the observations you want to export.

   If your project contains external data, the Export Observational Data window also contains an External Data tab. See page 416 for instructions how to export external data.
3. Under **Export** options, select the following:
   - **Create a single sheet with all observations** – If you have multiple observations, with this option all observations are exported to a single Excel sheet.
   - **Create separate sheets per observation** – If you have multiple observations, with this option each observation is exported to a separate Excel sheet.
   - **Create separate files per observation** – If you have multiple observations, with this option each observation is exported to a separate Excel file.
   - **Include user-defined Independent Variables** – If you select this option, one or more columns with user-defined Independent Variables are added to the export file.

   When you click the **Reset to Default** button, the Export option Create a single sheet with all observations is selected and the option Include user-defined Independent Variables is de-selected.

You get a message when the maximum number of rows/columns of the Excel version installed is exceeded (Excel 2007/2010: maximum number of rows = 1.048.876, maximum number of columns = 16384, Excel 2003 and earlier: maximum number of rows = 65.536, maximum number of columns = 256.

## EXPORTING DATA TO TEXT FILES (*.TXT)

Event data are always exported to a single text (*.txt) file. For more information on how event data are exported, see page 415.

1. To export event data to a text file, you have the following options:
   - To export multiple observations at once, from the **File** menu, select **Export** and **Observational Data**. In the **Export Observational Data** window, select **Other software** and click **OK**.
   - To export a specific observation, right-click that observation in the Project Explorer and select **Export Observational Data** and **Other software**.
   - To export event data selected in the currently active Data Profile (indicated in blue and bold in the Experiment Explorer), from the **Analyze** menu, select **Select Data** and **Export Selected Data**.
   - To export event data selected in a specific Data profile, in the Project Explorer, right-click the **Data Profile** and select **Export Data Profile**.
2. In the **Export Observational Data** window, in the **Observations** tab, select the observations you want to export.

   If your project contains external data, the **Export Observational Data** window also contains an **External Data** tab. See page 416 for instructions how to export external data.
3. 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** – If you select this option, one or more columns with user-defined Independent Variables are added to the export file.
   - **Create separate file per observation** – If you have multiple observations and you select this option, each observation is exported to a separate text file. Otherwise, all observations are exported to a single text file.
4. Click **OK**. In the **Save As** window, if necessary, change the file name and the file location.
5. From the **Save as type** list, select **Unicode Text** (in case your data file contains Chinese/Japanese/Cyrillic characters, or characters like "ä", "ö" etc.,) or **ANSI** Text (in all other cases). Choose **ANSI** if you want to import your data into SPSS.
6. Click **Save**.

   When you click the **Reset to Default** button, the list separator is reset to the default Windows list separator and both Export options **Include user-defined Independent Variables** and **Create separate file per observation** are de-selected.

***How event data are exported***

- All event data are exported to one text file. However, you can export observations to separate text files.
- 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.

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**!** Merging of event logs assumes that a specific subject-behavior combination does not occur at the same time in two separate event logs within the same observation.

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- 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 (see Figure 11.2):
  - **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.
    - 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**.

**A**

| | Date_Time_Absolute_dmy_hmsf | Date_dmy | Time_Absolute_hms | Time_Absolute_f | Time_Relative_hmsf | Time_Relative_hms | Time_Relative_f | Time_Relative_sf | Duration_sf |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 26-03-2010 15:46:11.956 | 26-03-2010 | 15:46:11 | 956 | 00:00.0 | 0:00:00 | 0 | 0 | 37.6709 |
| 3 | 26-03-2010 15:46:11.956 | 26-03-2010 | 15:46:11 | 956 | 00:00.0 | 0:00:00 | 0 | 0 | 8.742 |
| 4 | 26-03-2010 15:46:19.026 | 26-03-2010 | 15:46:19 | 26 | 00:07.1 | 0:00:07 | 70 | 7.07 | 0 |
| 5 | 26-03-2010 15:46:20.698 | 26-03-2010 | 15:46:20 | 698 | 00:08.7 | 0:00:08 | 742 | 8.742 | 0 |
| 6 | 26-03-2010 15:46:20.698 | 26-03-2010 | 15:46:20 | 698 | 00:08.7 | 0:00:08 | 742 | 8.742 | 0.767 |
| 7 | 26-03-2010 15:46:21.465 | 26-03-2010 | 15:46:21 | 465 | 00:09.5 | 0:00:09 | 509 | 9.509 | 0 |
| 8 | 26-03-2010 15:46:21.465 | 26-03-2010 | 15:46:21 | 465 | 00:09.5 | 0:00:09 | 509 | 9.509 | 8.909 |
| 9 | 26-03-2010 15:46:30.374 | 26-03-2010 | 15:46:30 | 374 | 00:18.4 | 0:00:18 | 418 | 18.418 | 0 |
| 10 | 26-03-2010 15:46:30.374 | 26-03-2010 | 15:46:30 | 374 | 00:18.4 | 0:00:18 | 418 | 18.418 | 0.667 |
| 11 | 26-03-2010 15:46:31.041 | 26-03-2010 | 15:46:31 | 41 | 00:19.1 | 0:00:19 | 85 | 19.085 | 0 |
| 12 | 26-03-2010 15:46:31.041 | 26-03-2010 | 15:46:31 | 41 | 00:19.1 | 0:00:19 | 85 | 19.085 | 4.705 |
| 13 | 26-03-2010 15:46:35.746 | 26-03-2010 | 15:46:35 | 746 | 00:23.8 | 0:00:23 | 790 | 23.79 | 0 |

**B**

| Duration_sf | Observation | Event_Log | Behavior | Event_Type | Age | Gender |
|---|---|---|---|---|---|---|
| 37.6709 | Willard | Event log0001 | No | State start | 3 | boy |
| 8.742 | Willard | Event log0001 | Unknown | State start | 3 | boy |
| 0 | Willard | Event log0001 | Vocalization | Point | 3 | boy |
| 0 | Willard | Event log0001 | Unknown | State stop | 3 | boy |
| 0.767 | Willard | Event log0001 | Happy | State start | 3 | boy |
| 0 | Willard | Event log0001 | Happy | State stop | 3 | boy |
| 8.909 | Willard | Event log0001 | Neutral | State start | 3 | boy |
| 0 | Willard | Event log0001 | Neutral | State stop | 3 | boy |
| 0.667 | Willard | Event log0001 | Happy | State start | 3 | boy |
| 0 | Willard | Event log0001 | Happy | State stop | 3 | boy |
| 4.705 | Willard | Event log0001 | Neutral | State start | 3 | boy |

***Figure 11.2*** *Example of the columns of an text export file which was imported into Excel.* ***A*** *– Date/time columns,* ***B*** *– Event data and independent variable columns.*

### *Notes on export of event data*

- To export media files and external data together with observational data, choose ODX as export format (see page 411).
- Default names – 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". You can preview this name in the File name box.

