# Pro Lab
## Product Description

tobii pro

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# 1   Introduction

Tobii Pro Lab provides a comprehensive platform for the recording and analysis of eye gaze data, which helps in the interpretation of human behavior, consumer responses, and psychology. Combining simple preparation for testing procedures and advanced tools for visualization and analysis, eye-tracking data is easily processed for useful comparison, interpretation, and presentation. A broad range of studies are supported, from usability testing and market research, to psychology and oculomotor physiological experiments. Pro Lab's intuitive workflow, along with its advanced analysis tools, enables large and small studies in a timely and cost-efficient way without the need for extensive training.

In addition to offering powerful analysis tools, Pro Lab is also designed to work with other software commonly used for recording and analyzing data. This is done by synchronizing with recording software using TTL, as well as by enabling data exports in standardized formats, for example for Microsoft Excel, Matlab, and SPSS.

## 1.1   Pro Lab editions

Pro Lab is available in three editions: **Full** Edition, **Screen-Based** Edition, and **Analyzer** Edition.

The editions have different combinations of enabled modules (Design, Record, Analysis) and compatible hardware (screen-based and wearable).

- The **Screen-Based** Edition contains all three modules and works with Tobii Pro Screen-based hardware. The featured project types are Screen-based and Scene Camera. In addition, External Presenter projects created with the Full Edition can be opened.

- The **Analyzer** Edition contains only the Analyzer module and features the Glasses project type to create new projects and import data recorded with Tobii Pro Glasses 2 & Tobii Pro Glasses 3. This edition opens Screen-based, Scene Camera, and External Presenter projects recorded with either the Full or Screen-based Edition.

- The **Full** Edition contains all modules (Design, Record, Analyze) and works with all Tobii Pro hardware; screen-based and wearable. It opens and creates all project types: Screen-based, Glasses, Scene Camera, and External Presenter.

ⓘ    Tobii Pro Lab is continuously being developed and refined. Please visit tobiipro.com for the most recent specifications for the software and for the latest version of this document.

⊘    VR 360 was discontinued in releases after version 1.162. This was the last version to support the VR 360 project type. For more information, read System requirements for Tobii Pro and VR-capable setups on Tobii Pro Connect.

## 1.2   Project types

Data about study layout, stimuli, participants, and recordings is stored in Pro Lab projects. There are four kinds of projects:

- **Screen project**: when stimuli is presented on a screen by Pro Lab and gaze data is captured using a screen-based eye tracker
- **Glasses projects**: when data is collected by Pro Glasses 2 or Pro Glasses 3
- **Scene Camera projects**: when you use an external video camera to record events in the real world
- **External Presenter projects**: when you use third-party software such as E-Prime together with Tobii Pro Lab

> ⓘ  In Glasses projects, only the Project Overview and Analyze module are available.

> ⓘ  Each project can contain many recordings, participants, timelines, snapshots, mapped data, and events, etc.

## 1.3   How Pro Lab is structured

Pro Lab software is comprised of three modules: the **Design** module, the **Record** module, and the **Analyze** module, as well as a **Project Overview** tab. Depending on which edition (license) of Pro Lab you use, available modules and functions vary. Access to the modules also varies depending on what kind of project you are working on.

The following tables show you which features are available with each edition.

### 1.3.1   Project Overview

Regardless of whether you use a screen-based or a wearable eye tracker, the Project Overview section provides information about the elements of your project, such as what recordings are in it and what Events are associated with the recordings. It also provides quick access to some analysis tools.

Project Overview is included in all licences.

### 1.3.2   Design

You can create experiments in the Design module based on Timelines containing different stimuli. You can edit stimuli presentation settings like display position, background color, presentation time and stimulus advancement methods, (i.e. end on a mouse click or key press to adapt your experiment). In this module, you also get a preview of what the stimuli will look like on the screen. The table below shows the features available for each edition of Pro Lab.

> ⓘ  The Design module works with selected screen-based eye trackers from Tobii Pro. It does *not* work with Tobii Pro Glasses 2 and Tobii Pro Glasses 3.

The table below shows the Design module features available for each edition of Pro Lab.

| Feature | Screen-based | Analyzer | Full |
|---|---|---|---|
| Design experiments with multiple timelines or use hierarchical structures with randomized presentation (shuffled order, randomized sampling), and repetitions with | ● | | ● |

| Feature | Screen-based | Analyzer | Full |
|---|:---:|:---:|:---:|
| stimuli | | | |
| Add text stimuli with automatic Area of Interest definitions | ● | | ● |
| Batch editing of stimuli settings | ● | | ● |
| Use multiple stimuli advance options, either alone or in combination (advance on time, key press, mouse click) | ● | | ● |
| Configure stimulus onset markers (TTL) for synchronization purposes | ● | | ● |
| Designate a gaze trigger zone to advance to next stimulus when viewed. | ● | | ● |

### 1.3.3   Record

The Record module lets you configure eye trackers from Tobii Pro and present different stimuli, with high timing accuracy. You can read more about this in the Tobii Pro Learning article [Stimulus presentation timing in Tobii Pro Lab](). You can validate a calibration, record eye tracking data, mouse clicks and key presses, as well as Galvanic Skin Response (GSR) data from Shimmer3 devices. The participant camera with audio lets you record the participant. The Record module turns into a Moderator view during live viewing of the track status, stimuli displayed, and gaze data.

ⓘ     The Record module works with selected screen-based eye trackers from Tobii Pro. It does *not* work with Tobii Pro Glasses 2 and Tobii Pro Glasses 3.

The table below shows the Record module features available for each edition of Pro Lab.

| Feature | Screen-based | Analyzer | Full |
|---|:---:|:---:|:---:|
| Scene camera project (support for real world experiments using screen based eye trackers) | ● | | ● |
| External Presenter project | | | ● |
| Configure eye tracker settings | ● | | ● |
| Define experiment participants | ● | | ● |
| Calibrate eye tracker (regular and infant calibration) | ● | | ● |
| Numeric calibration results (accuracy and precision values) | ● | | ● |
| Present image and video stimuli | ● | | ● |
| Record eye tracking, mouse, and | ● | | ● |

| Feature | Screen-based | Analyzer | Full |
|---|:---:|:---:|:---:|
| keyboard data | | | |
| Recording of galvanic skin response data from Shimmer3 GSR+ sensors | ● | | ● |
| Moderator view: track status, stimuli displayed and gaze data live | ● | | ● |
| Send stimulus onset markers (TTL) for synchronization purposes | ● | | ● |
| Receive TTL-in markers and the value for synchronization (available for Pro Spectrum and Tobii Pro TX300 eye trackers only) | ● | | ● |
| Participant camera | ● | | ● |
| Present webpages and make screen recordings | ● | | ● |

### 1.3.4   Analyze

The Analyze module enables you to replay, visualize and analyze your recorded data. It provides data-filtering features, visualizations and the ability to export data for presentations and for further processing in third-party software. In addition, it also provides assisted and manual mapping.

The list below shows the Analyze module features. They are available for *all* editions of Pro Lab unless otherwise noted.

**Analyze module features:**

- Replay of recordings
- Import Tobii Pro Glasses recordings*
- Manual mapping onto Snapshot images
- Assisted mapping onto Snapshot images
- Create and edit static and dynamic Areas of Interest (AOIs) on images and videos
- Add Areas of Interest on text stimulus (character, word, sentence)
- AOI Tags and Grouping by tags
- Log Events for behavioral coding
- Times of Interest: define time intervals based on recording and logged Events
- Selecting a frame as background and pairing it with Time of Interest (Screen and Scene camera projects only).
- Plot gaze x and y coordinates as well as eye movement velocity over time
- Plot and visualize galvanic skin response (GSR) data over time (together with gaze video replay and eye movements)**

- GSR data analysis: noise reduction filters and detection of Skin Conductance Responses (SCRs) and Event Related SCRs**
- Static Heat Map Visualizations on images
- Static Gaze Plot Visualizations on images
- Video export of recordings and recording segments
- Export eye tracking metrics
- Export Event and time interval based metrics
- Export GSR metrics**
- Export binned metrics
- Export visualizations as images (.png and .jpg)
- Export numeric calibration results (accuracy and precision values)
- Export calibration results as images (.png format)
- Recording data to text file (.tsv)

*not available for Screen, Scene Camera, and External presenter projects

**not available for Glasses projects

## 1.4    Pro Lab licenses

In order to use Pro Lab, you need to have a license for it. Pro Lab has two different licenses: a perpetual license and a subscription-based license.

