SR Research WebLink
User Manual

Version 2.1.1

Please report all functionality comments and bug reports to:
support@sr-research.com

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SR Research WebLink 2.1.1 [Computer Software]. (2021). Oakville, Ontario, Canada: SR Research Ltd.

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1 Introduction

SR Research WebLink is a software solution for EyeLink users to track participants' eye movements when using interactive media such as websites and online games, perform usability testing, or run simple psychology experiments with image and video stimuli. The WebLink software uses an intuitive drag-and-drop application interface allowing users to easily create these experimental paradigms. Along with the EyeLink Data Viewer analysis software, WebLink provides a complete eye tracking solution for a wide range of usability studies.

One of the primary uses of WebLink is the collection of eye movement and media data when viewing websites. WebLink tracks navigation from one webpage to another, and for each of the browsed webpages, it saves a screenshot of the entire page, and optionally a video recording of the display. For long webpages, mouse scrolling is recorded in the data file to enable automatic scroll compensation when performing analysis with EyeLink Data Viewer (version 4.2 or later). WebLink also allows collection of eye movement data and screen recordings when the participant uses an application in Windows, reads a PDF document, uses an external video device such as a gaming console, views stimuli in real space with a scene camera recording the participant's point of view, or simply views images and video clips presented by WebLink.

WebLink provides a seamless integration with all versions of EyeLink eye trackers. The software allows the user to configure and perform camera setup, calibration, accuracy checks, and data recording. If using a display computer with a dual-monitor configuration, the WebLink software can also provide a real-time view of the participant's gaze on the stimulus the participant is viewing.

WebLink also allows use of a webcam and microphone to record video and audio of the participant during the task. The software automatically logs all keyboard and mouse events during the experiment, and allows the user to define hotkeys to send events or commands to the EyeLink Host PC. WebLink is also capable of sending TTL signals for integration with other devices, such as EEG and other biometric recordings.

This manual is intended for users who are using version 1.2 or later of SR Research WebLink. Please use the following to cite the WebLink software in your manuscript:
SR Research WebLink 1.2.1 [Computer Software]. (2020). Oakville, Ontario, Canada:
SR Research Ltd.

2 Installation and Basic Setup

This section covers system requirements for computers used to create and run experiments with SR Research WebLink as well as software installation and licensing.

2.1 Computer Requirements

SR Research WebLink is presently a Windows-only application, compatible with both 32- and 64-bit versions of Windows 7 and 10. The following are the minimum computer specifications required to run the software; however, the preferred computer specifications are dependent on the type of experiments you plan to run—better computer hardware (solid state hard drive, better video card, more RAM) may be required for resource intensive applications such as the ones that involve high-resolution screen recording, some online games, video playback, or external video capture.

- Recent Intel CPUs with duo-core/multi-core processor
- Windows 7 or 10 (32-bit or 64-bit)
- A video card with at least 1.0 GB of memory and OpenGL support
- At least 4 GB or more computer memory
- A 250 GB or larger hard disk with 7,200 or higher rpm, or solid-state hard drive.
- Keyboard and Mouse
- Free USB ports for software license
- A dedicated Ethernet port for the connection to the EyeLink Host PC (please see section 19.1 "Connection Settings" for configuration details).

The following additional hardware/software may be required depending on the experiment to be run.

- For experiments involving webpage navigation, an additional Ethernet card/USB-to-Ethernet adapter or Wi-Fi network is required for Internet access. In general, users should avoid using a wireless connection for Internet access unless they have a reliable and stable connection.
- Ideally the video card on the display computer should support dual video output. With a dual-monitor setup the experimenter can start the experiment, perform calibration, monitor/control the experiment progress on a secondary monitor while the participant views experiment materials on the main presentation monitor. Please see section 19.3 "Monitor Settings".
- For webpage experiments, please make sure the latest version of Firefox (https://www.mozilla.org/en-CA/firefox/new/) or Google Chrome (https://www.google.ca/chrome/) is installed on the display computer.
- A microphone is required to perform live audio recording. The built-in microphones on USB webcams are typically supported, as well as external microphones connected to the input channel of the sound device on the display computer. (Using an external microphone with an amplifier will typically result in superior audio recording quality).

- If planning to capture the participant's activities via live video/audio recording, make sure a webcam is installed on the display computer. Please see section "19.4 Presentation Settings".
- If the experiment involves capturing external video or a scene camera, make sure a proper video capture device or webcam is used. Please see the discussion in sections 14 "External Video Component" or 15 "Scene Camera Component".
- If TTL synchronization is required, the display computer should have a parallel port card installed or a USB2TTL8 device. Please see section "19.6 TTL Settings".

2.2 Software Installation

Before running the WebLink installer, please make sure the following software is installed:

- The latest version of Firefox (https://www.mozilla.org/en-CA/firefox/new/) or Google Chrome (https://www.google.ca/chrome/).
- The Microsoft .NET Framework 4.6.2 (https://dotnet.microsoft.com/download/thank-you/net462-offline).

SR Research WebLink comes with a stand-alone installer. To install the software, double-click on the installer file and follow the instructions in the InstallShield interface. Users will have the choice of installing WebLink as a 32-bit application or a 64-bit application (on a 32-bit Windows, only the 32-bit option is available).

If you have a previous version of WebLink installed, you can choose the "Clean Install" to remove the old installation and install the newer version or the "Remove" option to just remove the old installation without installing the newer version). Once the installation is complete, you will be prompted to press any key to continue. After installation, the application can be accessed from "Start -> All Programs -> SR Research -> SR Research WebLink".

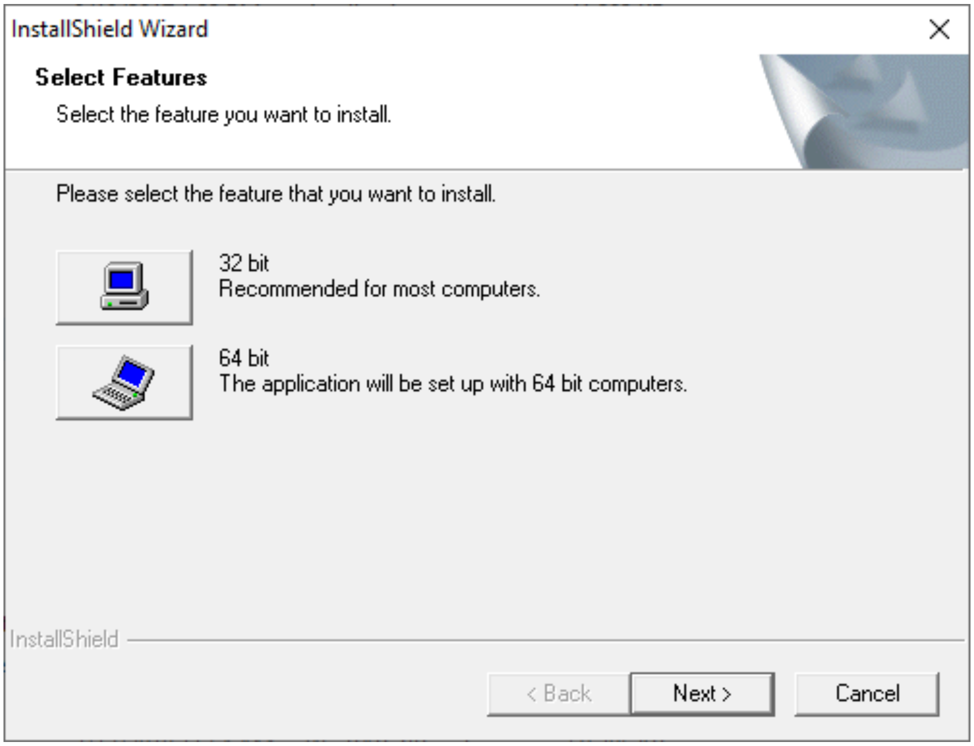

Figure 2-1. Installing WebLink Application

2.3 Software License

A license key is required to run the WebLink software – please contact sales@sr-research.com to obtain a license key. Please have the USB key plugged to the computer on which the WebLink software is installed. If this is the first time that the USB license key has been used on the Display PC, you will need to install the HASP key driver. First plug the license key into the Display PC, and then install the driver by clicking "Start -> All Programs -> SR Research -> Install HASP Driver".

3 Using WebLink - A Quick Overview

WebLink is designed to help users develop and perform usability-related experiments. A typical workflow in a WebLink experiment involves designing and creating an experiment, running the experiment, and then analyzing the collected data.

3.1 Design and Create an Experiment

Before collecting data, the user must first design and create the experiment in WebLink. In designing the experiment, users should assemble any necessary stimuli for the project (website URLs/offline webpage files, images, video clips, audio clips, PDF files, etc.); any media files to be used can be imported through the Library Manager in the WebLink project. The user can build the experiment in WebLink by adding components to the project Timeline. A new experiment will be saved in the "C:\{User Account}\Documents\WebLink" folder by default.

A typical experiment begins with a Camera Setup component, which includes calibrating the eye tracker and validating its accuracy. You may then add components to present the desired stimuli and record eye movement data. After adding the components, users can configure each component's properties according to the experiment design. In particular, the "Participant Response" properties of each component allow the user to configure the end of the stimulus—for instance, the user can set a Webpage component to end based on a maximum duration, the press of a keyboard hotkey or mouse click, or by closing the browser window. (The system-wide hotkey of F2 will also end any component.) Users may also add participant properties to collect desired participant info (age, gender, etc.) and any custom variables desired, e.g., for trial grouping during data analysis.

A simple one-trial web navigation experiment would involve just two components: a Camera Setup component to set up, calibrate, and validate the eye tracker; and a Webpage component to present the webpage to the participant. Longer and more complex experiments may also easily be created. Any component or group of components can be defined as a Repetition Sequence, allowing the user to repeat the component(s) and specify any desired properties to vary across the repetitions (e.g., to load a different URL on each repetition of the Webpage component). In this way a trial with multiple components can easily be created. For instance, one repetition sequence might include an Accuracy Check component, followed by an Image presenting some instructions, then a Webpage.

3.2 Run the Experiment

Once the experiment has been created and tested, users can lock the experiment (to prevent future changes) and click the Run button to run the experiment for data collection. At the beginning of the experiment, the user will be asked to enter the session name and any defined participant properties. (If testing the project design, you may run the experiment with a simulated tracker connection by checking the "Dummy Mode" box in the Experiment Configuration—this allows running the project without a connection to the eye tracker.)

The experimenter can perform the camera setup/calibration at the beginning of the experiment, then pass the experiment control to the participant. The participant will then proceed through the experiment as designed, with WebLink recording eye movement data.

WebLink allows the experimenter to view live feedback of the participant's gaze position when two monitors are connected to the display computer. One monitor can be used to present the stimuli to the participant, and the other to show the experimenter a live view of the participant's screen with their gaze position overlaid on top (see Figure 3-1). The experimenter may also use a second keyboard to trigger hotkeys if desired, e.g., to mark events or to end the component by pressing the F2 key.

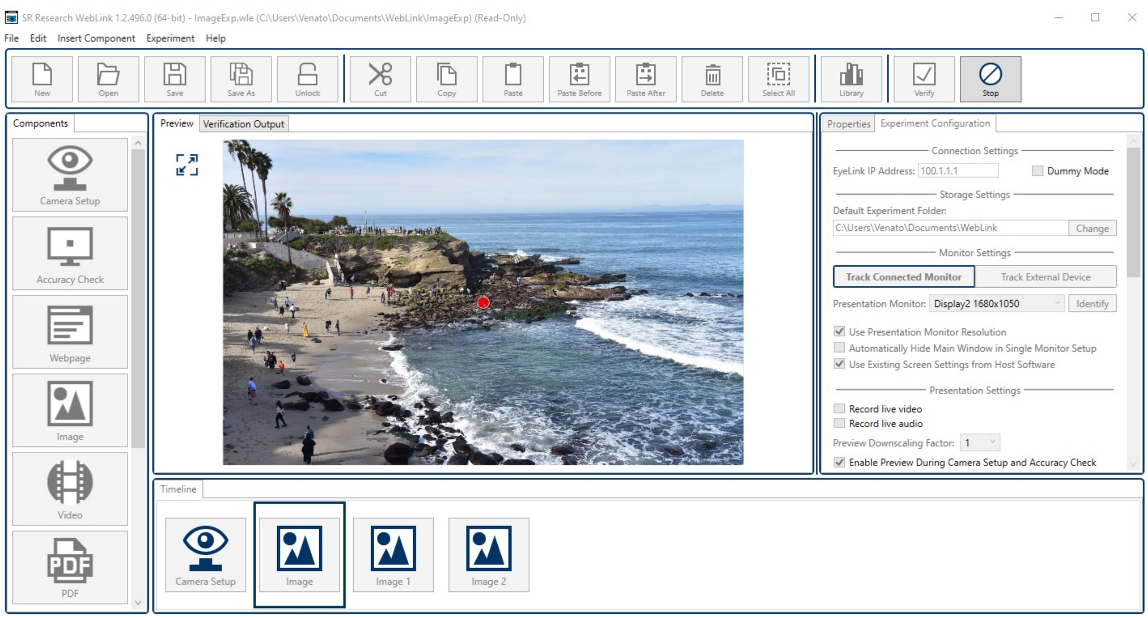

Figure 3-1. Live Gaze View from the WebLink Application

3.3 Perform Data Analysis

All of the eye tracking data and Data Viewer integration messages will be saved to the EDF file. The media files will be saved into the "\Images" and "\Videos" subfolder of the session Results folder. Users can perform data analysis with EyeLink Data Viewer (version 4.2 or later for webpage or PDF tracking experiments). The latest version of the Data Viewer software can be downloaded from https://www.sr-support.com/thread-7.html.

4 WebLink Graphical User Interface

From the Windows desktop, click “Start -> SR Research -> WebLink” to launch the WebLink software. WebLink uses a desktop framework that contains all the windows of the application. The following figure shows the graphical user interface (GUI) for creating an experiment. Below the menu and toolbar, the WebLink application GUI is divided into four areas: the Components on the left, Preview Area in the middle, the Properties/Experiment Configuration on the right, and Timeline at the bottom.

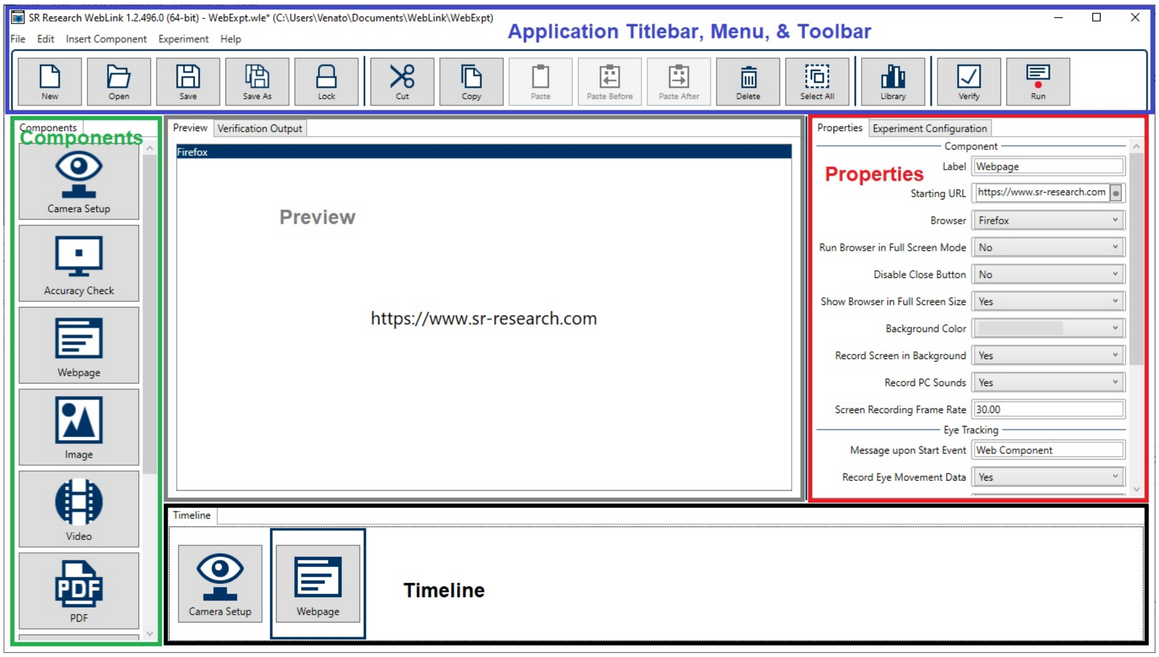

Figure 4-1. GUI of the WebLink Application

4.1 Components

The Component Panel contains the basic building blocks of the experiment graph and allows users to select a desired component to be added into the experiment. Please see Chapter 6 on the overview of the components and common operations and Chapters 7-15 on the discussion of each component.

4.2 Preview

When creating/editing an experiment, the Preview window shows the content of the currently selected component (camera setup, accuracy check, webpage, image, video, PDF, screen recording, external video/scene camera). When running an experiment with a dual-monitor setup on the Display computer, this window provides a live view to the experimenter (i.e., viewing the stimulus that the participant sees in real time with the gaze position overlaid on top of the stimulus).

4.3 Properties/Experiment Configuration

The left tab of this panel allows users to review/edit the properties of individual components. The right tab allows users to configure the experiment settings.

4.4 Timeline

The Timeline lists all of the experiment components in the order that users wish to present and allows users to select the nodes for review or modification. Repetition sequence can also be created if users can want to pass along different parameters (e.g., different URLs for the webpages, or different files for image or video components) while repeating the same components across trials.

4.5 Application Menu, Toolbar, and Keyboard Shortcuts

The WebLink application menu and toolbar contain a list of common operations. Most of the operations can also be performed by keyboard shortcuts.

4.5.1 File Menu and Tool Buttons

Commands that affect creating, opening, saving, locking/unlocking, or closing the WebLink sessions are located here.

Operation	Keyboard Shortcut	Function
New	Ctrl + N	Creates a new experiment.
Open …	Ctrl + O	Opens an existing experiment.
Save	Ctrl + S	Saves the current experiment.
Save As		Saves the experiment to a different name/directory.
Lock Unlock		Click the icon to lock a currently unlocked experiment, or the icon to unlock a currently locked experiment.
Recent Experiments		Reopens a recent WebLink experiment.
Close		Closes the WebLink application.

4.5.2 Edit Menu and Tool Buttons

The Edit menu contains commands such as copy, paste, cut, delete, undo and redo. It also provides a quick access to the library manager, experiment configuration, and creating repetition sequence.

Operation	Keyboard Shortcut	Function
Undo	Ctrl + Z	Undoes the last action performed.
Redo	Ctrl + Y	Redoes or repeats an action.
Cut	Ctrl + X	Removes a selection from the experiment and

		places it into the clipboard.
Copy	Ctrl + C	Puts a copy of a selection to the clipboard.
Paste	Ctrl + V	Inserts the previously copied item from the clipboard to the end of the list.
Paste Before		Inserts a previously copied component from the clipboard to the timeline before the selected position.
Paste After		Inserts a previously copied component from the clipboard to the timeline after the selected position.
Paste Multiple …		Inserts multiple of the previously copied item from the clipboard to the end of the list.
Delete	Delete	Removes the selection from the current location.
Select All	Ctrl+ A	Selects the entire contents of the active window.
Create Repetition Sequence …		This allows to create a repetition sequence so that users can pass along different parameters while repeating the same components across trials.
Edit Experiment Configuration	F4	Shows a list of experiment configuration settings for WebLink.
Library …	Ctrl + L	Used to load in image, audio, interest area set, video, PDF files.

4.5.3 Insert Component Menu

The Insert Component menu provides access to add nodes to the Timeline.

Operation	**Keyboard Shortcut**	**Function**
Camera Setup		Adds a Camera Setup component to the Timeline.
Accuracy Check		Adds an Accuracy Check component to the Timeline.
Webpage		Adds a Webpage component to the Timeline.
Image		Adds an Image component to the Timeline.
Video		Adds a Video component to the Timeline.
PDF		Adds a PDF component to the Timeline.
Screen Recording		Adds a Screen Recording component to the Timeline.
External Video		Adds an External Video component to the Timeline.
Scene Camera		Adds a Scene Camera component to the Timeline.

4.5.4 Experiment Menu

The Insert Component provides options to add nodes to the Timeline.

Operation	Keyboard Shortcut	Function
Verify		Checks errors/warnings of the created experiment before actually running it.
Run Dummy Run	F11	Runs the experiment for data collection. If the Dummy Mode option in the Experiment Configuration is turned on, this will run the experiment without an actual connection to the eye tracker.

4.5.5 Help Menu

The Help menu contains the WebLink Help document as well as licensing and product release information.

Operation	Keyboard Shortcut	Function
About		Displays the release information for this copy of the software.
Contents	F1	Displays the online help (html version of this document) of the WebLink application.
License		Displays the license information for this copy of WebLink.

5 Working with Files

Each WebLink experiment will be saved in its own directory, consisting of a binary .wle file, the main experiment file that contains the experiment details and preference settings, and Library folder containing any supporting files such as images, video clips, interest area sets, PDFs, etc. When the project is run, a Results folder will be created in the project directory, with each session's data saved within its own subfolder.

5.1 Creating a New Experiment

A brand-new WebLink session begins with a new session already started. Simply begin working by adding a component to the Timeline. To create a new experiment when a WebLink session is already open, either choose "File -> New" from the application menu, press CTRL + N, or click the New ( ) button in the application toolbar. If the current WebLink session contains unsaved changes, the user will be prompted to save the experiment.

5.2 Saving an Experiment

To save the current experiment, either click "File -> Save" from the application menu, press CTRL + S, or click the Save ( ) button in the application. If this is the first time the experiment is saved, you will be prompted for the experiment name and the directory in which to save the experiment. Enter the name for the experiment in the "Experiment Name" field, and either save in the default WebLink session directory, or click the "…" button to the right of the "Experiment Location" field to select the directory to save the project in. (If typing the directory into the "Experiment Location" field manually, please make sure that the intended directory already exists.) Make sure you have write permission for the selected directory.

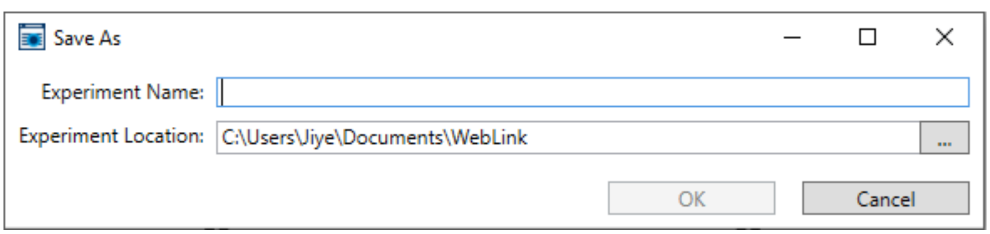

Figure 5-1. Saving a New Experiment

Note: Please avoid using non-ASCII characters in the experiment name or directory path as this may cause issues during runtime or analysis. The experiment name must start with a letter between 'a' and 'z' or 'A' and 'Z' and may contain letters, digits, and the underscore character. Any spaces in the filename will be replaced by underscores.

The default save location for new experiments is "C:\{User Account}\Documents\WebLink". The Default Experiment Folder can be configured in the Storage settings of the Experiment Configuration tab (see Section 19.2 "Storage Settings").

The following is the folder structure of the experiment. **Important! Please do not manually modify the file/directory structure of the WebLink experiment.**

```
WebLink Experiment
       |--- [library]
              |--- [Images]
              |--- [InterestAreaSets]
              |--- [PDF]
              |--- [Sounds]
              |--- [Videos]
       |--- [Results]
              |--- [Images]
              |--- [Videos]
              |--- {session}.EDF
              |--- {session}.log
       |--- {experiment}.wle
```

- *{experiment}.wle*: This is the main experiment file that contains the experiment details and preference settings. Double-click this file to open the experiment.
- *library*: This is the folder where the image, audio, interest area set, PDF, and video files are stored.
- *results*: This is the folder where the eye tracker result file, session log file, as well as the screen capture, audio, video recording files, are stored.

Note: to transfer experiments across computers for data collection or analysis, zip up the entire experiment directory, and copy the saved .zip file. The .wle file itself is not sufficient to run the experiment or perform data analysis.

5.3 Saving an Existing Experiment to a Different Directory

To save the experiment with a different name or in a different directory, choose "File -> Save As" from the application menu or click the Save As () button on the application toolbar. Enter the new experiment name in the Experiment Name field. To save the experiment to a different location, click the "…" button in the Experiment Location field to browse to the directory where the experiment should be saved. Click the OK button. Again, please avoid using non-ASCII characters in the experiment name or directory path.

5.4 Opening an Experiment

To open an existing experiment, either choose "File -> Open" from the application menu, press CTRL + O, or click the Open () button in the application toolbar. In the "Open" window, browse to the directory of the experiment and select the .wle file.

Users can also open an existing experiment through the Windows Explorer by navigating to the experiment directory and double-clicking the .wle file.

5.5 Locking/Unlocking an Experiment

Once the experiment has been finalized, the user should lock the experiment to prevent accidental changes to the experiment during execution. A locked experiment displays a "(Read-Only)" string in the title bar of the WebLink application. When an experiment is locked, users will not be able to access the library manager, adjust the components in the Timeline, or change the experiment properties.

To lock an experiment, click the "File -> Lock" option on the application menu or click the Lock () button on the application toolbar. To modify a locked experiment, unlock the project by clicking "File -> Unlock" on the application menu, or clicking the Unlock () button on the application toolbar.

5.6 Verifying an Experiment

WebLink allows users to verify an experiment so that errors and warnings can be detected before running the experiment. To verify an experiment, click the "Experiment -> Verify" option on the application menu or click the Verify () button on the application toolbar. If no errors or warnings are detected, WebLink will report "The experiment has been successfully validated." Otherwise, errors and warnings are displayed in the "Verification Output" tab of the preview window. The verification output tab displays any detected issues, including the severity of each issue (error vs. warning), the component involved, and a description of the issue. If an error/warning is from an individual component, double-click on the error/warning to open the offending component. Users can copy and paste the verification output elsewhere by clicking anywhere in the verification output tab, pressing CTRL + A to select all of the items in the table, and then using the typical keyboard shortcuts CTRL + C to copy and CTRL + V to paste.

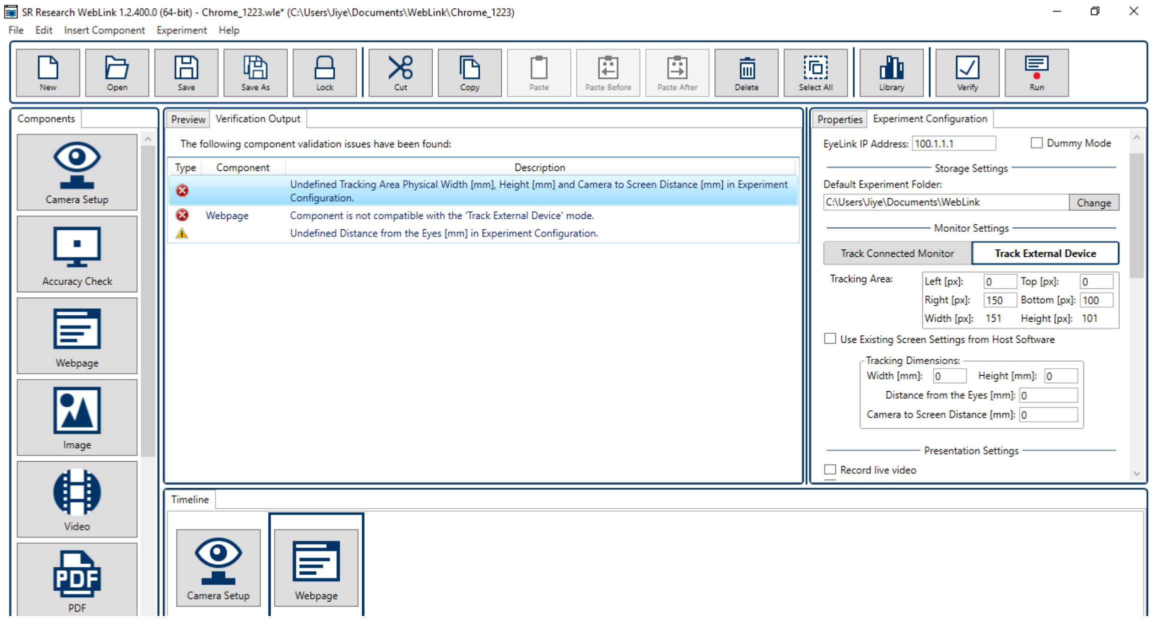

Figure 5-2. Verification Output Displayed in the Preview Window

5.7 Running an Experiment

Users can run the experiment for data collection by clicking "Experiment -> Run" from the application menu, clicking the Run ( ) button from the toolbar, or pressing F11. If you don't have access to eye tracker but would like to test run the experiment, first go to the Experiment Configuration and tick the "Dummy Mode" checkbox in the Connection Settings. Note that with Dummy Mode enabled, the Run button is replaced with a Dummy Run button ( ).

At the beginning of the experiment, the user will be prompted to enter the name of the experiment session and configure any specified participant properties (see figure below). WebLink will execute all of the components in the Timeline in sequence. The presentation of each component can be ended by the keyboard response, mouse click, or presentation duration specified in the component properties. Users can also move to the next component in the Timeline by pressing the system-wide Stop Component hotkey F2. To abort the experiment before completion, press CTRL + C.

