PsyExTool project for psychophysical research of sensory systems

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A range of computer programing packages for psychophysical methods including open source are available at present. But there are not many convenient and enough flexible experiment control tools that incorporates these methods. The current MATLAB and GNU Octave environment-based project PsyExTool is aimed to create a tool that enables to couple the methods with visual or audio stimulus presentation modules. At present the program allows to use adjustment, constant stimulus and adaptive PSI psychophysical methods. The parameters of the stimulus and psychophysical method is adjusted in a single graphical user interface. The responses are collected using keyboard or mouse. The process of experiment is displayed graphically. At the end of the session, the data can be stored or exported for further analysis. The structure of the program may incorporate and combine additional methods for data collection and stimuli presentation in various sensory modalities. The open-source status of the code should ensure availability and flexibility of the tool.

A tool for psychophysical experiment control, data collection and visualization is developed

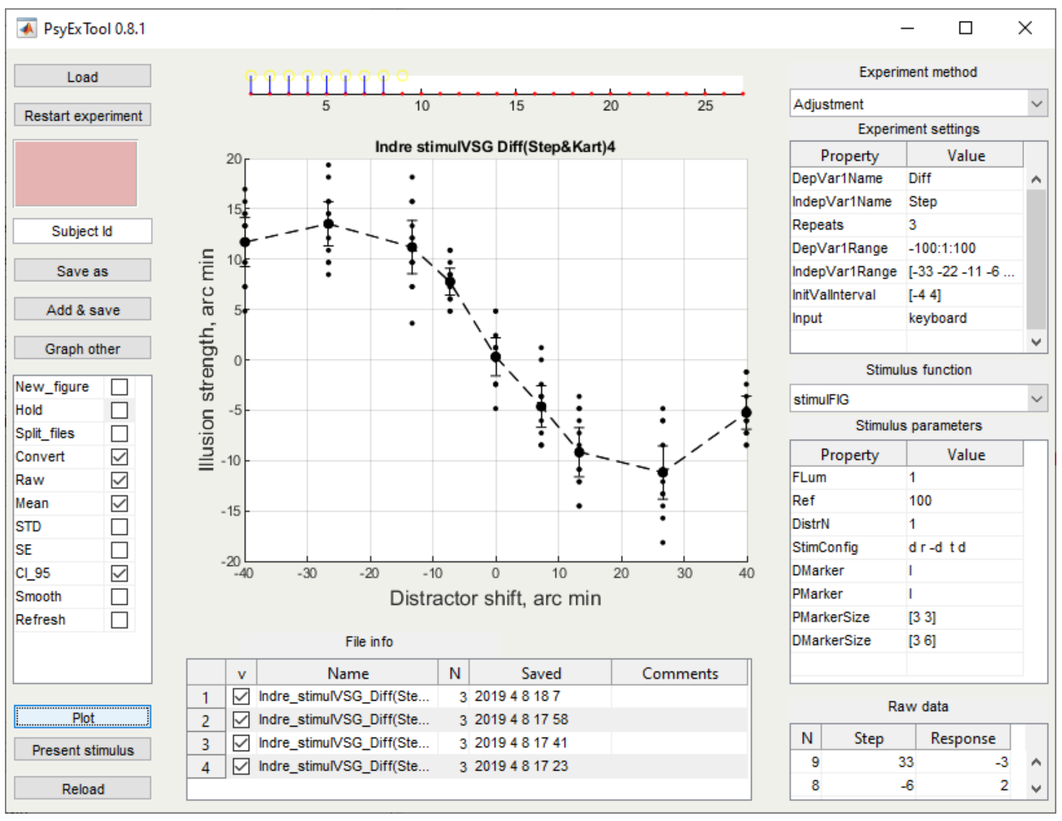
The features

- Perform experiments using adjustment, constant stimulus and adaptive Psi (from Palamedes toolbox) methods;
- Visualize state of ongoing experiment;
- Store, manage and export the data;
- Interface your own stimuli presentation function to the experiment control module;
- Change and develop the toolbox in MATLAB and its free alternative GNU Octave.