A perpetual license grants you one year of free upgrades. One- to four-year upgrade contracts are available for perpetual licenses.

A subscription license provides you with access to the latest software versions as soon as they become available.

Each license is associated with a specific edition of the software: Full Edition, Screen-Based Edition, or Analyzer Edition. The different editions provide access to different modules and features in the software. Read more about Pro Lab editions.

ⓘ    A license can only be active on one computer at a time. If you attempt to use a license that is already active on another computer, you will be asked to first deactivate the license on the other computer.

## 1.5    System requirements

For the most up-to-date information about Pro Lab's software system requirements, please read Minimum System Requirements for Tobii Pro on tobiipro.com.

# 2    Metrics

To set up a successful eye tracking study you need to define and calculate the appropriate meas-ures for your research question. In addition to choosing the right eye tracking measure, you need to define where and when to calculate this measure, i.e. the Areas of Interest (AOI) that are asso-ciated with operationalization of your research question. You also should calculate Times of Interest (TOI), the intervals of the recording when your stimulus or behavior of interest are pre-dicted to occur. Some examples are: the duration of the exposure of a stimulus on the screen, a section of a trial, the time between when a stimulus appears on the screen and when a participant presses a key on the keyboard, the moment someone enters a supermarket aisle and places a product in the shopping basket, etc.

In Pro Lab, the term "metric" is used to define the different measures that are calculated from the recording data. These measures can be exported in different table/file formats that can either be used to get an overview of the data and extract summary statistics, or to organize the data for fur-ther processing in statistical software platforms such as R or SPSS.

For best practice, and unless your study is an explorative one, measures should be defined dur-ing the planning and design phase of the study.

## 2.1    Metric export formats

There are four kinds of Metric export formats in Pro Lab:

**Interval-based TSV file**

Use this format when you want to analyze your data at the TOI interval level. If you want to ana-lyze the metrics data in a statistical analysis software, like R/SPSS/MATLAB etc. This format can be interpreted by the user, but is also especially designed for use in analysis software with meta information and metrics in a column format where the rows contain calculations for the actual Times of Interval.

**AOI-based TSV file**

This format is preferred for an analysis where you want to have AOI as a grouping factor and thus the AOI name as its own column and gaze metric in their own columns. Every AOI for every inter-val for every recording gets its own row.

**Event-based TSV file**

Use this format when you want to analyze individual events during an interval. Each fixation will generate a row in the report and the selected metrics will be shown as columns. Like the Interval-based TSV file it is formatted to be easily to import and analyze in statistical analysis software.

**Excel report (.xlsx)**

This format is compatible with most spreadsheet software such as Microsoft Excel (2007 and newer), Google Sheets, OpenOffice.org, etc. In this file, each metric is saved in a separate spreadsheet. Each image, Snapshot, or Time of Interest has its own table in the spreadsheet. The data in this export is highly aggregated and is intended to use "as is." It is therefore not the best choice for further analysis in statistical software platforms such as R or SPSS.

## General information about export metrics

The metrics available for export in the file formats are shown in the tables below. An interval corresponds to one occurrence of a specific TOI. A TOI can occur multiple times during a recording which means there are multiple intervals. Event-based metrics format where one row corresponds to one eye-movement event, as identified by the Gaze Filter in the top-right corner of the Metrics Export view. Currently, only fixations are supported.

### 2.1.1   Interval-based TSV file

The metrics available for export in the Interval-based TSV file formats are shown in the table below.

An interval corresponds to one occurrence of a specific time of interest. The interval start is defined as the starting event for the TOI. The interval end is defined as the ending event for the TOI. A specific TOI can occur multiple times during a recording which means there are multiple intervals.

⊘ Byte Order Marks (BOM) flags are removed in .tsv files. If you have scripts that rely on this flag, be sure to update them.

### General

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant variables | Variable value, or values, of the participant. One column for each participant variable. | |
| Timeline name | Timeline name | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |
| Media | The name of the media presented to the participant. | |
| Stimulus variables | Stimulus variable value or values of the stimulus. One column for each Stimulus variable. | |

### General (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant variables | Variable value, or values, of the participant. One column for each participant variable. | |

| Metric name | Description | Format |
| --- | --- | --- |
| Timeline name | Timeline name | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |
| Bin | The index of the current bin in the interval. | |
| Bin duration | The duration of the current bin. | Milliseconds |
| Media | The name of the media presented to the participant. | |
| Stimulus variables | Stimulus variable value or values of the stimulus. One column for each Stimulus variable. | |

## Interval metrics

| Metric name | Description | Format |
| --- | --- | --- |
| Duration of interval | The duration of an interval. | Milliseconds |
| Start of interval | The start time of an interval. | Milliseconds |

## Interval metrics (Binning turned on)

| Metric name | Description | Format |
| --- | --- | --- |
| Duration of interval | The duration of an interval. | Milliseconds |
| Start of interval | The start time of an interval. | Milliseconds |

## Event metrics

Events can also be used in measures. Event metrics allow you to measure behavior and calculate statistics based on your event coding scheme.

| Metric name | Description | Format |
| --- | --- | --- |
| Number of Events | The number of Events, including Custom Events and Logged live Events, for an interval. | Count |
| Time to first Event | The time to the first Event, including Custom Events and Logged live Events, for an interval. | Milliseconds |
| Last key Press | The last registered key press in the interval. | |

## Event metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Event occurred | Any Event, including Custom Events and Logged live Events, occurs during a bin, indicated be1/0, for each event type. | Binary |
| Number of Events | The number of Events, including Custom Events and Logged live Events, for a bin . | Count |
| Last key Press | The last registered key press in the bin. | |

## AOI fixation metrics

AOI fixations correspond to fixations that fall within an AOI. The fixations are defined based on the gaze filter you use (e.g. if you use the Raw gaze filter, every valid eye tracking sample is a fixation). AOI fixation metrics allow you to measure statistics based on the fixations within an AOI. They present as an interval (or an occurrence) of the TOI in separate rows in the exported spreadsheet.

| Metric name | Description | Format |
|---|---|---|
| Total duration of fixations | The total duration of the fixations inside an AOI during an interval. | Milliseconds |
| Average duration of fixations | The average duration of the fixations inside an AOI during an interval. | Milliseconds |
| Minimum duration of fixations | The duration of the shortest fixation inside an AOI during an interval. | Milliseconds |
| Maximum duration of fixations | The duration of the longest fixation inside an AOI during an interval. | Milliseconds |
| Number of fixations | The number of fixations occurring in an AOI during an interval. | Count |
| Time to first fixation | The time to the first fixation inside an AOI during an interval. | Milliseconds |
| Duration of first fixation | The duration of the first fixation inside an AOI during an interval. | Milliseconds |
| Last AOI viewed | The last AOI fixated during an interval. | |
| AOI at interval end | The AOI fixated at the end of an interval. | |

## AOI fixation metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Fixation hit | Any fixation hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of fixations | The total duration of the fixations inside an AOI during a bin. | Milliseconds |

| Metric name | Description | Format |
|---|---|---|
| Number of fixation starts | The number of fixations inside an AOI that starts in the bin. | Count |

## AOI fixation metrics (exclude partial fixations)

These metrics exclude fixations that don't fulfill the criteria for whole fixations (see previous section).