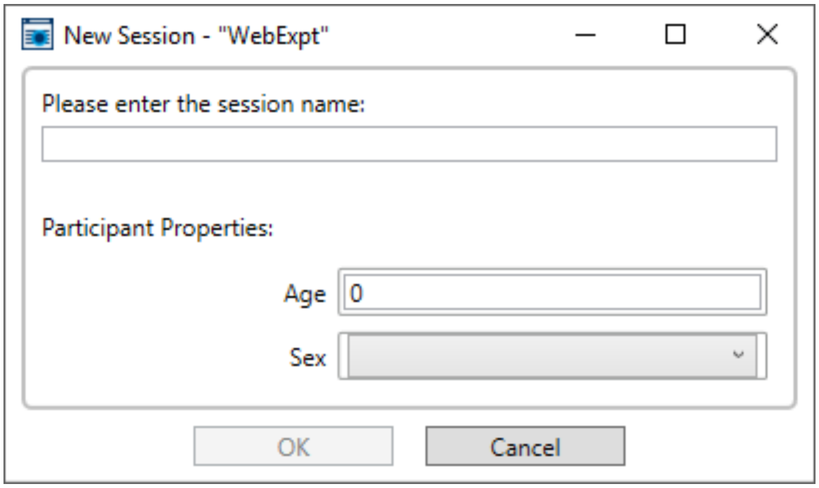

Figure 5-3. New Session Dialog Box

The experiment data will be saved in the “Results\{session name}” folder. Please always test the experiment before collecting actual experiment data and inspect the data file carefully, for instance, to check that all of the trial condition variables are properly recorded, interest areas and images are shown correctly, and important messages are recorded for analysis.

5.7.1 Running Experiments Using the Command-line Interface

In some cases, the experimenter may want to run a WebLink experiment without first opening the WebLink application and without displaying any startup messages (e.g., to keep the WebLink interface hidden, or to call the experiment from a batch script). In these cases, the experiment can be run from a command-line interface using the following syntax:

WebLink.exe <path_to_experiment_file> --R --<arg_name> <arg_value>

The arguments can be:

--R	The flag for automatically running the experiment.
--Participant	Participant name for the session. Mandatory for auto-run. Validation: maximum 8 chars, alphanumeric and "_", not previously used.
--TrackerIP	The preferred IP address of the tracker for this session (optional). The value entered must have the format of an IP address.
--<participantPropertyName>	Each of the participant properties defined in the experiment needs to be specified, along with the corresponding value. The value entered for each property must correspond to the values specified in the Details tab of the “Define Participant Properties” menu.

For example, to run a project “myProject” saved in C:\Experiments\, the command might look like this:

WebLink.exe C:\Experiments\myProject\myProject.wle --R --Participant test01 --Age 30.

This will save the session as test01.edf and set the participant “Age” property to 30.

Note: With the --R flag, WebLink will automatically run the experiment, without any warning dialogs in order to minimize user interaction, and will automatically close after saving the .edf file. If the --R flag is not included, WebLink will open the experiment in the WebLink application.

WebLink will check for the following before running the experiment:

- missing mandatory argument or invalid value.
- experiment validation error
- hardware error (tracker not connected, low disk space - under 100MB)

If an error is encountered, WebLink will cancel running the session, display an error message, and log the error to the console.

Non-critical warnings from experiment validation and hardware warnings (e.g., second monitor not found, resolution not supported) will not cause the session to be cancelled, but will be logged to the external console.

6 Experiment Components

Components are the building blocks of an experiment. Each component allows the user to determine how the experiment materials should be presented to the participant and specify the intended responses from the participant. WebLink includes the following components:

- Camera Setup ( ): Displays the EyeLink camera setup screen for the experimenter to perform camera setup, calibration, and validation.
- Accuracy Check ( ): Performs a pre-recording accuracy check by using a fixation point at a known position to report and/or correct for small drifts in the calculation of gaze position.
- Webpage ( ): Displays online or offline webpages to the participant and records their eye movement data while they browse the webpages.
- Image ( ): Presents an image file to the participant and records their eye movement data.
- Video ( ): Presents a video clip to the participant and records their eye movement data.
- PDF ( ): Presents a PDF document to the participant and records their eye movement data.
- Screen Recording ( ): Records the screen and eye movement data when the participant uses an application on the computer running the WebLink application.
- External Video ( ): Displays and records video from an external device or computer along with the participant's eye movement data.
- Scene Camera ( ). Records video from an external scene camera device (i.e., recording the participant's point of view) along with the participant's eye movement data.

This section provides an overview of the common operations that are applicable to the components (properties of individual components will be discussed in the following chapters). Most of the operations can be performed either by clicking a toolbar button, using a keyboard shortcut, selecting an option from the "Edit" application menu, or right-clicking the selection and selecting an option from the right-click menu.

6.1 Adding a Component

To add a component to the Timeline, either select the node from the Components panel and drag it to the Timeline or click "Insert Component" in the application menu and select the intended component. Once added, the properties of the component can be edited from the left tab of the properties panel.

6.2 Selecting Components

To select one component from the Timeline, simply click on the component. To select multiple items, hold down the CTRL key while doing the selection. To select all items in the Timeline, click the Select All ( ) button in the application toolbar, press CTRL + A, or select "Edit -> Select All" from the application menu.

6.3 Cutting Components

To cut component(s) from the Timeline, select the component(s), then either click the Cut () button in the application toolbar, press CTRL+ X, or select "Cut" from the Edit menu or right-click menu. Note the "Cut" operation removes (grays out) a selection from the Timeline and places it into the clipboard. The difference between the Cut and Delete operations is that Delete doesn't put the removed selection into the clipboard, so it cannot be pasted elsewhere.

6.4 Copying Components

To copy component(s) to the clipboard, select the component(s), then either click the Copy () button in the toolbar, press CTRL + C, or select "Copy" from the Edit menu or right-click menu.

6.5 Pasting Components

Several paste options are available to insert the previously copied item(s) from the clipboard.

- Paste – clicking the Paste ( ) button in the toolbar, pressing CTRL + V, or selecting "Paste" from the Edit menu or right-click menu will insert the copied item to the end of the Timeline.
- Paste Before – clicking the Paste Before () button in the toolbar or selecting "Paste Before" from the Edit menu will insert the copied item before the currently selected item in the Timeline.
- Paste After – clicking the Paste After () button in the toolbar or selecting "Paste After" from the Edit menu will insert the copied item after the currently selected item in the Timeline.
- Paste Multiple – clicking the Paste Multiple () button in the toolbar or selecting Paste Multiple from the Edit menu will bring up a Paste Multiple dialog box that allows the user to specify the number of copies to be made for the select item(s). The copied item(s) will be placed at the end of the Timeline.

6.6 Deleting Components

To delete component(s) from the Timeline, select the component(s), then either click the Delete ( ) button in the toolbar, press the Delete key, or select "Delete" from the Edit menu or right-click menu.

6.7 Moving Components

To move the position of a component in the Timeline, select the item, hold the left mouse button and drag it to the intended position.

6.8 Repetition Sequences

A repetition sequence can be created for the selected component(s) in the Timeline, allowing the user to easily repeat a component or group of components and set different properties for the different repetitions of the component(s). To add a repetition sequence, select the component or multiple components to be repeated, then either click "Edit -> Create Repetition Sequence" from the application menu or right-click on the selection and choose the "Create Repetition Sequence" option from the right-click menu. A Repetition Dialog will then open, allowing the user to configure the repetitions as desired. Please see section 16 "Repetition Sequence" for details.

6.9 Library

Each WebLink project has a built-in library for users to manage resource files such as image and video clips required in the experiment. To access the experiment library, click the Library ( ) button in the application toolbar or click "Edit -> Library …". The Library contains five tabs: Image, Sound, Interest Area Set, Video, and PDF (see figure below). Select the desired tab to manage the resources in the project. Click the Add ( ) button to import a file into the library, the Delete ( ) button to remove the file from the library, or the Rename ( ) button to rename a file. Please avoid using non-ASCII characters in the name of the files in the library as this may cause problems during runtime or analysis. Properties of the select file will be displayed to the right, and a preview displayed on the bottom.

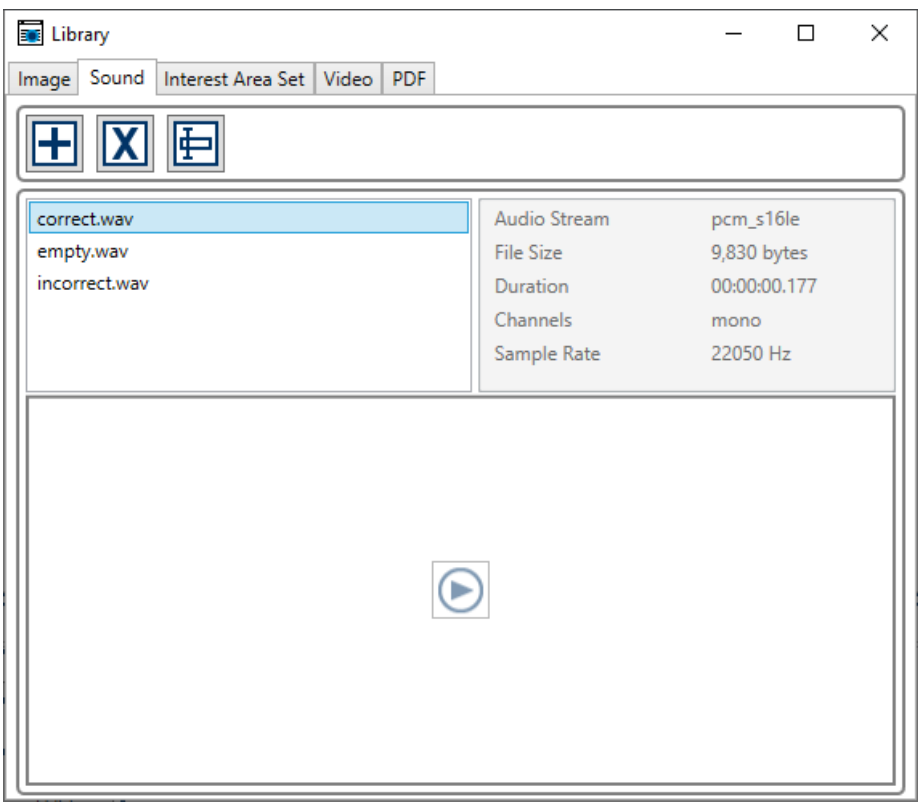

Figure 6-1. Library Manager

7 Camera Setup Component

The Camera Setup component will bring up the Camera Setup screen on the EyeLink Host PC for the experimenter to perform camera setup, calibration, and validation. Control of the Camera Setup procedure is the same as any application using the EyeLink API. The following is a brief recap of the operation—please refer to Chapter 3 “An EyeLink [*version*] Tutorial: Running an Experiment” of your EyeLink system’s User Manual for detailed instructions.

Pressing the ENTER key on either PC will transfer the camera image to the Display PC monitor. The right and left arrow keys can be used to alternate between the global and zoomed camera images. Several shortcut keys are available in this mode on the Display PC, including C for initiating a calibration, V for initiating a validation, A for Automatically thresholding the eye image, the space bar and ENTER for accepting fixations, and the cursor keys and +/- for fine tuning thresholds manually.

Once the system has been calibrated, and the validation has been performed to ensure the error is within the level of tolerance, you may start the recording. Press the “ESC” key to exit the camera setup screen and proceed to the next item in the Timeline.

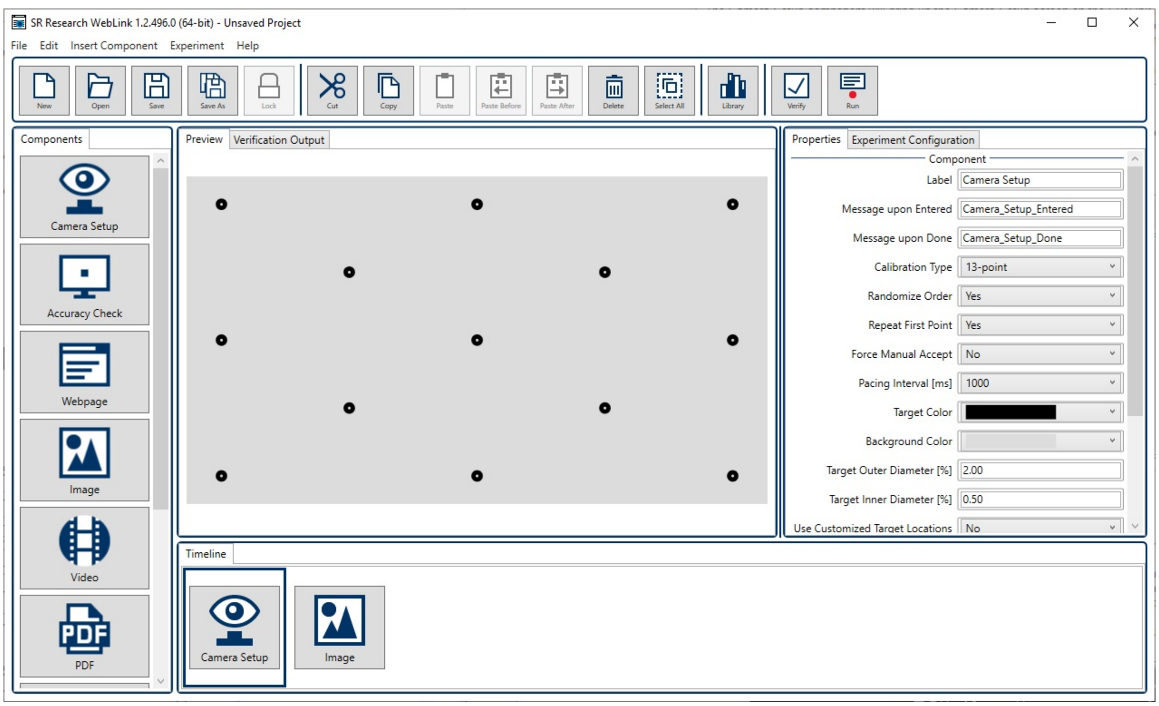

Figure 7-1. Using A Camera Setup Component

To add a camera setup component to the project, simply drag “Camera Setup” from the Components panel and place it in the intended position on the Timeline. Camera Setup will typically be the first event in the Timeline. Once added, a calibration grid is drawn in the preview window. Users can configure various aspects of the calibration in the Properties panel, such as calibration type (number of targets), background color and target color, positioning of the targets, and calibration. Please note that the background color of the calibration/validation screen should match the average luminance of your experimental stimuli as closely as possible to prevent large changes in the participant's pupil size between the camera setup display and the stimuli to be presented, as large changes in pupil size can affect the eye-tracking accuracy.

WebLink allows users to track stimuli either on the monitor of the WebLink PC ("Track Connected Monitor") for applications such as webpage, image, video, PDF, screen recording, or on an external device ("Track External Device") such as a game console or projector, or if using a scene camera. Some of the properties of the Camera Setup component will be automatically adjusted depending on the type of experiment configuration.

Camera Setup Properties	Track Connected Monitor	Track External Device
Calibration Type	HV-13	HV5 (External Video); HV-13 (Scene Camera)
Randomize Order	Yes	No
Repeat First Point	Yes	No
Force Manual Accept	No	Yes
Target Index Position/Target Index Color	Not Applicable	Configurable Options
Export	Not Applicable	Available

When the experiment is configured to track an external device (Scene Camera or External Video), users can save an image of the calibration grid as configured by clicking the "Export" button in the Preview window. The resulting image file will be saved in the folder of the current experiment project. Since WebLink cannot display targets on the external device during camera setup, the user can display this image on the device to serve as the calibration target grid. (Including the target indexes in the calibration display will help in directing the participant to the current target.)

The Camera Setup component will be skipped if running the experiment in Dummy mode (without an actual connection to the eye tracker).

7.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Camera Setup component.

7.2 Properties of the Camera Setup Component

The following discusses the properties of the Camera Setup component.

Property	Description
Label	Label of the Camera Setup component.
Message on Entered	Message to be sent to the EDF file when the camera setup component is entered (but not done yet).

Message on Done	Message to be sent to the EDF file when camera setup component is done. The experiment flow now moves to the next component in the Timeline.
Calibration Type	This sets the calibration type. One of the following calibration types can be selected from the dropdown list: 3-point: 3-point calibration (triangular pattern) 3-point, horizontal-only: horizontal-only 3-point calibration 5-point: 5-point calibration (cross pattern) 9-point: 9-point grid calibration 13-point: 13-point calibration (EyeLink II version 2.0 or later; any versions of EyeLink 1000, EyeLink 1000 Plus, EyeLink Portable Duo/Remote). The default calibration type is 13-point, which is recommended for the head-free remote mode.
Randomize Order	If set to "Yes", randomizes the presentation sequence of the calibration and validation targets.
Repeat First Point	If "Yes", redisplays the first calibration or validation target at the end of calibration or validation.
Force Manual Accept	If "Yes", the experimenter or participant needs to manually accept each calibration and validation target (when a stable gaze is directed to it).
Pacing Interval (ms)	Sets the time delay in milliseconds for showing the next calibration or validation target. This option applies only if the presentation of calibration or validation targets is triggered automatically by the tracker (as opposed to manual triggering by the experimenter; see the "Force Manual accept" option).
Target Color	Color used to draw calibration targets, and for the text on the camera image display. It should be chosen to supply adequate contrast to the background color. The default target color is (0, 0, 0).
Background Color	The color to which the entire display is cleared before calibration. This is also the background for the camera images. The background color should match the average brightness of your experimental displays as closely as possible, as this will prevent large changes in the participant's pupil size at the start of the trial. This will provide the best eye-tracking accuracy as well.
Target Outer Diameter [%]	The standard calibration target is a filled circle (for peripheral detectability) with a central "hole" target (for accurate fixation). The disk is drawn in the calibration target color, and the hole is drawn in the calibration background color. The "Target Outer Diameter" property specifies the diameter of the outer disk of the default calibration target (in percentage of screen width).

Target Inner Diameter [%]	Diameter of the inner disk of the default calibration target (in percentage of screen width). If the hole size is 0, no central feature will be drawn.
Target Index Position	Sets the position of the target index number. The index number can be displayed inside the target, above it, or not displayed at all.
Target Index Color	The target index font color, defined by red, green, blue, and alpha.
Use Customized Target Locations	If set to Yes, allows user-defined calibration target positions. If set to No, uses the default target positions.
Use Absolute Locations	If set to Yes, custom target positions are specified using pixel coordinates within the tracking area. If set to No, custom target positions are specified using the relative position within the tracking area (from 0 to 100%).
Customized Target Locations	A list of X/Y pairs to specify the calibration target positions, either in absolute (pixel) coordinates or relative coordinates as set in Use Absolute Locations. The number of points included in the list must match the calibration type.
Calibration Area Percentage X [%]	This sets the part of the width of the display to constrain the horizontal spread of the calibration and validation targets.
Calibration Area Percentage Y [%]	This sets the part of the height of the display to constrain the vertical spread of the calibration and validation targets.
Target Beep	WebLink plays alerting sounds during calibration by default. These sounds have been found to improve the speed and stability of calibrations by cueing the participant; this will make the experimenter's task easier. The "Target Beep" property enables the sound playing when the calibration target is presented. If set to No, no sound will be played for that event.
Error Beep	Sets sound (Yes, or No) to play on failure or interruption.
Good Beep	Sets sound (Yes, or No) to play on successful operation.

8 Accuracy Check Component

An accuracy check component allows the experimenter to to display a single fixation point so the participant's gaze can be checked against a known position before continuing with the experiment. This procedure can be regarded as a 1-point validation of the tracking accuracy, and it also gives the experimenter an opportunity to return to Camera Setup and recalibrate the tracker if needed. This is particularly useful for longer experiments with several components, as the Accuracy Check can be called multiple times in the Timeline, allowing the experimenter to ensure an accurate recording throughout the experiment. The Accuracy Check component puts the eye tracker into the accuracy check/drift correction mode, which displays a single target on the display PC. The participant must fixate on the target and press the spacebar key to proceed. (Alternatively, the experimenter can press the space bar on the Host PC while the participant fixates the target.) The experiment will only proceed if the participant is fixating within 2.0 degrees of the target (by default); if the gaze error is too high, the experimenter can press the “Esc” key to return to Camera Setup and recalibrate before proceeding. When the fixation is accepted, the accuracy check is completed, and the experiment moves to the next component in the Timeline window.

Performing an accuracy check for EyeLink 1000/1000 Plus/Portable Duo is optional, but is highly recommended for EyeLink II, especially when operating in the pupil-only mode. Please note that the background color of the accuracy check screen should match the average luminance of your experimental stimuli as closely as possible to prevent large changes in the participant’s pupil size between the camera setup display and the stimuli to be presented, as large changes in pupil size can affect the eye-tracking accuracy.

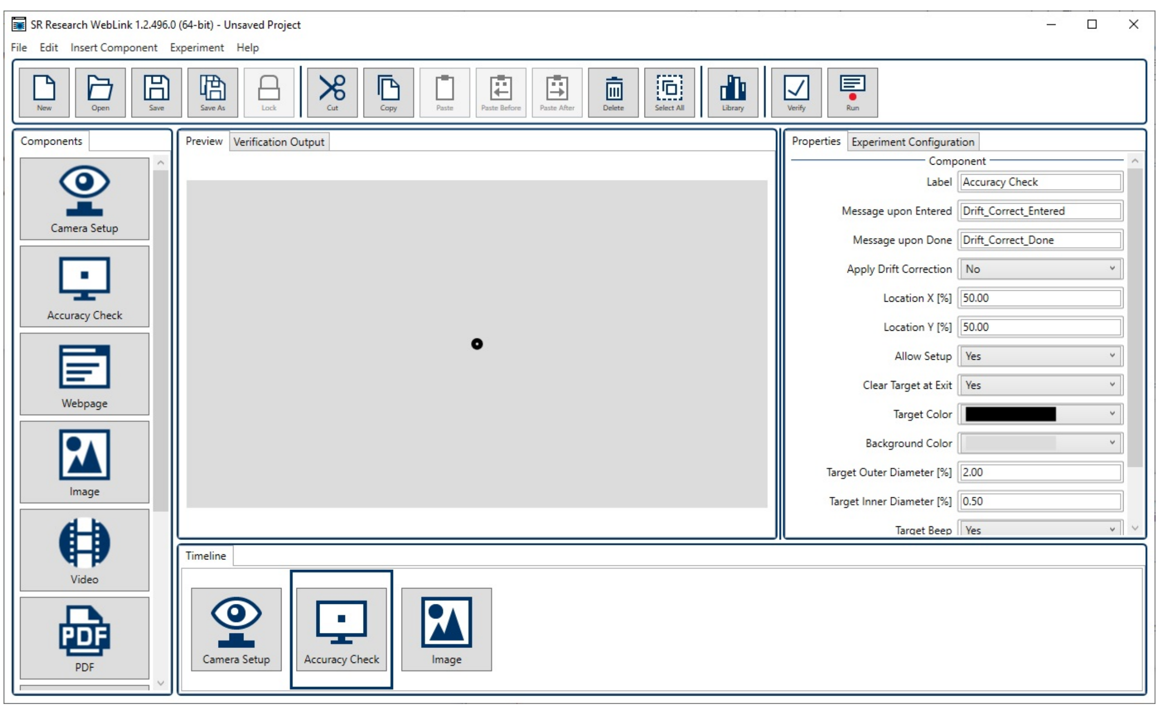

Figure 8-1. Using an Accuracy Check Component

To add an accuracy check component to the project, simply drag “Accuracy Check” from the Component panel and place it in the intended position in the Timeline. Once added, the preview window for the component displays an accuracy check target. Users can configure various aspects of the accuracy check in the Properties panel, such as background and target colors, positioning of the target, audio feedback, etc.

The Accuracy Check component will be skipped if running the experiment in Dummy mode (without an actual connection to the eye tracker).

8.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Accuracy Check component.

8.2 Properties of the Accuracy Check Component

The following table lists the properties of the Accuracy Check component:

Property	Description
Label	Label of the Accuracy Check component.
Message upon Entered	Message to be sent to the EDF file when the Accuracy Check component is entered (but not yet done).
Message upon Done	Message to be sent to the EDF file when the Accuracy Check component is done, and the experiment flow moves to the next component in the Timeline.
Apply Drift Correction	Whether a correction will be applied to the calibration mapping. If set to “Yes”, a true Drift Correction will be performed; if set to “No”, the eye tracker will perform an Accuracy Check and report the error without correcting for it. Set this option to “No” for EyeLink 1000, EyeLink 1000 Plus, and EyeLink Portable DUO trackers. Set this option to “Yes” for EyeLink II operating in “Pupil Only” mode, as applying drift-correction improves tracking accuracy for such a setup.
Location X [%]	X coordinate of the accuracy check target relative to the screen width. Typically, this is 50% (center of the screen) but can be set to any other screen location.
Location Y [%]	Y coordinate of the accuracy check target relative to the screen height. Typically, this is 50% (center of the screen) but can be set to any other screen location.
Allow Setup	If checked, the Camera Setup screen on the host software can be called up by pressing the ESC key during an Accuracy Check so that calibration problems can be corrected. The default setting is "Yes".
Clear Target at Exit	If “Yes”, the screen will be cleared to the background color after the Accuracy Check finishes; otherwise, the accuracy

	check target remains on the screen.
Target Color	Color used to draw the accuracy check target (and for the text on the camera image display if switching from the Accuracy Check to Camera Setup mode). It should be chosen to provide adequate contrast to the background color. The default target color is (0, 0, 0).
Background Color	The color to which the entire display is cleared before performing an Accuracy Check. The background color should match the average brightness of your experimental displays as closely as possible, as this will prevent large changes in the participant's pupil size at the start of the trial. This will provide the best eye-tracking accuracy as well.
Target Outer Diameter [%]	The standard accuracy check target is a filled circle (for peripheral detectability) with a central "hole" target (for accurate fixation). The disk is drawn in the target color, and the hole is drawn in the background color. The "Target Outer Diameter" property specifies the diameter of the outer disk of the default target (in percentage of screen width).
Target Inner Diameter [%]	Diameter of the inner disk of the default accuracy check target (in percentage of screen width). If hole size is 0, no central feature will be drawn.
Target Beep	This property enables the playing of a sound cue when the accuracy check target is presented. If set to "No", no sound will be played for that event.
Error Beep	Sets sound (Yes, or No) to play on failure or interruption.
Good Beep	Sets sound (Yes, or No) to play on successful operation.

9 Webpage Component

The Webpage component captures eye movement data while participants browsing websites. While the participant browses freely, WebLink captures the URL (or local address) for each of the webpages the participant views, saves screenshots of the entire webpage, and optionally saves a video recording of the screen as the participant browses. Any key presses, and mouse clicks and scrolling will also be recorded. When using the Webpage component, the display computer should either be connected to the Internet or have access to offline webpages stored locally on the computer. (If using online webpages, the display computer must have two network connections: one Ethernet connection to the EyeLink Host PC, and one Ethernet or WiFi connection to the Internet.)

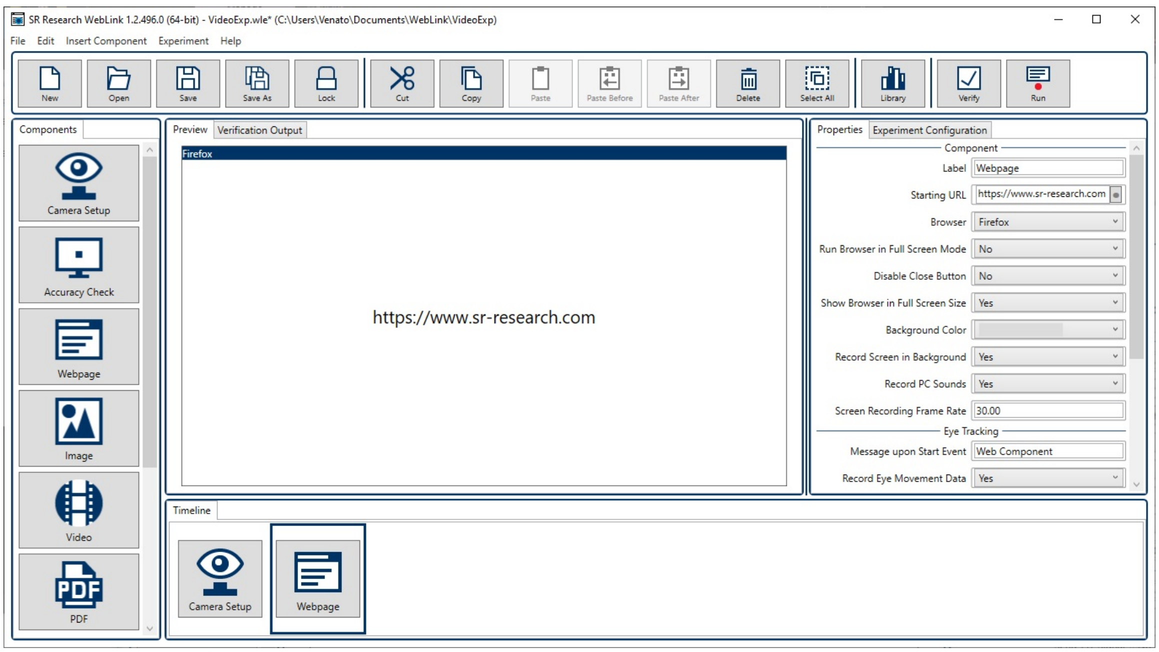

Figure 9-1. Using A Webpage Component

To add a webpage component, simply drag "Webpage" from the Component panel and place it in the intended position in the Timeline. When the component is selected, the starting URL will be displayed in the preview window. When WebLink executes the component during the experiment, it will launch the browser (Firefox or Chrome) and load the URL or local webpage files specified in the component. WebLink will log a "Webpage Component" message and the URL of the webpage to the eye tracker data file for trial segmentation in Data Viewer for each of the new page browsed (e.g., when the URL is accessed through the launch of the component, when clicking on the URL of the page, when the forward, backward, refresh, or home button on the toolbar of the browser is clicked, or when a new tab is opened in the browser).