## EXPORTING EXTERNAL DATA

You can 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.

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** on page 418.

1. From the **File** menu, select **Export** and **Observational Data**. In the **Export Observational Data** window, select **Excel** or **Other software** and click **OK**.

   To export a external data from a specific observation, open that observation, click the **Export current observation** icon in the tool bar and **Excel** or **Other software**.

   To export external data selected in a Data Profile, open that Data Profile, click the **Export selected data** icon and select **Export Data Profile**.

2. If you also want to export event data, select your observations in the Observations tab.

   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 4 below.

3. In the **External Data** tab, select the External data signals you want to export.

4. 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.

       Columns are separated by the List separator that you can select under **Export** options in the Observation tab (see page 414).

       For details about the result of selecting this option see **How event data and external data are resampled** on page 418.
     - **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.

       This option is not available, if you have selected the option Export external data only and exclude event data.
   - **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.

5. 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** on page 421.

***How combined external data + event data are exported***

- Event data and external data are resampled, based on the sample rate you selected. Therefore, time stamps are equidistant for both external and event data.

  See **How event data and external data are resampled** on page 418 and **How external data are resampled** on page 421 for more information on 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 page 415) except for the columns Durations (s), Event Log, Event type, and Comments.

***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 Figure 11.3 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 (see page 418), 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** on page 419 for more information.

| 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 |

***Figure 11.3*** *Example of part of an export Excel file with event data and heart rate data. In this example, the event data have been resampled to the sample rate (0.5 Hz) of the heart rate data. This Excel sheet shows the relative time, the observation name, the event log name, the behavior name of the two behavior groups and event type for each sample. For details, see the text above.*

### *How Point events are resampled*

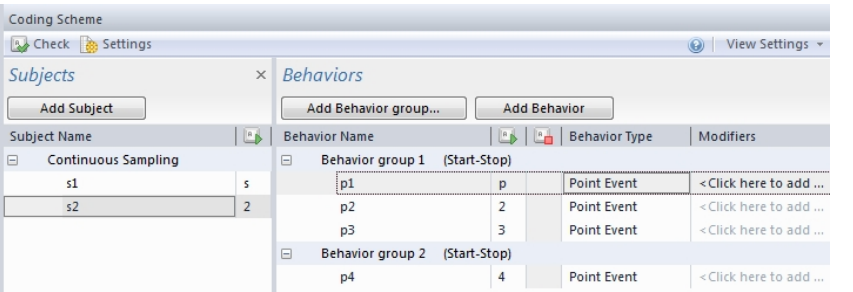
If you have mainly defined Point events (events without duration) in your coding scheme to score and analyze your data, you should export Point events to Separate columns (see page 417). As a result, Point events that have the same time-stamp after resampling are written to separate columns.

---

**!** Different Subject - Behavior group combinations are always exported to separate columns.

---

**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 Figure 11.4 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** | |

***Figure 11.4*** *Example of an observation with only Point events.*

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. Figure 11.5 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 | | | | | | |

***Figure 11.5*** *Example of an export file, in which Point events (as scored as shown in Figure 11.4) are exported to Separate columns with a sample rate of 1 Hz (compare this with Figure 11.6 in which Point events are exported to One column.*

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 Figure 11.6 below and compare with Figure 11.5).

| 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 | | |

***Figure 11.6*** *Example of an export file, in which Point events are exported to One column (compare with Figure 11.5 in which Point events are exported to Separate columns). As a result, Point events from the same Behavior group with the same time-stamp after resampling are exported to the same column.*

### *How external data are resampled*

For resampling external data, it is assumed that external data is continuous and therefore can be described by a continuous function.

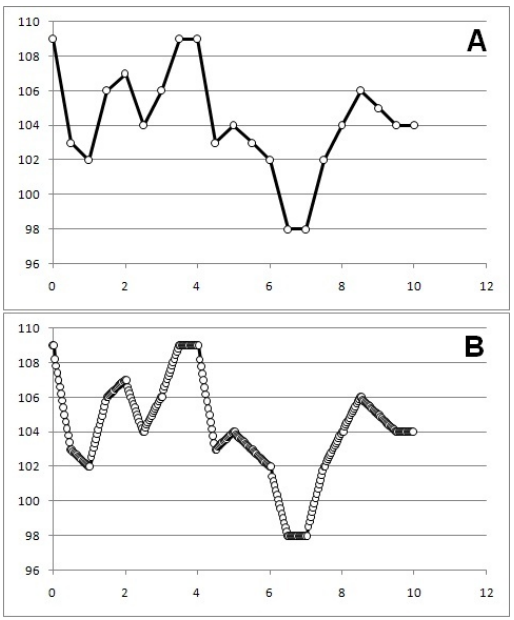



***Figure 11.7*** *Example of resampling external data. A - Original heart rate data (sample rate: 2 Hz), B - The same heart rate data resampled with a sample rate of 29.981 Hz.*

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.

In Figure 11.7 on page 421, picture A shows the original heart rate values (sample rate: 2 Hz) for the first 10 seconds of the observation. The picture B shows the resampled heart rate data (with sample rate: 29.981 Hz).

### *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. Figure 11.8 explains this in more detail.

| **Upsampling** | | | | | **Downsampling** | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **Time** | **$Y_{original}$** | **$Time_{resampled}$** | **$Y_{resampled}$** | | **Time** | **$Y_{original}$** | **$Time_{resampled}$** | **$Y_{resampled}$** |
| 1 Hz | | 3 Hz | | | 1 Hz | | 0.6 Hz | |
| 0.000 | 5.000 | 0.000 | 5.000 | | 0.000 | 5.000 | 0.000 | 1.000 |
| | | 0.333 | 4.966 | | | | | |
| | | 0.666 | 4.933 | | | | | |
| 1.000 | 4.900 | 1.000 | 4.900 | | 1.000 | 4.900 | | |
| | | 1.333 | 4.866 | | | | | |
| | | 1.666 | 4.833 | | | | 1.666 | 4.833 |
| 2.000 | 4.800 | 2.000 | 4.800 | | 2.000 | 4.800 | | |
| | | 2.333 | ***NaN*** | | | | | |
| | | 2.666 | ***NaN*** | | | | | |
| 3.000 | ***NaN*** | 3.000 | ***NaN*** | | 3.000 | ***NaN*** | | |
| | | 3.333 | ***NaN*** | | | | 3.333 | ***NaN*** |
| | | 3.666 | ***NaN*** | | | | | |
| 4.000 | ***NaN*** | 4.000 | ***NaN*** | | 4.000 | ***NaN*** | | |
| | | 4.333 | ***NaN*** | | | | | |
| | | 4.666 | ***NaN*** | | | | | |
| 5.000 | 4.500 | 5.000 | 4.500 | | 5.000 | 4.500 | 5.000 | 4.500 |