| Metric name | Description | Format |
|---|---|---|
| Total duration of whole fixations | The total duration of the fixations inside an AOI during an interval. | Milliseconds |
| Average duration of whole fixations | The average duration of the fixations inside an AOI during an interval. | Milliseconds |
| Minimum duration of whole fixations | The duration of the shortest fixation inside an AOI during an interval. | Milliseconds |
| Maximum duration of whole fixations | The duration of the longest fixation inside an AOI during an interval. | Milliseconds |
| Number of whole fixations | The number of fixations occurring in an AOI during an interval. | Number |
| Time to first whole fixation | The time to the first fixation inside an AOI during an interval. | Milliseconds |
| Duration of first whole fixation | The duration of the first fixation inside this area of interest during an interval. | Milliseconds |

## AOI fixation metrics (exclude partial fixations) (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Whole fixation hit | Any fixation hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of whole fixations | The total duration of the fixations inside an AOI during a bin. | Milliseconds |
| Number of whole fixation starts | The number of fixations inside an AOI that starts in the bin. | Count |

## AOI visit metrics

An AOI visit corresponds to all the data between the start of the first fixation inside and AOI to the end of the last fixation in the same AOI. From the first fixation inside the AOI until the last fixation inside the AOI, all data is considered as part of the AOI visit (even saccades, blinks or invalid gaze data).

AOI visit metrics allow you to measure statistics based on visits inside an AOI (e.g. calculating revisiting rate of an AOI).

| Metric name | Description | Format |
|---|---|---|
| Total duration of Visit | The total duration of the Visits inside an AOI during an interval. | Milliseconds |
| Average duration of Visit | The average duration of the Visits insidean AOI during an interval. | Milliseconds |
| Minimum duration of Visit | The duration of the shortest Visit inside an AOI during an interval. | Milliseconds |
| Maximum duration of Visit | The duration of the longest Visit inside an AOI during an interval. | Milliseconds |
| Number of Visits | The number of Visits occurring in an AOI during an interval. | Count |
| Time to first Visit | Time in milliseconds to the first Visit inside an AOI during an interval. | Milliseconds |
| Duration of first Visit | The duration of the first Visit inside an AOI during an interval. | Milliseconds |

## AOI Visit metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Visit hit | Any Visit hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of Visit | The total duration of the Visits inside an AOI during a bin. | Milliseconds |
| Number of Visit starts | The number of Visits inside an AOI that starts in the bin. | Count |

## AOI glance metrics

All data is considered to be part of the AOI glance (even saccades, blinks or invalid gaze data) from the first saccade leading into the AOI until the last fixation inside the AOI.

| Metric name | Description | Format |
|---|---|---|
| Total duration of Glances | The total duration of the Glances inside an AOI during an interval. | Milliseconds |
| Average duration of Glances | The average duration of the Glances inside an AOI during an interval. | Milliseconds |
| Minimum duration of Glances | The duration of the shortest Glance inside an AOI during an interval. | Milliseconds |
| Maximum duration of Glances | The duration of the longest Glance inside an AOI during an interval. | Milliseconds |
| Number of Glances | The number of Glances occurring in an AOI during an interval. | Count |
| Time to first Glance | Time in milliseconds to the first Glance inside this area of interest during an interval. | Milliseconds |
| Duration of first Glance | The duration of the first Glance inside this area of interest during an interval. | Milliseconds |

## AOI glance metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Glance hit | Any Glance hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of Glances | The total duration of the Glances inside an AOI during a bin. | Milliseconds |
| Number of Glance starts | The number of Glances inside an AOI that starts in the bin. | Count |

## AOI click metrics

All AOI Click metrics are based on the primary (left or right, depending on the Windows settings) button clicks only. By default, it is most commonly the left button.

A mouse click itself is a combination of two events - MouseEvent Down & MouseEvent Up where both have their timestamps and position. (Read Screen project-specific Event groups for more information.)There are two sets of metrics related to mouse clicks:

- **Clicks**: computed based on MouseEvent Down events only
- **Clicks & Releases**: takes both MouseEvent Down & MouseEvent Up events into account

Click & Release in Pro Lab counts only if both events spatially happened inside an AOI or a group of AOIs labeled by the same tag in case of AOI tag selection (even if MouseEvent Up and MouseEvent Down events happened in two different AOIs labeled by the same tag) and MouseEvent Down event occurred in a TOI interval.

All Click & Release temporal (time) metrics are computed (in milliseconds)based on the timestamp of the MouseEvent Down event.

> ⓘ The definition of *Clicks* changed in version 1.162. In the versions 1.152 and earlier, *Clicks* were what we now call *Clicks & Releases*.

| Metric name | Description | Format |
|---|---|---|
| Number of mouse clicks | The number of times the mouse button is pressed in an AOI during an interval. | Count |
| Time to first mouse click | The time to when the mouse button is pressed insidean AOI during an interval. | Milliseconds |
| Time from first fixation to mouse click | The time from the first fixation to when the mouse button is pressed inside an AOI during an interval. | Milliseconds |
| Number of mouse clicks & releases | The number of times the mouse button is both pressed and released in the same AOI during an interval. | Count |
| Time to first mouse click & release | The time to the first mouse button is pressed the first time inside an AOI during an interval. | Milliseconds |

| Metric name | Description | Format |
|---|---|---|
| Time from first fixation to mouse click & release | The time from first fixation to the first time the mouse button is pressed inside an AOI during an interval. This metric requires the mouse button is also released inside the same AOI. | Milliseconds |

## AOI click metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Click hit | Any mouse click (button is pressed) hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Number of mouse clicks | The number of times the mouse button is pressed in an AOI during a bin. | Count |

## GSR metrics

SCRs can be generated as a response to an specific event (e.g., visual stimulus or unexpected question) known as event-related SCR (ER-SCR). ER-SCRs are the most common measure used in research to relate changes in emotional arousal to a specific stimuli. A good stimulus design that allows enough time between stimuli is necessary to avoid uncertainties about which stimulus caused a specific ER-SCR.

ⓘ The SCR is reported in the interval/bin when it starts to rise. It does not reflect the peak. For example, if the onset is in bin 1 and the peak is in bin 3, the the value would be "1" for bin 1 and "0" for bins 2 and 3.

| Metric name | Description | Format |
|---|---|---|
| Average GSR | The average galvanic skin response (GSR) signal, after filtering, for an interval. | Microsiemens |
| Number of SCR | The number of skin conductance responses (SCRs) for an interval. | Count |
| Amplitude of event related SCR | The amplitude of each event-related skin conductance response (ER-SCR), for an interval. ER-SCRs are calculated using filtered GSR data. | Microsiemens |

## GSR metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Average GSR | The average galvanic skin response (GSR) signal, after filtering, for each bin. | Microsiemens |
| Number of SCR | The number of skin conductance responses (SCRs) in the bin. | Count |

## Fixation metrics (exclude partial fixations)

Fixation metrics (exclude partial fixations) let you measure statistics based on whole fixations within an interval (occurrence of a TOI) regardless of what the user specifically looked at. The fixations are defined based on the gaze filter you use and exclude fixations that don't fulfill the criteria for whole fixations.

| Metric name | Description | Format |
|---|---|---|
| Total duration of whole fixations | The total duration of the fixations during an interval. | Milliseconds |
| Average duration of whole fixations | The average duration of the fixations during an interval. | Milliseconds |
| Number of whole fixations | The number of whole fixations occurring during an interval. | Count |
| Duration of first whole fixation | The duration of the first fixation during an interval. | Milliseconds |
| Average whole-fixation pupil diameter | The average pupil diameter of all whole-fixation samples in this interval. | Millimeters |

## Fixation metrics (exclude partial fixations) (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Number of whole fixation starts | The number of whole fixations that starts during a bin. | Count |
| Average whole-fixation pupil diameter | The average pupil diameter of all whole-fixation samples in this bin. | Millimeters |

## Saccade metrics

Saccade metrics let you measure statistics based on saccades within an interval (occurrence of a TOI). You can get general indicators on the velocity, amplitude and direction of saccades.