During recording, the preview window in WebLink displays a live feed of the participant's display with their gaze position overlaid on the webpage. WebLink takes a screen capture of the entire webpage when a page is fully loaded; an icon will be displayed in the preview window whenever a page screenshot is taken (see Figure 9-2).

Data Viewer accounts for the mouse scrolling data recorded in the EDF to correctly display the gaze data over the screenshot of the entire webpage.

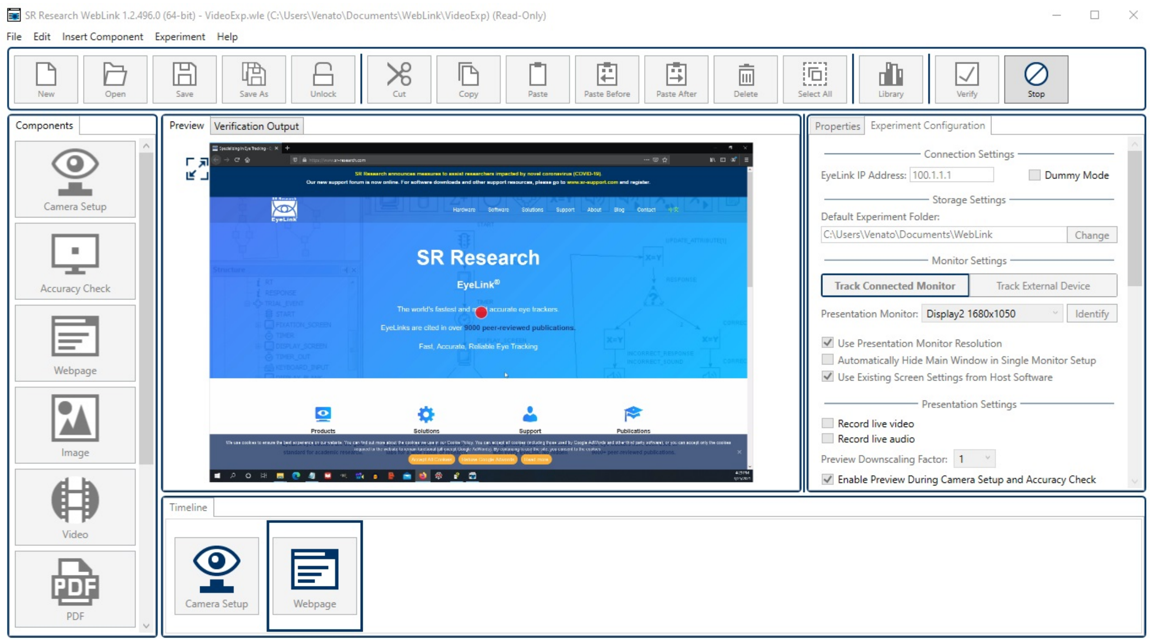

Figure 9-2. Preview Window Shows Screenshot in Program during Webpage Navigation

The presentation of the Webpage Component can be configured to end in several different ways: by pressing the system-wide Stop Component hotkey F2 or a key press specified in the “Keyboard Response” property, a mouse action specified in the “Mouse Response” property, by clicking the close button of the browser, or when the elapsed time exceeds the “Max Duration” specified (the default duration of “0” means no maximum duration). The web browser will be closed automatically when one of the trial-ending events is detected.

WebLink supports full-length webpages running on common screen resolutions (the maximum supported resolution is 1920 x1080). The software allows the user to display the browser in either the full-screen mode or the windowed mode, in which the user may set the browser dimensions and placement on the desktop, and to disable the browser close button if desired. Presently, WebLink supports Firefox (version 69 or later) and Chrome. Please make sure the intended browser is installed on the display computer. Make sure to disable browser updates, default browser checks, etc., before running the experiment, to prevent these windows from being displayed to the participant.

While WebLink is designed for general webpage browsing, please keep in mind that it is challenging to handle some websites as webpage standards keep evolving. When using Firefox, WebLink attempts to make a full-length screenshot of the webpage when a new page is loaded, when new content is detected on the current page (e.g., scroll to the bottom of page), and when a change in the URL of the webpage is detected (e.g., immediately before navigating away from the current page). When using Chrome browser, WebLink attempts to make multiple screen captures of the current screen and create a full-length screenshot of the Webpage by stitching together individual screen captures. These screenshots may not be sufficient to fully capture websites with dynamic content (e.g., Web 2.0 content, videos, online games, or other webpages where content changes over time), so it is important to enable background screen recording for these types of stimuli. Other types of webpages that can pose difficulties for screen capturing or scroll compensation during analysis include webpages with frames or floating windows, viewing files such as PDFs in the browser window, webpages with excessively long URLs, or excessively long webpages. With dynamic content, users should take care during analysis if they intend to compare data across participants—for instance, the positions and durations of interest areas created for one participant's recording may need to be adapted significantly or rebuilt entirely for another participant.

9.1 Activating the WebLink Extension (Firefox)

WebLink uses a browser extension to perform the webpage recording. In both Firefox and Chrome, the WebLink browser extension is critical for properly saving the webpage screen captures and the background screen recording, as well as recording eye tracking data. The first time running an experiment with a Webpage component with either browser selected, you will be prompted to enable the WebLink extension for that browser. For the Firefox browser extension activation, you can follow the instruction steps below or watch this tutorial video (https://download.sr-support.com/wlrelease/WebLink_FireFox.mp4).

To activate the WebLink Extension for Firefox, simply add a Webpage component to a WebLink project, set the browser to Firefox, and run the project (you may wish to enable Dummy Mode so a tracker connection is not necessary). You will first see the dialog box shown in Figure 9-3. Click "Next" to continue.

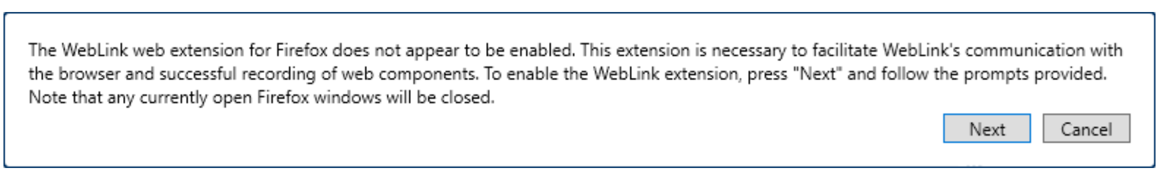

Figure 9-3. Dialog Box Prompting Activating WebLink Extension for Firefox

WebLink will then open a Firefox window, and the following dialog box (Figure 9-4) will be shown. Please don't click the "Next" button just yet, because you will need to ***manually*** activate the WebLink extension for Firefox first, following the steps below. (If you click "Next" before properly activating the extension, WebLink will show an "Activation not successful" message—simply run the experiment again to continue the activation.)

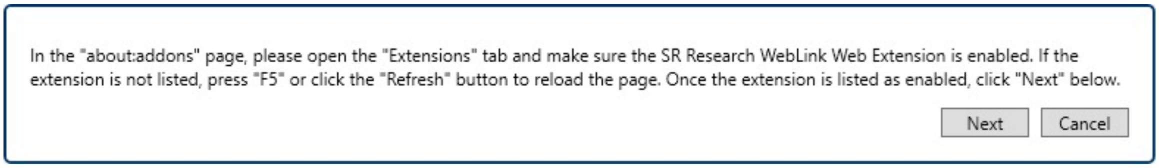

Figure 9-4. Instructions for Manually Activating WebLink Extension for Firefox

The Firefox window will be opened to the "about:addons" page (see Figure 9-5). Click on the "Extensions" tab and you will see the "SR Research WebLink Web Extension". The extension is disabled at this moment. Click the "Open Menu" button ( ) on the right end of the browser toolbar.

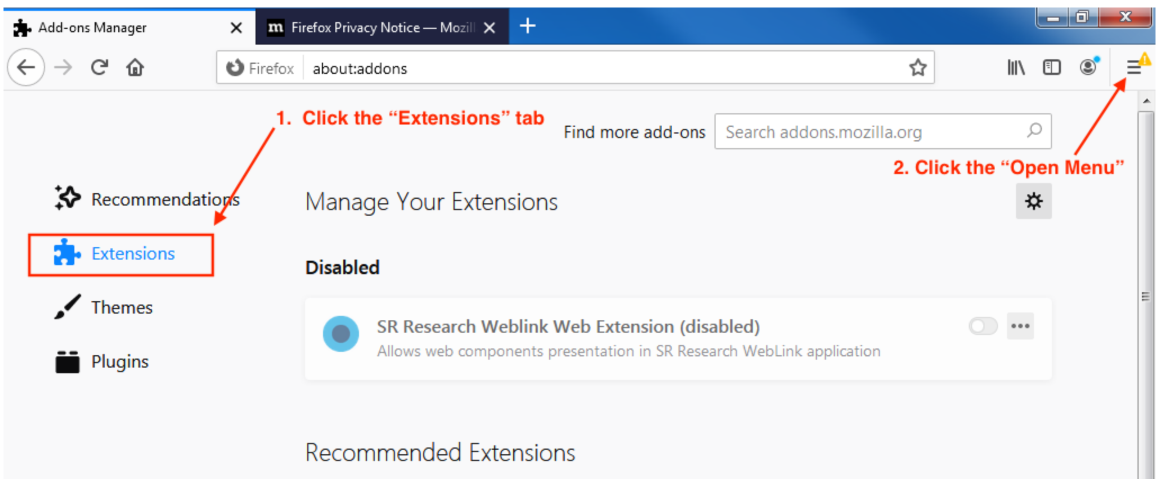

Figure 9-5. Selecting the Extensions Tab and Clicking the Open Menu

Click on the first item listed in the Open Menu "SR Research WebLink Web Extension …" (see Figure 9-6).

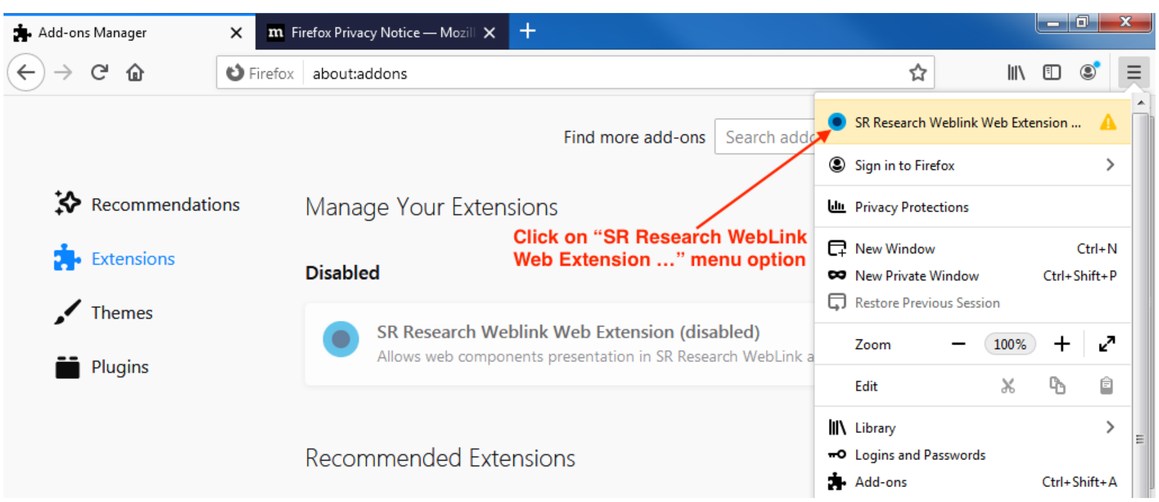

Figure 9-6. Selecting "SR Research WebLink Web Extension …" on the Open Menu

Firefox will then present a prompt below the address bar showing "SR Research WebLink Web Extension added" (see Figure 9-7). Click the "Enable" button.

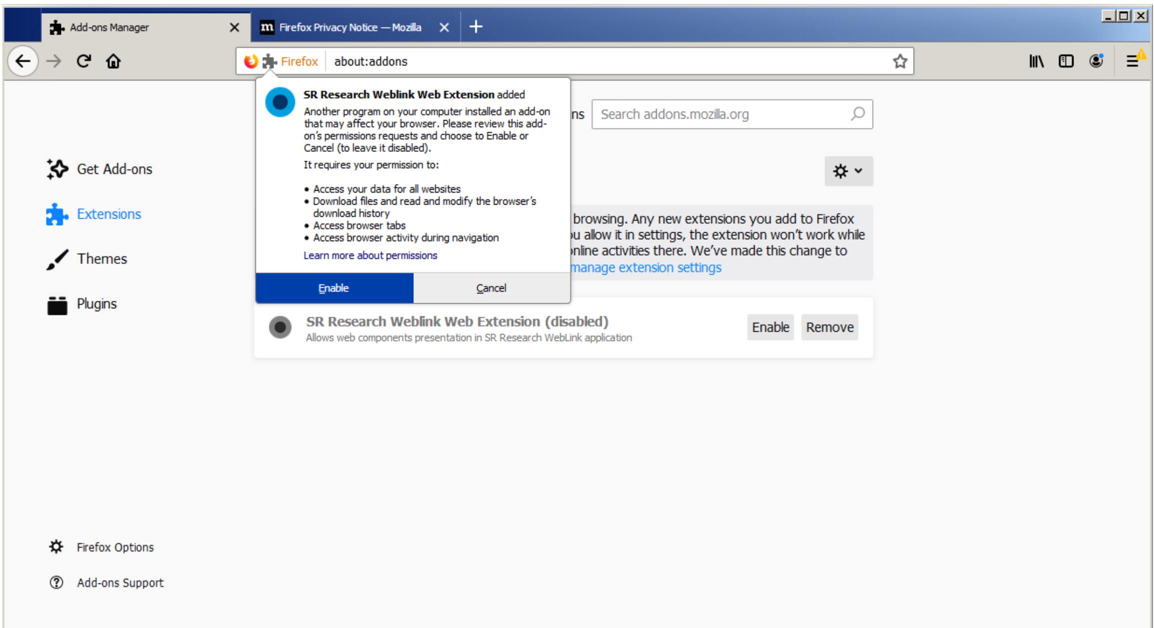

Figure 9-7. Enabling WebLink Extension for Firefox

After the extension has been enabled, Firefox will show a final confirmation that "SR Research WebLink Web Extension has been added to Firefox" (see Figure 9-8). Click "Okay, Got It". Leave the Firefox window open, then go back to the WebLink application and click the "Next" button on the dialog box (Figure 9-4).

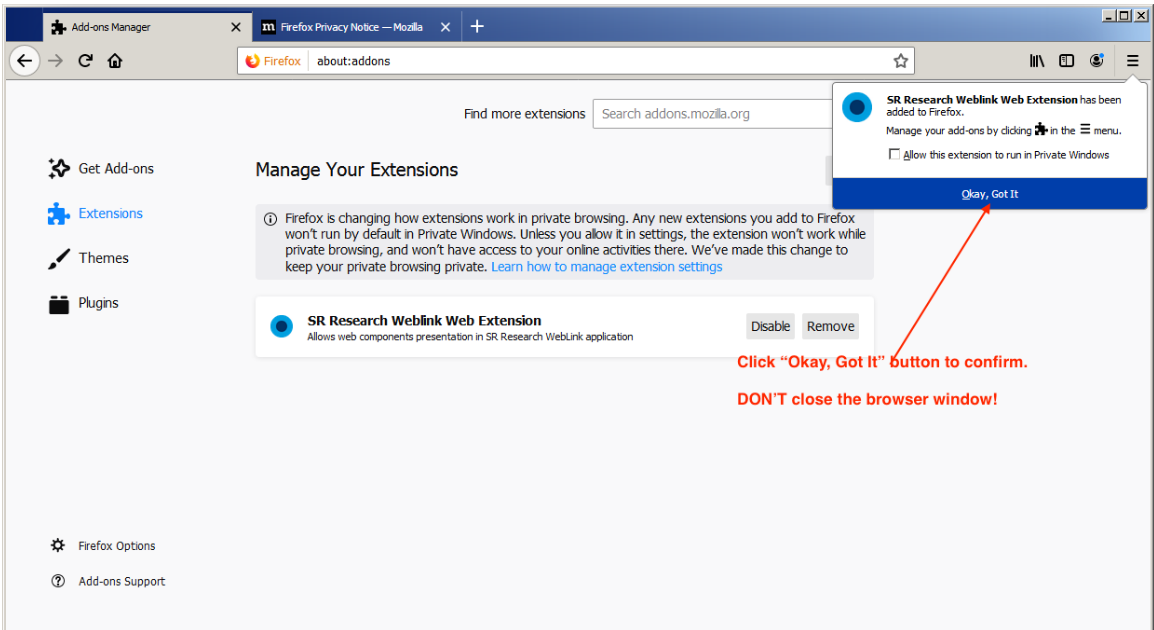

Figure 9-8. Finishing WebLink Extension Activation

WebLink will then check the activation of the extension and display the message "The SR Research WebLink Web Extension has been detected as active" when successful. Click the "Continue" button to finish the activation. WebLink will automatically close the Firefox window(s) before continuing with the experiment.

Should you see an "Activation not successful" message, please click the "Run" button from the application toolbar to restart the manual activation of the WebLink extension.

9.2 Activating the WebLink Extension (Chrome)

As with Firefox, the WebLink browser extension for Chrome is critical for properly saving the webpage screen captures and the background screen recording, as well as recording eye tracking data. For the Chrome browser extension activation, you can follow the instruction steps below or watch this tutorial video (https://download.sr-support.com/wlrelease/WebLink_Chrome.mp4).

To activate the WebLink Extension for Chrome, simply add a Webpage component to a WebLink project, set the browser to Chrome, and run the project (you may wish to enable Dummy Mode so a tracker connection is not necessary). You will first see the dialog box shown in Figure 9-9. Click "Next" to continue.

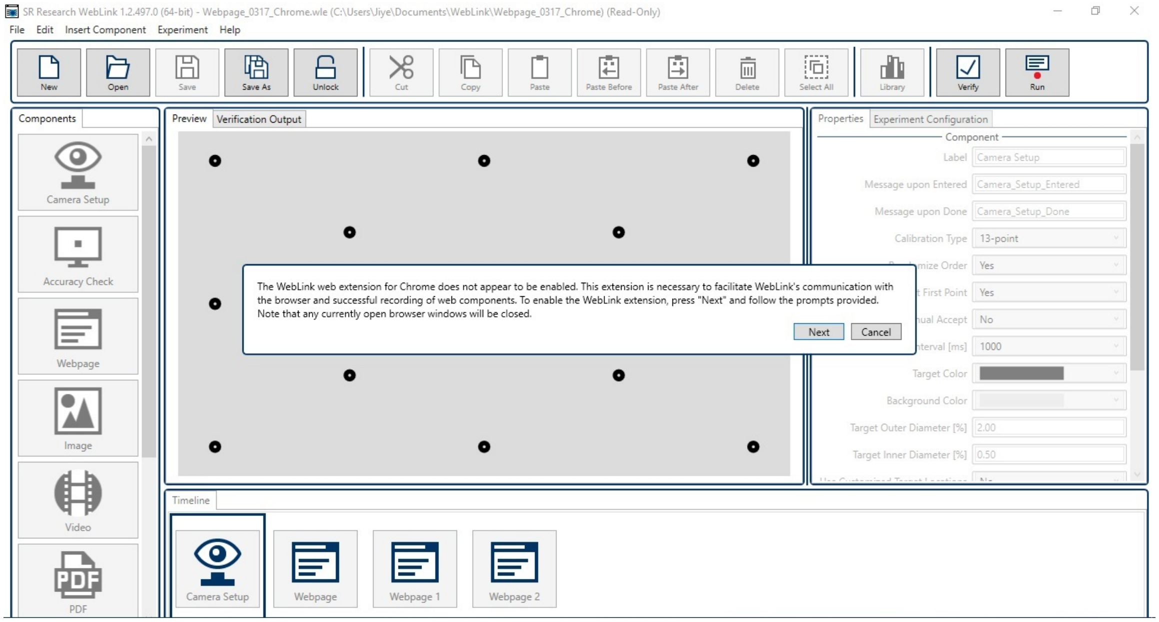

Figure 9-9. Dialog Box Prompting Activating WebLink Extension for Chrome

WebLink will then open a Chrome browser window, and the following dialog box (Figure 9-10) will be shown. Please don't click the "Next" button just yet, because you will need to ***manually*** activate the WebLink extension for Chrome first, following the steps below. (If you click "Next" before properly activating the extension, WebLink will display an "Activation not successful" message—simply run the experiment again to continue the activation.)

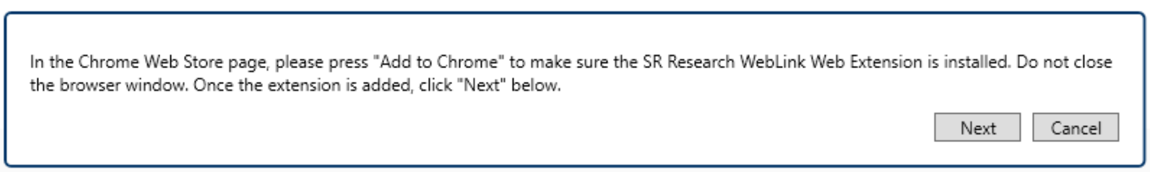

Figure 9-10. Instructions for Manually Activating WebLink Extension for Chrome

The Chrome browser will open the Chrome web store and displays a page that lists "SR Research WebLink Extension for Chrome". Click the "Add to Chrome" button on the right side (see Figure 9-11).

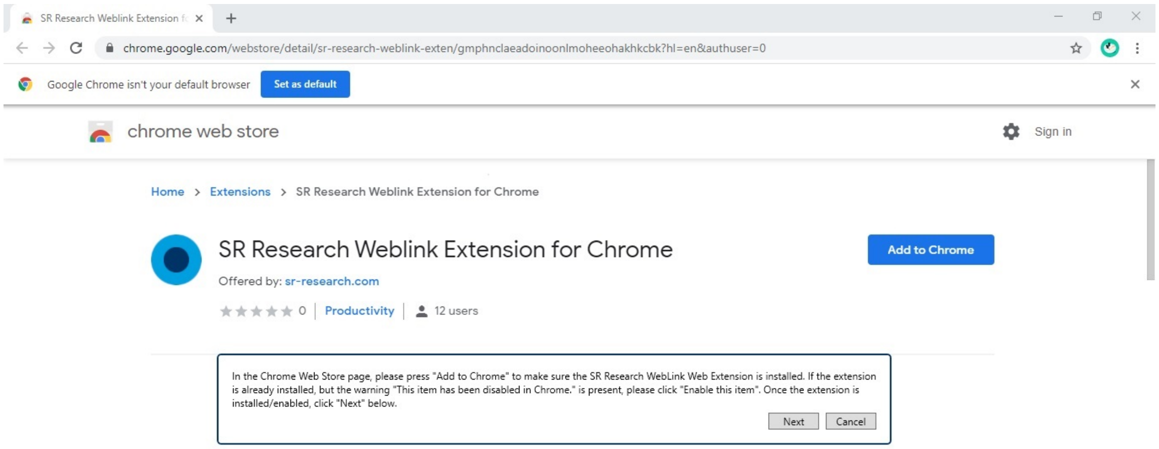

Figure 9-11. Chrome Web Store for Adding the WebLink Extension

You will see a dialog box titled “Add SR Research WebLink Extension for Chrome?”. Click the “Add extension” button on the left side (see Figure 9-12).

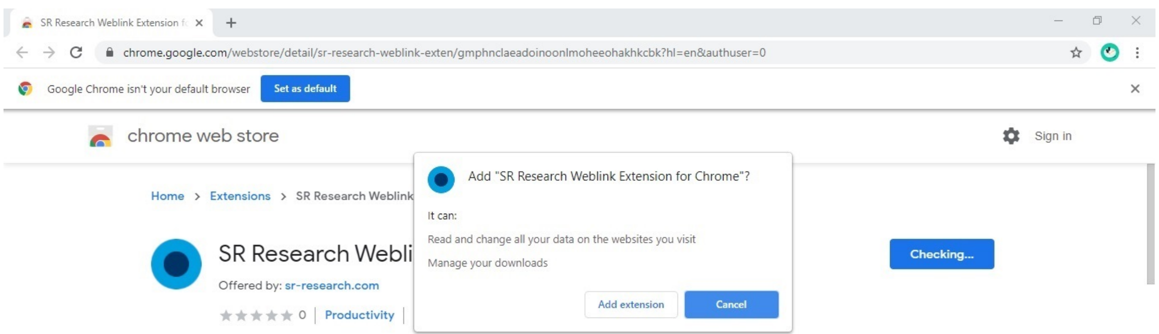

Figure 9-12. Add SR Research WebLink Extension for Chrome

Chrome will then show a dialog reading “SR Research WebLink Extension for Chrome has been added to Chrome”. Click anywhere on the browser page. Now click “Next” in the WebLink dialog box (see Figure 9-13).

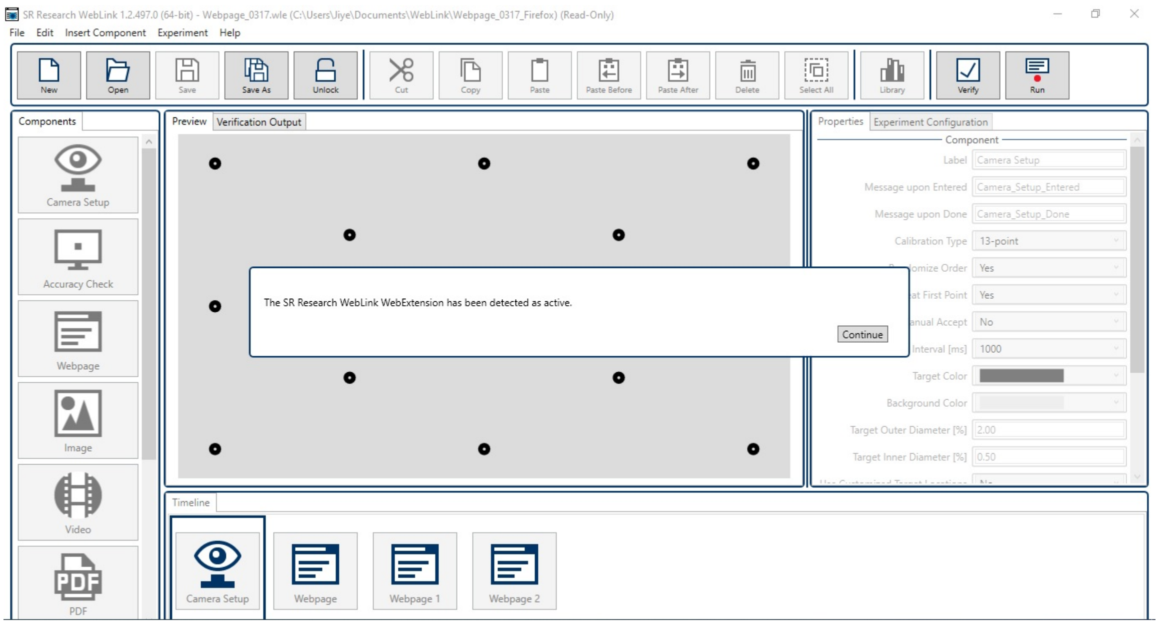

Figure 9-13. Click "Next" to Finish WebLink Extension Activation

WebLink will then check the activation of the extension, and show a message "The SR Research WebLink Web Extension has been detected as active" when successful. Click the "Continue" button to finish the activation. WebLink will automatically close the Chrome window(s) before continuing with the experiment.

Should you see an "Unable to confirm the extension activation. Please retry" message, please click the "Run" button from the application toolbar to restart the manual activation of the WebLink extension.

9.3 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Webpage component.

9.4 Properties of the Webpage Component

The following discusses the properties of the Webpage component.

Property	Description
Label	Label of the Webpage component.
Starting URL	The URL of the webpage to be displayed when the Webpage component is first entered. This can be URL of an online website or an offline/local html file. For an online webpage, remove the existing text in the edit box and enter the intended website URL. To display a local offline html file, click the button at the right end of the field. This will bring up a file chooser dialog box. Browse to the intended directory and choose the starting .html or .htm file.

Browser	The name of the browser (Firefox or Chrome) that will be used to open the online/offline webpage specified. In a project with multiple Webpage components, if the user changes this property, WebLink will ask whether to change the browser for all components.
Run Browser in Full Screen Mode	If set to Yes, the web browser window will be shown in full-screen mode (which renders websites over the entire display area). If set to No, the browser window will be in normal window mode (which has a navigation toolbar above the browsing area in which you see the websites that you visit).
Disable Close Button	If set to Yes, the Close button on the browser window will be disabled.
Show Browser in Full Screen Size	If set to Yes, the browser window will be shown in the entire presentation screen. If set to No, the browser window will have a configurable width, height, and starting location.
Browser Width [%]	If "Show Browser in Full Screen Size" set to No, this specifies the width of the browser window as a percentage of the presentation screen width.
Browser Height [%]	If "Show Browser in Full Screen Size" set to No, this specifies the height of the browser window as a percentage of the presentation screen height.
Browser Starting Location X [%]	The x position of the top-left corner of the browser window specified as a percentage of the presentation screen width.
Browser Starting Location Y [%]	The y position of the top-left corner of the browser window specified as a percentage of the presentation screen height.
Record Screen in Background	If set to Yes, a recording of the participant's screen during the webpage component presentation will be saved. This can be used in data analysis as an alternative to the screenshots of the webpages, especially for websites with dynamic contents. If set to No, only the screenshots will be captured, and not the background screen recording.
Record PC Sounds	If set to Yes, the PC audio output will be saved in the resulting video recording. If set to No, only video will be saved, without audio.
Screen Record Frame Rate	The frame-per-second capture rate of the background screen recording (1 to 30).
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the Webpage component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Base Address	The address of the port at which the TTL signal will be

	sent out. For the device address, a hexadecimal value will be reported in the Windows Device Manager. Here we need to convert it to an integer. For instance, for a parallel port device with an I/O Range of BFF8-BFFF, the hexadecimal address "BFF8" should be converted to "49144".
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds. If set to 0, the stimulus will not time out (the trial has to be terminated by a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.) Note: many keys may be used as browser shortcuts for web browsing. Please check out this page http://dmcritchie.mvps.org/firefox/keyboard.htm to avoid accidentally specifying a "Keyboard Response" that may conflict with these navigation keys and Browser specific shortcuts. Avoid using "Any" as the response because this may occasionally capture the key press from the previous trial.
Mouse Response	A list of mouse events that can be selected to stop the execution of the current component.