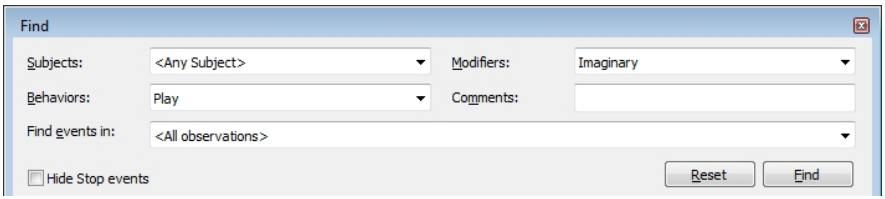
***Figure 11.8*** *Resampling a data file with missing samples. A cell in the export file will get a NaN value when at least one of the cells used for interpolation had a NaN value.*

## EXPORTING DATA TO TEXT FILES WITH THE FIND FUNCTION

With the Find function you can quickly export your data by copying them and pasting them into another program. You can also export a specific selection of your events. You can use this method for a quick view of your events or a selection of events.

To export events into another program:

1. Open an observation.
2. Click the **Find** button on the tool bar, select **Find** from the **Edit** menu, or press <**Ctrl+F**>.
   The **Find** window appears.
3. Specify the selection in the upper part of the screen.




[

4. Click **Find**.
5. You can hide columns that are not of interest. To select which columns to show or hide, right-click a header.
6. If you scored Start-Stop events and want to hide the stop events, click the checkbox in front of **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.

---

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 Chapter 6).

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 the checkbox in front of Duration.

---

# 11.4 Importing observational data

You can import observational data into an existing Project (see also the previous page for importing data from multiple projects). Observational data can be:

- Exported Observer XT (*.odx) data files and Observer log files (*.odx) from FaceReader – See below.

  Please note that The Observer 11.5 is compatible with odx output from FaceReader 3, 4, and 5, not from FaceReader 2.

- Other external data in text format containing a header, a column with time stamps and one or more columns with codes – See page 427.

## IMPORTING OBSERVER XT DATA FILES

When you work with several researchers on the same project, you may need to export your data and import them into The Observer on a different computer. Follow this procedure if you have exported observational data as ODX files (with extension *.odx; see page 411) and you want to import them to a project.

An ODX file may contain two or more observations and event logs, depending on how many observations you have selected for export (see page 411).

### *Chinese, Japanese or Cyrillic characters*

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 click **Region and Language**. In the **Administrative** tab and click **Change System Locale** and choose your preferred language. Next, close and restart The Observer.

Note that In The Observer XT 11.5 the space bar is not accepted as a key code. If your observational data files exported from previous Observer XT versions contain key codes with “space” (for example “a b”), the space is automatically removed at import.

### *Importing ODX files as separate observations*

1. From the **File** menu, select **Import**, then **Observational Data**.

   Alternatively, in the Project Explorer, click the **Observations** item, then in the overview window, click **Import observations**.

2. In the **Import Observational Data** window, make sure that **The Observer XT (*.odx)** is selected in the **Files of type** list.
3. Locate the folder where the exported ODX files are stored and click the one you want to import. Next, click **Open**.

   Result – The observations contained in the ODX file are imported and shown in the Project Explorer. Each observation can contain more than one event log, depending on how many event logs the exported observations contained. The first observation of this group is opened on your screen. Repeat the procedure to import more ODX files.

***Importing ODX files to an existing observation***

1. Open the observation you want the data to be imported to.
2. Click the **Import Data** button in the Component tool bar, then choose **Import observational data**.
3. In the **Import Observational Data** window, make sure that **The Observer XT (*.odx)** is selected under **Files of type**.
4. Locate the folder where the exported ODX files are stored and click the one you want to import. Next, click **Open**.

   Result – A message informs you that event logs from the first observation in the ODX file have been added to the current observation. A check for errors in the Event logs is carried out. Correct the errors that were found.

   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 the ODX file contains multiple observations, data are imported only for the first observation.

---

When you import *.odx files from a coding station, the start time of the event logs will depend on the setup of your main project:

- If the Observation source in the main project is set to **Offline** observation, all event logs that you import into one observation are set to the same start time, in order for all observations to match the video/audio file. This overwrites the original start time of the coding station. If you have specified an offset, this relative offset stays the same.
- If the Observation source in the main project is set to **Live**, then the start times of each imported event log are not changed. In this case it is important that the clocks of all the coding stations are synchronized, so that relative differences in start time does not change after importing it into the main project.

---

### *What happens to the coding scheme?*

**Elements are imported 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 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. Note: any difference in Description, Sound file, Plot color and 'Always add comment' option is ignored.
- If there is any difference in the properties, the new element is incorporated in 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. **CHECKING THE EVENT LOG FOR ERRORS AND CORRECTING ERRORS AUTOMATICALLY** on page 147 for more information.

*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. You can also export event logs with errors to edit them externally and then import them again after you have fixed them. To do this: from the File menu, select Export, Observational Data, No, OK, No, OK and then Other software (see page 414 for further instructions).

### *What happens to the independent variables?*

An ODX file contains the independent variables and their values assigned in the original project. 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.

### *Importing media files and physiological data*

If you have chosen to include media files or external data files in the exported observations (see page 411), 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 media 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 name of the external data file is stored in the Independent Variables List under External Data. If the external data file (*.pbi) is not found, a message is shown 'Physiological data file not found'. To restore the link between an observation and a external data file, copy the PBI file to the project's External folder.

### *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.

***Table 11.9*** *Alignment of time stamps of imported data to 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 |

## IMPORTING OTHER OBSERVATIONAL DATA

Follow this procedure if you want to import event data stored in a format different from Observer data.

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 page 424.

1. From the **File** menu, select **Import**, then **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**.

   In the **Files of type** list, select **All Files (*.*)** if you want to see all files in the folder.

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.

   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.

4. Select the external data file and click **Open**.

***Creating a Custom Import Profile***

1. In the **Import Observational Data** window, click **Custom Import Profiles**.

2. In the **Import Profiles** window, click **Create New**.

3. In the **Import Profile Definition** window (Figure 11.10), click **Browse** and select a representative file for defining your import profile. Next, click **Open**.

   The Observer XT automatically detects header and data information in the observational data file. If automatic header detection does not work and you get an import error, you should use manual header detection. **HEADER DETECTION** on page 434 for more information.

   Next, you can manually assign the file content from the **File content** section to the **Data definition** part of the **Profile definition** section. You do this by dragging-and-dropping the content from the **File content** to the **Profile definition** (see point 5, below).