✅ If you have unrecognizable data, try adjusting the fixation filter settings. This is not a problem that can be fixed in the metrics.

| Metric name | Description | Format |
|---|---|---|
| Number of saccades | The number of saccades occurring during an interval. | Count |
| Average peak velocity of saccades | The average peak velocity of all saccades in this interval. | Degrees/second |
| Minimum peak velocity of saccades | The peak velocity of the saccade with the lowest peak velocity in this interval. | Degrees/second |

| Metric name | Description | Format |
|---|---|---|
| Maximum peak velocity of saccades | The peak velocity of the saccade with the highest peak velocity in this interval. | Degrees/second |
| Standard deviation of peak velocity of saccades | The standard deviation of all peak velocities of the saccades in this interval. | Degrees/second |
| Average amplitude of saccades | The average amplitude of all saccades in this interval. | Degrees |
| Minimum amplitude of saccades | The amplitude of the saccade with the lowest amplitude in this interval. | Degrees |
| Maximum amplitude of saccades | The amplitude of the saccade with the highest amplitude in this interval. | Degrees |
| Total amplitude of saccades | The total amplitude of all saccades in this interval. | Degrees |
| Time to first saccade | The time to the first saccade during an interval. | Milliseconds |
| Direction of first saccade | The direction of the first saccade in the interval. | Degrees |
| Peak velocity of first saccade | The peak velocity of the first saccade in the interval. | Degrees/second |
| Average velocity of first saccade | The average velocity of the first saccade in the interval. | Degrees/second |
| Amplitude of first saccade | The amplitude of the first saccade in the interval. | Degrees |

## Saccade metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Number of saccade starts | The number of saccades that starts during a bin. | Count |

## AOI saccade metrics

AOI saccades are saccades that start, end, or are within an AOI. AOI saccade metrics let you measure statistics based on saccades within an AOI. You can get general indicators on the velocity, amplitude and direction of these saccades.

| Metric name | Description | Format |
|---|---|---|
| Number of saccades in AOI | The number of saccades occurring in an AOI during an interval. | Count |
| Time to entry saccade | The duration until the start of the first saccade that ends in an AOI during an interval. | Milliseconds |
| Time to exit saccade | The duration until the start of the first saccade that exits an AOI during an interval. | Milliseconds |

| Metric name | Description | Format |
|---|---|---|
| Peak velocity of entry saccade | The peak velocity of the first saccade that ends in an AOI during an interval. | Degrees/second |
| Peak velocity of exit saccade | The peak velocity of the first saccade that exits an AOI during an interval. | Degrees/second |

### 2.1.2   AOI-based TSV file

**General**

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant variables | Variable value, or values, of the participant. One column for each participant variable. | |
| Timeline name | Timeline name | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |
| Media | The name of the media presented to the participant. | |
| Stimulus variables | Stimulus variable value or values of the stimulus. One column for each Stimulus variable. | |
| AOI | The Area of Interest name of the current row. | |
| AOI Tags | The name or names of Tags connected to the AOI. One column for each Tag group and one for Ungrouped tags. | |

**General (Binning turned on)**

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant variables | Variable value, or values, of the participant. One column for each participant variable. | |
| Timeline name | Timeline name | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |
| Bin | The index of the current bin in the interval. | |
| Bin duration | The duration of the current bin. | Milliseconds |
| Media | The name of the media presented to the participant. | |
| Stimulus variables | Stimulus variable value or values of the stimulus. One column for each Stimulus variable. | |
| AOI | The Area of Interest name of the current row. | |

| Metric name | Description | Format |
|---|---|---|
| AOI Tags | The name or names of Tags connected to the AOI. One column for each Tag group and one for Ungrouped tags. | |

## Events

| Metric name | Description | Format |
|---|---|---|
| Number of Events | The number of Events, including Custom Events and Logged live Events, for an interval. | Count |
| Time to first Event | The time to the first Event, including Custom Events and Logged live Events, for an interval. | Milliseconds |
| Last key Press | The last registered key press in the interval. | |

## Events (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Event occurred | Any Event, including Custom Events and Logged live Events, occurs during a bin, indicated be1/0, for each event type. | Binary |
| Number of Events | The number of Events, including Custom Events and Logged live Events, for a bin. | Count |
| Last key Press | The last registered key press in the bin. | |

## AOI fixation metrics

AOI fixations correspond to fixations that fall within an AOI. The fixations are defined based on the gaze filter you use (e.g. if you use the Raw gaze filter, every valid eye tracking sample is a fixation). AOI fixations metrics allow you to measure statistics based on the fixations within an AOI. They present as an interval (or an occurrence) of the TOI in separate rows in the exported spreadsheet.

| Metric name | Description | Format |
|---|---|---|
| Total duration of fixations | The total duration of the fixations inside an AOI during an interval. | Milliseconds |
| Average duration of fixations | The average duration of the fixations inside an AOI during an interval. | Milliseconds |
| Minimum duration of fixations | The duration of the shortest fixation inside an AOI during an interval. | Milliseconds |
| Maximum duration of fixations | The duration of the longest fixation inside an AOI during an interval. | Milliseconds |
| Number of fixations | The number of fixations occurring in an AOI during an interval. | Count |

| Metric name | Description | Format |
| --- | --- | --- |
| Time to first fixation | The time to the first fixation inside an AOI during an interval. | Milliseconds |
| Duration of first fixation | The duration of the first fixation inside an AOI during an interval. | Milliseconds |
| Last AOI viewed | The last AOI fixated during an interval. | |
| AOI at interval end | The AOI fixated at the end of an interval. | |

## AOI fixation metrics (Binning turned on)

| Metric name | Description | Format |
| --- | --- | --- |
| Fixation hit | Any fixation hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of fixations | The total duration of the fixations inside an AOI during a bin. | Milliseconds |
| Number of fixation starts | The number of fixations inside an AOI that starts in the bin. | Count |

## AOI fixation metrics (exclude partial fixations)

These metrics exclude fixations that don't fulfill the criteria for whole fixations (see previous section).

| Metric name | Description | Format |
| --- | --- | --- |
| Total duration of whole fixations | The total duration of the fixations inside an AOI during an interval. | Milliseconds |
| Average duration of whole fixations | The average duration of the fixations inside an AOI during an interval. | Milliseconds |
| Minimum duration of whole fixations | The duration of the shortest fixation insidean AOI during an interval. | Milliseconds |
| Maximum duration of whole fixations | The duration of the longest fixation insidean AOIduring an interval. | Milliseconds |
| Number of whole fixations | The number of fixations occurring inan AOI during an interval. | Count |
| Time to first whole fixation | The time to the first fixation insidean AOI during an interval. | Milliseconds |
| Duration of first whole fixation | The duration of the first fixation insidean AOI during an interval. | Milliseconds |

## AOI fixation metrics (exclude partial fixations) (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Whole fixation hit | Any fixation hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of whole fixations | The total duration of the fixations inside an AOI during a bin. | Milliseconds |
| Number of whole fixation starts | The number of fixations inside an AOI that starts in the bin. | Count |

## AOI visit metrics

An AOI visit corresponds to all the data between the start of the first fixation inside and AOI to the end of the last fixation in the same AOI. From the first fixation inside the AOI until the last fixation inside the AOI, all data is considered as part of the AOI visit (even saccades, blinks or invalid gaze data).