10 Image Component

The image component displays an image file (.png .bmp, .jpg, .tif) from the project library to the participant. This can be used to deliver experiment stimuli or to present instructions to the participants. Images can be presented in the original pixel size or scaled to a desired resolution.

To add an image component, simply drag "Image" from the Component panel and place it in the intended position in the Timeline. Make sure the desired image has been added to the project library, then select the Image component and choose the image to be displayed from the "Source File" dropdown list. The selected image will then be displayed in the Preview window.

The presentation of the Image Component can be configured to end in several different ways: by pressing the system-wide Stop Component hotkey F2 or a key press specified in the "Keyboard Response" property, a mouse action specified in the "Mouse Response" property, or when the elapsed time exceeds the "Max Duration" specified (the default duration of "0" means no maximum duration).

The Image component also allows users to present audio stimuli either synchronized to the display onset or with a time offset.

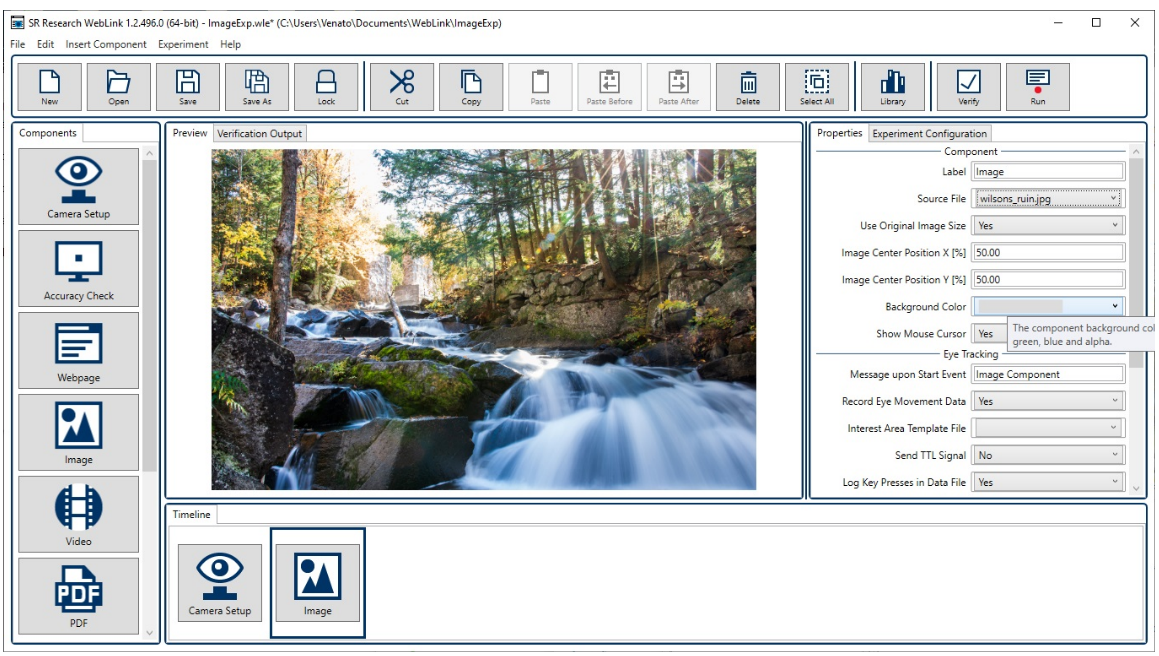

Figure 10-1. Using an Image Component

10.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Image component.

10.2 Supported File Formats and Library Manager

Image files need to be loaded into the Library Manager before they can be presented through the Image component. To open the Library Manager, click "Edit -> Library Manager" from the application menu or the Library ( ) button in the toolbar. In the Library Manager dialog box, select the "Image" tab. Click the Add ( ) button to import an image file into the library. (The “Remove” ( ) button removes a file from the library, and the Rename ( ) button renames a file in the library.) The names of the image files should not contain any spaces or non-ASCII characters.

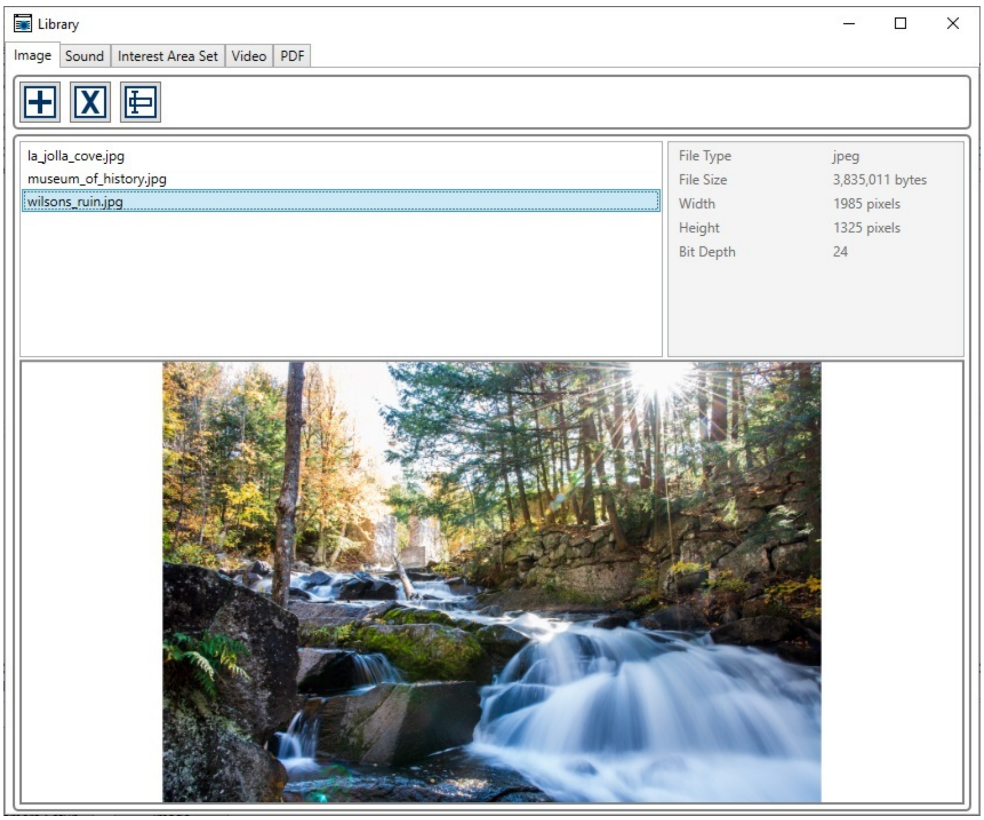

Figure 10-2. Image Tab of the Library Manager

The panel on the right side of the Library Manager displays the properties of the images added to the library: type, file size, width and height, and bit depth.

- The following image file formats are supported by WebLink: .bmp, .png, .tif, and .jpg.
- Avoid using images with an excessively large width or height, as the size of the images that can be displayed and the performance of the stimulus presentation depend on the hardware capability of the display computer.
- Bit depth indicates the number of bits used for each color component of a single pixel. Common image files have a color depth of 24-bit - each pixel has three components: red, green blue. Some .bmp and .png files come with a color depth of 32 - those images have an additional alpha channel (alpha of 255 is opaque

while alpha of 0 is transparent). WebLink supports displaying images with a built-in alpha channel.

10.3 Properties of the Image Component

The following discusses the properties of the Image component.

Property	Description
Label	Label of the Image component.
Source File	The name of the image file to be displayed. Make sure that the file name does not contain spaces or non-ASCII characters. The images used in the experiment must be first loaded into the library manager. An error will be given at the beginning of experiment runtime if this field is left empty, or if the field is populated (either directly in the component, or through the repetition sequence) but the selected file is missing from the library.
Use Original Image Size	If set to Yes, the image will be displayed in its original size. If set to No, the image may be stretched to the size specified by “Image Width” and “Image Height” properties.
Image Width [%]	The intended width of the image, defined as percentage of the presentation screen width.
Image Height [%]	The intended height of the image, defined as percentage of the presentation screen height.
Image Center Position X [%]	The X position of the center of the image, defined as percentage of the presentation screen width.
Image Center Position Y [%]	The Y position of the center of the image, defined as percentage of the presentation screen height.
Background Color	The background color of the component on top of which the image is drawn, in case the image is not displayed to fill the entire screen.
Show Mouse Cursor	If set to Yes, this will allow the mouse cursor to be visible over the presentation area of the component. If set to No, the cursor will be hidden.
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the Image component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Interest Area Template	The name of the interest area file to be applied to the component for Data Viewer analysis. The interest areas should be loaded into the Interest Area tab of the Library Manager.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).

TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds (minimum value should be 150). If set to 0, the stimulus will not time out (the trial has to be terminated by either a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.) By default, this is set to Any.
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, this is set to "Left Button".
Experiment Flow	
Enable Audio Playback	If Yes, an audio clip will be played when the image component is executed.
Audio File	The name of the audio file to be played. Make sure that the file name does not contain space or non-ASCII characters. The audio file must be first loaded into the Sound tab of the library manager.
Playback Offset (ms)	The delay (in milliseconds) of the audio playback relative to the onset of the image presentation.

11 Video Component

The Video Component is used to present a video clip on the display screen. For optimal video playing performance, the display computer should have a fast CPU processor, at least 4 GB of RAM, a video card with at least 1.0 GB of memory and OpenGL 2.0 support. An SSD hard drive is also recommended for fast video data transfer.

To add a video component, simply drag “Video” from the Component panel and place it in the intended position in the Timeline. Make sure the desired video has been added to the project library, then select the Video component and choose the video to be displayed from the “Source File” dropdown list. The first frame of the selected video clip will then be displayed in the Preview window.

For users of SR Research Experiment Builder software, please note a few differences in the video playback between the two software. The video-playing engine used by WebLink allows users to play back both the audio and video channels in a single video clip; there is no need to split the audio and video channels as with Experiment Builder. WebLink allows playing a video clip either in its original size or scaled to a desired resolution. In addition, for any given video clip, users can specify the Start Frame and End Frame of the video to be played. WebLink will seek to the intended frame of the video clip and displayed it in the preview window when the “Start Frame” or “End Frame” button is pressed.

The presentation of the Video Component can be configured to end in several different ways: by pressing the system-wide Stop Component hotkey F2 or a key press specified in the “Keyboard Response” property, a mouse action specified in the “Mouse Response” property, or when the elapsed time exceeds the “Max Duration” specified (the default duration of “0” means no maximum duration).

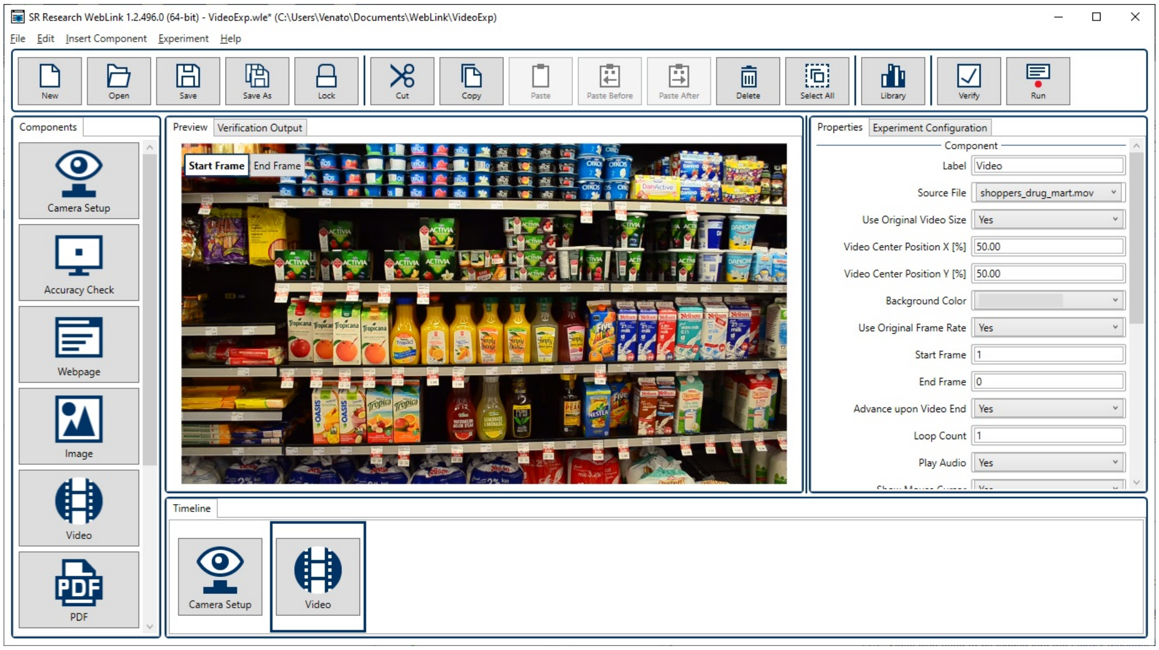

Figure 11-1. Using a Video Component

11.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Video component.

11.2 Supported File Formats and Library Manager

Video files need to be loaded into the Library Manager before they can be presented through the Video component. To open the Library Manager, click “Edit -> Library Manager” from the application menu or the Library () button in the toolbar. In the Library Manager dialog box, select the "Image" tab, and click the add () button to import a video file into the library. The names of the video files should not contain any spaces or non-ASCII characters.

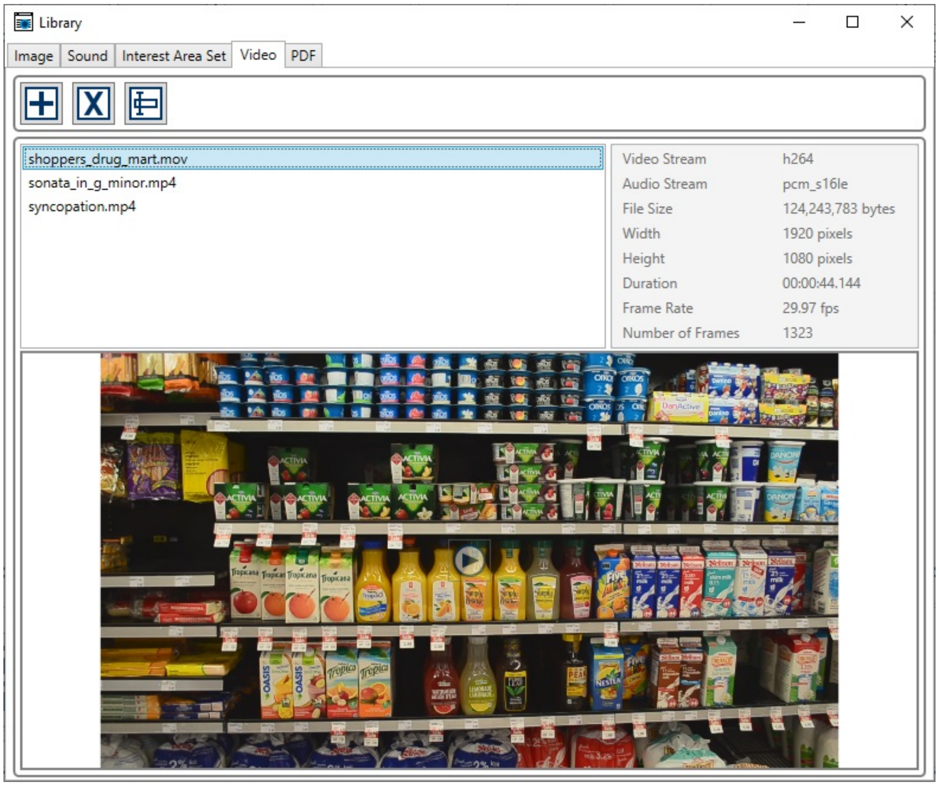

Figure 11-2. Video Tab of the Library Manager

The panel on the right side of the Library Manager displays the properties of the video clips added to the library: type, audio stream, file size, width and height, duration, and frame rate.

- WebLink supports playing video clips with the extensions .mov, .mp4, .xvd, and .avi. Note that the performance of video playback depends on the computer hardware, operating system used and the availability of the required codecs.
- WebLink can play video clips that contain both audio and video streams. It's not necessary to split the audio stream from the video file as with the Experiment Builder software.
- WebLink can play video clips either in their original size or resized to specified dimensions.
- WebLink supports playing the video clips either in their original frame rate or a frame-per-second speed specified in the "Frame Rate" property of the component. The user can specify the starting and ending frames of the video clip to play back.

11.3 Properties of the Video Component

The following discusses the properties of the Video component.

Property	**Description**
Label	Label of the Video component.
Source File	The name of the video file. Make sure that the file name does not contain spaces or non-ASCII characters. The video clips must be loaded into the library manager in advance. An

	error will be given at the beginning of experiment runtime if this field is left empty, or the field is populated (either directly in the component, or through the repetition sequence) but the selected file is missing from the library.
Use Original Video Size	If set to Yes, the video will be displayed in its original size. If set to No, the video may be stretched to the dimension set by “Video Width” and “Video Height” fields.
Video Width [%]	The intended width of the video, defined as percentage of the presentation screen width.
Video Height [%]	The intended height of the video, defined as percentage of the presentation screen height.
Video Center Position X [%]	The X position of the center of the video clip, defined as percentage of the presentation screen width.
Video Center Position Y [%]	The Y position of the center of the video clip, defined as percentage of the presentation screen height.
Background Color	The background color of the component on top of which the video is drawn.
Use Original Frame Rate	If set to Yes, the video will be played in the original Frame Rate. If not, the video will be played in the FPS specified in the “Frame Rate” property.
Frame Rate	If the video clip is not played in the original frame rate, this property specifies the intended number of frames to be displayed each second.
Start Frame	The start frame of the video presentation. Default is 1 (i.e., the first frame of the video clip). The preview window displays the start frame of the video presentation if “Start Frame” button is selected.
End Frame	The end frame of the video presentation. Default is 0 (i.e., the last frame of the video clip). The preview window displays the end frame of the video presentation if “End Frame” button is selected.
Advance upon Video End	If set to Yes, will advance to the next component when the end of the video presentation is reached. If set to No, the behavior defined “Clear Frame upon Video End” will be applied.
Clear Frame upon Video End	Defines the behavior in case the video playback ends before the component is ended. If set to Yes, the last frame of the video presentation will be cleared and replaced with the background color specified until the component ends. If set to No, the last frame of the video presentation will remain on the screen until the component ends.
Loop Count	The total number of times the video clip will be played when the component is executed. If 0, the video clip will be played continuously in a loop.
Play Audio	If set to Yes, this will enable playback of the audio channel from the video clip.

Show Mouse Cursor	If set to Yes, this will allow the mouse cursor to be visible over the presentation area of the component. If set to No, the cursor will be hidden.
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the Video Component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Interest Area Template	The name of the interest area file to be applied to the component for Data Viewer analysis. The interest areas should be loaded into the Interest Area tab of the Library Manager.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts (corresponding to what message for data alignment?).
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds (minimum value should be 150). If set to 0, the stimulus will not time out (the trial has to be terminated by a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.) By default, this is set to Any.
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, this is set to “Left Button”.

12 PDF Component

The PDF component displays a PDF file from the project library to the participant. To add a PDF component, simply drag "PDF" from the Component panel and place it in the intended position in the Timeline. Make sure the desired PDF file has been added to the project library, then select the PDF component and choose the PDF file to be displayed from the "Source File" dropdown list in the Properties panel. The start page of the selected PDF file will then be displayed in the Preview window.

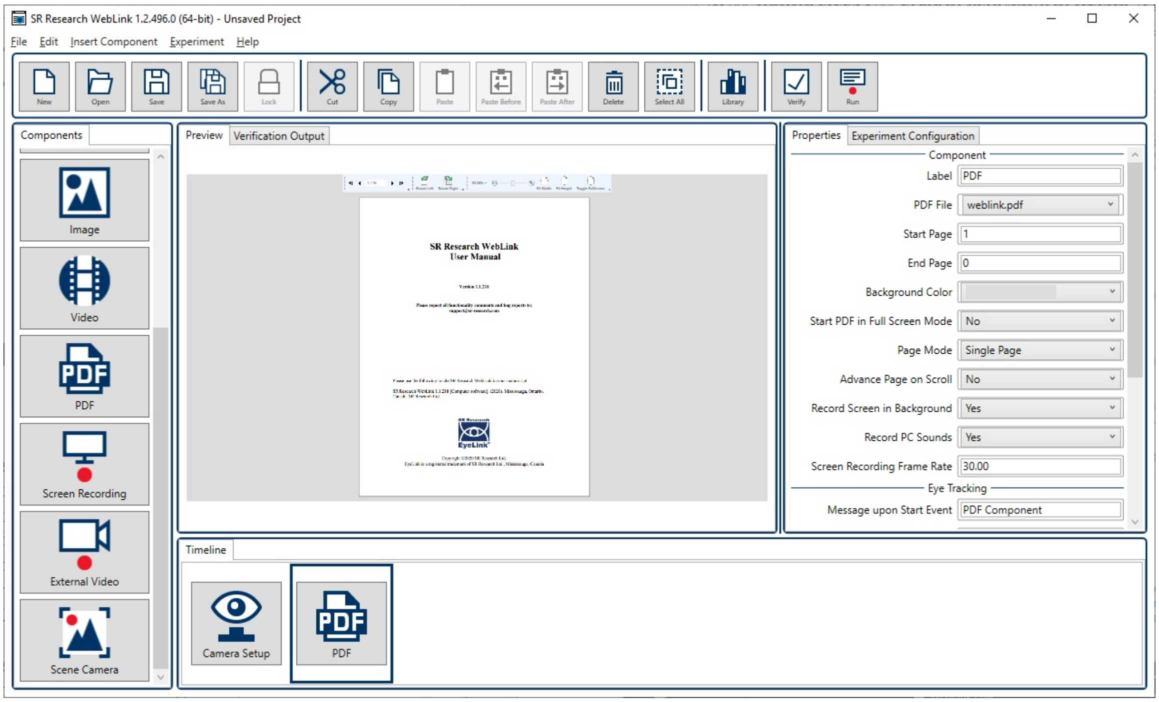

Figure 12-1. Using a PDF Component

WebLink supports presenting the PDF files in both a single-page and double-page view. The single-page mode displays only a single document page at a time, while the double-page mode allows users to view two adjoining pages at the same time, like a book. In both modes, only the current page/pair of pages are visible on-screen, regardless of the magnification or scrolling. Please note that WebLink presently doesn't support continuous PDF page scrolling (i.e., the user cannot scroll down to see the top part of the next page and the bottom part of the current page simultaneously).

When the PDF page(s) are displayed, a toolbar at the top of the page allows the user to navigate through the pages and control PDF page layout. Page navigation buttons are on the left—the double arrows navigate to the first or last page, the single arrows navigate to the previous or next page, and the text box allows the user to enter a specific page number. The user can also navigate with the keyboard by pressing the up/left arrow keys to go to the previous page, and the right/down arrow keys to go to the next page. The Rotate Left and Rotate Right buttons allow the user to rotate the selected page (in a double-page layout, click on the desired page first to select it). The user may also adjust the zoom level or fit the page on the screen (either Fit Width or Fit Height), and toggle the Full Screen view on or off.

Figure 12-2. PDF Toolbar

The presentation of the PDF Component can be configured to end by pressing the system-wide Stop Component hotkey F2, a key press specified in the “Keyboard Response” property, a mouse action specified in the “Mouse Response” property, or when the elapsed time exceeds the “Max Duration” specified (the default duration of “0” means no maximum duration).

12.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the PDF component.

12.2 Library Manager

PDF files must be loaded into the Library Manager before they can be presented through the PDF component. To open the Library Manager, click "Edit -> Library Manager" from the application menu or the Library () button in the toolbar. In the Library Manager dialog box, select the "PDF" tab. Click the Add () button to import a PDF file into the library. (The “Remove” () button removes a file from the library, and the Rename () button renames a file in the library.) The names of the PDF files should not contain any spaces or non-ASCII characters.

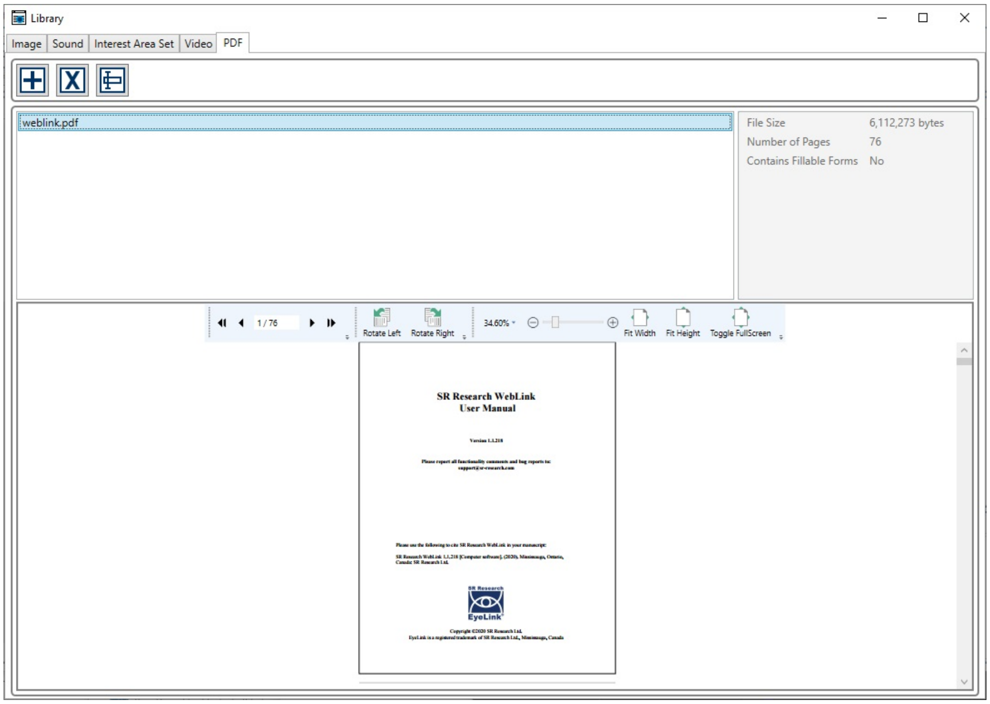

Figure 12-3. PDF Tab of the Library Manager

The panel on the right side of the Library Manager displays the properties of the PDF files added to the library: file size, number of pages, and whether the PDF file contains fillable forms. If the the PDF does contain fillable forms, a copy of the filled PDF file with the participant's responses will be saved in the experiment results folder at the end of the session.

When the PDF files are added into the Library Manager of the experiment, WebLink saves high-resolution images of the PDF pages (250% zoom level, unrotated) in the "Library\PDF" folder. The saved images are used for stimulus visualization when analyzing data with EyeLink Data Viewer. A preview of the doc is displayed in the preview panel with toolbars displayed at the top of the preview panel so users can preview the content of the PDF file.

12.3 Properties of the PDF Component

The following discusses the properties of the PDF component.

Property	Description
Label	Label of the PDF component.
Source File	The name of the PDF file to be displayed. Make sure that the file name does not contain spaces or non-ASCII characters. The PDF files used in the experiment must first be loaded into the library manager. An error will be given at the beginning of experiment runtime if this field is left empty, or if the field is populated but the selected file is missing from the library.

Start Page	The first page of the PDF document to be displayed. (Pages before the Start Page will not be visible to the participant.)
End Page	The last page of the PDF document to be displayed. (Pages after the End Page will not be visible to the participant.)
Background Color	The background color to be shown behind the PDF document.
Start PDF in Full Screen Mode	If set to Yes, the PDF file will be shown in full screen mode. If set to No, the file will be shown in normal mode. (The participant may toggle the full-screen view during the recoding.)
Page Mode	Whether the PDF will be displayed a Single Page at a time, or in Double Page mode with two pages displayed at a time.
Advance Page on Scroll	If set to Yes, the PDF control will scroll to the next or previous page when the user scrolls past the bottom (or top) of the current page.
Record Screen in Background	If set to Yes, a video recording of the participant's screen during the PDF component presentation will be saved. This can be used in data analysis as a supplement or alternative to the screenshots of the PDF pages. If set to No, only the screenshots will be captured, and not the background screen recording.
Record PC Sounds	If set to Yes, the PC audio output will be saved in the resulting video recording. If set to No, only video will be saved, without audio. This propery is only visible if recording background video.
Screen Recording Frame Rate	The frame-per-second capture speed of the screen recording (1 to 30). This propery is only visible if recording background video.
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the PDF component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, mouse click and scroll events during presentation are logged to the EDF file.

Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds (the minimum value allowed is 150). If set to 0, the stimulus will not time out (the trial can be terminated by either a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.) By default, this is set to Any.
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, this is set to “Left Button”.

13 Screen Recording Component

The WebLink software is capable of recording eye movements and a video capture of the participant's screen while they use an application on the display computer. WebLink allows users to launch the intended application automatically upon the start of the component, or to let the participant start the application manually during recording. In addition to the eye tracking data, the EDF file also records the participant's keyboard and mouse activities. The screen capture video is saved as an .mp4 file in the "Video" subfolder of the results folder.