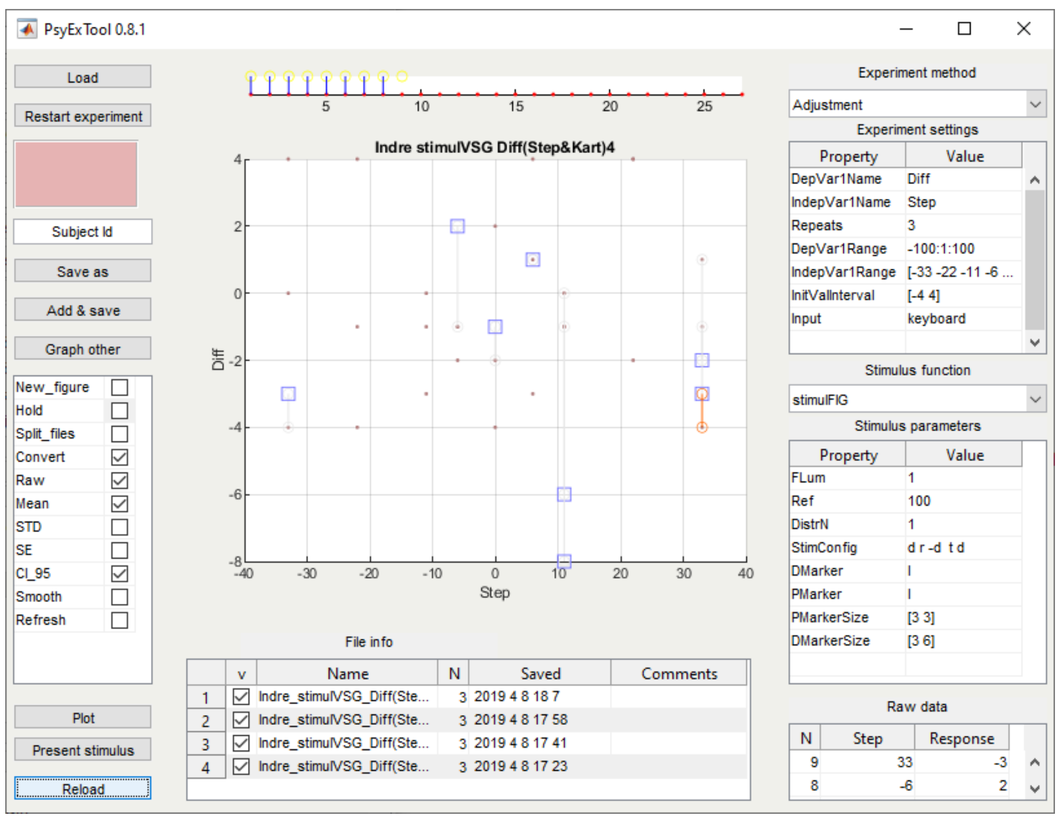
PsyExTool main window example with a loaded psychophysical experiment

Load - load the experiment data and settings.
Start (Restart) experiment - starts the experiment.
Empty **panel** of green color - ready to start, red - ongoing experiment, yellow - finished unsaved experiment. You can keep a cursor on this panel in case you are using a mouse as input device.
Subject id input panel is for to enter id of the subject that performs experiment.
Save as - to save the performed experiment in a new file or to save or export a loaded experiment/experiments or part of it to a new file.
Add & save - to add newly performed experiment to a loaded dataset in case you repeate the experiment with the same subject.
Graph other - to plot saved experiment results without loading experiment parameters.
Ploting settings panel with checkboxes
- **New figure** - every time the data is plotted in a new figure.
- **Hold** - the graph is plotted without erasing the previous.
- **Split files** - the experiment sessions are plotted or saved separately.
- **Convert** - convert and put labels in a plot of experiment results, it also applies for exporting.
- **Raw** - plot or export every response.
- **Mean** - plot or export the means of the responses.
- **STD** - plot or export the standard deviation of the responses.
- **CI** - plot or export the 0.95 confidence intervals of the responses mean.
- **Smooth** - plot or export the smoothed data.
- **Refresh** - plot after every new check in ploting or file info check box panels.

Plot - plot the data of current selection denoted in File info table.
Present stimulus - presents stimulus that is defined in stimulus parameters table.
Reload - refreshes the view of the window.
File Info - info about loaded repeats of the experiment (name, number of repeats or responses, saved time, comments). It is possible check or uncheck certain experiment sessions in order to plot (button Plot) them or to save/export in a separate file through a bottom Save as.



PsyExTool main window example with ongoing psychophysical experiment



Experiment settings
Experiment methods: Adjustment | constant stimulus | PAL_AMP (Palamedes toolbox Adaptive Method Psi)
IndepVar1Name - Independent Variable 1 Name of the stimulus presentation function.
IndepVar1Range - Independent Variable 1 Range of the stimulus presentation function.
Input - keyboard | mouse

Stimulus parameters
StimulFIG is a visual stimulus presentation function

Raw data table shows entered data.

The generated visual stimulus of the example. In the illusory figure the intervals between dots are mispercieved.

Comments and questions are wellcome!

The PsyExTool is available at https://sourceforge.net/projects/psyextool/