AOI visit metrics allow you to measure statistics based on visits inside an AOI (e.g. calculating revis- iting rate of an AOI).

| Metric name | Description | Format |
|---|---|---|
| Total duration of Visit | The total duration of the Visits inside an AOI during an interval. | Milliseconds |
| Average duration of Visit | The average duration of the Visits inside an AOI during an interval. | Milliseconds |
| Minimum duration of Visit | The duration of the shortest Visit inside an AOI during an interval. | Milliseconds |
| Maximum duration of Visit | The duration of the longest Visit inside an AOI during an interval. | Milliseconds |
| Number of Visits | The number of Visits occurring in an AOI during an interval. | Count |
| Time to first Visit | Time in milliseconds to the first Visit inside an AOI during an interval. | Milliseconds |
| Duration of first Visit | The duration of the first Visit inside an AOI during an interval. | Milliseconds |

## AOI visit metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Visit hit | Any Visit hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of Visit | The total duration of the Visits inside an AOI during a bin. | Milliseconds |
| Number of Visit starts | The number of Visits inside an AOI that starts in the bin. | Count |

## AOI Glance metrics

All data is considered to be part of the AOI glance (even saccades, blinks or invalid gaze data) from the first saccade leading into the AOI until the last fixation inside the AOI.

| Metric name | Description | Format |
|---|---|---|
| Total duration of Glances | The total duration of the Glances insidean AOI during an interval. | Milliseconds |
| Average duration of Glances | The average duration of the Glances inside an AOI during an interval. | Milliseconds |
| Minimum duration of Glances | The duration of the shortest Glance insidean AOI during an interval. | Milliseconds |
| Maximum duration of Glances | The duration of the longest Glance insidean AOI during an interval. | Milliseconds |
| Number of Glances | The number of Glances occurring inan AOI during an interval. | Count |
| Time to first Glance | Time in milliseconds to the first Glance inside an AOI during an interval. | Milliseconds |
| Duration of first Glance | The duration of the first Glance insidean AOI during an interval. | Milliseconds |

## AOI Glance metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Glance hit | Any Glance hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Total duration of Glances | The total duration of the Glances inside an AOI during a bin. | Milliseconds |
| Number of Glance starts | The number of Glances inside an AOI that starts in the bin. | Count |

## AOI Click metrics

All AOI Click metrics are based on the primary (left or right, depending on the Windows settings) button clicks only. By default, it is most commonly the left button.

A mouse click itself is a combination of two events - MouseEvent Down & MouseEvent Up where both have their timestamps and position. (Read Screen project-specific Event groups for more information.)There are two sets of metrics related to mouse clicks:

- **Clicks**: computed based on MouseEvent Down events only
- **Clicks & Releases**: takes both MouseEvent Down & MouseEvent Up events into account

Click & Release in Pro Lab counts only if both events spatially happened inside an AOI or a group of AOIs labeled by the same tag in case of AOI tag selection (even if MouseEvent Up and MouseEvent Down events happened in two different AOIs labeled by the same tag) and MouseEvent Down event occurred in a TOI interval.

All Click & Release temporal (time) metrics are computed (in milliseconds)based on the timestamp of the MouseEvent Down event.

ⓘ The definition of "Clicks" changed in version 1.162. "Clicks & Releases" was called simply "Clicks" in earlier versions.

| Metric name | Description | Format |
|---|---|---|
| Number of mouse clicks | The number of times the mouse button is pressed in an AOI during an interval. | Count |
| Time to first mouse click | The time to when the mouse button is pressed inside an AOI during an interval. | Milliseconds |
| Time from first fixation to mouse click | The time from the first fixation to the first time the mouse button is pressed inside an AOI during an interval. | Milliseconds |
| Number of mouse clicks & releases | The number of times the mouse button was both pressed and released in the same AOI during an interval. | Count |
| Time to first mouse click & release | The time to when the mouse button is pressed inside an AOI during an interval. This metric requires the mouse button is also released inside the same AOI. | Milliseconds |
| Time from first fixation to mouse click & release | The time from the first fixation to the first time the mouse button is pressed inside an AOI during an interval. This metric requires the mouse button is released inside the same AOI. | Milliseconds |

## AOI Click metrics (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Click hit | Any mouse click (button is pressed) hits inside an AOI, indicated by 1/0, for each bin. | Binary |
| Number of mouse clicks | The number of times the mouse button is pressed in an AOI during a bin. | Count |

## AOI saccade metrics

AOI saccades are saccades that start, end, or are within an AOI. AOI saccade metrics let you measure statistics based on saccades within an AOI. You can get general indicators on the velocity, amplitude and direction of these saccades.

| Metric name | Description | Format |
|---|---|---|
| Number of saccades in AOI | The number of saccades occurring in an AOI during an interval. | Count |
| Time to entry saccade | The duration until the start of the first saccade that ends in an AOI during an interval. | Milliseconds |
| Time to exit saccade | The duration until the start of the first saccade that exits an AOI during an interval. | Milliseconds |

| Peak velocity of entry saccade | The peak velocity of the first saccade that ends in an AOI during an interval. | Degrees/second |
|---|---|---|
| Peak velocity of exit saccade | The peak velocity of the first saccade that exits an AOI during an interval. | Degrees/second |

## AOI reading metrics

AOI reading metrics are only available for text stimuli and are AOI-based metrics on Automatic AOIs, generated for a text stimulus.

These metrics follow the writing system order. AOI1 comes before AOI2 which comes before AOI3, etc. (This determines the occurrence of regressions, progression, and skipping). Metrics for AOIn are computed using other AOIs as well (AOIn-2, AOIn-1, AOIn+1). The AOI-selection determines what gets displayed in the data but if the calculations use the data from adjacent AOIs (even if they are not selected) the calculations will still be correct.

AOIs have 3 different levels and all reading metrics are level dependent. Reading metrics on different level AOIs are computed independently from each other. Several Automatic reading-related AOIs can exist at the same time (with their own AOI order):

- Character AOIs
- Word AOIs
- Sentence AOIs

## Reading metrics are based only on fixations.

- A regression/progression is determined if there is a fixation afterwards on an area of interest with a respective lower/higher index of the same level (Word, Character, Sentence) regardless of the direction of the saccade itself.
- If the trial/interval ends in the middle of a saccade that would have resulted in a fixation in a regressive position, it will not count as a regression.

## Non-AOI data is ignored.

- Fixations landing outside of text AOIs are disregarded, and will not contribute to any metrics calculation, nor terminate any metric calculation.
- A fixation in an AOI, followed by a fixation outside of it, and then followed by a fixation inside the AOI again, will be equivalent to having two fixations in the AOI directly followed by each other. Both fixations in the AOI will count as part of the same pass.

| Metric name | Description | Format |
|---|---|---|
| Character index | Index of character-level AOI inside its word-level AOI. | Position |
| Word index | Index of word-level AOI inside its sentence-level AOI. | Position |
| Sentence index | Index of sentence-level AOI inside this text stimulus. | Position |

| | | |
|---|---|---|
| AOI string | Text string contained in an AOI. | |
| Text unit type | Type of text unit: character, word, sentence, or custom. | |
| Number of units | Number of units. | Count |
| First-pass first fixation duration | The duration of the first fixation during first-pass inside an AOI during an interval. | Milliseconds |
| First-pass duration | The total duration of the fixations during first-pass inside an AOI during an interval. | Milliseconds |
| Selective regression-path duration* | The total duration of the fixations from first fixation in this area of interest until a fixation occurs in an area of interest progressive to this one, during an interval.<br>*Previously called "Go-past duration" | Milliseconds |
| First pass regression | Indicates whether the reader exits the AOI with a regression (1) or reads on progressively (0) during an interval. | Boolean |
| Total duration of fixations | The total duration of the fixations inside an AOI during an interval. | Milliseconds |
| Regression-path duration | The total duration of the fixations from first fixation in this area of interest until a fixation occurs in an AOI progressive to this one, including fixations in regressive AOIs, during an interval. | Milliseconds |
| Re-reading duration | Regression path duration excluding first pass fixations during an interval. | Milliseconds |

### 2.1.3   Event-based TSV file

Use this format when you want to analyze individual events during a trial or interval. Each fixation will generate a row in the report and the selected metrics will be shown as columns. Just like the Interval-based TSV file, it is formatted to be easy to import and analyze in statistical analysis software.