To add a Screen Recording component, simply drag "Screen Recording" from the Component panel and place it in the intended position in the Timeline. The execution of the Screen Recording component can be configured to end in several different ways: by pressing the system-wide Stop Component hotkey F2 or a key press specified in the "Keyboard Response" property, a mouse action specified in the "Mouse Response" property, or when the elapsed time exceeds the "Max Duration" specified (the default duration of "0" means no maximum duration).

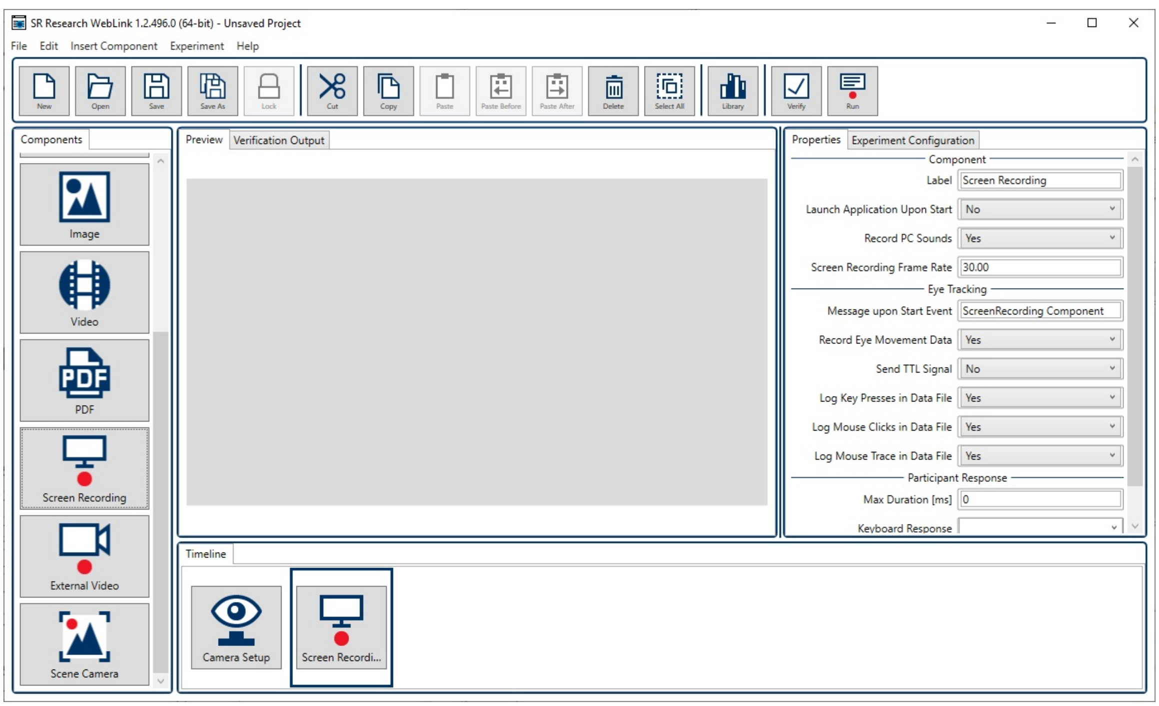

Figure 13-1. Using A Screen Recording Component

Note that the Screen Recording component is intended for capturing participant behavior when using applications that are not heavily demanding on processor or graphics usage. With resource-intensive applications, like computer games or 3D simulators, running the application and the screen capture on the same computer can cause issues like choppy playback. To run resource-intensive applications with no degradation in performance, the user can run the application on a separate computer from the one running WebLink and use WebLink's External Video component to capture the stimulus.

If using the Screen Recording component to record a full screen application (e.g., many computer games or simulators), make sure the resolution of the presentation monitor is set to the application resolution before starting the experiment. The maximum supported screen resolution is 1920 x1080. To set the presentation monitor resolution in WebLink, click the Experiment Configuration tab, then uncheck the box for "Use Presentation Monitor Resolution", and then set the "Use custom resolution" to match the resolution of the application. If the application resolution does not match the resolution specified in WebLink, the participant's eye data will not be scaled correctly to the application resolution, and image capture will be disrupted.

13.1 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Screen Recording component.

13.2 Properties of the Screen Recording Component

The following discusses the properties of the Screen Recording component.

Property	**Description**
Label	Label of the Screen Recording component.
Launch Application Upon Start	Whether an external application will be launched when the execution of the component starts.
Application to Start	The external application that will be automatically opened when the component starts.
Command-line Arguments	Any command-line arguments to pass to the external application when it starts.
Record PC Sounds	If set to Yes, the PC audio output will be saved in the resulting video recording. If set to No, only video will be saved, without audio.
Screen Recording Frame Rate	The frame-per-second capture speed of the screen recording (1 to 30).
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the Screen Recording component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).

Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds. If set to 0, the stimulus will not time out (the trial has to be terminated by a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. By default, no keys are selected. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.)
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, no mouse events are selected.

14 External Video Component

The External Video component is used to track eye movements while the participant views live video from an external device and record a capture of the video. This allows the user to capture from sources such as gaming console, or TV; or to capture resource-intensive applications running on another computer (e.g., applications that cannot be run concurrently with WebLink on the same computer without suffering a drop in performance). The video source may either be displayed through WebLink or viewed on the external device.

To capture video from another external device, the computer running WebLink must have a video capture device installed (e.g., a USB capture device such as the Magewell USB Capture HDMI Gen 2), and the video output from the external device should be connected to the capture device. The captured video will be saved as an .mp4 file in the "Video" folder of the experiment results. If the "Record Audio" option of the component is selected, the resulting video file will also include the audio channel of the captured video. Please note the timing performance of the external video capture is highly dependent on the computer specifications, the capture resolution of external video, and the frame grabber hardware. The maximum supported video resolution is 1920 x1080.

To add an external video component, simply drag "External Video" from the Component panel and place it in the intended position in the Timeline. Make sure to configure the intended video source from the "External Video Source" property and the format of the video from the "Video Format" property. Once configured, a preview of the captured video will be displayed in the preview window.

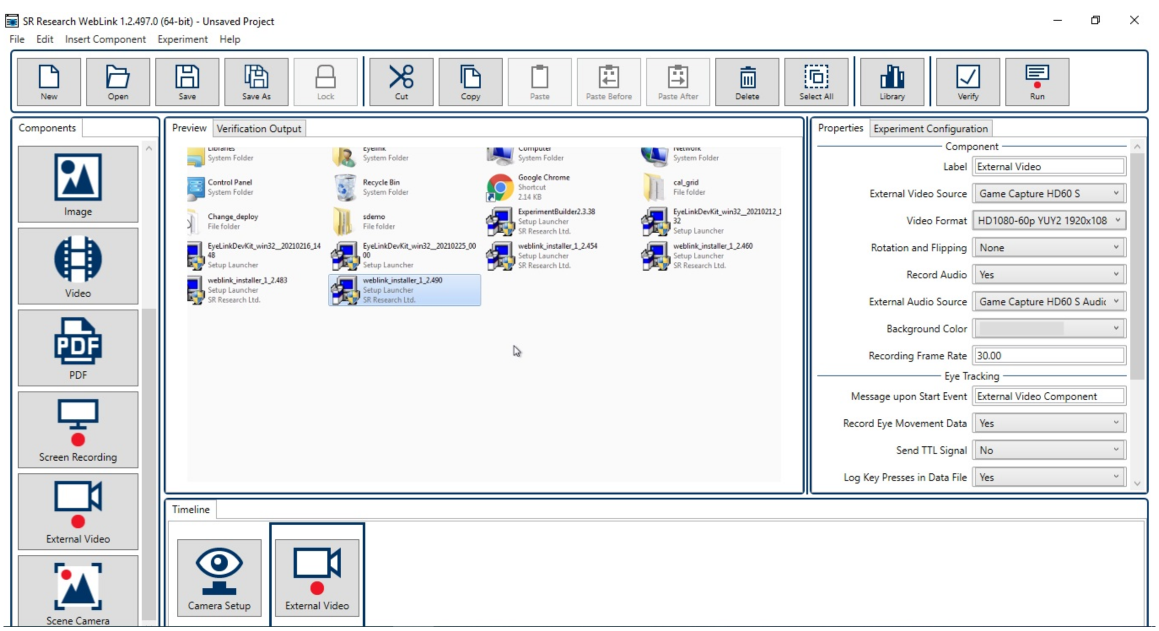

Figure 14-1. Using an External Video Component

The presentation of the External Video component can be configured to end in several different ways: by pressing the system-wide Stop Component hotkey F2 or a key press specified in the “Keyboard Response” property, a mouse action specified in the “Mouse Response” property, or when the elapsed time exceeds the “Max Duration” specified (the default duration of “0” means no maximum duration).

As mentioned above, the video from the external device may be displayed either on the monitor of the WebLink computer (“Track Connected Monitor”), or directly on the external device (“Track External Device”). When using the “Track Connected Monitor” option, the live video feed of the external device will be displayed by WebLink (this can be another computer that is running a resource-intensive application, a live webcam feed, etc.). One benefit of this mode is that the calibration drawing will be performed by WebLink in conjunction with the Host PC. The “Track External Device” option is used when participants will be viewing the experiment stimuli directly on an external display (e.g., if playing a video game console, watching television, or using a tablet), with the video feed sent to WebLink for recording. In this case, the experimenter will typically need to present the calibration target array on the external device and conduct calibration manually. (This is discussed in further detail below in section 14.2.2 Calibration and Adjusting the Calibration Grid.) The viewing mode can be selected in the Experiment Configuration by clicking on the “Track Connected Monitor” or “Track External Device” button in the Monitor settings. Please note that some properties of the Camera Setup component will be updated automatically depending on the mode selection.

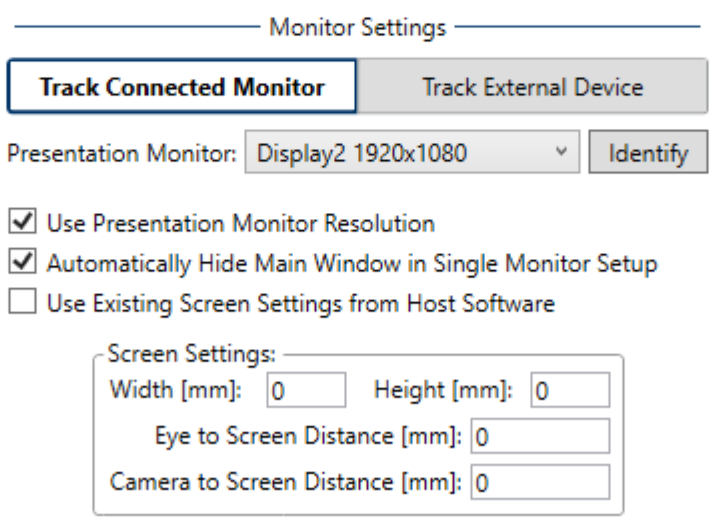

Figure 14-2. Track Connected Monitor vs. Track External Device

14.1 Track Connected Monitor

When the "Track Connected Monitor” option is used, WebLink captures the live video from an external device and displays the video on the WebLink monitor. In this case, the external video is integrated into the WebLink experiment display, allowing the External

Video source to be used like the other screen-based components such as Webpage, Image, Video, PDF, and Screen Recording. In particular, the calibration is done in the same manner as the other screen-based components, using the onscreen calibration driven by the EyeLink Host PC. Recorded eye movements will be based on the coordinates of the WebLink monitor, and therefore users can use the same Screen Settings (“Width”, “Height”, “Eye to Screen Distance”, and “Camera to Screen Distance”) as in a typical screen-based application.

14.2 Track External Device

When the "Track External Device” option is used, participants will view the experiment stimuli on an external display (e.g., a gaming console connected to a television) while WebLink captures the eye movement data and video feed from the external device. In this configuration, WebLink will not display any experimental stimuli onscreen during data collection; instead WebLink will display only the live video with the participant gaze cursor in the application Preview Window. Since WebLink is not displaying any stimuli on the device the participant is viewing, the experimenter will likely need to present the targets manually to the participant. This is discussed in further detail below in section 14.2.2.

The External Video component shows the following controls on the top of the Preview Window allowing users to adjust the tracking area and target position configurations:

- Adjust Tracking Area
- Auto-Detect Tracking Area
- Adjust Calibration Grid
- Auto-Detect Calibration Grid
- Show Control Panel

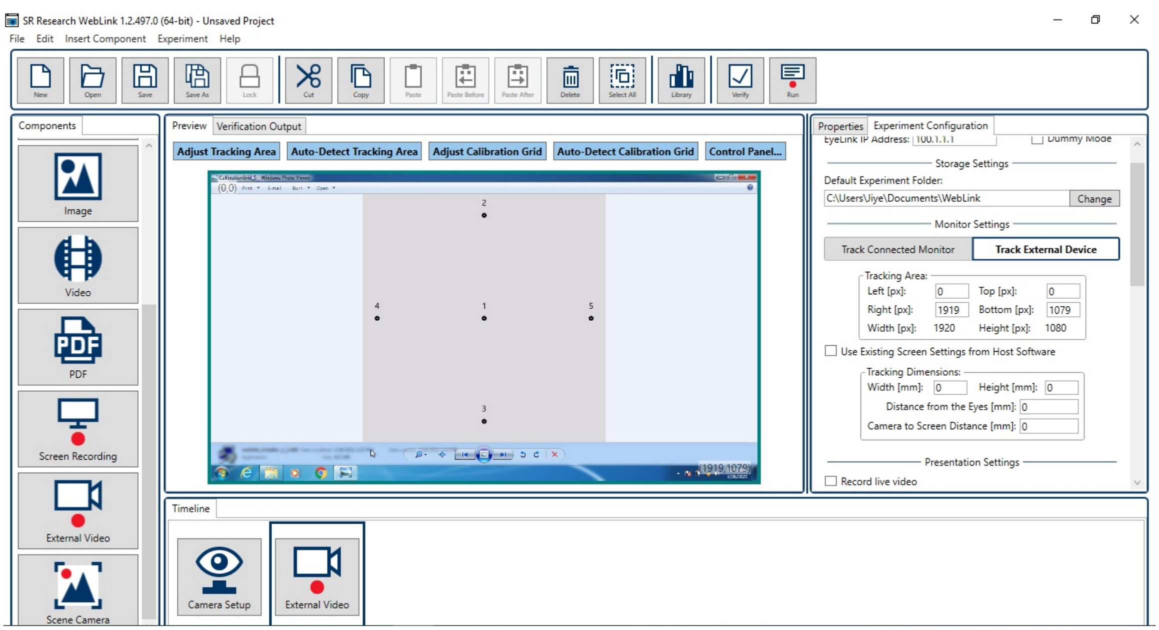

Figure 14-3. Adjustment Options on the Preview Window of the External Video Component

14.2.1 Adjusting the Tracking Area

When the "Track External Device" option is used, WebLink allows users to adjust the tracking area by choosing a portion of the video source to be tracked (for instance, if the stimuli are only presented in one segment of the display). The tracking area can be modified either manually by clicking "Adjust Tracking Area" or automatically by clicking "Auto-Detect Tracking Area". The following figure illustrates the interface when the "Adjust Tracking Area" control is selected.

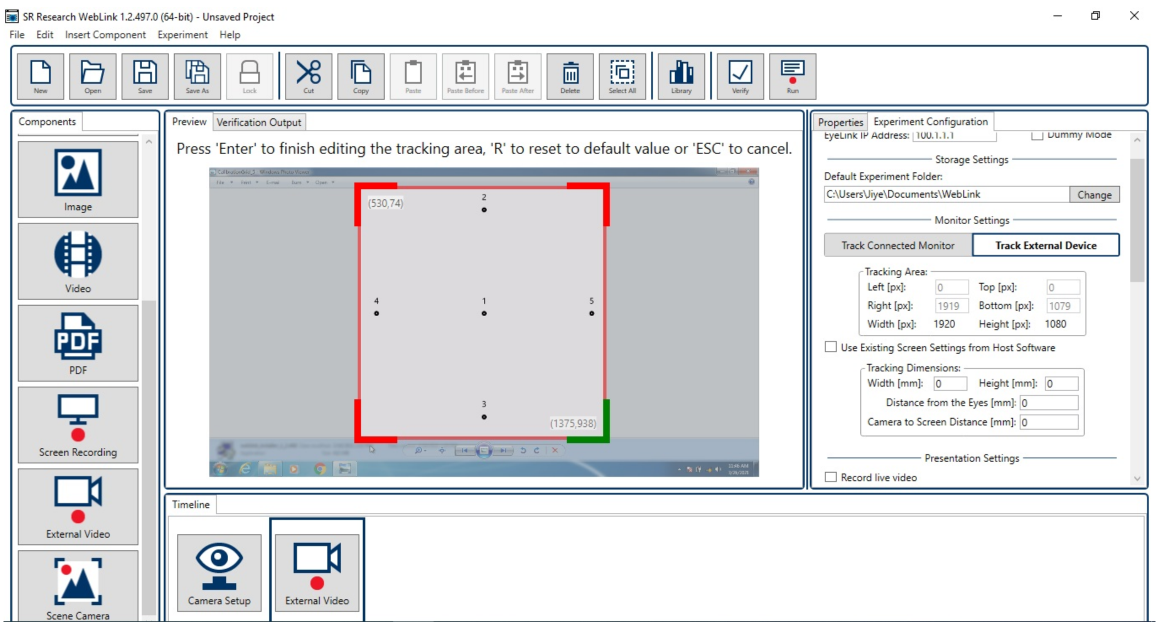

Figure 14-4. Adjusting the Tracking Area for the External Video Component

After clicking the "Adjust Tracking Area" button, a frame will appear over the video for the user to adjust the tracking area boundaries. To move the boundaries, simply click and drag one of the edges or corners of the frame. Fine adjustments may also be made with the keyboard—click a corner to select it (it will turn green), then press the arrow keys to move the selected corner of the cropping frame. The coordinates printed in the top-left and bottom-right corners of the frame represent the pixel coordinates of the video source relative to the top-left corner. To move the tracking area frame, click inside the frame (not one of the edges) and then drag it to the desired location. After setting the tracking area, press the Enter key to finish editing the tracking area, the ESC key to cancel the adjustments, or the R key to reset to the default values.

The "Auto-Detect Tracking Area" button will first attempt to automatically determine the tracking area from the external video footage. Then the user may either accept the changes or make further adjustments in the same manner as with the “Adjust Tracking Area” button.

The tracking area can also be set by entering precise pixel values in the “Left”, “Top”, “Right”, and “Bottom” fields of the Tracking Area in the Experiment Configuration when not in the “Adjust Tracking Area” or “Auto-Detect Tracking Area” modes. After entering the new values, press Enter to apply the changes. The size of the recorded video and the resolution of the eye tracking data will be based on the dimensions of the Tracking Area. (Note that to ensure playability of the captured video, WebLink will automatically adjust the tracking area width to a multiple of 4 pixels and the height to a multiple of 2 pixels.).

After setting the tracking area of the video source, it is important to update the physical dimensions of the tracking area so the eye tracker can provide precise pixel-per-degree resolution calculation and properly calculate eye velocity and saccade amplitudes. In the Experiment Configuration, make sure the “Use Existing Screen Settings from Host Software” is unchecked (which is typically used for monitor-based tracking). Then measure the width and height of the actively tracked portion of the external display (i.e., the portion within the Tracking Area), the distance from the eye to the external display, and the distance from the camera to the external display. (For more information, hover the mouse cursor over the value field and follow the instructions provided.)

14.2.2 Calibration and Adjusting the Calibration Grid

Since participants will be viewing the experimental stimuli on the external device, calibration should also be done on the external display (and not on the display of the WebLink computer). Since the calibration must be performed on a display not connected to the WebLink computer, the typical screen-based calibration driven by the EyeLink host cannot be used. Instead, the experimenter must present the targets to the user and conduct the calibration manually. When the “Track External Device” option is used, WebLink will automatically update the following properties of the Camera Setup component to facilitate the manual calibration:

- The default calibration type is set to 5-point calibration to make the calibration process easier.
- An “Export” button is added to the Camera Setup component to save the calibration display as an image file. The user may then present the saved image of the calibration grid on the external device or print the grid for use as a calibration array.
- A target index with configurable color is printed on or above the target (“Target Index Position” and “Target Index Color”) to easily direct the participant to the current target.
- The presentation order of the calibration targets is fixed (the “Randomize Order” option is set to No). With the target index printed, participants can perform the calibration by fixating the index number printed on/above the target in sequence. The first calibration target (the center point) will not be

displayed twice, as in the default calibration (the “Repeat first point” option is set to No).

- The “Force Manual Accept” option is set to Yes, so the experimenter needs to accept each calibration target fixation manually.

WebLink allows users to adjust the position of the calibration targets to ensure the placement of the target positions in the EyeLink host software matches the positions of the target positions in the external display. The user may adjust the target positions either in the Camera Setup component, or in the Preview window of the External Video component. When previewing the live feed of the calibration image displayed on the external device, users can easily adjust the positions of the calibration targets in WebLink to align with calibration array presented to the partcipants.

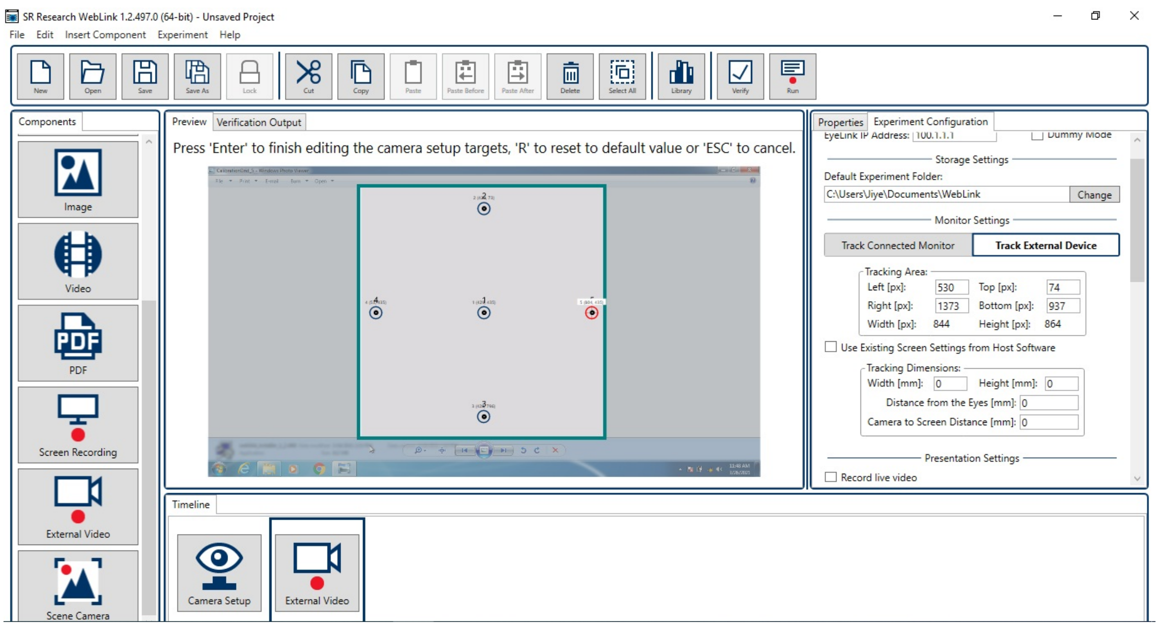

Figure 14-5. Adjusting the Calibration Grid for the External Video Component

First display the image of the calibration grid on the external device and make sure that tracking area is properly configured as in Section 14.2.1”Adjusting the Tracking Area”. Then click the “Adjust Calibration Grid” button at the top of the Preview Window. An array of calibration targets will be drawn on top of the preview video (see Figure 14-5). If the targets drawn in the “Adjust Calibration Grid” interface do not properly align with the calibration targets from the external video feed, the user can move the targets manually. Click a target to select it—once selected, it will be drawn in red with a crosshair in the center. The selected target can then be moved by clicking and dragging with the mouse, or by using the up, down, left and right arrow keys on the keyboard for fine adjustments. To save the calibration target adjustments, press the Enter key; alternatively press the Esc key to discard changes or to “R” to reset to the default. WebLink can also attempt to identify the target locations automatically by clicking “Auto-Detect Calibration Grid”. If the automatic target detection fails, the user can adjust the targets manually.

If it is not feasible to show the image of the calibration grid on the tracked external display, then users may prepare their own calibration array by placing a piece of paper or cardboard on top of the external display with the calibration targets drawn or printed. If preparing a homemade calibration array, great care should be taken to ensure that the array is properly sized to the external display, and that the position of the targets on the array accurately corresponds to the target positions in the Camera Setup component. (It may help to set “Use Absolute Locations” to No, so the reported target locations will be output in relative position on the array, as opposed to pixel coordinates.) Present this calibration array when performing calibration and validation in the Camera Setup component. Once the Camera Setup is complete, remove the array so the user can see the external display before beginning data collection.

14.2.3 Control Panel

The Preview Window of the External Video component also has the “Show Control Panel” option. This will open the control panel of the video device that WebLink is interfacing. As this control panel is provided by the manufacturer of the device, the layout and content will vary from device to device. Most of the control panels will allow users to adjust common video properties such as brightness, contrast, hue, saturation, etc., and some devices will provide further options to adjust zoom level.

14.3 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the External Video component.

14.4 Properties of the External Video Component

The following discusses the properties of the External Video component.

Property	Description
Label	Label of the External Video component.
External Video Source	The source for the external video. This can be a webcam or a frame-grabbing device.
Video Format	The format of the external video as permitted by the source.
Rotation and Flipping	Allows the user to rotate and/or flip the video feed to ensure the proper orientation.
Record Audio	If set to Yes, the saved video file will include the audio channel from the selected video source. If set to No, only video will be recorded.
External Audio Source	The source for the external audio (can be either a webcam or a frame grabbing device).
Background Color	The background color of the component on top of which the video is drawn.
Recording Frame Rate	The frame-per-second capture speed of the video saving (1

	to 30).
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the External Video component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds. If set to 0, the stimulus will not time out (the trial has to be terminated by a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. By default, no keys are selected. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.)
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, no mouse events are selected.

15 Scene Camera Component

The Scene Camera component allows users to track eye movements on real-world stimuli using a live webcam to record from the participant's point of view. Examples could be a live puppet show paradigm for infants, or a task where a participant moves objects in space. To use a Scene Camera component, first connect the webcam to the display computer. Then add the component by dragging "Scene Camera" from the Component panel to the intended position in the Timeline. (When the component is added, the Experiment Configuration will automatically be set to use the "Track External Device" mode under Monitor Settings.) In the Scene Camera component Properties panel, set the Scene Camera Video Source to the desired video source, and choose the desired format and resolution in the "Video Format" dropdown menu. The video will appear in the preview window with the chosen format settings. The captured video will be saved as an .mp4 file in the "Video" folder of the experiment results. If the "Record Audio" option of the component is selected, the resulting video file will also include the audio channel of the captured video. Please note the maximum supported video resolution is 1920 x1080.

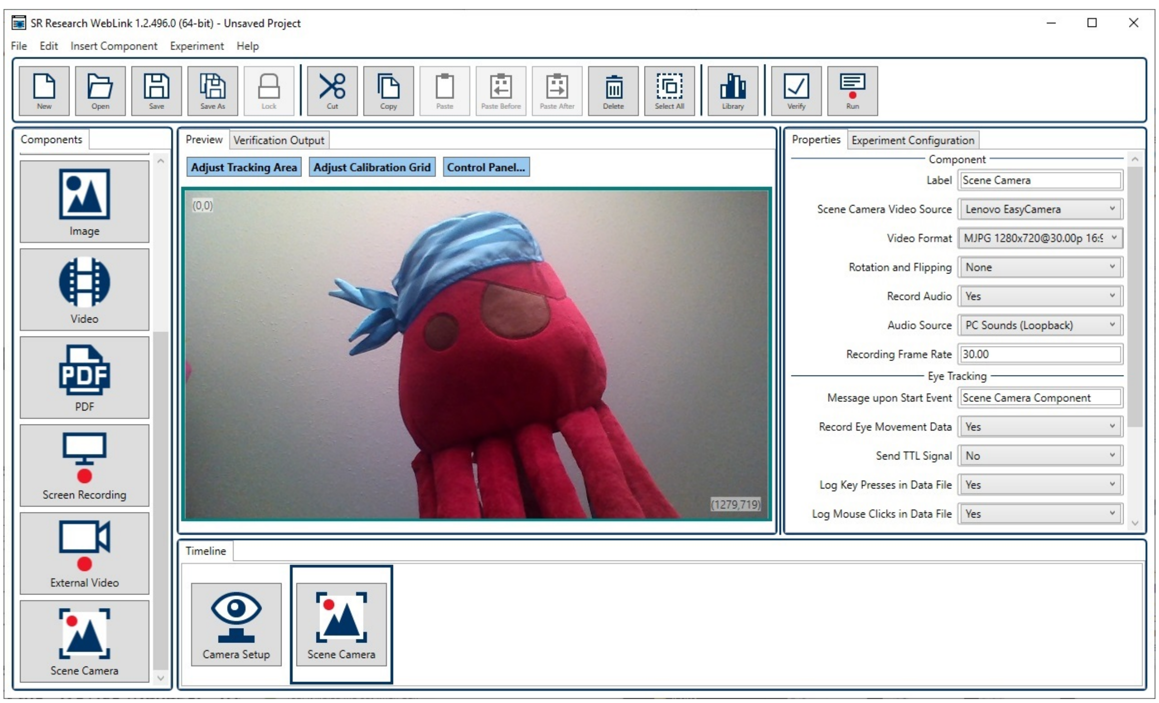

Figure 15-1. Using a Scene Camera Component

15.1 Adjusting the Tracking Area

When the "Track External Device" option is used, WebLink allows users to adjust the tracking area by choosing a portion of the video source to be tracked by clicking the "Adjust Tracking Area" button in the Preview window of the Scene Camera component.

