The Observer XT
The neXT generation of observation software
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Systematic Observation

Recording who does what, when, where and with whom

Who - Subject (one or more)

What - Behavior

When – Time (recorded automatically)

Where - Modifier

With whom - Modifier
Setup

- Observation Source
- Observation method
- Coding Scheme
- Independent Variables

The Observer XT

**Setup**
- Set up project
  - Select a recording method and duration, manage hardware devices
- Make a coding scheme
  - Define Subjects, Behaviors and Modifiers that you want to observe
- Define Independent Variables
  - Independent Variables remain constant throughout an observation
- Preferences
  - Set time formats, terminology, file locations and auto save
Observe

- Create new observation
- Open an observation
- Import observational data
Analyze

- Select data for analysis
- Visualize data
- Calculate statistics
- Advanced analyses
Scoring data *Offline* from video files

Setup

Observation source

Record video to media files

Formats: MPEG-1/2/4, AVI, DivX, DV-AVI
Scoring data *Live* with video recording

Connect video camera to PC via FireWire or USB

Formats: DV AVI, DivX
Setup
Observation method

Continuous sampling
Record the subject’s behavior as it occurs

Instantaneous sampling
Record the subject’s behavior at regular time points, called *samples*

Combine Continuous and Instantaneous sampling
Combine Continuous and Instantaneous sampling

- One or more subjects coded with Continuous sampling
- Other subjects coded with Instantaneous sampling

You must specify those subjects in the Coding scheme

Result: Focal subject

Other subjects
Specify options like:

- Are key codes required?
- Do you want to use case-sensitive codes?
- How many key presses for each code?
- Do you want to check for errors?
- Do you want to check for compatibility with **Pocket Observer 3**?
Subjects are individuals in a project that can initiate a behavior.

Specify the ID of each subject in the Independent Variables.

Examples
- Individual monkeys
- Two parent birds at the nest
Behaviors are actions, postures, and movements of the subjects. Behaviors must be defined in groups.
For Continuous sampling:

State Events
- A behavior that takes a period of time
  - For instance, Walking or Feeding
  - They can be Mutually exclusive or Start-stop

Point Events
- A behavior that only takes an instant of time or the duration is not of importance
  - For instance, Hit or Bite
Behaviors that exclude one another
You do not need a Stop code to stop them
In the example below, they are also *exhaustive*, that is, the subject’s state is known at any time.
Behaviors that exclude one another
- You can also use a Stop code to stop them
- In the example below, they are not exhaustive, that is, there may be gaps between events.
For Instantaneous sampling:

Samples exclude each other in a group
Modifiers specify a behavior more precisely or limit its scope.

Modifiers must be organized in groups.

**Modifiers**

- **Prey type** (Mutually exclusive, Nominal, Optional)
  - Caterpillar
  - Spider
  - Undetermined
  - Other Arthropod
  - Other larva
  - Syrphid larva
  - No feed

- **Prey size** (Mutually exclusive, Numeric, Must be scored)
  from 0.00 to 2.00
Specify *combinations* when you want to restrict the range of behaviors for a certain subject.
**Definition**
A variable that potentially determines the value of the dependent variable (behavior) and remains constant throughout an observation.

**Examples**
- Subject descriptors — Age of the subject
- Observation characteristics — Name of observer
- Environmental conditions — Temperature, Size of the group
- Independent or user-defined variables
- Media files
- External data files
- System variables (Start Time, Stop Time, Duration)
Create a new observation
or open an existing one

Watch the video and score data
1. Create an Observation
2. Start the Observation
3. Score Data
4. Stop the Observation

Or

<table>
<thead>
<tr>
<th>Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>P</td>
</tr>
</tbody>
</table>
Observe
Position the video before starting
Observe
Scoring with Instantaneous sampling

The first sample is at Time 0:00!