**General**

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant variables | Variable value, or values, of the participant. One column for each participant variable. | |
| Timeline name | Timeline name | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |
| Bin duration | The duration of the current bin. | Milliseconds |
| Media | The name of the media presented to the participant. | |

| Metric name | Description | Format |
|---|---|---|
| Stimulus variables | Stimulus variable value or values of the stimulus. One column for each Stimulus variable. | |
| AOI Tags* | The name or names of Tags connected to the AOI. One column for each Tag group and one for Ungrouped tags. | |

*AOI Tags is not available when binning is turned on

## Event properties

These properties are shared for all events types that are covered by the event-based metrics. Currently, only fixations are supported.

| Metric name | Description | Format |
|---|---|---|
| Event type | The type of event of the current row. | Fixation; Saccade |
| Validity | The validity of the event of the row, either whole or partial. | Partial; Whole |
| EventIndex | Represents the order of the events in the current TOI interval. The index is an auto-increment number starting with 1 for each event type. | Position |
| Start | The start time counted from current TOI interval start. | Milliseconds |
| Stop | The stop time counted from current TOI interval start. | Milliseconds |
| Start bin | The bin the event starts in. | Count |
| Stop bin | The bin the event stops in. | Count |
| Duration | The duration of the event. | Milliseconds |

## Event properties (Binning turned on)

| Metric name | Description | Format |
|---|---|---|
| Event type | The type of event of the current row. | Fixation; Saccade |
| Validity | The validity of the event of the row, either whole or partial. | Partial; Whole |
| EventIndex | Represents the order of the events in the current TOI interval. The index is an auto-increment number starting with 1 for each event type. | Position |
| Start | The start time counted from current TOI interval start. | Milliseconds |
| Stop | The stop time counted from current TOI interval start. | Milliseconds |
| Start bin | The bin the event starts in. | Count |
| Stop bin | The bin the event ends in. | Count |
| Duration | The duration of the event. | Milliseconds |

**Fixation properties**

Information specific to each fixation as well as to the general event properties.

| Metric name | Description | Format |
|---|---|---|
| AOI | The name of the AOI (s) which the current fixation hits. | |
| AOI pro-portion | The proportion of the fixation that occurs within the AOI. | |
| Fixation point | The normalized horizontal and vertical coordinate of the fixation point. | Normalized coordinates (DACS) |
| Average pupil size | The average size of the pupil of the fixation. Note: If the fixation is cut by TOI interval borders, only the gaze samples within the TOI are included. | Millimeters |

**Fixation properties (Binning turned on)**

| Metric name | Description | Format |
|---|---|---|
| AOI | The name of the AOI (s) which the current fixation hits. | |
| AOI pro-portion | The proportion of the fixation that occurs within the AOI. | |
| Fixation point | The normalized horizontal and vertical coordinate of the fixation point. | Normalized coordinates (DACS) |
| Average pupil size | The average size of the pupil of the fixation. Note: If the fixation is cut by TOI interval borders, only the gaze samples within the TOI are included. | Millimeters |

### 2.1.4   Excel Report

**General**

| Metric name | Description | Format |
|---|---|---|
| Recording name | Recording name | |
| Participant | Participant | |
| Participant vari-ables | Variable value or values of the participant. One column for each participant variable | |
| TOI | The name of the current Time of Interest. | |
| Interval | The interval number of the current TOI interval. | |

## Interval metrics

| Metric name | Description | Format |
|---|---|---|
| Duration of interval | The duration of all time Intervals for each Time of Interest, with averages, medians, sums, counts, variances and standard deviations (n-1). | Seconds |
| Start of interval | The start time of all time Intervals for each Time of Interest, with averages, medians, counts, variances, and standard deviations (n-1). | Seconds |

## Event metrics

Events can also be used in measures. Event metrics allow you to measure behavior and calculate statistics based on your event coding scheme.

| Metric name | Description | Format |
|---|---|---|
| Number of Events | The number of Events, including Custom Events and Logged live Events, for each Time of Interest, with averages, medians, counts, variances, and standard deviations (n-1). Descriptive statistics only include recordings where Events occur. | Count |
| Number of Events (include zeroes) | The number of Events, including Custom Events and Logged live Events, for each Time of Interest, with averages, medians, counts, variances, and standard deviations (n-1). Descriptive statistics also include recordings where no Events occur. | Count |
| Time to first Event | The time to first Event, including Custom Events and Logged live Events, for each Time of Interest, with averages, medians, counts, variances, and standard deviations (n-1). | Seconds |

## AOI fixation metrics

AOI fixations correspond to fixations that fall within an AOI. The fixations are defined based on the gaze filter you use (e.g. if you use the Raw gaze filter, every valid eye tracking sample is a fixation). AOI fixations metrics allow you to measure statistics based on the fixations within an AOI. They present as an interval (or an occurrence) of the TOI in separate rows in the exported spreadsheet.

| Metric name | Description | Format |
|---|---|---|
| Total duration of fixation in AOI | The total time each participant has fixated each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the share of total time spent in each AOI out of all AOIs; and the percentage of Participants that fixated within each AOI at least once. Descriptive statistics only based on Recordings with fixations within the AOIs. | Seconds |
| Total duration of fixation in AOI (include zeroes) | The total time each participant has fixated each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the share of total time spent in each AOI out of all AOIs; and the percentage of Participants that fixated within each AOI at least once. Descriptive statistics also include Recordings with 0 fixations within the AOIs. | Seconds |
| Average duration of fixation in AOI | The average duration of the fixations within each AOI on all Media, with averages, medians, variances, and standard deviations (n-1); the total Time of Interest and Recording durations. | Seconds |
| Number of fixations in AOI | The number of fixations within each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the percentage of Participants that visited each AOI at least once; total number of fixations within the Time of Interest; and the total Time of Interest and Recording Durations. Descriptive statistics only based on Recordings with fixations within the AOIs. | Count |

| Metric name | Description | Format |
|---|---|---|
| Number of fixations in AOI (include zeroes) | The number of fixations within each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the percentage of Participants that visited each AOI at least once; total number of fixations within the Time of Interest; and the total Time of Interest and Recording Durations. Descriptive statistics also include Recordings with 0 fixations within the AOIs. | Count |
| Time to first fixation in AOI | The time to first fixation for each AOI on all Media, with averages, medians, counts, variances, standard deviations (n-1) and Recording durations. | Seconds |
| Duration of first fixation in AOI | The duration of the first fixation for each AOI on all Media, with averages, medians, counts, variances, standard deviations (n-1) and Recording durations. | Seconds |

## AOI Visit metrics

An AOI visit corresponds to all the data between the start of the first fixation inside and AOI to the end of the last fixation in the same AOI. From the first fixation inside the AOI until the last fixation inside the AOI, all data is considered as part of the AOI visit (even saccades, blinks or invalid gaze data).