The following figure illustrates the interface when the “Adjust Tracking Area” control is selected.
After clicking the “Adjust Tracking Area” button, a frame will appear over the video for the user to adjust the tracking area boundaries. To move the boundaries, simply click and drag one of the edges or corners of the frame. Fine adjustments may also be made with the keyboard—click a corner to select it (it will turn green), then press the arrow keys to move the selected corner of the cropping frame. The coordinates printed in the top-left and bottom-right corners of the frame represent the pixel coordinates of the video source relative to the top-left corner. To move the tracking area frame, click inside the frame (not one of the edges) and then drag it to the desired location. After setting the tracking area, press the Enter key to finish editing the tracking area, the ESC key to cancel the adjustments, or the R key to reset to the default values.

When using a Scene Camera, it is critical to position the calibration board (discussed in the next section) so that it fits the boundaries of the tracking area as closely as possible. For this reason, we suggest putting the calibration board in place before adjusting the tracking area. Then the tracking area boundaries can be set to align with the edges of the board.

After setting the tracking area of the video source, it is important to update the physical dimensions of the tracking area so the eye tracker can provide precise pixel-per-degree resolution calculation and properly calculate eye velocity and saccade amplitudes. In the Experiment Configuration, make sure the “Use Existing Screen Settings from Host Software” is unchecked (which is typically used for monitor-based tracking). Then measure the width and height of the Tracking Area, the distance from the eye to the external display, and the distance from the camera to the external display. (For more information, hover the mouse cursor over the value field and follow the instructions provided.)

It may not always be straightforward to measure the width and height of the tracking area for the scene camera component, as it may not be a flat surface or have visible edges. If the Tracking Area is sized to the dimensions of the calibration board at the tracking depth, the user can easily measure the calibration board as a proxy for the tracking area size. Another option, e.g., for larger displays, is to place a yardstick (or some other object of known length) at the intended scene camera tracking depth. From the dimensions of the yardstick and its size in the video in pixel units, users should be able to derive the width and height of the tracked scene in physical units.

15.2 Calibration and Adjusting the Calibration Grid

For a scene camera experiment, calibration is typically done manually by using a calibration board in the center of the tracked scene. Users can make their own calibration boards by exporting the calibration grid (click the “Export” button in the preview window of the Camera Setup component) and printing or tracing it out onto a large enough piece of paper/coardboard/foamcore to cover the tracked region. For the calibration to work properly, users should place the calibration board at the intended tracking depth and adjust the scene camera angle/calibration board placement so that shape of the calibration board appears to be as close to rectangular as possible in the scene camera video. As mentioned in the previous section, it is often best to position the calibration board, then adjust the tracking area to fit the dimensions of the board.

To adjust the locations of the calibration targets, click the “Adjust Calibration Grid” control in the Scene Camera Preview Window. An array of calibration targets will be drawn on top of the scene camera preview video. If the targets drawn in the “Adjust Calibration Grid” interface do not properly align with the calibration targets from the external video feed, the user can move the targets manually. Click a target to select it—once selected, it will be drawn in red with a crosshair in the center. The selected target can then be moved by clicking and dragging with the mouse, or by using the up, down, left and right arrow keys on the keyboard for fine adjustments. To save the calibration target adjustments, press the Enter key; alternatively press the Esc key to discard changes or to “R” to reset to the default.

Similar to experiments using an External Video component in the “Track External Device” mode, some properties of the Camera Setup component are updated to facilitate the calibration process (target indices are drawn on the targets, options like randomized calibration order and repeating first point are turned off, and the “Force Manual Accept” option is set to Yes). To minimize possible effects of scene camera distortion, the default calibration type is set to 13-point instead of the 5-point used in the External Video component.

15.3 Common Operations

Please see Chapter 6 for a discussion of the editing operations for the Scene Camera component.

15.4 Properties of the Scene Camera Component

The following discusses the properties of the Scene Camera component.

Property	Description
Label	Label of the Scene Camera component.
Scene Camera Video Source	The source for the scene camera video. This is typically a webcam.
Video Format	The format of the scene camera video as permitted by the source.
Rotation and Flipping	Allows the user to rotate and/or flip the video feed to ensure the proper orientation.
Record Audio	If set to Yes, the saved video file will include the audio channel from the selected video source. If set to No, only video will be recorded.

External Audio Source	The source for the scene camera audio.
Background Color	The background color of the component on top of which the video is drawn.
Recording Frame Rate	The frame-per-second capture speed of the video saving (1 to 30).
Eye Tracking	
Message upon Start Event	Message to be sent to the EDF file when the Scene Camera component starts.
Record Eye Movement Data	If set to Yes, eye movement data will be recorded for this component.
Send TTL Signal	If set to Yes, a TTL signal will be sent when the component starts.
TTL Signal Value	The hexadecimal value of the TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
TTL Duration	The duration of the TTL signal in milliseconds.
Clearing TTL Value	The hexadecimal value of the clearing TTL signal. It should be a value from 0x00 to 0xFF (corresponding to a decimal value from 0 to 255).
Log Key Presses in Data File	If set to Yes, the key press events during presentation are logged to the EDF file.
Log Mouse Clicks in Data File	If set to Yes, the mouse click events during presentation are logged to the EDF file.
Log Mouse Trace in Data File	If set to Yes, the position of the mouse on each retrace during presentation is logged to the EDF file.
Participant Response	
Max Duration	The maximum presentation duration of the component in milliseconds. If set to 0, the stimulus will not time out (the trial has to be terminated by a key press or mouse click).
Keyboard Response	A list of keys that can be selected to end the presentation of the current component. By default, no keys are selected. (Even if no key is selected, pressing the Stop Component hotkey F2 will end the component.)
Mouse Response	A list of mouse events that can be selected to stop the current component. By default, no mouse events are selected.

16 Repetition Sequence

It is common in some experimental paradigms to run through dozens or hundreds of trials. WebLink allows users to easily build these types of experiments by defining a component or group of components as a Repetition Sequence. A Repetition Sequence allows the user to repeat the component(s) and specify any desired properties to vary across the repetitions (e.g., to load a different URL on each repetition of the Webpage component). An important step in designing an experiment, therefore, is to identify the basic structure of the experiment that repeats over time. For instance, in a web browsing experiment, the trial defined in a repetition sequence might include an Image component presenting some instructions, followed by an Accuracy Check component, then a Webpage component presenting a different URL on each repetition; or in a video experiment, the repeated trial may consist of an Accuracy Check, a Video, then an Image displaying a question.

Once the user has added the component(s) of the trial to the Timeline, they can select the desired component(s) and right-click to create the Repetition Sequence. The user can specify the number of repetitions, indicated by rows in the Repetition Dialog, and choose the parameters to edit, indicated by columns (see section 16.3 Editing a Repetition Sequence). During execution of the experiment, rows in the repetition sequence are read one at a time, supplying the actual parameters for each iteration of the trial.

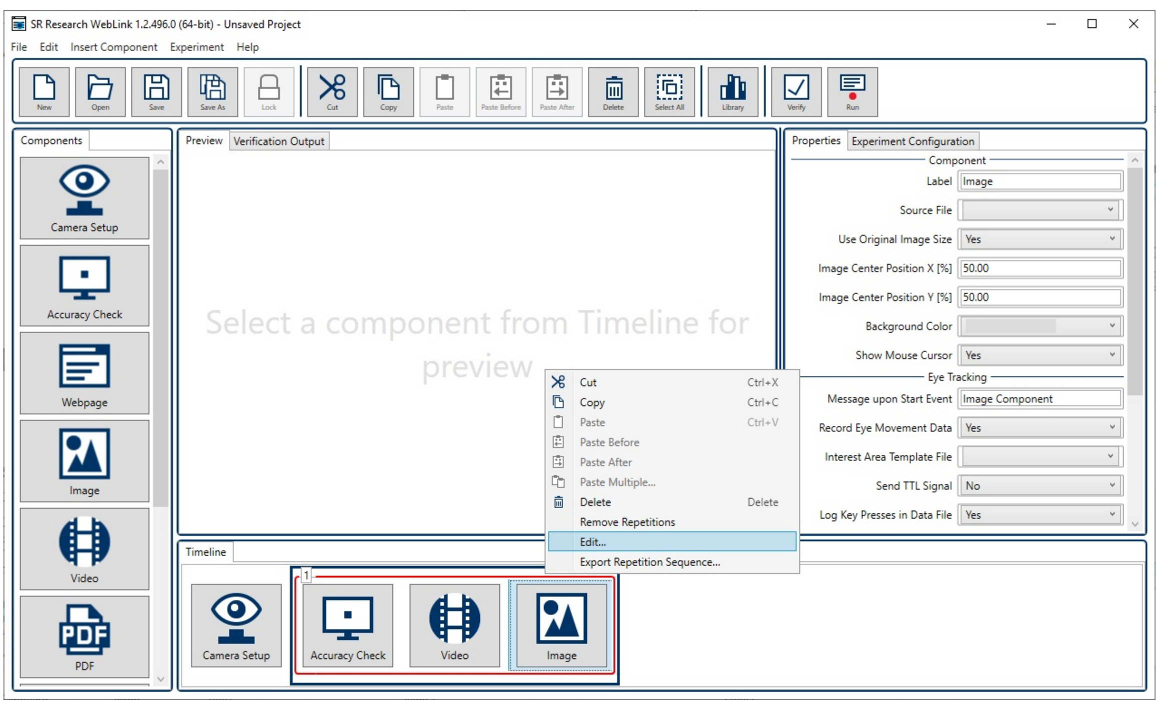

Figure 16-1. Editing a Repetition Sequence

16.1 Inserting a Repetition Sequence

From the Timeline, select the component(s) to be repeated, then either right-click and select "Create Repetition Sequence …" from the context menu, or select "Edit -> Create Repetition Sequence …" from the application menu. When the sequence is created, the "Repetition Dialog" will be displayed, allowing the user to edit the repetition sequence properties (see section 16.3 Editing a Repetition Sequence). Once added, a repetition sequence in the Timeline is marked by a red framed box with the repetition count displayed at the upper-left corner of the box (see Figure 16-1 above).

16.2 Removing a Repetition Sequence

An existing repetition sequence in the Timeline can be removed by selecting any component in the repetition sequence, then right-clicking and selecting "Remove Repetition" from the context menu. Click "OK" in the following confirmation dialog box to continue.

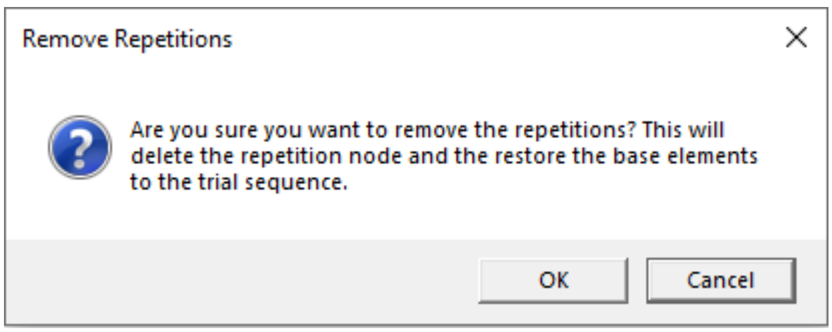

Figure 16-2. Removing a Repetition Sequence

16.3 Editing a Repetition Sequence

The Repetition Dialog allows the user to set the number of repetitions, and to specify the values of any parameters that will vary. The repetition dialog will be displayed immediately when a new repetition sequence is added. To edit an existing repetition sequence, either double-click on any component in the sequence group, or right-click on the sequence and select "Edit…" in the context menu. Single-clicking any component in the repetition sequence will display its properties in the properties panel, where the user can configure any properties that will remain constant across repetitions (e.g., the background color of an Image or Video component, or the browser dimensions of a Webpage component).

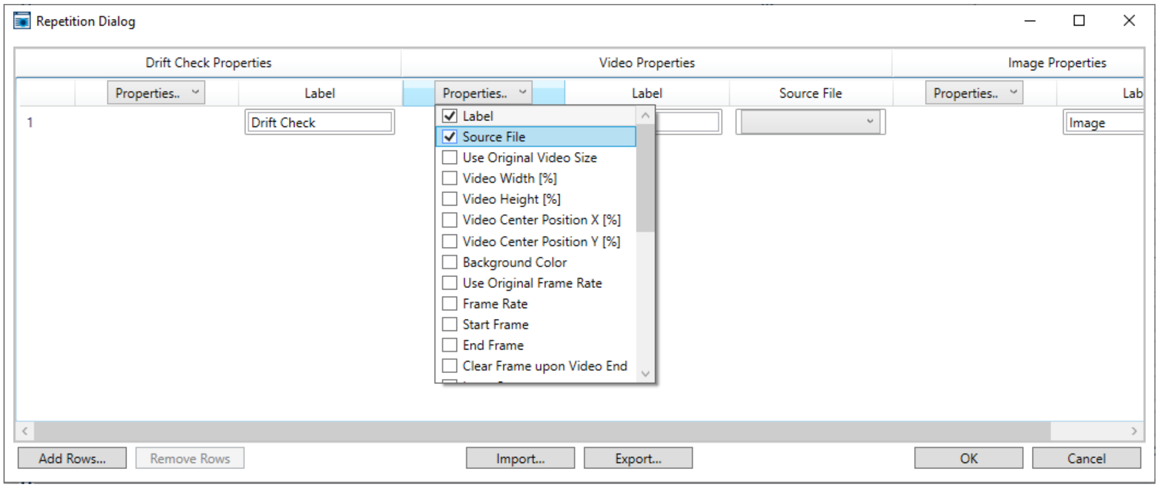

Figure 16-3. Editing Repetition Sequence

The repetition dialog shows a table—the columns in the table represent the components in the sequence and the properties to be configured, and the rows indicate each of the repetitions. In a newly created repetition sequence, only the "Label" column will be visible for each component—to display more properties, click the "Properties…" menu for that component. This will reveal a dropdown list containing all of the configurable properties for the component. Tick the box for any desired property to add it as a column. To remove a property from the table, open the "Properties…" menu for the component, and uncheck the box for the property to be removed.

Each row of the table represents a single repetition of the sequence. Click the "Add Rows…" button to add the desired number of repetitions. A row can be selected by clicking anywhere within the row; select multiple rows by holding Ctrl and clicking each desired row, or by holding Shift and selecting a range of rows. To delete rows from the table, select the row(s) to be deleted, then right-click and click "Delete" from the context menu. A selection of rows can similarly be copied and pasted within the table. (Note that the repetition sequence needs at least one row of data, so even if all the rows in the sequence are deleted, one row will remain in the sequence.).

16.4 Exporting / Importing a Repetition Sequence

The contents of a repetition sequence can be exported for use in another WebLink project by clicking the "Export …" button in the Repetition Dialog. This will create an Excel file (.xlsx) with the properties for all of the nodes in the table.

To import a saved repetition sequence file into another WebLink project, right-click an empty space in the Timeline and select "Import Repetition Sequence…" This will add the exported sequence to the project Timeline, including all its components and their specified parameters. Alternatively, if a Repetition Sequence has already been defined in the project, the sequence information can be imported from the saved repetition sequence files, as long as the sequence in the project contains the same components in the same order as the exported sequence. To import values into an existing sequence, click the

"Import…" button in the Repetition Dialog.

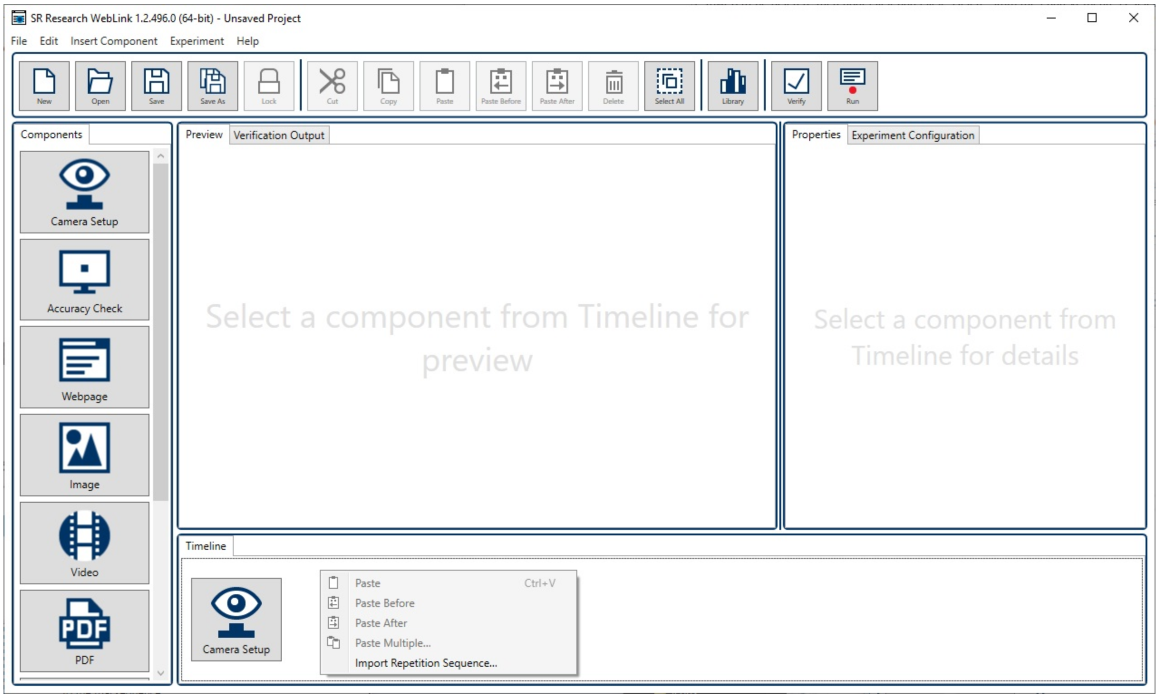

Figure 16-4. Importing a Repetition Sequence

17 WebLink Remote Preview

The WebLink Remote Preview is an application that allows the user to view a live feed of the current WebLink experiment on another computer on the network, or on another monitor connected to the WebLink PC. The Remote Preview must first be enabled in the WebLink project by enabling the "Remote Live Preview" option in the Experiment Configuration. If running the remote preview on the same WebLink Display PC, keep the default "Remote IP Address" of 127.0.0.1. If running the WebLink Remote Preview on another PC, they should be connected on the same local network. (The WebLink PC will need to have separate network connections for the EyeLink Host PC connection and the local network connection). Set the "Remote IP Address" field to the IP address of the computer that will be running the WebLink Remote Preview application (an easy way to find the IP address is to open WebLink Remote Preview on the second PC, which reports the "Own IP Address" of that computer). Please also note down the "Own IP Address" provided for the WebLink PC (10.200.1.115 in the example below), as you need to enter this value as the "WebLink IP Address" in the WebLink Remote Preview application on the second PC.

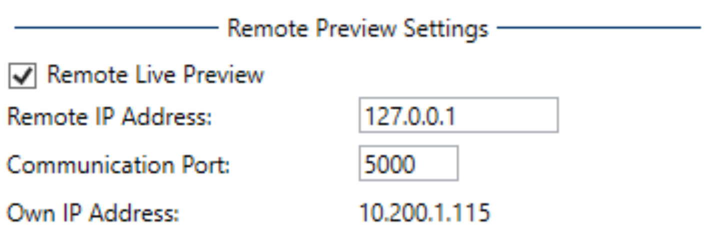

Figure 17-1. Remote Preview Settings

The "WebLink Remote Preview.exe" application may be found in the WebLink folder (by default "C:\Program Files\SR Research\WebLink"). The following figure shows the interface when the application starts. If you run the Remote Preview on the same PC, keep the "Default IP" box checked; otherwise, uncheck the box and enter the IP address of the WebLink PC accordingly (the "Own IP Address" from the Experiment Configuration of the WebLink project).

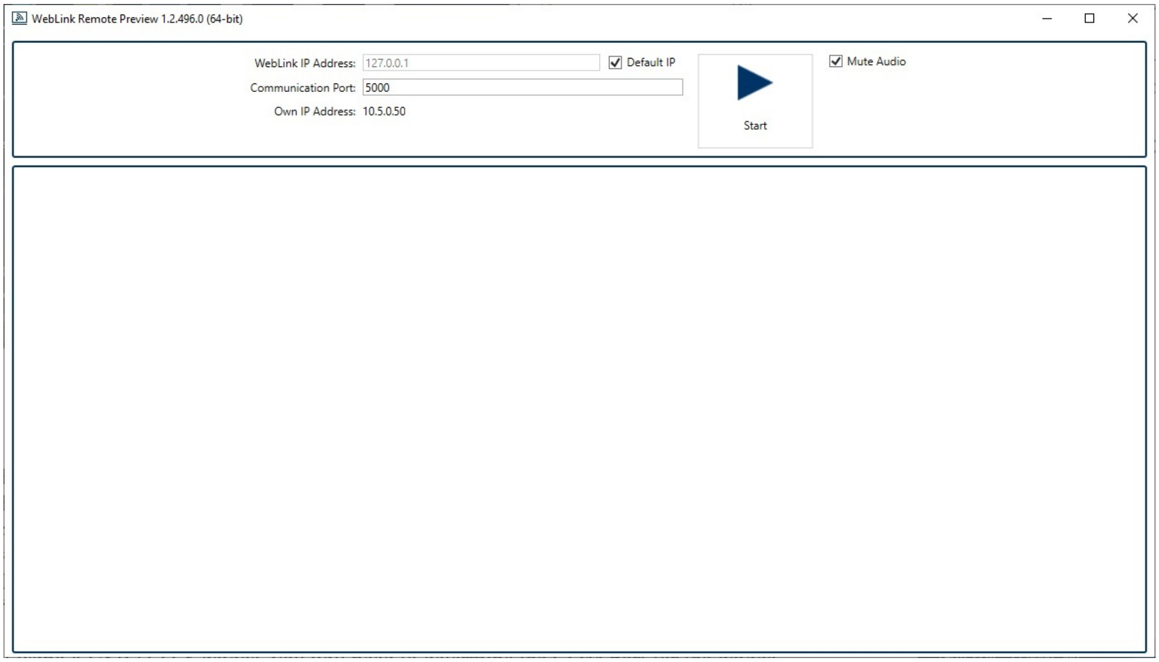

Figure 17-2. WebLink Remote Preview Application

Now run the WebLink experiment as usual. When the experiment starts, click the “Start” button on the Remote Preview Application. You should now see a live preview of the experiment running on the WebLink PC.

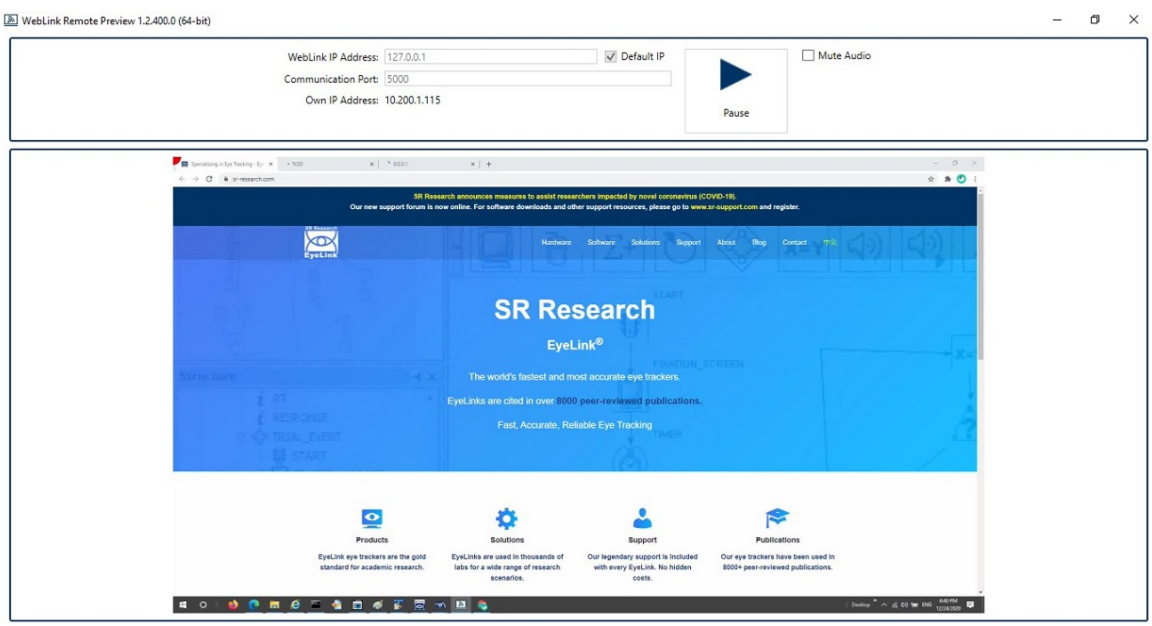

Figure 17-3. Live Preview Displayed on the Remote Preview Application

18 Data Viewer Integration

EyeLink recording data, saved as .EDF files, can be conveniently analyzed with the EyeLink Data Viewer software. WebLink automatically writes messages to the data file to send trial information to Data Viewer, (e.g., defining trial condition variables, image files to display for visualizations, or URL changes in a Webpage component).

It's always a good idea to plan for data analysis while the experiment is still being designed. Spend some time considering what exactly you plan to measure in your participants' behavior, and how you plan to analyze the collected data. We strongly recommend testing at least one participant after creating the experiment to make sure the collected data contains the necessary information to support data analysis later on. It may help analysis, for instance, to customize the "Message upon Start Event" for different components, or to include interest area templates in the project design.

18.1 Folder Structure

The recorded data are stored in the "Results" folder of the experiment, with each recording session saved in its own subfolder corresponding to the session name. Each session's folder contains the eye tracking data (.EDF) file for the session as well as a log file that can be used for trouble-shooting if necessary. The "Images" subfolder contains all of the screen captures made during the session, and the "Videos" folder contains all of the video clips saved for the individual trials (e.g., screen recordings, external video clips, and the frame tables for the corresponding video clips).

18.2 Data Viewer Integration for All Components

WebLink automatically sends messages to the data file to integrate with EyeLink Data Viewer. This includes messages marking the onset times of stimuli, integration messages for playing back video and image stimuli, sending interest area set information if configured, logging the participant's responses, and logging optional trial conditional variables and participant properties.

18.2.1 Onset of the Stimulus

For each component, a message is automatically sent to the EDF file to mark the onset of stimulus presentation. For example, a "Web Component" message is written to the EDF file when the browser is started. An "Image Component", "Video Component", "PDF Component", "Screen Recording Component", "External Video Component" and "Scene Camera Component" message is sent at the onset of the image, video, PDF, screen recording, external video, and scene camera components. (The message for a given component can be configured in the "Message Upon Start Event" property.) These messages can be used in Data Viewer to create interest periods corresponding to stimulus onset.

18.2.2 Image/Video Integration

To help visualize eye movement data in the spatial overlay view and animation view, a "DRAW_LIST" or "IMGLOAD" message is written to the EDF file at the onset of the component specifying the image or video clip to be used for visualization in Data Viewer.

18.2.3 Interest Area Integration

The Image and Video components allow users to specify an interest area file through the "Interest Area Template File" property. If valid interest area files have been provided, Data Viewer will load the interest areas automatically in the viewing session.

18.2.4 Participant Properties

WebLink logs participant properties that have been entered at the beginning of the experiment. Please see section 19.8 "Participant Properties" for detailed discussion on the use of this feature.

18.2.5 Customized/User Variables

WebLink also allows users to log customized trial condition data. Please see section "19.9 User Variables" for detailed discussions on creating and managing user variables. Note that newly-created variables will be added to the property fields of all specified components, so users should make sure to properly configure the values of the variables on each component. Both the participant properties and User Variables will be available in the "Trial Variable Value Editor" in Data Viewer (from the "Analysis" menu). They can be used for trial grouping and data filtering in the viewing session and included in the output files exported from a viewing session.

18.2.6 Response Logging

For each component in a WebLink sessions, the user can end the stimulus by pressing a key (the default shortcut key is F2), by clicking a mouse button (left, right, middle, press/release/scroll), or when the elapsed time exceeds the specified maximum duration. WebLink automatically sends an integration message to the EDF file to log the response data.

The following message is logged to the EDF file when a keyboard response is made.

```
Trial_response Keyboard <name of the key> <keycode>
Example: MSG 161758225 Trial_response Keyboard ENTER 13
```

The following message is logged to the EDF file when a mouse response is made.

```
Trial_response Mouse <Left/Right/Middle Button> <Press/Release/Scroll> <Click
Position>
Example: MSG 161758225 Trial_response Mouse Left Button Press 683 384
```

The following message is logged to the EDF file when the display times out.

```
Trial_response Timeout <requested duration>
Example: MSG 161758225 Trial_response Timeout 5000
```

For Webpage component, the following message is logged to the EDF file when the participant clicks on a URL to navigate away from the current page.

Trial_response URL_navigation <URL> Example: MSG 161758225 Trial_response URL_navigation https://www.sr-research.com/about-us/

18.3 Data Viewer Integration for Webpage/PDF Tracking

In addition to the above-mentioned integration applicable to all component types, Version 4.2 of EyeLink Data Viewer has advanced integration for webpage and PDF page tracking using WebLink:

- Automatic trial segmentation based on the webpage URL/PDF page
- Trials browsing the same web/PDF page can be grouped together.
- A timeline and navigation in the Animation and Spatial Overlay views facilitating navigation between different pages within a recording trial.
- Allows playing back the recorded trial based on the image captures of the web/PDF pages, viewing the entire page at once, or based on the saved video recording to view dynamic content.
- Automatic scroll compensation for eye events and samples in the Spatial Overlay View and Animation View.
- Marking of mouse clicks in the Spatial Overlay View and Animation View.
- Web/PDF page-specific condition variables automatically added into the Trial Variable Value Editor and analysis reports.
- New variables in output reports pertaining to web/PDF page tracking (trial, fixation, sample, and interest area reports).
- New preference settings specific to web/PDF page tracking.