<table>
<thead>
<tr>
<th>Event Time</th>
<th>Subject</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>Start</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>Instantaneous Sample (1) Start</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>Dominant subject</td>
<td>Activity</td>
</tr>
<tr>
<td>4.00</td>
<td>Dominant subject</td>
<td>Location</td>
</tr>
<tr>
<td>5.00</td>
<td>Juvenile 1</td>
<td>Activity</td>
</tr>
<tr>
<td>6.00</td>
<td>Juvenile 1</td>
<td>Location</td>
</tr>
<tr>
<td>7.00</td>
<td>Juvenile 2</td>
<td>Activity</td>
</tr>
<tr>
<td>8.00</td>
<td>Juvenile 2</td>
<td>Location</td>
</tr>
<tr>
<td>9.00</td>
<td>Instantaneous Sample (1) End</td>
<td></td>
</tr>
</tbody>
</table>

Score the samples for each subject:

<table>
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<tr>
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</thead>
<tbody>
<tr>
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<tr>
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<td>Instantaneous Sample (1) End</td>
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</table>

When ready click the **Finish sample** button
An observation can contain:

- Event log files
- Video files
- External data files
1. Press **Ctrl+F**
2. Select an element, or type in the first characters or free text (for comments)
   
   Example: S for Search, Swing, ..

3. The program searches for multiple events in all your observations

Use this function to make a selection of event lines and copy them to another program.
Observe
Quick Review

1. Rewinds the video for a user-defined interval
2. Replays the video at a user-defined playback speed

Use this function to review video and correct coding errors
Correcting scoring errors

Click the cell you want to edit
Analyzing data
Select Data
- Choose the data you want to analyze

Visualize Data
- Make charts, highlights, video clips

Analyze Data
- Calculate statistics or carry out advanced analyses

\[ s = \sqrt{\frac{\sum (D - \overline{D})^2}{N-1}} \]
Grouping
means that two or more observations or elements of the coding scheme are analyzed as one entity

Filtering
means that you choose a subset of elements to be displayed or used in quantitative analyses

Nesting
means that you analyze time segments based on an event (or a combination of events) scored for one or more subjects
Analyze All data

Select Data
Default data profile

Data Selection - Default Data Profile

Start
- Selection contains
  - All
    - 30 Observations
    - 3 Subjects
    - 19 Behaviors
- Observations
  - Manual
- Subjects
  - Manual

Results
- Selection contains
  - 30 Observations
  - 3 Subjects
  - 19 Behaviors
  - <No time bins>
- Timebins...

Data to be analyzed
Use **Filter** to choose the observations, subjects and event types to analyze.
Use Nest to analyze the time when a state event occurred.
For example:
Analyze data in two or more data selections
Visualize Data
- Chart
- Episode Selection

Analyze Data
- Statistics Analysis
- Lag-Sequential analysis
- Reliability analysis

Export to other programs
Analyze

Visualize Data
Create a chart
Visualize Data
Generate a highlight video clip

Behavioral Group

Location

Locomotion

Feeding

Add subtitles to the video clip

Highlight video clip

0 5 10 15 20

Event 1  Event 2

Time (s)

Ground  Rock 1

Sit  Walk  Sit

Yes  Yes

Analyze
Behavior Analysis

*Example:* Calculate the total duration of *Display*

Numerical Modifier Analysis

*Example:* Calculate the average value of the numerical modifier *Prey size* (1, 2, 3...)

Lag Sequential Analysis

*Example:* Calculate the number of times *Approach* is followed by *Attack*

Reliability Analysis

*Example:* Evaluate consistency of observations between observers
For Behavior Analysis – Continuous sampling:

- Minimum duration
- Maximum duration
- Total duration
- Total number
- Mean duration
- Standard deviation of duration
- Standard error of duration
- Rate per minute (observation)
- Rate per minute (interval)
- Rate per minute (analyzed duration)
- Percentage (observation)
- Percentage (interval)
- Percentage (analyzed duration)
- Latency
For Behavior Analysis – Instantaneous sampling:

- Proportion (all samples)
- Proportion (scored samples)
- Scored Samples
- Total number (all samples)
- Total number (scored samples)
Calculates the frequency of transitions between pairs of events within a certain lag

- How many times is the event *Approach* followed by the event *Attack*?
- How likely is the dog's behavior *Ignores Trainer* preceded by each type of command by the trainer?
Lag Sequential Analysis
State lag and Time lag

State lag
- lag order +1

State lag
- lag order +2

Time lag
State Lag = +1
Time Lag = 0 sec to 5 sec
• **X₀** — Transitions where a target has been identified but the criterion is not found

• **Y₀** — Transitions where a criterion has been identified but the target is not found
Reliability Analysis
What is it?

- Intra-observer reliability
  For checking your own consistency

- Inter-observer reliability
  For training observers
Reliability Analysis
How does it work?

Find agreements

Find disagreements

Analyze
Questions ?