AOI visit metrics allow you to measure statistics based on visits inside an AOI (e.g. calculating revis- iting rate of an AOI).

| Metric name | Description | Format |
|---|---|---|
| Total duration of Visit | The total time each participant has visited each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the share of total time spent in each AOI out of all AOIs; and the percentage of Participants that visited each AOI at least once. Descriptive statistics are only based on Recordings with fixations within the AOIs. | Seconds |

| Metric name | Description | Format |
|---|---|---|
| Total duration of Visit (include zer-oes) | The total time each participant has visited each AOI on all Media, with averages, medians, sums, variances, and standard deviations (n-1); the share of total time spent in each AOI out of all AOIs; and the percentage of Participants that visited each AOI at least once. Descriptive stat-istics also include Recordings with 0 fixations within the AOIs. | Seconds |
| Average duration of Visit | The average duration each participant has vis-ited each AOI on all Media, with averages, medi-ans, sums, variances, and standard deviations (n-1). | Seconds |
| Number of Visits | The number of Visits within each AOI on all Media, with averages, medians, variances, and standard deviations (n-1); and the percentage of Participants that fixated within each AOI at least once. Descriptive statistics only based on Recordings with fixations within the AOIs. | Count |
| Number of Visits (include zeroes) | The number of Visits within each AOI on all Media, with averages, medians, variances, and standard deviations (n-1); and the percentage of Participants that fixated within each AOI at least once. Descriptive statistics also include Record-ings with 0 fixations within the AOIs. | Count |

## AOI Click metrics

One click is defined as the combination of when the participant presses the primary (left or right) but- ton of the mouse, and when he or she releases it again.

| Metric name | Description | Unit |
|---|---|---|
| Number of clicks & releases in AOI | The number of times the mouse button is both pressed and released within each AOI on all Media, with aver-ages, medians, variances, and standard deviations (n-1); and the percentage of Participants that clicked within each AOI at least once. Descriptive statistics only based on Recordings with fixations within the AOIs. | Count |
| Number of clicks & releases in AOI (include zeroes) | The number of times the mouse button is both pressed and released within each AOI on all Media, with aver-ages, medians, variances, and standard deviations (n-1); and the percentage of Participants that clicked within each AOI at least once. Descriptive statistics also include Recordings with 0 clicks within the AOIs. | Count |

| Metric name | Description | Unit |
|---|---|---|
| Time to first click & release in AOI | The time to first mouse button is pressed for each AOI on all Media, with averages, medians, counts, variances, standard deviations (n-1) and Recording durations.This metric requires the mouse button is also released inside the same AOI. | Seconds |
| Time from first fixation to mouse click in AOI | The time from first fixation to next time the mouse button is pressed for each AOI on all Media, with averages, medians, counts, variances, standard deviations (n-1), Recording durations and the percentage of Participants that fixated and then clicked within each AOI at least once. This metric requires the mouse button is also released inside the same AOI. | Seconds |

## GSR metrics

SCRs can be generated as a response to an specific event (e.g., visual stimulus or unexpected question) known as event-related SCR (ER-SCR). ER-SCRs are the most common measure used in research to relate changes in emotional arousal to a specific stimuli. A good stimulus design that allows enough time between stimuli is necessary to avoid uncertainties about which stimulus caused a specific ER-SCR.

| Metric name | Description | Unit |
|---|---|---|
| GSR Average | The average galvanic skin response (GSR) signal, after filtering, for each Time of Interest, with averages, medians, and counts for each participant. | Microsiemens |
| ER SCR Amplitude | The amplitude of each event related skin conductance response (ER-SCR), for each Interval in Time of Interest, with mean amplitudes, mean magnitudes, response frequencies, and counts for each participant. Time of Interest intervals that does not have an ER-SCR are shown with the symbol "---". ER-SCRs are calculated using filtered GSR data. | Microsiemens |
| SCR Count | The number of skin conductance responses (SCRs), for each Interval in Time of Interest, with averages, medians, counts, variances, and standard deviations (n-1). | Number |

# 3   Data export

## 3.1   Data export formats

Exports from Data Export are saved in a tab-separated values file (.tsv) that follows the Unicode standard. The *.tsv output file contains columns. Each column contains data of a type given by the data type name found in the top row for the corresponding column. All data types are described in the tables in Data export information. Images and Snapshots have a set of their own columns with information about the image or Snapshot itself and the gaze data mapped to it. Thus, each added image or Snapshot produces additional columns in the output file. The same is true for Areas of Interest, where each AOI will get its own column in the Data Export.

All rows in a Data Export file have a Recording Timestamp value (except the first row, which contains the column data type name). You can choose whether the timestamp shows milliseconds or microseconds. The timestamp starts at zero at the beginning of each recording.

Since all recorded eye gaze data samples are recorded in a sequence, all eye gaze data points in a recording will have different timestamps. However, some Events may have the same timestamp as eye gaze data points and others may have timestamps between two eye gaze data point timestamps.

Gaze data points and Events have their own rows in the export file so the relationship between the number of rows and time is not linear. Instead, timestamps must be used when plotting/charting eye gaze data from a Data Export file.

In a Data Export file, you will also have a Computer Timestamp value. The tables in Data export information list the type of information and data types available for export from Pro Lab. Each type has its own column in the Data Export output file.

Read more about timestamps in Computer timestamp (screen-based) and Computer timestamp (wearable).

### 3.1.1   Computer timestamp (screen-based)

For screen-based recordings (including scene camera and external presenter), the Computer timestamp column contains the value of the win32 clock "QueryPerformanceCounter" (QPC) in microseconds. This means that if other software running on the same computer collects data, and this data is timestamped with QPC, the data can be synced with the data recorded in Pro Lab.

This is the same clock provided by Tobii Pro SDK.

### 3.1.2   Computer timestamp (wearable)

For Pro Glasses 2 recordings, the Computer timestamp value comes from the internal clock of the recording unit and not the computer running Pro Glasses 2 controller application. This clock starts when the recording unit is booted. It is not possible to use this clock for synchronization of other data sources.

For Pro Glasses 3 recordings, the Computer timestamp value comes from an internal clock that is initialized when the recording is started, so the value will be identical to the Recording Timestamp.

## 3.2 Data export information

The following tables list the data types and information available for export from Pro Lab. Each type has its own column in the Data Export output file.

### 3.2.1 General

| Data name | Description | Format | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|:---:|:---:|:---:|:---:|
| Project name | Project name | Text | ● | ● | ● | ● |
| Export date | Date when the Data Export is done. | YYYY-MM- DD | ● | ● | ● | ● |
| Participant name | Participant name | Text | ● | ● | ● | ● |
| Participant variables | Variable value or values of the participant. | Text | ● | ● | ● | ● |
| Recording name | Recording name | Text | ● | ● | ● | ● |
| Recording date | Date when the Recording was performed in this time zone. | YYYY-MM- DD | ● | ● | ● | ● |
| Recording date UTC | Date when the Recording was performed in UTC. | YYYY-MM- DD | ● | ● | ● | ● |
| Recording start time | Start time of the Recording in this time zone. | HH:MM: SS:FFF | ● | ● | ● | ● |
| Recording start time UTC | Start time of the Recording in UTC format | HH:MM: SS:FFF | ● | ● | ● | ● |
| Recording duration | Total duration of the recording | Milliseconds | ● | ● | ● | ● |
| Timeline name | Name of the Timeline used during the Recording. | Text | ● | ● | | |
| Recording Fixation filter name | The name of the Fixation Filter applied to the Recording eye tracking data in the export. | Text | ● | ● | ● | ● |
| Recording soft- ware version | The version of the software used to make the Recording. | Text | ● | | ● | ● |
| Recording resolution | Screen resolution used during the Recording. | Pixels | ● | | ● | ● |

| Data name | Description | Format | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|---|---|---|---|
| Recording monitor latency | The monitor latency setting for the Recording. Stimulus start and end Event timestamps have been off-set by this number to account for the monitor latency. | Milliseconds | ● | | | ● |
| Calibration results | Average accuracy and precision of calibration. | Millimeters, degrees and pixels. | ● | | ● | ● |
| Validation results | Average accuracy and precision of validation. | Millimeters, degrees and pixels. | ● | | | |
| Eye tracker timestamp | The Recording timestamp in the eye tracker clock. | Microseconds | ● | | ● | ● |
| Event | Name of the Event. | Text | ● | ● | ● | ● |
| Event value | The event value. | Text | ● | ● | ● | ● |