A summary of the features in Data Viewer 4.2 related to webpage and PDF analysis is provided below. For a more detailed description of these and other new features, see the Data Viewer User Manual.

18.3.1 Trial Splitting and Trial Grouping

In a single recording trial of a web/PDF page navigation experiment, participants may navigate between multiple pages, so Data Viewer will automatically segment the original recordings into individual pages based on the messages logged to the EDF file when navigating to a new URL or PDF page. For ease of data aggregation and comparison across participants, the webpage segments will be automatically grouped by URL in Data Viewer, and PDF segments will be grouped by PDF page and zooming level. (The full, unsegmented trial recordings may also be viewed under the “Whole WebLink Trials” grouping.) If the webpage recordings were collected under different screen or browser resolutions, then users should regroup trials by both the CURRENT_PAGE and PAGE_WIDTH variables to ensure the validity of comparing and/or aggregating data within a grouping. The trial splitting and grouping behaviors can be configured under “Preferences -> Data Views -> WebLink”.

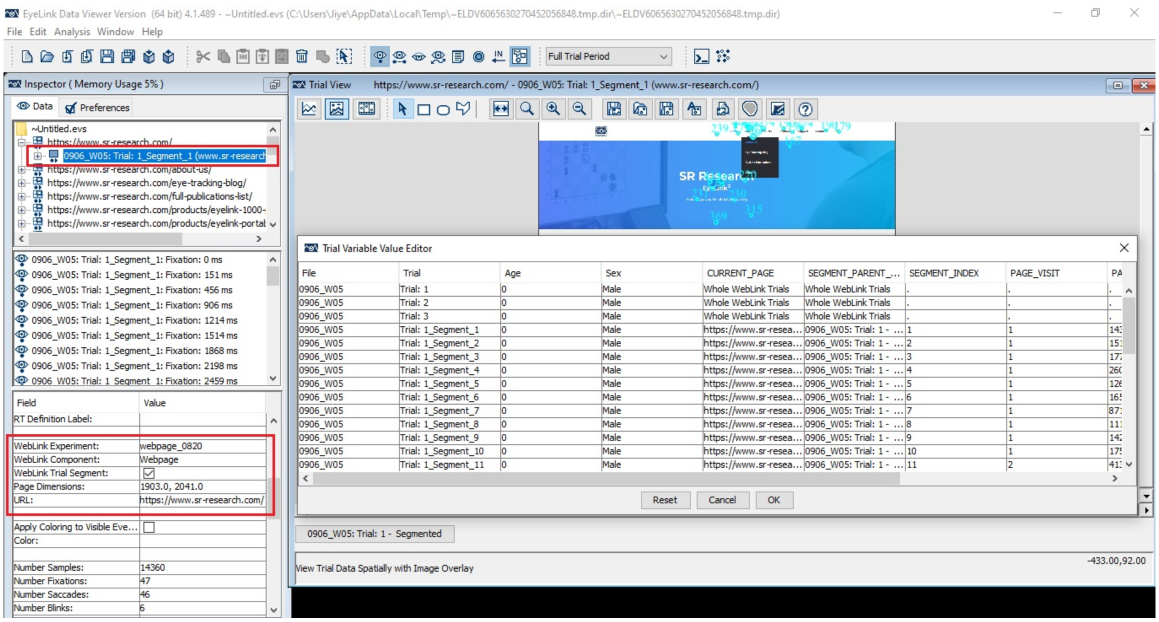

Figure 18-1. Trial Splitting and Grouping by URL of the Webpages

The following additional variables will be included in the property table of webpage/PDF trials:

- **WebLink Experiment:** The name of the WebLink experiment that was used to record the EDF file.
- **WebLink Component:** The WebLink component type (Webpage, Image, Video, PDF, Screen Recording, External Video, Scene Camera) used to produce this recording trial.
- **WebLink Trial Segment:** If checked, indicates the current trial is a segment of a longer webpage/PDF recording collected with the WebLink software; if unchecked, the trial is the original full recording trial.
- **Trial Segmentation Performed:** If checked, indicates the current trial is a full webpage/PDF recording that has been segmented by URL. If unchecked, the current trial has not been segmented. If for some reason a webpage/PDF trial was not segmented upon import, the user can segment the trial by right-clicking and selecting the "Segment Web/PDF Trial" option from the context menu. This property is applicable to the Whole WebLink Trials only.
- **Web Navigations**: Reports the number of times the participant navigated to a different webpage in the current trial. If the participant visits a page multiple times, each visit will be included in the count.
- **PDF Navigations:** Reports the number of times the participant changed pages or views (rotation, zoom) in the current trial.
- **Page Dimensions:** The width and height of the screen capture for the full-length webpage/PDF page viewed during the current recording segment.

- **URL:** The URL of the webpage viewed during the current recording segment. This property is only available for EDF files recorded with WebLink using the Webpage component.
- **Page:** Reports the file name of the PDF document and the page number viewed in the current trial segment. This property is only available for EDF files recorded with WebLink using the PDF component.
- **Page Displayed:** Reports the number of PDF pages shown in the current segment (either 1 or 2). This property is only available for EDF files recorded with WebLink using the PDF component.
- **Orientation:** Reports the degree(s) of rotation of the page(s) viewed in the current segment. This property is only available for EDF files recorded with WebLink using the PDF component.
- **Zoom Level:** Reports the percent zoom level(s) of the page(s) in the current segment. This property is only available for EDF files recorded with WebLink using the PDF component.
- **Unique Visits:** Reports the number of unique web/PDF pages that the participant viewed in the current trial. If the same page is visited multiple times, it will be counted only once. This property is only available for EDF files recorded with WebLink using the Webpage or PDF component.

18.3.2 Scroll Compensation

For webpage/PDF recording data collected with the WebLink software, Data Viewer automatically compensates for the scroll position of the webpage in the browser or the PDF page in the PDF viewer. This ensures the fixation, saccade and message events are shown in their proper location on the full capture of the displayed page, despite any page scrolling within the browser window or PDF viewer. Users can choose to disable the automatic scroll compensation through the WebLink preferences.

The following additional variables are included in the property table of fixation and saccade events in webpage/PDF trials:

- **Scroll Compensation Applied:** Whether scroll compensation is applied to the event data. Scroll compensation will only be applied when the "Apply Scroll Compensation to Events" option in the WebLink preference is enabled (the default setting) and a scroll event occurs before or during the current event.
- **Scroll Event Occurred during the Fixation/Saccade:** Whether the page is scrolled up or down during the current event.

Scroll data can be retrieved from the fixation report, saccade report, and sample report (see the list of new variables added to the reports in section "18.3.7 New Variables in the Reports").

18.3.3 Timeline and Navigation

For webpage/PDF recording data collected with the WebLink software, version 4.2 of Data Viewer adds a timeline in the Spatial Overlay View and Animation Playback View to navigate between the pages a participant visited during the trial recording. When viewing a full webpage/PDF trial recording in the Animation Playback View, numbered buttons corresponding to the page segments will be displayed below the timeline. The URL/PDF page of any segment can be displayed by hovering the mouse over the button. Left-click any numbered segment button to seek to the start of that segment in the current view; right-click the button to navigate to the corresponding trial segment in the Inspector and display the data for that segment only. When viewing a trial segment, a button to return to the full trial recording will be shown instead.

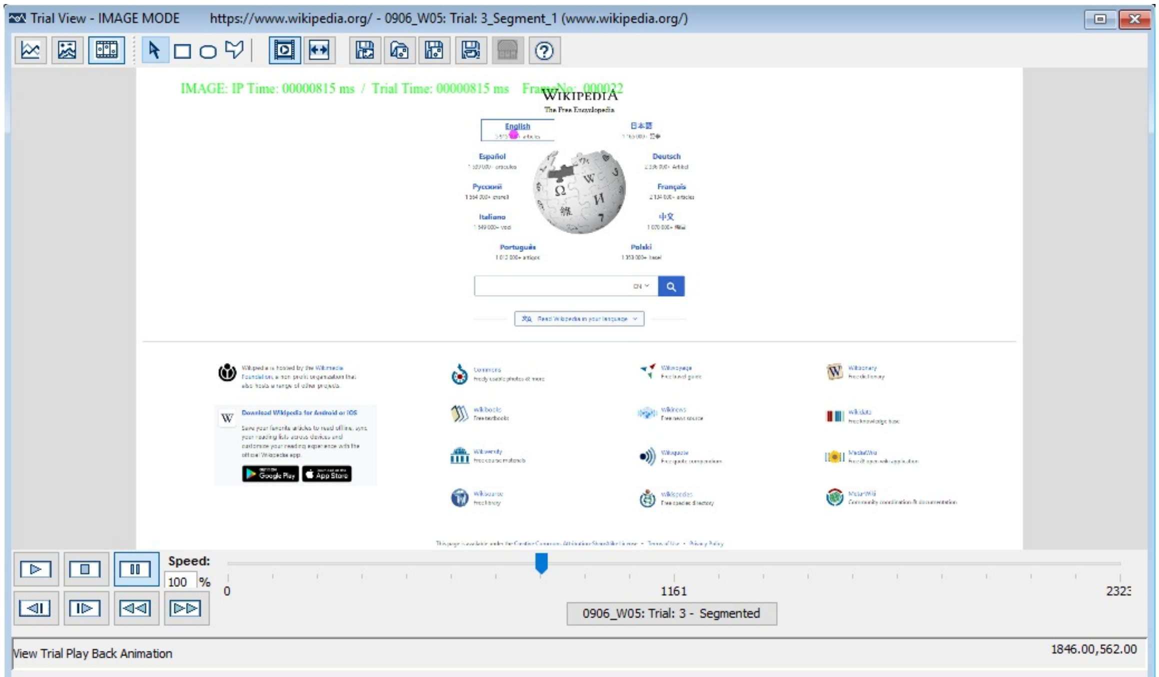

Figure 18-2. Timeline in the Trial View Window

18.3.4 Trial View Window GUI Changes

For webpage/PDF stimuli, which are typically taller than they are wide, it's often necessary to zoom in on the stimuli to see anything in detail. For webpage/PDF recordings made with WebLink, the Spatial Overlay toolbar will include a “Fit to the Width of Display” () button to stretch the page display to the width of the Trial View window. A vertical scrollbar and a horizontal scrollbar are added to the right and bottom edge of the Trial View Window to move around while the page is zoomed in.

The Animation Playback View allows user to play back the recorded trial based on the image captures of the web/PDF pages, or the saved background screen recording to view dynamic content. Two new buttons are added to the toolbar - the “Fit to the Width of Display” () button to switch between showing the entire webpage or stretching the webpage display to the width of the window, and the “Show Video/Image Animation View” button () to switch between webpage image capture or background screen recording.

18.3.5 Messages

Recording data collected with the WebLink software includes many additional types of integration messages to report web/PDF page navigation, page scrolling, mouse position and clicks, keyboard events, display and video frame data. Users may toggle the visibility of these WebLink specific messages in the preferences under Data Views > WebLink. All visible messages in a viewing session can be exported through the Message Report (Analysis -> Reports -> Message Report).

18.3.6 Trial Condition Variables

Data Viewer generates the following webpage-specific trial variables which will be shown in the Trial Variable Value Editor (accessible through the "Analysis" menu) and in the Reports:

- **PAGE_VISIT_DURATION:** The viewing duration of the current webpage/PDF segment, calculated as the interval between the Webpage/PDF Load Start messages for the current page and the next page ("Web Component"/"PDF Component" by default; the message text can be configured in WebLink in the "Message upon Start Event" preference). This variable is only available for webpage/PDF data files recorded with SR Research WebLink software.
- **PAGE_HEIGHT:** The height of the screen capture for the full-length webpage/PDF page viewed during the current recording segment. This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.
- **SEGMENT_PARENT_TRIAL:** Label of the original full recording trial from which the current webpage/PDF segment is extracted. This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.
- **SEGMENT_INDEX:** Reports the order in which the current webpage/PDF page was visited in the original full recording trial (e.g., returns "2" for the second webpage/PDF page visited in a trial). This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.
- **CURRENT_PAGE:** In a webpage trial segment, reports the URL of the page currently being viewed; in a PDF segment, reports the document name and page number(s) currently being viewed. This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.
- **PAGE_VISIT:** Reports the number of visits so far to the current URL/PDF page in the original full recording trial. This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.
- **PAGE_WIDTH:** The width of the screen capture for the full-length webpage/PDF page viewed during the current recording segment. This variable is only available for webpage/PDF data files recorded with the SR Research WebLink software.

- **ZOOM_LEVEL:** Reports the percent zoom level of the page in the current segment. If two pages are displayed it includes both values. This variable is only available for PDF data files recorded with the SR Research WebLink software.
- **PAGE_ORIENTATION:** Reports the degrees of rotation of the page viewed in the current segment. If two pages are displayed it includes both values. This variable is only available for PDF data files recorded with the SR Research WebLink software.
- **PAGE_NUMBER:** Reports the page number(s) of the page(s) viewed in the current segment. This variable is only available for PDF data files recorded with the SR Research WebLink software.

18.3.7 New Variables in the Reports

The following new variables in the reports are related to mouse clicks, scroll position, and Web/PDF page identification. They are only available for data files recorded with the SR Research WebLink software.

Trial Report:

- **FIRST_/LAST_MOUSE_CLICK_EDF_TIME:** Timestamp (in milliseconds since EyeLink tracker was activated; i.e., EDF file time) of the first/last mouse click in the trial.
- **FIRST_/LAST_MOUSE_CLICK_IN_IAS_EDF_TIME:** Timestamp (in milliseconds since EyeLink tracker was activated; i.e., EDF file time) of the first/last mouse click within any interest area defined in the trial.
- **MOUSE_CLICK_COUNT:** Total number of mouse clicks in the trial.
- **MOUSE_CLICK_COUNT_IN_IAS**: Total number of mouse clicks in the trial that occurred inside any of the defined interest areas.

Fixation/Saccade Report:

- **CURRENT_FIX_/SAC_AVERAGE_SCROLL_X/Y_OFFSET:** The horizontal/vertical scroll position of the webpage averaged across all samples of the current fixation/saccade. If samples are not loaded, this will be calculated as the average horizontal scroll at the beginning and end of the event.
- **CURRENT_FIX_/SAC END_SCROLL_X/Y_OFFSET:** The horizontal/vertical scroll position of the webpage when the current fixation/saccade ends.
- **CURRENT_FIX_/SAC START_SCROLL_X/Y_OFFSET:** The horizontal/vertical scroll position of the webpage when the current fixation/saccade starts.
- **CURRENT_FIX_/SAC_SCROLL_OCCURRED:** Whether the webpage is scrolled up or down during the current fixation/saccade.

Interest Area Report:

- **IA_FIRST_/LAST_MOUSE_CLICK_TIME:** Trial time (in milliseconds relative to the start of the current trial "TRIAL_START_TIME") of the first/last mouse click in the interest area.

- **IA_FIRST_/LAST_MOUSE_CLICK_TYPE:** Type (left vs. right) of the first/last mouse click in the current interest area.
- **IA_FIRST_/LAST_MOUSE_CLICK_X/Y:** The X/Y position of the first/last mouse click into the interest area. In a webpage recording, Data Viewer will automatically compensate for any scrolling, so the reported X/Y coordinate will reflect the proper location on the webpage.
- **IA_FIXATION_COUNT_BEFORE_FIRST_MOUSE_CLICK:** Number of fixations in the current interest area before the first mouse click event.
- **IA_FIXATION_COUNT_AFTER_LAST_MOUSE_CLICK:** Number of fixations in the current interest area after the last mouse click event.
- **IA_MOUSE_CLICK_COUNT:** The total number of mouse clicks in the current interest area.

Sample Report:
- **PAGE:** In a webpage trial, reports the URL of the page being viewed at the time of the current sample. In a PDF trial, reports the document name and page number(s) being viewed at the time of the current sample.
- **SCROLL_X_/Y_OFFSET:** The horizontal/vertical scroll position of the webpage at the time of the current sample.

Message Report:
- **CURRENT_MSG_SCROLL_X_/Y_OFFSET:** The horizontal/vertical scroll position of the webpage at the time of the current message.
- **CURRENT_MSG_TYPE:** The type of message event ("Mouse Event", "Key Event", or "Message" for all other events).

Aggregate Event Statistics:
- **FIRST_/LAST_MOUSE_CLICK_TIME:** Time of the first/last mouse click in the trial (relative to the start of the trial TRIAL_START_TIME).
- **FIRST_/LAST_MOUSE_CLICK_IN_IAS_TIME:** Average time (across all trials within the trial group) of the first mouse click in any interest area defined in the trial relative to the start of the trial (TRIAL_START_TIME).
- **MOUSE_CLICK_COUNT:** Average number of mouse clicks in a trial, calculated as the total number of mouse clicks in the trial group divided by the number of trials in the group.
- **MOUSE_CLICK_COUNT_IN_IAS:** Average number of mouse clicks per trial within any of the defined interest areas.
- **TRIALS_CLICKED_%:** Percentage of trials with a mouse click. This is calculated as the total number of trials with a mouse click, divided by the total number of trials in the trial group.
- **TRIALS_CLICKED_IN_IAS_%:** Percentage of trials with a mouse click in any of the defined interest areas. This is calculated as the total number of trials with a mouse click in any of the interest areas, divided by the total number of trials in the trial group.

Aggregate Interest Area Report:

- **IA_CLICKED_TRIAL_%:** Percentage of trials with a click in the current interest area. This is calculated as the total number of trials with a click in the interest areas with this ID, divided by the total number of trials using this interest area (TRIALS_USING_THIS_IA).
- **IA_FIRST_MOUSE_CLICK_TIME:** Average trial time (in milliseconds relative to the start of the current trial "TRIAL_START_TIME") of the first mouse click in the interest area. This is calculated as the mean value across all trials with a mouse click in the interest area with this ID.
- **IA_FIXATION_COUNT_BEFORE_FIRST_MOUSE_CLICK:** Number of fixations in the current interest area before the first mouse click event. This is calculated as the mean value across all trials with a mouse click in the interest area with this ID.
- **IA_MOUSE_CLICK_COUNT:** The average number of mouse clicks in the current interest area per trial. This is calculated as the total number of mouse clicks in interest areas with this ID across all trials, divided by the number of trials using this interest area (TRIALS_USING_THIS_IA).

18.3.8 WebLink Preferences

Data Viewer 4.2 includes a group of preference settings related to webpage/PDF recordings made with WebLink. The new preference settings, available under Data Views > WebLink, allow the user to configure whether and how the original webpage/PDF recording trials should be parsed, and how the trial segments should be grouped in the treeview. The scroll compensation settings allow the user to configure whether scroll compensation should be applied to events, samples, velocity/acceleration calculations, and event parsing. The users may also configure the visibility of the various types of messages (web, mouse events, mouse position, scroll, keyboard, and display messages) in the event list, and configure the coloring for these events in the Trial View Window.

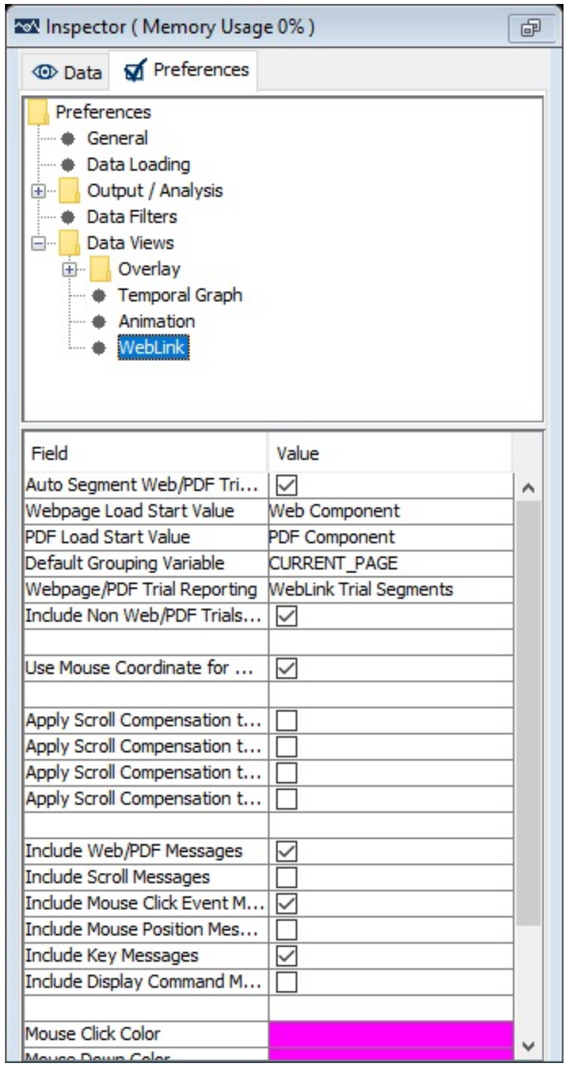

Figure 18-3. Data Viewer Preferences for Webpage Tracking

18.3.9 Creating an Interest Period

The webpage segments as parsed by Data Viewer will typically contain extra recording data at the beginning and end of the recording due to browser behavior (e.g., when starting /closing the browser, loading the webpage content). To filter out this additional data, users can determine the proper start time of each recording and create an interest period based on the start times. Since webpage loading times can vary drastically, we recommend that users find the proper starting time in the Animation View, and add a message corresponding to the onset time. In the Animation View, make sure “VIDEO MODE” is displayed in the Trial View title bar by clicking the “Show Video/Image Animation View” button. To find the proper start frame, start playback (you may want to decrease the playback speed) and/or use the Forward Frame/Backward Frame navigation buttons to find the video frame when the page has loaded. Pause playback at the intended position, then insert a message by right-clicking in the Trial View or Inspector window and selecting “Add New Message”. Enter a common message string across all the trials (e.g., “PageLoaded”). Users can then create a new interest period from the interest period dropdown list, using the newly added message as the Start Event Message Text. The End Event Message Text may be set to “Trial_response” to use the participant response/ hyperlink click as the end time, or to “webpage_dimension” to capture the full duration of the webpage segment. (If not all webpages in the session require precise timing, e.g., only on some “critical” pages in the experiment, users can add start messages to only the critical trials, and uncheck the “Apply Strict Event Matching” box—with Strict Event Matching disabled, all the “filler” webpages would be shown from trial_start_time, coinciding with the “Web Component” / “URL changed” messages. If Strict Event Matching were enabled, nothing would be shown on those trials.)

19 Application Configuration

Many properties of the WebLink software can be configured in the Experiment Configuration settings, which can be accessed by selecting “Edit -> Edit Experiment Configuration” from the application menu, or by clicking the “Experiment Configuration” tab of the properties panel. These include the EyeLink connection settings, data storage settings, monitor settings, preview settings, audio/video settings, hotkey definitions, etc. These settings are experiment specific and stored in the .wle file.

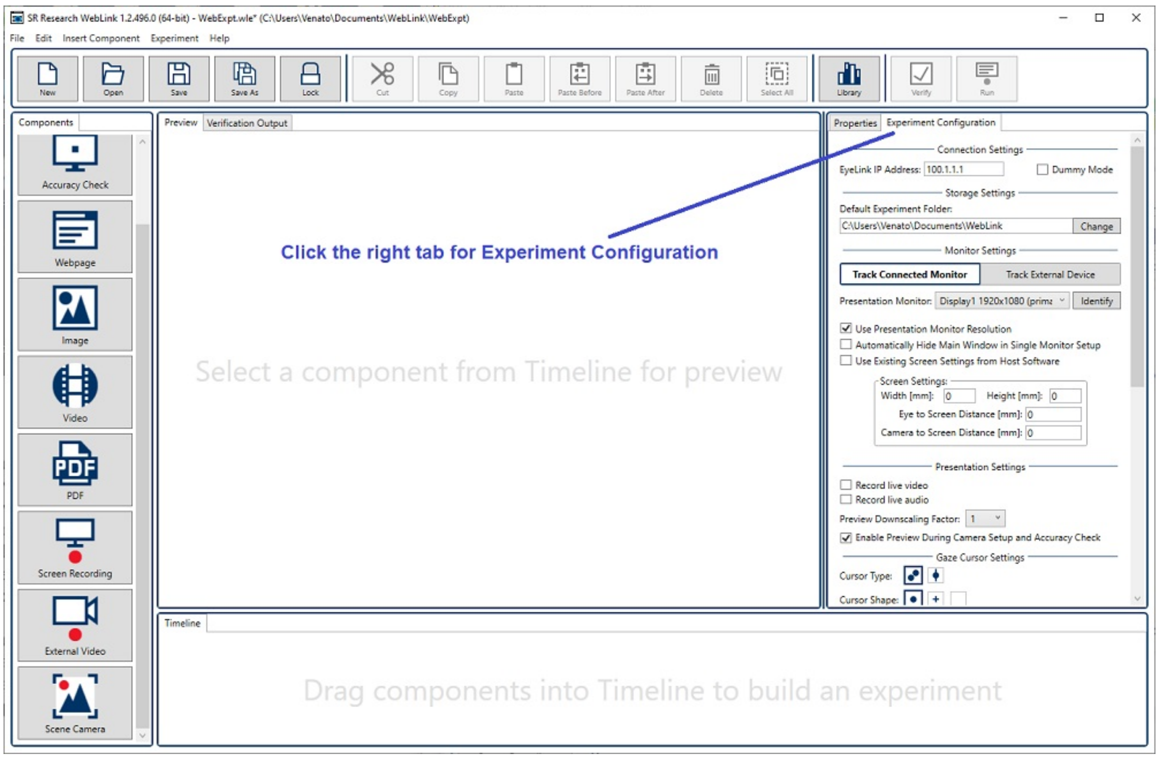

Figure 19-1. Accessing Experiment Configuration

19.1 Connection Settings

This section contains settings for connecting to an EyeLink eye tracker.

- **EyeLink IP Address**
  The IP address of the EyeLink Host PC. This must be the same as the "host_address" setting in the eyenet.ini file on the Host PC (typically under \eyelink2\exe directory for an EyeLink II tracker, \EyeLink\exe directory for an EyeLink I tracker, and \elcl\exe directory for an EyeLink 1000, EyeLink 1000 Plus, or EyeLink Portable Duo eye tracker). In general, users should keep the default tracker IP address 100.1.1.1.
- **Dummy Mode**
  If checked, the experiment can be run without attempting to connect to an EyeLink eye tracker. This can be used to simulate EyeLink link connection for experiment programming when an EyeLink tracker is not available. Note that the “Run” button in the application toolbar will now display as “Dummy Run” if this option is enabled.

The display computer should have a dedicated Ethernet port to connect to the EyeLink Host PC. Typically, users should use the IP address of 100.1.1.2 and subnet mask of 255.255.255.0 for the display PC. The following are the instructions to configure the IP address on Display PC IP on Windows 10.

1) From the Start menu, select “Windows System -> Control Panel”.
2) Click on the “Network and Internet” icon, and then select the “Network and Sharing Center” icon. In the following screen, choose “Change adapter settings” icon on the left side panel (see figure below).

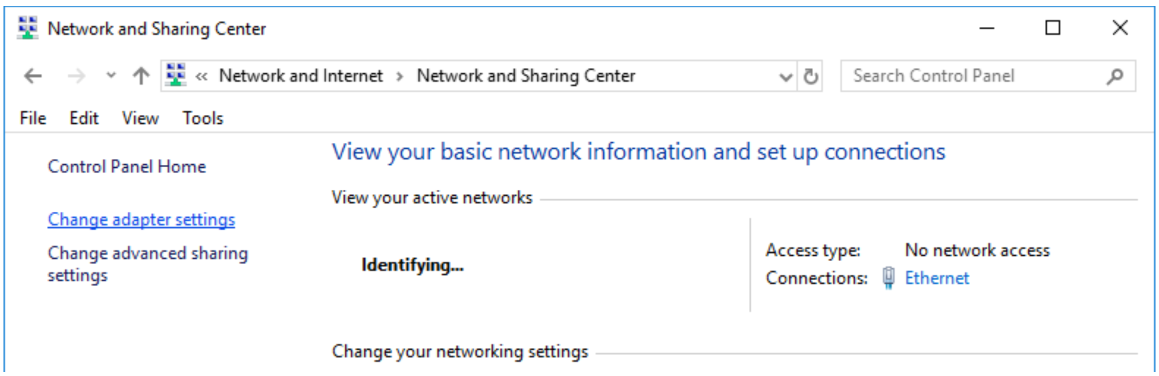

Figure 19-2. Change the Network Adapter Settings

3) Check the list of installed components to make sure a network card is detected. If not, install the driver for the network card.
4) Double click on the network card icon that represents the network card that will be connected to the EyeLink Host PC.
5) Select the “Properties” button.
6) Select the “Internet Protocol Version 4 (TCP/IPv4)” and then click on the “Properties” button (see figure below).