4. Select a delimiter or a combination of delimiters for both the file context in the Header and Data Sets. Double-click <**user-defined**> if you want to use a delimiter that is not in the list of delimiters. If the data file contains text between quotes, and you do not want to have that text split according to the data delimiters, select the quote from the Text qualifier list.

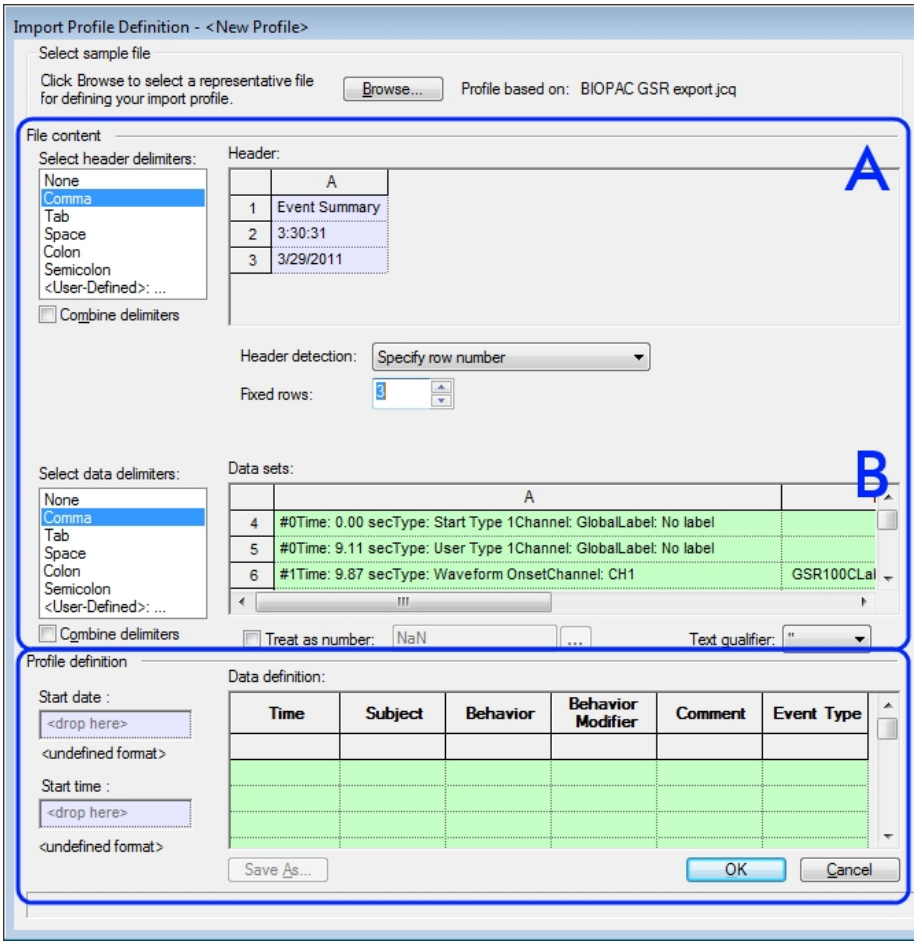



***Figure 11.10*** *Part of the Import Profile Definition window. The window consists of two parts: the File content section and the Profile definition section. The File content section contains two groups: A - Header with header information from the imported observational data file, B - Data sets with the data information from the imported data file.*

5. If the data is correctly separated into different cells, you can drag-and-drop content from the File content section to the corresponding cells in the Profile definition section.

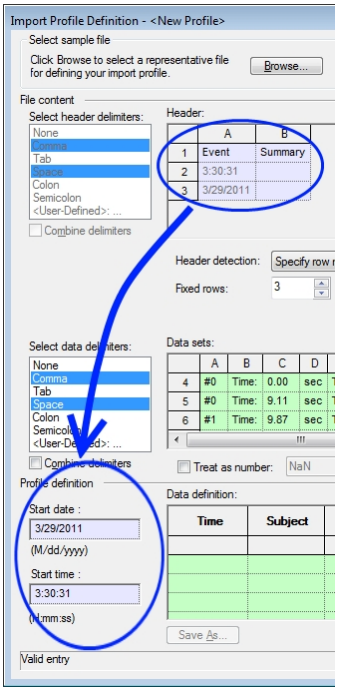
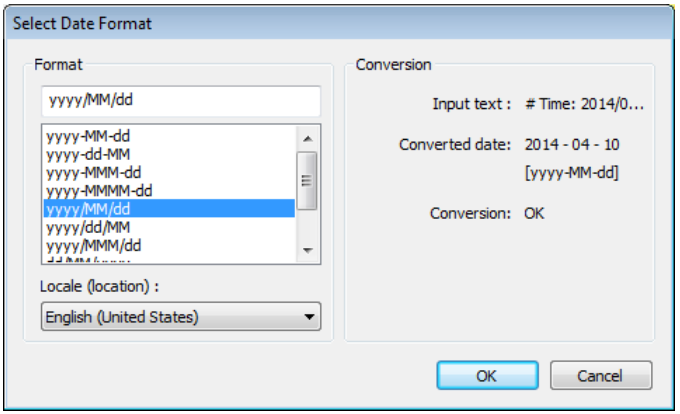



***Figure 11.11*** *The original location of date and time information in the Header section and the new location in the Profile definition section you can drag-and-drop them to.*

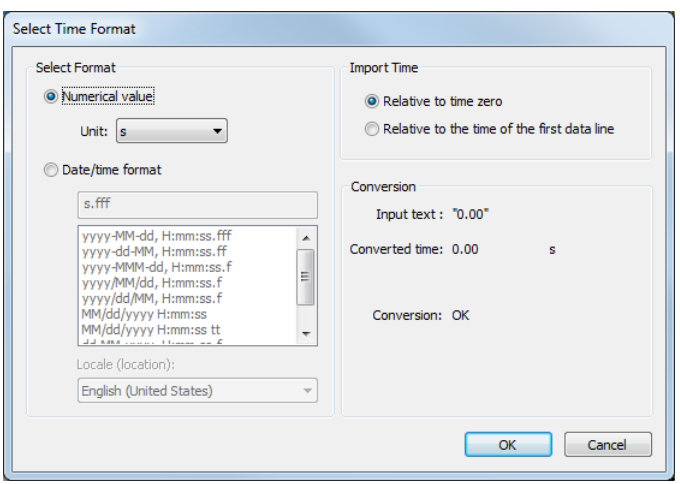
If the Header contains date and time information, drag-and-drop this to the Start date box and the Start time box in the Profile definition section (Figure 11.11).

- Specifying the date format
  - 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 automatically selects one. Converted Date shows the converted date and Conversion is OK. Click **OK**.