### 3.2.2   Eye tracking data

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|---|---|---|---|
| Gaze point 2D | Raw gaze coordinates for each eye individually. | Pixels (DACS) | ● | | | ● |
| Gaze point 2D | Raw gaze coordinates for both eyes combined. | Pixels (MCS) | | ● | ● | |
| Gaze point 3D | The vergence point of left and right gaze vectors. | Millimeters (HUCS) | | ● | | |
| Gaze direction | The unit vector for the direction of the gaze, for each eye individually. | Normalized coordinates (DACS) | ● | | ● | ● |
| Gaze direction | The unit vector for the direction of the gaze, for each eye individually. | Normalized coordinates (HUCS) | | ● | | |
| Pupil position | The 3D coordinates of the pupil position for each eye individually. | Millimeters (HUCS) | | ● | | |
| Pupil diameter | Estimated size of the pupils. | Millimeters | ● | ● | ● | ● |
| Validity of eye data | Indicates if the eyes have been correctly identified. | Valid/invalid | ● | ● | ● | ● |

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|---|---|---|---|
| Eye position (DACSmm) | 3D position of the eyes. | Millimeters (DACS) | ● | | ● | ● |
| Gaze point 2D (DACSmm) | Raw gaze coordinates for each eye individually. | Millimeters (DACS) | ● | | | ● |
| Gaze point (MCSnorm) | Raw gaze coordinates for each eye individual on the Media. | Normalize coordinates (MCS) | ● | | ● | ● |
| Assisted mapping gaze point | Assisted mapping gaze point coordinates. | Pixels (MCS) | ● | ● | ● | ● |
| Manually mapped gaze point | Manually mapped gaze point coordinates. | Pixels (MCS) | ● | ● | ● | ● |
| Mapped gaze point | The combination of the manually and assisted mapped gaze point coordinates. Manual mapping overrides assisted. | Pixels (MCS) | ● | ● | ● | ● |
| Assisted mapping gaze point score | Similarity score of assisted mapping gaze points. | Normalized | ● | ● | ● | ● |

### 3.2.3   Media

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External presenter project |
|---|---|---|---|---|---|---|
| Presented Stimulus name | The name of the Stimulus being presented to the Participant. | Text | ● | | | ● |
| Presented Media name | The name of the Media presented to the Participant. | Text | ● | | | ● |
| Recording Media name | The name of the Recording Media. | Text | | ● | | |
| Presented Media dimensions | The dimensions of the Media as presented on the screen to the Participant, including any scaling set in the Stimulus properties. | Pixels | ● | | | ● |

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External presenter project |
|---|---|---|---|---|---|---|
| Recording Media dimensions | The dimensions of the Recording Media. | Pixels | | ● | | |
| Presented Media position | The position of the Media on the screen. The value represents the positions of the top left corner of the Media in relation to the top left corner of the screen. | Pixels (DACS) | ● | | | ● |
| Original Media dimensions | The original size of the Media presented to the Participant. | Pixels | ● | | | ● |
| Media dimensions | The original size of the Snapshot. | Pixels | ● | ● | ● | ● |

### 3.2.4   Gaze events

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|---|---|---|---|
| Mapped eye movement type | Type of eye movement event classified by the selected Fixation filter for mapped gaze data. | Fixation Saccade Unclassified EyesNotFound | ● | ● | ● | ● |
| Mapped eye movement type index | Represents the order in which an eye movement was recorded for mapped gaze data. The index is an auto-increment number starting with 1 for each eye movement type. | Number | ● | ● | ● | ● |
| Mapped fixation point | Mapped fixation point. This column is affect by the settings of the Fixation Filter. | Pixels (MCS) | ● | ● | ● | ● |
| Eye movement type | Type of eye movement event classified by the fixation filter settings applied during the gaze data export. | Fixation Saccade Unclassified EyesNotFound | ● | ● | ● | ● |

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External Presenter project |
|---|---|---|---|---|---|---|
| Gaze event duration | The duration of the currently active eye movement. | Milliseconds | ● | ● | ● | ● |
| Eye movement type index | Represents the order in which an eye movement was recorded. The index is an auto-increment number starting with 1 for each eye movement type. | Number | ● | ● | ● | ● |
| Fixation point | Coordinates of the fixation point. This column is affected by the settings of the Fixation Filter. | Pixels (DACS) | ● | ● | ● | ● |
| Fixation point (MCSnorm) | Coordinates of the fixation point on the Media. | Normalized coordinates (MCS) | ● | | | ● |
| AOI hit | Reports whether the AOI is active and whether the fixation is located inside of the AOI: -1 = AOI not active; 0 = AOI active, the fixation is not located in the AOI; 1 = AOI active and the fixation is located inside of the AOI; empty cell indicates that the media of the AOI was not visible. | Number | ● | ● | ● | ● |

### 3.2.5  Web data

| Data name | Description | Format/Units | Screen Project | Glasses project | Scene Camera project | External presenter |
|---|---|---|---|---|---|---|
| Browser client area position | The position of a web browser's client area on the screen. The value represents the position of the top left corner of the client area in relation to the top left corner of the screen. | Pixels (DACS) | ● | | | |

| Data name | Description | Format/Units | Screen Project | Glasses project | Scene Camera project | External presenter |
|---|---|---|---|---|---|---|
| Viewport position | The position of the visible area of a web page. The value represents the position of the top left corner of the visible area of a web page in relation to the full web page size. | Pixels | ● | | | |
| Viewport dimensions | The dimensions of the visible area of a web page. | Pixels | ● | | | |
| Full page size | The full size of the web page. Limited by 5000 px horizontally and 15000 px vertically. | Pixels | ● | | | |

### 3.2.6   Other sensor data

| Data name | Description | Format/Units | Screen project | Glasses project | Scene Camera project | External presenter project |
|---|---|---|---|---|---|---|
| Mouse position | The position of the mouse. | Pixels (DACS) | ● | | | |
| Gyro | Rotation along the X, Y and Z axes. | Degrees/second (HUCS) | | ● | | |
| Accelerometer | Acceleration along the X, Y and Z axes. | Meters/second^2 (HUCS) | | ● | | |
| Magnetometer | Magnetic field along the X, Y and Z axes. | Microteslas (HUCS) | | ● | | |
| Galvanic skin response (GSR) | The raw galvanic skin response signal of the Participant. | Microsiemens | ● | | ● | ● |

## 3.3   Plof file format

The Pro Lab Output Format (plof) exports all data in a machine-readable format. The main goal for this format is to enable third-party software and researchers an easy and robust import of Tobii Pro eye tracking data. All data stored in Pro Lab can be exported, including raw eye tracking data, eye movement data, manual event coding data, stimulus information data, areas of interest data, raw GSR data and GSR events.

For more detailed information about plof, request the "Tobii Pro Lab Output Format Reference guide" from Tobii Pro Sales.

# Appendix A    Support, Training, and Warranty

## A1    Customer Support

If you need help, please contact Customer Support at Tobii Pro. In order to receive assistance as quickly as possible, make sure you have access to your Tobii Pro device and, if possible, an Internet connection. You should also be able to supply the serial number of the device, which you will find on a sticker on the back or bottom of the device.

### A1.1    Get help online

Many questions can be answered by visiting Tobii Pro Connect. It contains the latest information about contacting Support, helpful articles and FAQs, links to downloads, and much more. Log in or register to see information about your account and to reach Customer Support on Tobii Pro Connect.

## A2    Training and Education Services

If you are new to eye tracking, or want to extend your knowledge about eye tracking research, sign up for one of our learning programs and events on our website at Training and Education Services.

## A3    Warranty information

Read more online about Tobii Pro Care and Tobii Pro's eye tracker warranty.

**tobii pro**

## Support for Your Tobii Pro Device

### Get Help Online

Visit Tobii Pro Connect for help with your Tobii Pro device. It contains the latest information about contacting Support, links to our Learning Center, and much more. Visit connect.tobiipro.com.

### Contact Your Solution Consultant or Reseller

For questions or problems with your product, contact your Tobii Pro sales representative or authorized reseller for assistance. They are most familiar with your personal setup and can best help you with tips and product training.

Visit tobiipro.com/contact .