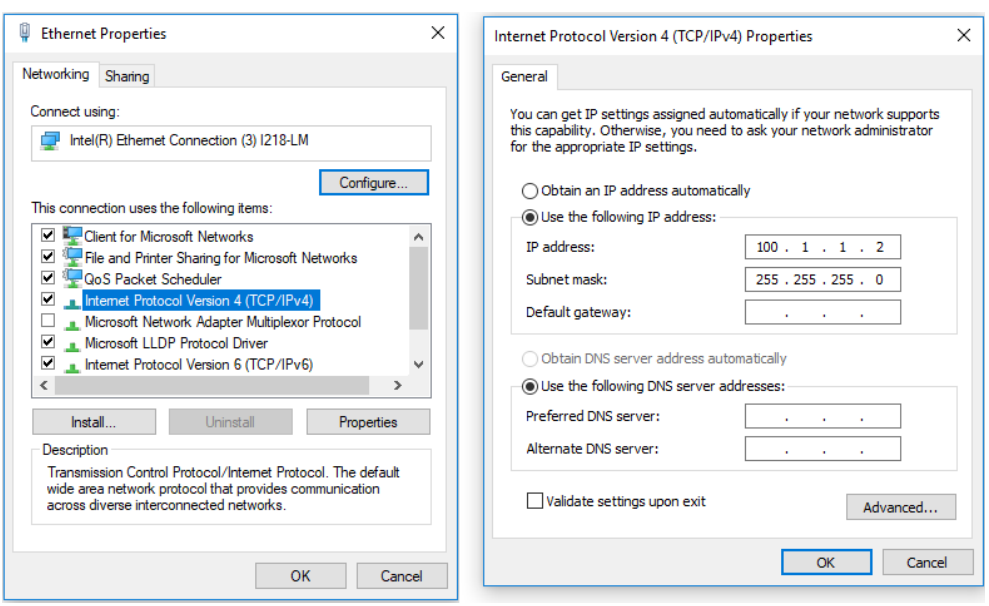

Figure 19-3. Configuring IP Address of the Display Ethernet Port for Connection to Eye Tracker

7) Select the "Use the following IP address" radio button. Enter the IP address "100.1.1.2" for the display computer that runs Experiment Builder. The last digit of the IP address can be increased as necessary to account for other computers on the network. Enter the subnet mask of "255.255.255.0". Leave the default gateway and other settings blank.
8) Click on "OK" to return to the Properties dialog. Click "OK" again to save your changes. Click "Close" to exit from the network card dialog.

19.2 Storage Settings

This section contains the storage settings for the experiment project and recording data.

- **Default Experiment Folder**
  Sets the default directory for saving WebLink experiment files and recorded data. This can be changed by clicking on the "Change" button and then browse to the intended folder from the Select Folder window. For data integrity and performance considerations, users should set this to a local hard drive. Please avoid saving the experiment to a removable data storage such as flash drive, external hard drive, or network drive.

19.3 Monitor Settings

This section contains the settings to configure the experimental display, including whether the experiment tracks screen-based applications (e.g., Webpage, video, image, PDF, screen recording, and External video if the video is presented on the monitor) on the connected monitor or track the stimuli on an external device (e.g., Scene Camera, or external video if the video is presented on the external device).

Track Connected Monitor vs. Track External Device: Selects whether the experiment is displayed on the WebLink computer or on an external device. Select Track Connected Monitor if the experiment will be displayed on the computer running WebLink. This includes the Webpage, Image, Video, PDF, and Screen Recording components, and the External Video component if the video is being presented through the WebLink PC. Select Track External Device if using the Scene Camera component or if using an External Video component displayed on an external device (e.g., a tablet, a game console connected to an external television, a projector, etc.). Different settings will be displayed below depending on which option is chosen.

19.3.1 Track Connected Monitor

For experiment stimuli presented on a connected monitor, the following settings are displayed, allowing the user to configure the display used for stimulus presentation.

- **Presentation Monitor**
  If multiple monitors are connected to the WebLink computer, determines which monitor is used to display the experiment stimuli to the participant. Click the

"Identify" button to display the numbers on each connected monitor and select the desired monitor from the dropdown. Please note in some setups, the monitor IDs reported by WebLink may not match the IDs used in the Windows Display settings.

- **Use Presentation Monitor Resolution**
  If checked, WebLink uses the current desktop resolution of the presentation monitor as the eye tracking recording resolution. Otherwise, the custom resolution specified below will be used.
- **Use Custom Resolution**
  If the "Use Presentation Monitor Resolution" option is not checked, users will be able to use a custom experiment resolution from a dropdown list. When opening an existing experiment with a specific resolution that is not supported by the current presentation monitor, a warning will be displayed and the user can choose to switch to use the current Windows desktop resolution.
- **Automatically Hide the Main Window in Single Monitor Setup**
  Users should typically use a two-monitor setup for WebLink experiments so that the WebLink main application and the experiment stimuli will be presented on different monitors. The current option allows users to hide the main window when running the WebLink experiment in a single-monitor setup so that the participants will not see what is displayed on the WebLink main window.
- **Using Existing Screen Settings from Host Software**
  If checked (default for connected monitor), the screen dimension and eye tracker distance will be loaded from the Host PC. If unchecked, enter the measurements for the screen settings below.
    - Width (mm): Width of the visible portion of the Display PC screen in millimeters.
    - Height (mm): Height of the visible portion of the Display PC screen in millimeters.
    - Eye to Screen Distance (mm): Distance (in millimeters) from the eye to the center of the Display PC screen (enter one number) or to the top and bottom of the screen respectively (enter two numbers). This is only used in the head-stabilized eye-tracking mode.
    - Camera to Screen Distance (mm): Distance (in millimeters) from the EyeLink camera to the presentation monitor. If using an EyeLink Portable Duo, measure from the back of the camera to the screen. If using an EyeLink 1000 Plus or EyeLink 1000, measure from the back of the lens (where it connects to the camera) to the screen. This is only used in the remote eye-tracking mode.

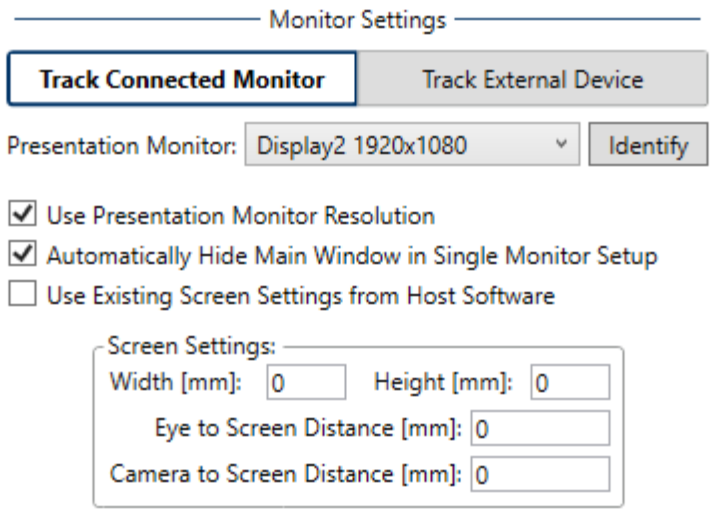

Figure 19-4. Track Connected Monitor

To enable a dual-monitor setup on the display PC, first make sure both monitors are connected to the computer. On the Windows desktop, right click and choose "Display Settings". For each of the displays, choose the intended resolution. For the "Multiple Displays" configuration, choose the "Extend these displays" option (see figure below).

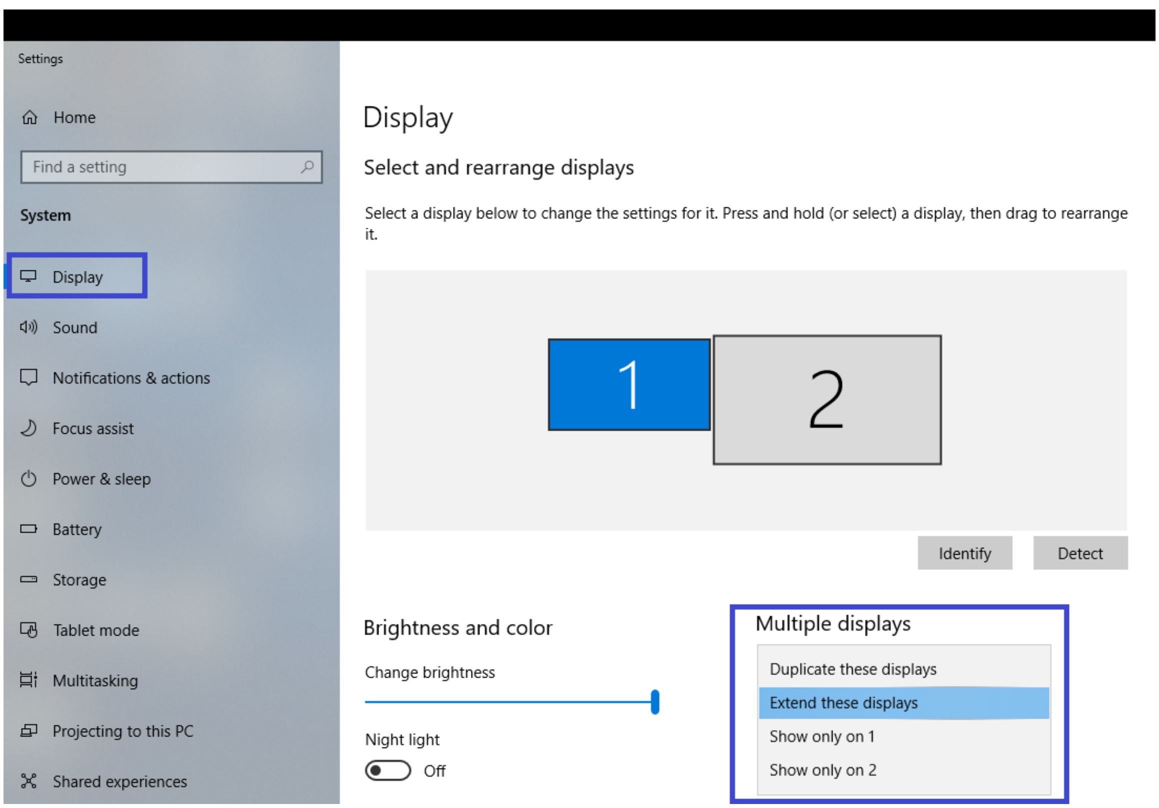

Figure 19-5. Dual-Monitor Configuration on the Display Computer

19.3.2 Track External Device

If WebLink is used to capture stimulus through a scene camera (i.e., a camera recording the participant's point of view), or if the participant views the stimulus presented on an external display (e.g., a tablet, game console, etc.) instead of the monitor connected to the WebLink PC, choose the "Track External Device" option. The following settings will be available when tracking an external device.

- Tracking Area: Users can configure and adjust cropping of the video source.
    - Left (px): The position of the left boundary of the tracking area within the video source (0 corresponds to the left edge of the video source).
    - Top (px): The position of the top boundary of the tracking area within the video source (0 corresponds to the top edge of the video source).
    - Right (px): The position of the right boundary of the tracking area within the video source (a value equal to the video resolution width -1 corresponds to the right edge of the video source).
    - Bottom (px): The position of the bottom boundary of the tracking area within the video source (a value equal to the video resolution height -1 corresponds to the bottom edge of the video source).
- Tracking Dimensions: Enter the physical measurements for the tracking area below.
    - Width (mm): Width in millimeter of the external device or tracking area.
    - Height (mm): Height in millimeter of the external device or tracking area.
    - Distance from the Eyes (mm): Distance in millimeter from the eye to the center of the display device/tracking area (enter one number) or to the top and bottom of the display device/tracking area, respectively (enter two numbers). This is only used in the head-stabilized eye-tracking mode.
    - Camera to Screen Distance (mm): Distance in millimeters from the EyeLink camera to the display device/tracking area. If using an EyeLink Portable Duo, measure from the back of the camera to the display. If using an EyeLink 1000 Plus or EyeLink 1000, measure from the back of the lens (where it connects to the camera) to the display. This is only used in the remote eye-tracking mode.

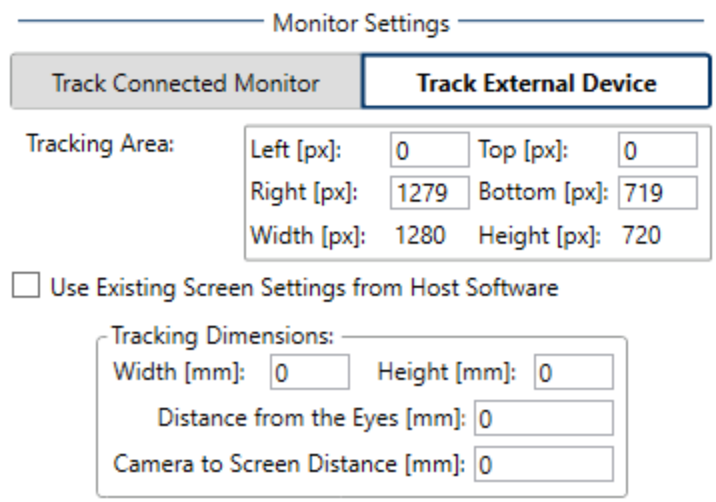

Figure 19-6. Track External Device

19.4 Presentation Settings

This section discusses the settings for audio/video recording.

- **Record Live Video**
  If enabled, live webcam video can be recorded for the session. Users will be provided further options to configure "Video Source" and "Format". The recorded video will be stored in the session results folder (under "Videos" subfolder).
- **Record Live Audio**
  If enabled, live webcam audio can be recorded for the session. Users will be provided a further option to configure "Audio Source". The recorded audio will be stored in the session results folder (under "Videos" subfolder).
- **Preview Downscaling Factor**
  This sets the downscaling factor when displaying the preview images on the WebLink main window during experiment runtime. A higher downscaling factor will lead to more compressed preview image (but will demand less computer resources).
- **Enable Preview During Camera Setup and Accuracy Check**
  Enables live preview during Camera Setup and Accuracy Check. If disabled, the hardware load during these components will be slightly reduced. Please note that if disabled, the remote preview application will be able to connect only when a component with live preview is reached.

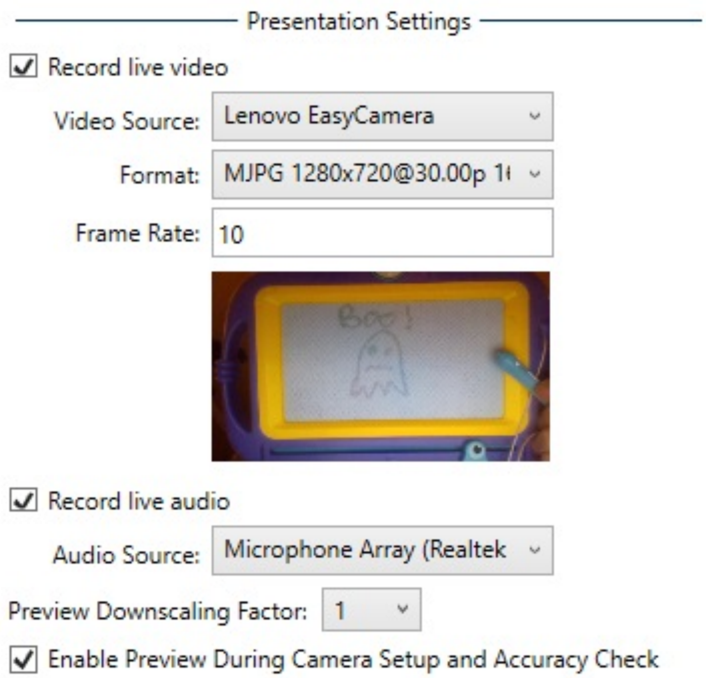

Figure 19-7. Video and Audio Presentation Settings

19.5 Gaze Cursor Settings

The following gaze cursor/shape/color options are provided for the drawing of gaze cursors in the preview window during recording.

- **Cursor Type**
  When performing a binocular recording, if the cyclopean cursor button is enabled, a single gaze cursor will be drawn in the recorded video, representing the average data from the two eyes; otherwise, a separate gaze cursor will be drawn for each of the eyes.
- **Cursor Shape**
  Gaze cursor may appear as a solid circle, a small cross hair, or be disabled. Select the cursor appearance by clicking on the appropriate button.
- **Cursor Color**
  The color of the cyclopean, left, and right eye gaze cursors can be set by clicking on the colored buttons.

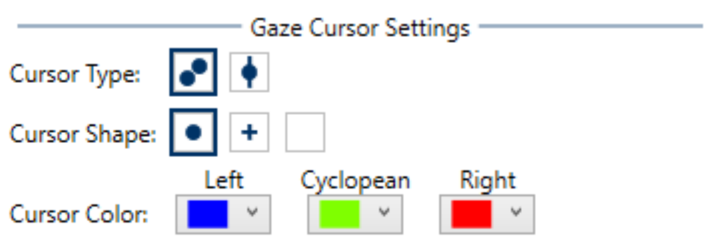

Figure 19-8. Gaze Cursor Settings

19.6 TTL Settings

A parallel port card or USB2TTL device (http://www.labhackers.com/usb2ttl8.html) is required to send synchronization signals from WebLink to other devices, or to trigger hotkey from the application.

If using a parallel port, you will need to determine the base address of the parallel port device. Start the "Device Manager" from Windows Control Panel. In the following device list, find the entry for the parallel card under "Ports (COM & LPT)". Click on the card and select the "Resources" in the properties table. The base address will be the lower value in the reported I/O Range. Set the "Parallel Port Base Address" property based on the value, starting with "0x" (e.g., for the reported I/O Range "0378-037F", enter "0x378" as the base address).

If using a USB2TTL8 device, you will need to determine the COM port for the device. Start the "Device Manager" from Windows Control Panel. In the following device list, search for the entry "USB Serial Port" under "Ports (COM & LPT)". For the WebLink application, choose the proper COM port in the "Serial Port" dropdown list.

19.7 Remote Preview Settings

The WebLink installer includes an accessory application "WebLink Remote Preview.exe" that provides a live view of the experiment remotely (see section 17 "WebLink Remote Preview"). This section discusses the settings in WebLink to connect to the remote preview appliction.

- Remote Live Preview: If checked, enables sending the live content of the preview panel to the WebLink Remote Preview application.
- Remote IP Address: The IP address of the computer running the WebLink Remote Preview application. If Weblink Remote Preview will be run on the same computer as WebLink, leave this as the default 127.0.0.1. If running WebLink Remote Preview on another computer, you can find its IP address listed as the "Own IP Address" in the remote preview application on that computer. Both computers should be connected via a local network.
- Communication Port: The port (default: 5000) used by the application for communication with the Remote Preview application.
- Own IP Address: Reports the IP address of the current computer.

19.8 Hotkey Settings

This section discusses the keyboard shortcuts and hotkey configurations in the WebLink software.

- **Terminate Hotkey**
  CTRL + C is the keyboard shortcut to terminate the experiment at any time.
- **Web Screenshot Hotkey**
  The hotkey(s) used to take screen captures manually in a webpage experiment.
- **Stop Component Hotkey**

F2 is the default keyboard shortcut to end the presentation of the current component. This may be used in addition to any response methods specified for the component, such as key press, mouse event, or timeout. Any key between F2 and F12 may be used.

- **Start Preview Fullscreen**
  Determines whether the live preview will be shown in its original size (No) or zoomed to full screen (Yes) when recording begins.
- **Toggle Preview Fullscreen**
  Selects the key combination that can be pressed to toggle between the full screen and original preview size.
- **Clear Keyboard and Mouse Queue**
  When enabled, WebLink will flush any stored keyboard/mouse events before executing a new component to get rid of old responses.

19.8.1 Define Experiment Hotkeys

WebLink allows users to define hotkeys to send messages or commands to the eye tracker, to send TTL signals, or to perform a drift correction during recording. Click on "Define Experiment Hotkeys …" to show a hotkey editor window. To create a hotkey, select the intended key(s) from the dropdown menus. Any alphanumeric keys, function keys, cursor keys, number pad keys, and Enter, Space, or Escape may be used, either alone or in combination with the Shift, Alt, or Ctrl keys. The function for the hotkey can be selected from the next dropdown menu.

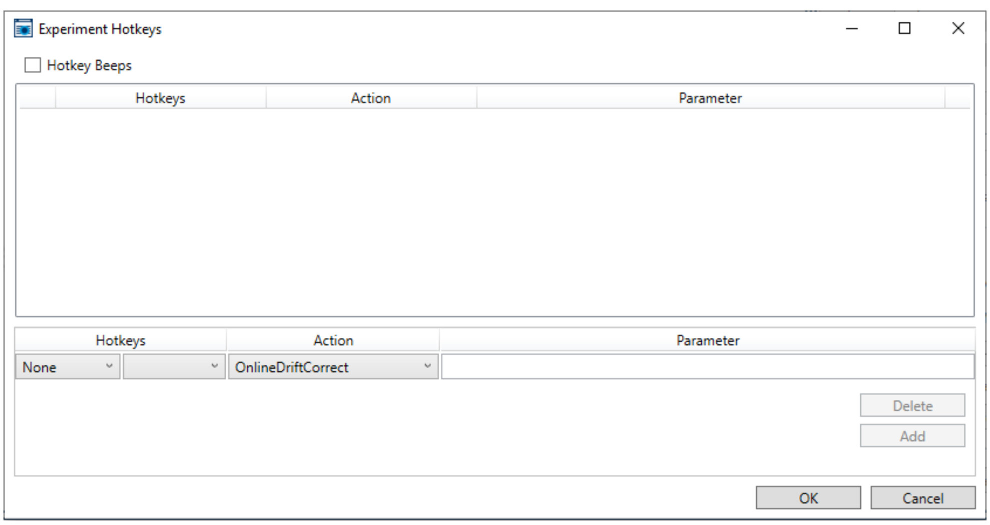

Figure 19-9. Hotkey Definition Dialog

The following hotkey functions are supported:

- Online Drift Correction – Allows the user to perform an online drift correction during recording by holding down the specified hotkey and clicking the display PC mouse at the intended fixation location on the presentation monitor. The online drift correction should be used only in a dual-monitor setup on the display PC so the experimenter can monitor the participant's gaze position in the live view.

- Send Command – Sends a command to the EyeLink tracker when the hotkey is pressed. Enter the intended EyeLink command string in the parameter box on the right.
- Send Message – Sends a message to the EDF file when the hotkey is pressed. Enter the intended message text in the parameter box on the right.
- TTL – Sends a TTL signal through the display PC parallel port. The base address of the parallel port is specified through the "TTL Base Address (hex)" option in the TTL settings.

When defining a hotkey to send a TTL signal, the following additional parameters should be configured.

- Register – The parallel port register from which to send the TTL signal. Typically, this is set to "Data Register" (which corresponds to the base address of the parallel port).
- Set Value – The value of the TTL signal to send. It should be a hexadecimal value from 0x0 to 0xFF (corresponding to a decimal value from 0 to 255).
- Send Clearing TTL Automatically – If enabled, WebLink will send a clearing signal automatically.
- Duration – Sets the duration of the TTL signal before the clearing signal is sent. This field is used only if "Send Clearing TTL Automatically" is enabled.
- Clear Value – Sets the value of the clearing signal. This field is used only if "Send Clearing TTL Automatically" is enabled.

Once the hotkey, action, and parameter fields are filled, press the "Add" button to add the hotkey definition to the list. If the "Hotkey Beeps" option is enabled, a beep sound will be played when one of the keys is pressed.

19.9 Participant Properties

WebLink allows the user to collect some participant information at the beginning of each experimental session in the "New Session" dialog. Click the "Define Participant Properties…" button in the Experiment Configuration panel to configure the properties to include; the "Age" and "Sex" properties are included by default. To add a new property, first enter a Display Name in the edit box at the lower left corner, then choose String, Integer, Float, or Option as the Response Type. For the String response type, the user can enter any text (the Details field may be left empty). Both the Integer and Float types accept a numeric response (integer or float) within the range specified in the "Details" section. The Option type allows the user to choose between a list of options—enter the options in the Details tab as a list of the possible values separated by an "/" (e.g., "Male/Female/Other"). Once the new property has been configured, click the "Add" button to add it to the list. An existing property can be edited by clicking on the field to be edited. To remove a property from the list, select the property, then right-click and select "Delete" from the context menu.

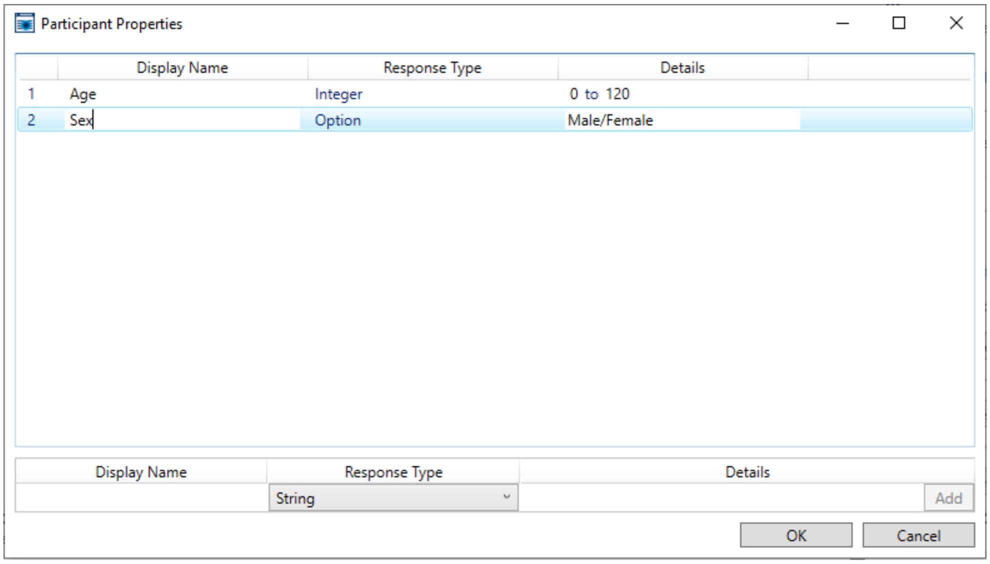

Figure 19-10. Participant Properties Dialog Box

19.10 User Variables

WebLink allows the user to define custom variables to code any additional desired properties (e.g., condition information for various trial types). Click "Define User Variables…" to open the user variable window. To add a variable, enter the desired Display Name of the variable in the edit box in the lower left corner, then choose String, Integer, Float, or Option as the Response Type. The "String" type allows the user to enter any desired text as the variable value. The Option type allows the user to choose the variable value from a list of options—enter the options in the Details tab as a list of the possible values separated by an "/" (e.g., "Condition1/Condition2/Condition3"). the Integer and Float types accept a numeric response (integer or float) within the range specified in the Details section. For the "Applicable Type" section, choose which component type(s) the variable will be added to. Click the "Add" button to add the new entry. All fields of an existing variable can be edited except for the "Variable Type". Simply select the variable from the list and double-click the field that you wish to edit (see figure below). To delete a variable, select the variable in the list (by clicking on the row), then right-click and choose "Delete". The newly created variable will be added to the property table of the applicable component. The user should make sure to set the values for the newly-added variables on each applicable component.

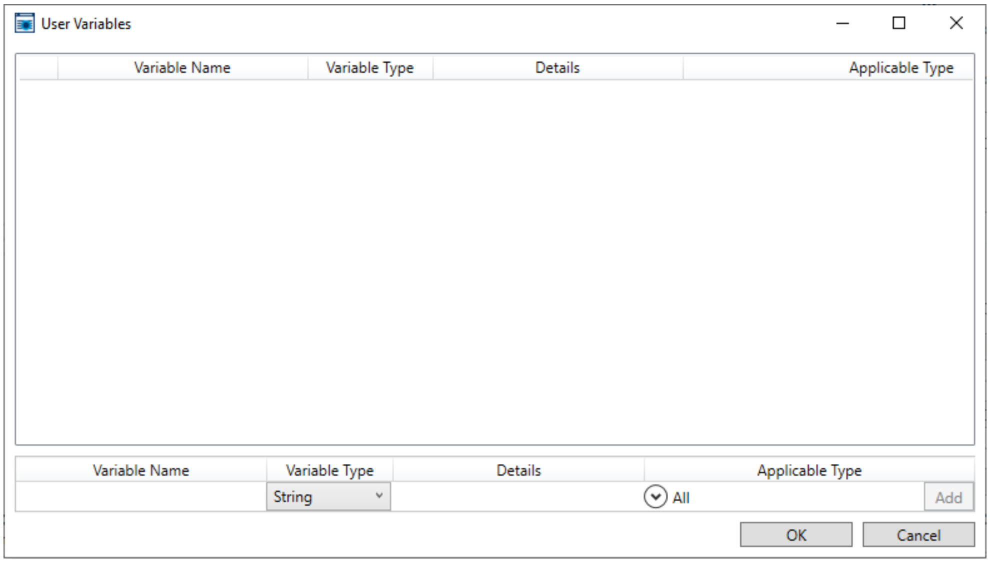

Figure 19-11. Creating User Variables

20 Revision History

Version 2.1.1

- Added Scene Camera Component
- Added PDF Component
- Added Chrome browser extension to the Webpage component
- Added “Track Connected Monitor” and “Track External Device” options to the Experiment Configuration
- Added “Adjust Tracking Area”, “Auto-Detect Tracking Area”, “Adjust Calibration Grid”, “Auto-Detect Calibration Grid”, “Show Control Panel” tabs to the Preview window of the External Video Component when tracking external device option is used.
- Added “Use custom target locations”, “Use Absolution location”, “Custom target locations” options to Camera Setup component
- Added “Export options”, “Target Index position”, “Target Index Color” to Camera Setup component
- Added “Rotation and Flipping” option to External Video component
- Added Remote Live Preview option in the Experiment Configuration; added WebLink Remote Preview.exe to the application folder
- Added automatic logging of EyeLink commands sent from the application
- Added command line option to run the experiment
- Added “Verify” button to the Application Toolbar
- Added “Verification Output” tab to the main Preview Window
- Added Space, Enter, ESC key to the list of supported hotkeys
- Added “Use Existing Screen Settings from Host Software” option in Experiment Configuration, and allow users to configure Screen Settings (Width, Height, Eye to Screen Distance, and Camera to Screen Distance).
- Added option to start Preview in full screen and hotkeys to toggle the presentation options

Version 1.1.218

- Updated the HASP driver bundled with the installer
- Improved the Subject Camera Plugin application
- Fixed bugs with the Firefox extension activation

Version 1.1.1

- Initial release