What's up, popEye?

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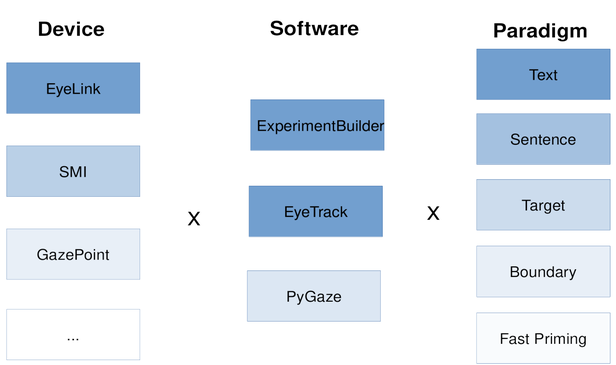
What is popEye?

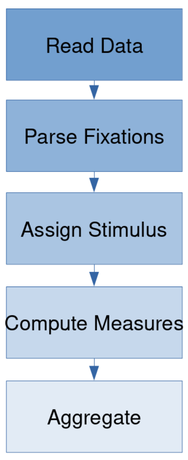
popEye [4] is an R package to analyse eye-tracking data from reading experiments. A unique feature of popEye is that it allows to analyse data collected using different eye tracking devices (SR research, SMI, GazePoint) and software packages (Experiment Builder, EyeTrack, PyGaze) using the same workflow. In addition, popEye aims at analysing reading data from all levels of reading and using different paradigms (e.g., text reading, sentence reading, boundary paradigm, fast priming).



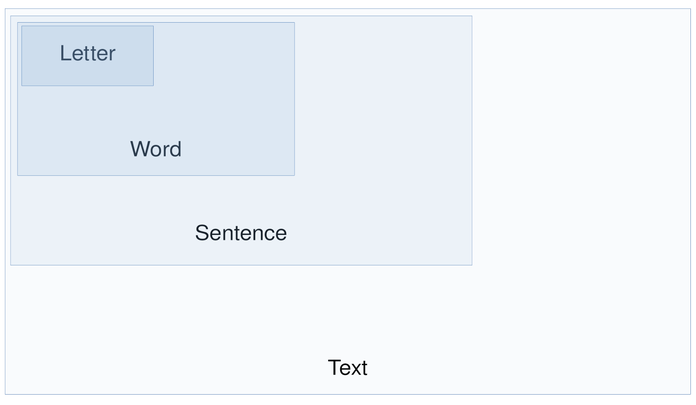
How popEye works

popEye:

- reconstructs the stimulus input as shown by the display software used in the experiment,
- preprocesses the data,
- assigns fixations to linguistic units on different levels,
- computes output variables for each level of analysis.



Next to structural units (words, sentence, texts), interest areas can flexibly be defined on the sub-lexical (e.g., morphemes) or super-lexical level (phrases or paragraphs etc.).



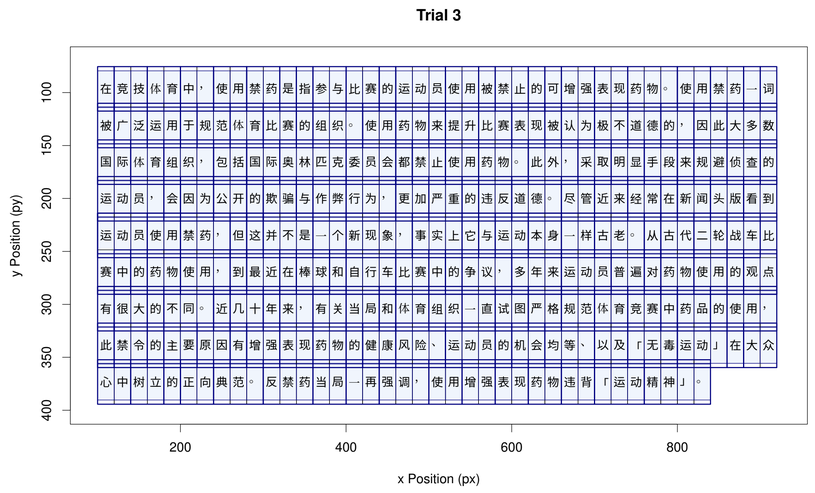
popEye uses linguistic units during analysis and exploits the hierarchical nature of language. In addition, it provides different processing options based on the nature of the experiment (e.g., sentence vs. text reading experiments, boundary experiments).

What is new in popEye?

The latest popEye version is **0.8** (August 2022). Development in the last two years mainly focused on the analysis of experiments on the text-level using an EyeLink/Experiment Builder setup.

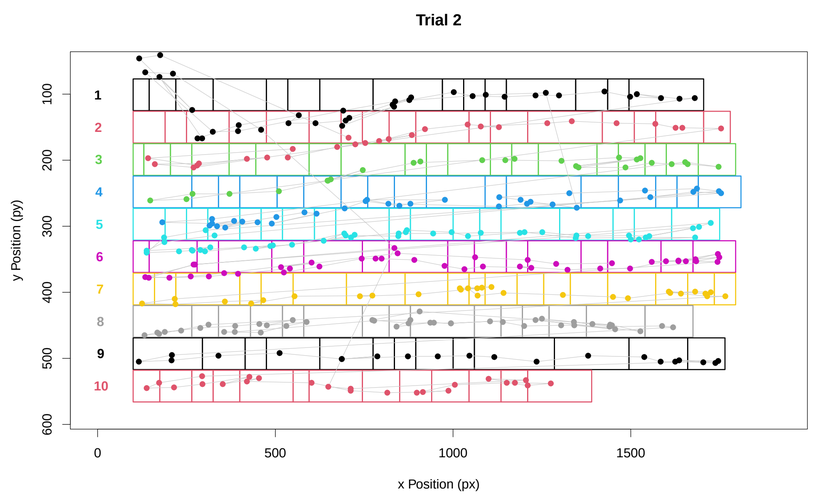
Multilanguage support

popEye has been used to process the data in the MECO corpus [5], a multi-lingual eye-movement corpus. As a consequence, popEye supports a wide variety of languages, including Chinese and Korean.