- You can also 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 Conversion is OK, then click **OK**.




- Specifying the time format:
  - 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 converted time and Conversion is OK. Click **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 number representing millisecond (see the next picture). If Conversion is OK, then click **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. 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. This is also the case when a **Start date** is specified in the **Custom Import Profiles** window (see Figure 11.11).

6. Next, you can assign Data Set information to the corresponding columns in the Data definition part.
   - **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 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**>, click **OK** and enter this text after a comma (,).
     - If text is identified by a character, select this from the **Text qualifier** list.
   - **Time** – Drag-and-drop one of the cells containing time stamps to the Time column (see Figure 11.12). The Select Time Format window opens. Under Select Format in the Select Time Format window you can select a Numeric Value or a Date/time format. Click OK if the Converted time shows the right format and Conversion is OK.
   - **Subject**, **Behavior**, **Modifier**, **Comment**.

     Drag-and-drop one of the 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.

     Effects of import of modifiers on the coding scheme – 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, respectively. Click OK to confirm.

  After dragging the Event Type column, the Treat new behaviors as option (page 427) is disabled because the program recognizes events automatically.

7. Click **OK**. Type in the profile name. You can also add a **Description**. Next, click **OK**. Note: If you want to save the profile with a new name, click **Save As** instead of OK in the Import Profile Definition window.

8. Close the Profile Definition window.

9. Select the newly created import profile and click **Close**.

10. Select the observational data file and click **Open** to finish the import of the observational data file.

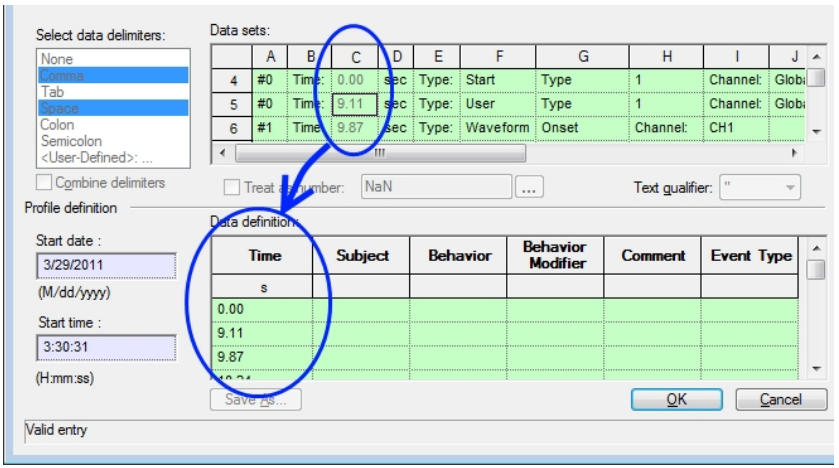



***Figure 11.12*** *The original location timestamps (column C) and the new location (Time column) in the Profile definition section. After drag-and-drop, data are grayed in the original location.*

---

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 via the ODX files (page 443).

In The Observer XT 11.5 you cannot use uLog and you cannot import uLog data.

---

*Editing an existing Import Profile*

If you want to import an observational data file that is very similar to another data file for which you already have an Import Profile, then you can edit the existing Import Profile.

1. In the **Import Observational Data** window, click **Custom Import Profiles**.
2. Select the Import Profile from the list in the **Import Profiles** window and click **Edit**.

   In the **Select Sample File** group, you see the original sample file behind Profile based on.
3. Click **Browse** to select the new observational data file and click **Open**.
4. Follow the instructions 4-6 under "Creating a new Import Profile" above.
5. Click **Save Profile As** when you are finished filling in the Data definition sheet.
6. Type in the name for the Import Profile.
7. Click **OK**.
8. Close the Profile Definition window.
9. Close the Import Profiles window. Make sure you select the right import profile.
10. Select the observational data file and click **Open** to finish import.

## HEADER DETECTION

When you create a Custom Import Profile when you want to import an observational data file, The Observer XT usually automatically detects header and data information in the file. In some cases, however, the format of the file prevents The Observer from automatically detecting header and data. For these cases, new Header detection methods have been added to the Import Profile Definition window.

The methods for Header detection are:

- **Automatic** - This method (which was already available in previous Observer XT versions) is selected by default and works most of the time.
- **Specify tag** - If automatic detection does not work, you can specify the line (with either nominal or numerical information) that indicates the end of the header part of the file. If necessary, you can also specify the number of rows between this 'header end line' and the data.
- **Specify row number** - If automatic detection does not work but the data file always has the same number of rows in the header, you can specify the number of rows in the Import Profile.

***Specify tag***

Select this method if the external data file has a variable number of header lines rows and header and observational data are always separated by the same 'header end line'.

**Example** - The header always ends with a line containing the following text: "[ObsData]". After this header end line there are always two empty lines before the data starts. So, in the End tag box you enter: "[ObsData]" and in the Extra rows box you enter a value of '2'.

***Specify row number***

Select this method if the header contains less than 10 lines. In the Fixed rows box, enter the appropriate number of rows.

# 11.5 Importing European Data Format files

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. You can import EDF, or BDF data into The Observer XT.

---

You need the External Data Module (see **Additional licenses** on page 21) to import EDF or BDF data.

---

To import EDF, or BDF data:

1. Open the observation that you want to import the data into.

   If you do not have an observation open, a new observation will be created. Give the observation a name, select a video if you score offline, and continue with step 3 below.

2. Choose **File** > **Import** > **European Data Format Files**.

3. Locate the file and click **Open**.

   If you do not have an observation open, a new observation will be created. Give the observation a name and select a video if you score offline.

You can now:

- If necessary, synchronize the imported data with the event log (see **MANUAL SYNCHRONIZATION** in Chapter 5 External Data).
- Select data based on the value of the imported data (see **SELECT INTERVALS BY EXTERNAL DATA** in Chapter 6 Selecting Data).

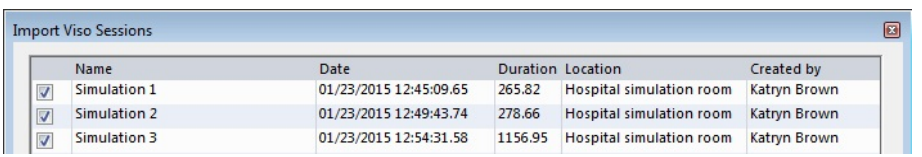
- Visualize the imported data (see **Visualizing external data** in Chapter 7 Visualizing Data).
- Analyze the imported data with Numerical Analysis (see Chapter 8 Calculating Statistics).

# 11.6 Importing Viso sessions

Sessions made in the Noldus video recording program Viso can be imported into The Observer XT. The Viso annotations markers and remarks are imported into the coding scheme and event log. Viso markers are imported as behaviors without duration (point events) and remarks as comments in the event log.

