

Pro Lab
Product Description

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Table of Contents

1 Introduction	4
1.1 Overview	4
1.2 Modules	4
1.2.1 Designer	4
1.2.2 Recorder	4
1.2.3 Analyzer	5
1.3 License models	5
1.4 System requirements	5
2 Software Features and Editions	6
2.1 Project Overview	6
2.2 Designer	6
2.3 Recorder	6
2.4 Analyzer	7
3 Metrics export	9
3.1 Interval-based TSV file	9
3.2 AOI-based TSV file	15
3.3 Event-based TSV file	20
3.4 Excel Report	21
4 Data export	27
4.1 Data Export formats	27
4.1.1 General	27
4.1.2 Eye tracking data	29
4.1.3 Media	30
4.1.4 Gaze events	31
4.1.5 Web data	33
4.1.6 Other sensor data	33

1 Introduction

1.1 Overview

Modules

This document describes the features and functionality of *Tobii Pro Lab*. This powerful, versatile, and comprehensive software supports the entire research workflow for eye trackers from Tobii Pro. The software comprises three modules: *Designer*, *Recorder*, and *Analyzer*. For more information, read [Modules](#).

Editions

Pro Lab is available in four editions: Full Edition, Edition, Analyzer Edition, and VR 360 Edition. The Full Edition contains all three modules; the Presenter Edition contains Designer, Recorder/Stimuli, Presentation, and a selection of Analyzer's functionality; and the Analyzer Edition contains only the Analyzer module. The Full Edition and the VR 360 Edition contains all three modules but with different eye tracker support.



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.

1.2 Modules

1.2.1 Designer

You can create experiments in the Designer module based on Timelines consisting of different stimuli. You can also 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). Here you also get a preview of what the stimuli will look like on the screen.



The Designer module works with selected screen-based eye trackers from Tobii Pro and with the HTC VIVE Pro Eye and Tobii Pro VR Integration VR Headsets, but not with Pro Glasses 2.

1.2.2 Recorder

The Recorder 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 also 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. Recorder turns into a Moderator view during live viewing of the track status, stimuli displayed and gaze data.

The Recorder module works with selected screen-based eye trackers from Tobii Pro and with the HTC VIVE Pro Eye and Tobii Pro VR Integration VR Headsets, but not with Pro Glasses 2.

1.2.3 Analyzer

The Analyzer 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, for Pro Glasses 2 based projects, it also provides manual and automatic fixation mapping.

1.3 License models

Pro Lab has two different license models; a *perpetual-based* license model and a *subscription-based* license model. A subscription license provides you with access to the latest software versions as soon as they become available. A perpetual license grants you one year of free upgrades. One- to four-year upgrade contracts are available for perpetual licenses.



If you use the subscription-based model, your Pro Lab must connect to the internet at least once every 14 days to validate the license. If you fail to do this, your software will not work until you connect to the internet again.

1.4 System requirements

For the most up-to-date information about Pro Lab's software system requirements, please visit tobii.com/product-listing/tobii-pro-lab/system-requirements/

2 Software Features and Editions

2.1 Project Overview

Feature	Presenter	Analyzer	Full	VR 360
Export project	•	•	•	•
Import project	•	•	•	•

2.2 Designer

Feature	Presenter	Analyzer	Full	VR 360
Design experiments with multiple timelines or use hierarchical structures with randomized presentation (shuffled order, randomized sampling), and repetitions with 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.	•		•	

2.3 Recorder

Feature	Presenter	Analyzer	Full	VR 360
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)	•		•	

Feature	Presenter	Analyzer	Full	VR 360
Present image and video stimuli	•		•	•
Record eye tracking, mouse, and 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	•		•	

2.4 Analyzer

	Presenter	Analyzer	Full	VR 360
Replay of recordings	•	•	•	•
Import Tobii Pro Glasses recordings		•	•	
Manual mapping onto Snapshot images for Glasses, Screen, and Scene Camera projects		•	•	
Assisted mapping onto Snapshot images (Pro Glasses projects only)		•	•	
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		•	•	•

	Presenter	Analyzer	Full	VR 360
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 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)	•	•	•	•

3 Metrics export

To set up a successful eye tracking study you need to define and calculate the appropriate measures 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 associated 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 predicted 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 further 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 during the planning and design phase of the study.