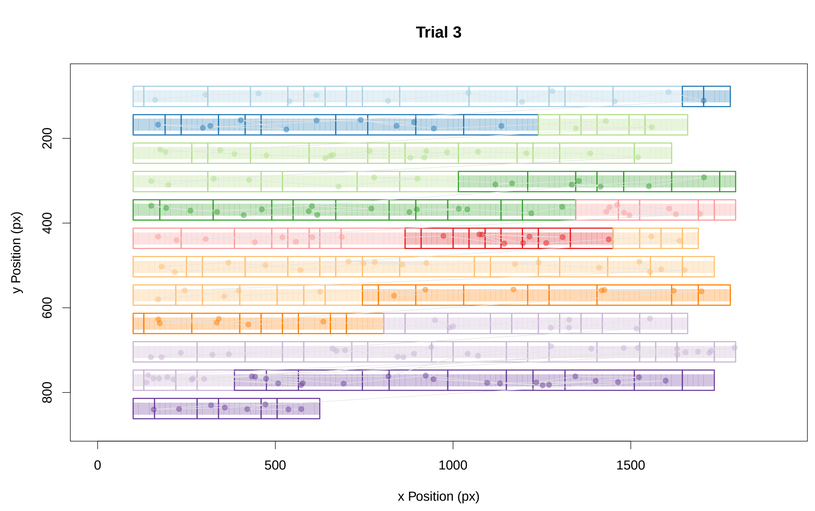
Automated Line Alignment

popEye includes several algorithms to automatically align fixations to lines, including [1] and [2]. Fixations can also assigned manually if necessary.



Sentence and Text Measures

popEye provides multiple measures capturing processes on the sentence- and text-level, e.g. [3].



How to get popEye?

popEye lives on GitHub:

github.com/sascha2schroeder/popEye

SCAN ME!

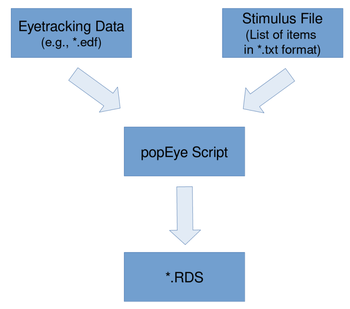
Install the latest version in R using:

```
require(devtools)
install_github('sascha2schroeder/popEye')
```

Workflow

To analyse your data using popEye, you need:

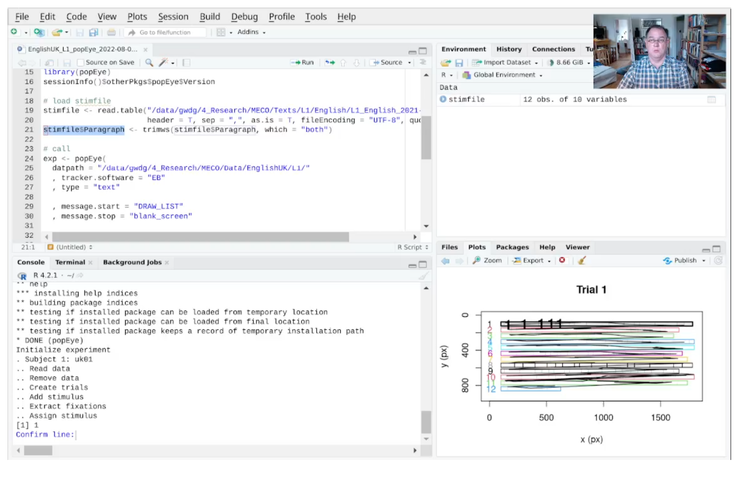
- *.asc files for your experiment as generated by SR Research's EDF2ASC conversion tool.
- An "stimulus file" which comprises all items used in your experiment (maybe in different versions).
- An R script in which the popEye() function is used to preprocess the data.



This will create an .RDS file that can than be used for further processing, e.g. generating plots and reports or data cleaning.

Examples and Video Tutorials

*.ebz templates and R scripts showing how to create and analyse popEye experiments can be found on GitHub as well as links to short video tutorials demonstrating how use popEye step-by-step.



References

[1] Jon W Carr et al. "Algorithms for the automated correction of vertical drift in eye-tracking data". In: *Behavior Research Methods* 54.1 (2022), pp. 287–310.

[2] Dominik Glandorf et al. "Slice: an algorithm to assign fixations in multi-line texts". In: *Procedia Computer Science* 192 (2021), pp. 2971–2979.

[3] Jukka Hyönä et al. "Eye movement measures to study global text processing". In: *The Mind's Eye*. Elsevier, 2003, pp. 313–334.

[4] S. Schroeder. "popEye - An R package to analyse eye movement data from reading experiments. Paper presented at the 20th European Conference of Eye Movements." In: Alicante, Spain, 2019.

[5] Noam Siegelman et al. "Expanding horizons of cross-linguistic research on reading: The Multilingual Eye-movement Corpus (MECO)". In: *Behavior research methods* (2022), pp. 1–21.

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