To import Viso sessions directly into The Observer XT, the computer with The Observer XT must be in the same network as the Viso computers. 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 page 424).

If the computers are in the same network, choose **File** > **Preferences** > **Viso settings** to set communication between the computer with The Observer XT and the computer with Viso Services. See page 96 for details. Choose **File** > **Import** > **Viso Sessions** and select the sessions in the **Import Viso Sessions** window that appears.




| | Name | Date | Duration | Location | Created by |
|---|---|---|---|---|---|
| ☑ | Simulation 1 | 01/23/2015 12:45:09.65 | 265.82 | Hospital simulation room | Katryn Brown |
| ☑ | Simulation 2 | 01/23/2015 12:49:43.74 | 278.66 | Hospital simulation room | Katryn Brown |
| ☑ | Simulation 3 | 01/23/2015 12:54:31.58 | 1156.95 | Hospital simulation room | Katryn Brown |

For more information on Viso sessions in The Observer XT, consult the Viso Reference Manual.

# 11.7 Media files

Check the The Observer XT Service Manual to see which media files The Observer XT supports.

### *Why add media files?*

If you have not added a media file to a new Observation, you can afterwards add one or more media files to an existing Observation. This is useful if you want to log events from different scenes or from two cameras recording the same scene from different angles.

You can add two video and/or audio files to an existing observation in the standard version of The Observer. With the Multiple Video add-on module you can add a total of four video and/or audio files to an observation.

### *Adding a video file*

To add a video file to an existing observation, open the observation, then click the **Import Video** button in the Component tool bar.

Select a video file in the **Select Video** window and click **OK**.

The video file is always added with the Observation as the Scope. The Scope determines at what level you can score using this video file.

### *Adding an audio file*

To add an audio file to an existing observation, open the observation, then click the **Import Audio** button in the Component tool bar.

Select an audio file in the **Select Audio** window and click **OK**.

### *Showing audio waveforms from a video file*

When you add a video file you can choose to show the audio waveforms next to the video image. See the procedure on page 160.

### *Adding two or more media files*

Depending on your license, you can add multiple media files to the same observation. See the procedures on page 158.

### *Replacing a media file*

1. Open the Independent Variable List window by doing one of the following:
   - From the **Setup** menu, select **Independent Variables**.
   - Click the **Enter independent variables** button on the tool bar.
   - In the Project Explorer, click **Independent Variables**.
2. Click on the name of the media file you want to replace and click the ellipsis button. 

   In the window that opens, select another media file and click **Open**.

***Removing a media file from an observation***

To remove a single media file from an observation, click in the Independent Variables List the corresponding cell in the Video or Audio column and press **Delete** and then **OK**.

The media file is only removed from your project, not deleted from disk.

***Removing 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 above.

1. Open the Independent Variable List window by doing one of the following:
   - From the **Setup** menu, select **Independent Variables**.
   - Click the **Enter independent variables** button on the tool bar.
   - In the Project Explorer, click **Independent Variables**.
2. Right-click in a **Video** or **Audio** column and select **Delete independent variable**, and click **OK**.

# 11.8 Analysis results

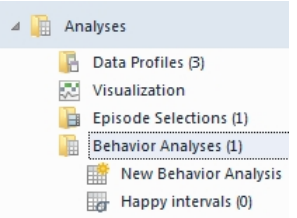
Analysis results are created when you run behavioral analysis, numerical analysis, reliability analysis or lag sequential analysis. However, they are not saved automatically.

Saved (archived) Analysis Results can contain one or more Charts.

***Saving Analysis Results and associated charts***

1. Make sure that the analysis result is open on the screen. In the Component tool bar, click the **Archive** button. 
2. Change the result file name or accept the suggested name, then click **Save**.

3. The Analysis Result now appears in the Project Explorer in the appropriate folder under Analyses.




- 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.

### *Opening analysis results*

You can open one or more analysis results for re-inspection or export. You can only open analysis results from the current project.

1. From the **Analyze** menu, select the analysis type and then **Open Archive**.
2. Select the result file you want to open and click **Open**.

   The result window opens. You cannot re-run calculations in a saved and re-opened analysis result.

   To open an analysis result you can also:
   - Click the **Analysis result** in the Project Explorer.
   - Right-click the **Analysis result** in the Project Explorer and select **Open**.
   - If an analysis result of the same type is open, click the **Open Archive** button on the Component tool bar. 

### *Removing 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 tool bar.

### *Exporting analysis results*

You can export analysis results to Excel or ASCII (text). Either format can be imported into Excel or a statistical program for further analysis.

---

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.

---

1. Make sure that the analysis result you want to export is open on the screen (see the previous page). From the **Analyze** menu, select **Export Analysis Results**, or click the **Export** button on the Component tool bar.

2. In the **Export Analysis Results** window, browse to the folder where you want to store the exported file. By default, this is the Export folder within your project folder.

3. From the Save as type list, select the format you require:
   - **Excel Workbook (*.xlsx)**.
   - **Text File (*.txt)**.

   If you choose **Text Files**, next to **Encoding**, select whether you want to export as **Unicode (UTF-16)** (choose this if your export file contains Chinese, Japanese, or Cyrillic characters, or characters like "ä", "ö" etc.) or **ANSI** (choose this option if you want to open the analysis results in SPSS). Furthermore, select a column separator from the List separator list.
   - Additionally, you can select the option **Merge header rows**.

4. In the **File name** field, type in a name or accept the suggested name and click **Export**.

### *Notes*

- **Exporting to Text files** – If the results are in separate sheets in the Analysis Results window, then these sheets are exported to separate text files. The name of such a file is: [File name]_[name of sheet].txt.

- **Exporting to Excel** –
  - You get a message when the maximum number of rows/columns is exceeded (Excel 2007/2010: maximum number of rows = 1.048.876, maximum number of columns = 16384, Excel 2003 and earlier: maximum number of rows = 65.536, maximum number of columns = 256.
  - If the results are in separate sheets in the Analysis Results window, then these sheets are exported as separate worksheets within the Excel file.

- **Copy and paste** – You can also export analysis results directly by copying and pasting the cells into, for example, an Excel-sheet:

  a Drag the mouse to select the rows and columns you want to export. Select **Copy** in the **Edit** menu. If you want to copy the whole result including the headings, select **Select All** in the **Edit** menu and subsequently select **Copy**.

  b Open the document you want to paste the result to, and press <**Ctrl+V**>.

***Saving a Chart***

See page 336 how to create a Chart. Make sure the corresponding Analysis Results are saved.

1. In the **Chart** window, click the **Save Chart in Archive** button. 
2. In the **Analysis Chart** window, enter the **Chart name**.
3. Click **OK** to save the chart in the Analysis Results archive.