3.1 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	Unit
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.	

Interval metrics

Metric name	Description	Unit
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	Unit
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

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	Unit
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

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	Unit
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 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	Unit
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 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	Unit
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 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	Unit
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 when the mouse button is pressed inside an AOI during an interval.	Milliseconds

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

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
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

Fixation metrics (exclude partial fixations)

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	Unit
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

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	Unit
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
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

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	Unit
Number of saccades in AOI	The number of saccades occurring in an AOI during an interval.	Count

Metric name	Description	Unit
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

3.2 AOI-based TSV file

General

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

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	Unit
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

Metric name	Description	Unit
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

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	Unit
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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.	Count
Time to first whole fixation	The time to the first fixation inside an AOI during an interval.	Milliseconds
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AOI visit metrics

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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	Unit
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

Metric name	Description	Unit
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 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	Unit
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 an AOI during an interval.	Milliseconds
Duration of first Glance	The duration of the first Glance inside an AOI during an interval.	Milliseconds

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	Unit
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 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	Unit
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	Unit
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-	Milliseconds

	pass inside an AOI during an interval.	
Go-past 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.	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

3.3 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

Metrics name	Description	Unit
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.	
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.	

Event properties

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

Metrics name	Description	Unit
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 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	Unit
AOI	The name of the AOI (s) which the current fixation hits.	
AOI proportion	The proportion of the fixation that occurs within the AOI.	
Fixation point	The normalized horizontal and vertical coordinate of the fixation point.	Normalized coordinates
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

3.4 Excel Report

General

Metric name	Description	Unit
Recording name	Recording name	
Participant	Participant	
Participant variables	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	Unit
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	Unit
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	Unit
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	Unit
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 revisiting rate of an AOI).

Metric name	Description	Unit
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	Unit
Total duration of Visit (include zeroes)	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 also include Recordings with 0 fixations within the AOIs.	Seconds
Average duration of Visit	The average duration each participant has visited each AOI on all Media, with averages, medians, 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 Recordings 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) button 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 averages, 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

Metric name	Description	Unit
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 averages, 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
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 a 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

4 Data export

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4.1 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 table below. 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 produce 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. Since gaze data points and Events have their own rows in the export file, 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.

The following tables 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.

4.1.1 General

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 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	•	•	•	•	•

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 project	External Presenter project
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 software version	The version of the software used to make the Recording.	Text	•		•	•	•
Recording resolution	Screen resolution used during the Recording.	Pixels	•		•		•
Recording monitor latency	The monitor latency setting for the Recording. Stimulus start and end Event timestamps have been offset 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.	•				

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 project	External Presenter project
Eye tracker timestamp	The Recording timestamp in the eye tracker clock.	Microseconds	•		•		•
Event	Name of the Event.	Text	•	•	•	•	•
Event value	The event value.	Text	•	•	•	•	•

4.1.2 Eye tracking data

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 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	•	•	•	•	•
Eye position (DACSmm)	3D position of the eyes.	Millimeters (DACS)	•		•		•
Gaze point 2D (DACSmm)	Raw gaze coordinates for each eye individually.	Millimeters (DACS)	•				•

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 project	External Presenter project
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	•	•	•		•

4.1.3 Media

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 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	VR 360 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	•	•	•		•

4.1.4 Gaze events

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 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 affected by the settings of the Fixation Filter.	Pixels (MCS)	•	•	•		•

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 project	External Presenter project
Eye movement type	Type of eye movement event classified by the fixation filter settings applied during the gaze data export.	Fixation Saccade Unclassified EyesNotFound	•	•	•	•	•
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	•	•	•	•	•

4.1.5 Web data

Data name	Description	Format/Units	Screen Project	Glasses project	Scene Camera project	VR 360 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)	•				
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	•				

4.1.6 Other sensor data

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 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)		•			

Data name	Description	Format/Units	Screen project	Glasses project	Scene Camera project	VR 360 project	External presenter project
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	•		•	•	•
Head rotation	The coordinates of the participant's head rotation quaternion.	Normalized coordinates (WCS)				•	



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