***Opening a Chart***

In the Project Explorer, under an archived **Analysis Result**, click a **Chart** to open it.

***Deleting a Chart***

To delete a chart, right-click it in the Project Explorer and select **Delete**. Deleting a chart also deletes the chart file from the computer.

***Exporting a Chart***

1. Open the **Chart** (see above).
2. In the **Chart** window, click the **Export** button. 
3. Enter the **File name** and select one of the image formats from the **Save as type** list.
4. Click **Save** to export the Chart.

# 11.9 Episode selections

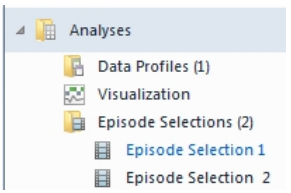
With an episode selection (page 273) you can create a selection of events from the Event Log. From this episode selection you can generate a video file containing the selected episodes (available with an additional module of The Observer XT). You can export an episode selection to a text file.

By exporting an episode selection, you also export the physiological data associated with the observations listed in the episode selection to text.

### *Opening an episode selection*

Do one of the following:

- From the **Analyze** menu, select **Episode Selection**, then **Open**. Select an episode selection and click **OK**.
- In the Project Explorer, right-click **Episode Selections** and select **Open Episode Selection**. Select an episode selection and click **OK**.
- In the Project Explorer, open the **Episode Selections** folder and click the episode selection you want to open.




### *Deleting an episode selection*

Do one of the following:

- From the **Analyze** menu, select **Episode Selection**, then **Delete**. In the **Remove Episode Selection** window, select the **Episode Selection** you want to delete and click **OK**.
- In the Project Explorer, right-click the **Episode Selections** folder and select **Delete**. Select the episode selection you want to delete and click **OK**.
- In the Project Explorer, right-click an episode selection and select **Delete**.

### *Exporting an episode selection*

You can choose to export all created episode selections at once or each episode selection separately.

If you export an episode selection, The Observer automatically also exports the associated physiological data to ASCII.

1. To export all episode selections at once, from the **Analyze** menu, select **Episode Selection**, then **Export**.

   To export a single episode selection, In the Project Explorer right-click the **episode selection** and select **Export Episode Selection**.

2. In the **Episode Selection Export** window, browse to the folder where you want to store the episode selections.
3. In the **File base name** field, enter a 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", "ö" 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.

   You can check what your current Windows list separator is in the **Control Panel**, under **Region and Language**. In the **Formats** tab, click the **Additional Settings** button to display the List separator.

6. Click **Export**.

***Notes***

- **Default folder** – By default, The Observer opens the Export folder of your project.
- **Exporting physiological data** – The associated physiological data are exported to a separated file: [Base filename]-[Episode Selection name]- physiological data set number (#).txt. If you have an episode selection with more than one associated physiological data file, each data file is exported to a separate text file. For example, if you have 2 Episode Selections with 3 physiological data files each, the result of the export is 2 files with events and 6 files with physiological data.

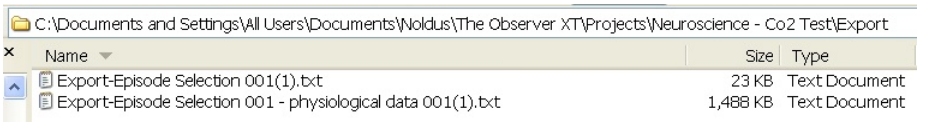



***Figure 11.13*** *The result export of an episode selection. The associated physiological data are also exported.*

  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.

# 11.10 Independent Variable list

### *Exporting independent variables*

You can export the independent variables (i.e., system variables, user-defined variables, external variables). The independent variables are exported in two files. One file contains the Header with variable names and their properties:

| | System | System | System | User-defined |
|---|---|---|---|---|
| **Label** | Start time | Stop time | Duration | Name of focal subject |
| **Description** | The start time of the observation | The stop time of the observation | The duration of the observation | |
| **Type** | Timestamp | Timestamp | Duration | Text |
| **Format** | HH:mm:ss.ff | HH:mm:ss.ff | s.ff | |
| **Predefined Values** | | | | Dylan; Alice; Katie; La |
| **Scope** | Observation | Observation | Observation | Event Log |
| **Value Update** | Automatic | Automatic | Automatic | Optional |

The other file contains the actual values of the variables for each combination of observation, event log and subject (see Structure of the values file below).

| Observation | Event Log | Subject | No. | | | | |
|---|---|---|---|---|---|---|---|
| Dylan_1 | Event log0001 | | 1 | 00:00:00.00 | 00:06:15.13 | 375.13 | Dylan |
| Dylan_2 | Event log0001 | | 2 | 00:00:00.00 | 00:06:15.13 | 375.13 | Dylan |
| Dylan_3 | Event log0001 | | 3 | 00:00:00.00 | 00:06:15.13 | 375.13 | Dylan |

1. From the **File** menu, select **Export**, then **Independent Variables**.
2. In the **Independent Variable List Export** window (Figure 11.14), browse to the folder where you want to store the variable list.
3. In the **File base name** field, enter a name. An example of the file names is shown in the File name example box:
   - **[file name entered in step 3] - Independent Variables Header (1).txt** is the file containing the variable definitions.
   - **[file name entered in step 3] - Independent Variables Values (1).txt** is the file containing the variable values.
4. Select whether you want the files to be exported as **Unicode** or **ANSI** text files 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**.

To check what your current Windows list separator is, open the Control Panel, and choose **Region and Language** > **Formats** > **Additional Settings**.

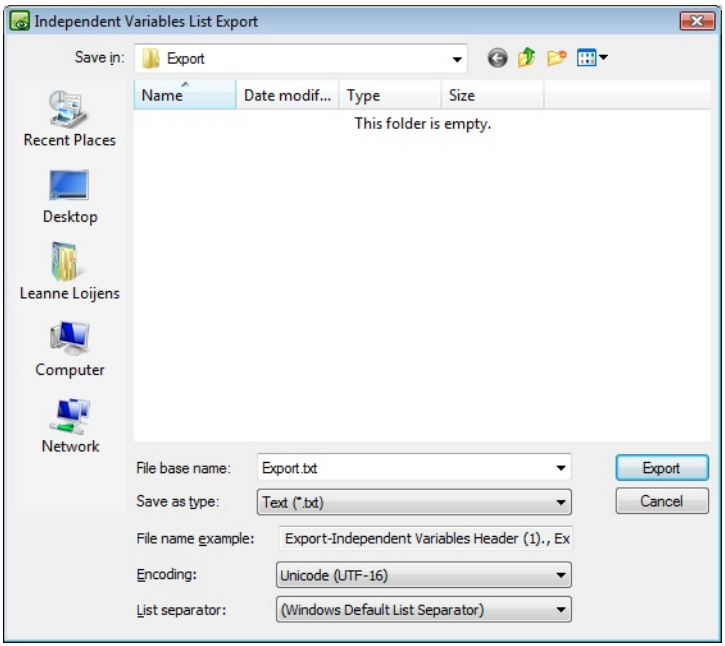



***Figure 11.14*** *The Independent Variables List Export window.*

### *Structure of the values file*

- The values file contains the values of all independent variables, including the system variables, and those you chose not to display in the Independent Variables List (see page 91).
- 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 ("").

  Example - The project contains two observations, each with one event log and two subjects (Child 1 and Child 2). The independent variables include the user-defined variable *Age* with Subject scope and the system variable *Start date* with Observation scope.

| | | | | System | User-defined |
|---|---|---|---|---|---|
| Label | | | | Start Time | Age |
| **Observation** | **Event Log** | **Subject** | **N** | | |
| Observation0001 | Event log0001 | Child 1 | 1 | Apr-24-07 15:32:15.9 | 6 |
| | | Child 2 | 2 | | 5 |
| Observation0002 | Event log0001 | Child 1 | 3 | Apr-25-07 9:26:57.5 | 4 |
| | | Child 2 | 4 | | 5 |

The export file opened with the Notepad contains the following:

```
"Observation Name","Event Log Name","Subject Name","Start Date","Start Time","Start Time (ms)","Stop Date","Stop Time","Stop Time (ms)","Duration","Age"
"Observation0001","Event log0001","Child 1","","","","","","","","","6"  B                                                                  A
"Observation0001","Event log0001","Child 2","","","","","","","","","5"
"Observation0001","Event log0001","","","","","","","","","","","",  C
"Observation0001","","","2007-04-24","15:32:15","912","2007-04-24","15:32:43","600","+ 0:00:27.7","",  D
"Observation0002","Event log0001","Child 1","","","","","","","","","4"
"Observation0002","Event log0001","Child 2","","","","","","","","","5"
"Observation0002","Event log0001","","","","","","","","","","","",
"Observation0002","","","2007-04-25","09:26:57","464","2007-04-25","09:27:40","945","+ 0:00:43.5","",
```

For Observation 1, we can distinguish:

- **A** – First line containing the variable names. Note the Age variable at the end of the line.
- **B** – Two lines, each specifying one subject (Child 1 or Child 2), with the values of Age. Note the age values at the end of the lines. Values of variables with other scope than Subject are exported as "" for those lines.
- **C** – 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.
- **D** – A line specifying the observation. This line contains the values of the system variables, since those have Observation scope. Note that this line does not contain the event log and subject names.

# 11.11 File locations

***General folders***

The default application folder of The Observer is C:\Program Files\Noldus\The Observer XT 11. You can specify the application folder during installation. The application folder is only written to during installation.

All files that The Observer writes to or reads after installation are, by default:

- C:\Users\Public\Public Documents\Noldus\The Observer XT **Projects** - contains all project folders.
- C:\Users\Public\Public Documents\Noldus\The Observer XT **Video files** - contains all video files.
- C:\Users\Public\Public Documents\Noldus\The Observer XT **Audio files** - Here you can store the audio files which you use for coding.
- C:\Users\Public\Public Documents\Noldus\The Observer XT **Templates** - contains all templates.

The application folder and all other Observer folders can be network folders. However, in that case the program or Projects might not be accessible by all users.

***Project-level folders***

Each project you make has its own folder. It is named as the project and has a fixed structure. It contains the following subfolders:

- **Analysis Results** - with the analysis results files (*.arx) and sub-folders with the analysis charts (*.nac).
- **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 event generator plugins.
- **Log** - with The Observer log file (*.log).

The Profiles for import of observational (*.oip) and physiological data (*.eip) are stored in:

C:\ProgramData\Noldus\Common\Profiles.

These files are common for Noldus applications.

***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 11.dmp. These are stored on:

- **Log file** – C:\ProgramData\Noldus\The Observer\XT 12\Log.
- **Dump file** – C:\Users*<user name>\AppData\Local\Temp*\.

# Appendix A

# 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.

## A.1 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 |

## A.2 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 |

## A.3 Carrying 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 |

# A.4 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[a] |
| 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[b] |
| 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 |

[a] If a fixed play speed is not available, nothing happens. If the video is already playing, it keeps playing at the current speed.

[b] 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.

# A.5 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 |

# A.6 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 |

# A.7 Selecting and editing

| | |
|---|---|
| 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 |

# A.8 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 thru tabs (direction: left -> right and top -> bottom) |
| Ctrl+Shift+Tab | Cycle thru tabs in reverse order |
| Tab | Cycle thru options (direction: left -> right and top -> bottom) |
| Shift+Tab | Cycle thru options in reverse order |
| Arrow keys | Cycle thru 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 |

# Appendix B

# Technical support

## B.1 Support database

If you encounter a problem using The Observer XT or any other Noldus system, you can search through hundreds of entries in a database of questions submitted by our customers to the Noldus support department with answers by our support staff.

You find the support database at (www.noldus.com/support-center).

## B.2 Help Desk

If you have any problems, questions, remarks or comments, please let us know. You can contact us via our website (www.noldus.com/helpdesk) and fill out a Support Request Form (preferred), or phone. We offer 24-hour support via several help desks in different time zones. You can also contact us via the The Observer XT program. From the **Help** menu choose **Noldus Online** and then **Contact Help Desk**. If you encounter a problem with the program, you can also select **Report an Issue**. This opens a form on our website which is sent to the help desk when submitted.

Having the following information available when you contact the help desk will enable our support staff to help you as quickly as possible. 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 **User Info**).
- The license number of your copy of The Observer XT (click **User Info**).

Please refer to the **About Noldus - Contact** section on our website (www.noldus.com) for other contact information.

### ERROR MESSAGES

When an error message occurs, in most cases a log file is created called Observer.log. The Technical Support Department may request this file when answering your support question. You can locate the file in:

C:\ProgramData\Noldus\The Observer\XT 12\Log.

It is possible that this folder is hidden – to view hidden files: from the **Organize** menu of the Windows Explorer, choose **Folder** and **Search Options**. Go to the tab **View**. Under **Hidden Files and Folders** select **Show Hidden Files and Folders**.

## B.3 Service contracts

Your licence of The Observer XT comes with a standard service package of one year. This includes a one-year period of free support.

We can offer you even greater value and reassurance by providing comprehensive service contracts. Our **Plus** and **Platinum** service contracts both extend the standard service you are entitled to as well as provide peace of mind at defined cost.

Please look for more information on our website (www.noldus.com) under **Human Behavior** or **Animal Behavior** in the **Services - Service Contracts** section.

# Appendix C

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