

PsychLab

Startle Blink

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PRECISION INSTRUMENTS

PsychLab is ideally suited to startle studies. Its intelligent stimulus script allows procedures including pre-pulse inhibition, affective modulation and unusual complex designs to be easily accommodated without the constraint of limited options found with menu driven systems. Studies involving variation of stimulus - probe interval and all other parameters are easily accommodated.

Designing the experiment

PsychLab measuring software allows other measures to be mixed with startle blink. Often Skin Conductance and Heart Rate are also measured, providing additional information for each trial when data are analyzed.

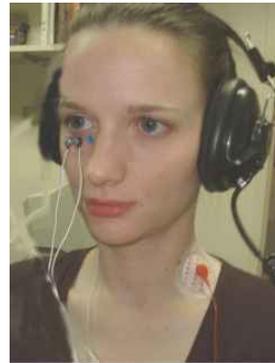
The subject may be positioned behind a screen or in another room, and a synchronized video image can be stored on the hard drive. If pictures or video are to be shown for stimulus, a second monitor can be attached to the computer using windows "extended desktop" mode, which allows one program to show different things on the two monitors.

The PsychLab program allows pictures to be loaded in groups and shown in chosen sequence. Intelligent script allows choice of picture type, picture timing, probe delay, probes in the inter trial interval (ITI), and so on to be designed so that correctly weighted trial distribution is achieved. Pseudo random and true random functions may be used. For fear conditioning, the PsychLab shocker can provide UCS.

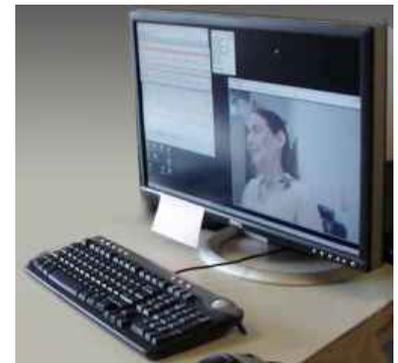


Shocker

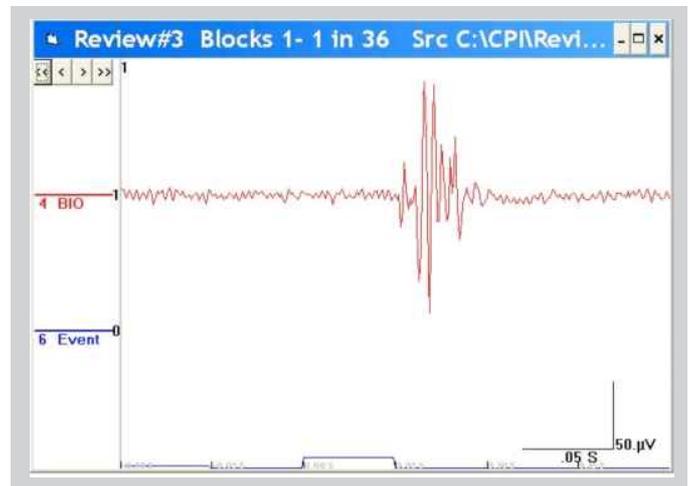
Auditory startle probe is most commonly used - a short burst of noise (40 or 50 mS duration at 80-110dB) provided by the PsychLab TG-WN sound generator. Alternative probe modalities are light flash, electrocutaneous stimulation, or air puff.



subject of experiment



Experimenter room



Typical eye blink startle response shown in the upper (red) trace, following a 40mS acoustic startle probe shown in the lower (blue) channel.



Experiment set-up with stimulus screen for viewing pictures or movie clips.



PsychLab Equipment

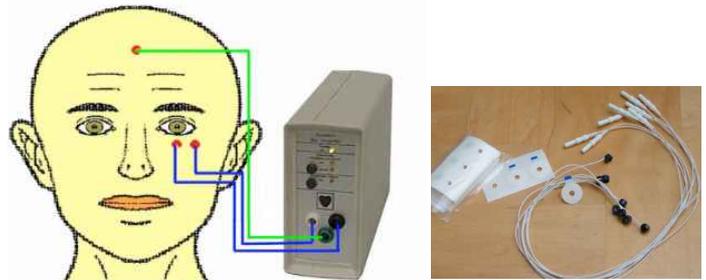
Equipment required for a minimal startle system:

- | | |
|---------|-----------------------|
| 1 EMG | EMG amplifier |
| 1 TG-WN | Sound generator. |
| 1 PHON | Headphones. |
| 1 EL123 | Set of EMG electrodes |
| 1 CL31 | Long input lead. |
| 1 PSY | PsychLab software. |

Positioning the electrodes

Two 4mm diameter measuring electrodes (part no EL1 TDE23) may be positioned below the eye, 12mm to 36mm apart, ideally 25mm. Suitable adhesive collars are supplied with these re-usable electrodes. Greater distance between the electrodes lowers the upper bandwidth of EMG energy. It may be necessary to trim the collars to allow the electrodes to be positioned close together, as the collar diameter is about 15mm. Peel off the backing from one side of the collar and stick it onto the electrode so that it does not obscure the active area of the electrode. Then fill the electrode with jell, so that the jell is flush with the electrode/collar surface. Wipe away excess jell, then peel off the other surface of the collar, taking care not to get jell on the sticky surface. Wipe the skin where the electrode is to be placed to remove any grease, then apply the

electrode to the skin, pressing firmly so that it sticks in position. It must be well enough attached to remain in position for the duration of the procedure. It does not matter which of the two electrodes is plugged into which of the white and black sockets of the amplifier. A third electrode must then be similarly attached to the centre of the forehead and plugged into the green (isolated ground) socket of the amplifier.

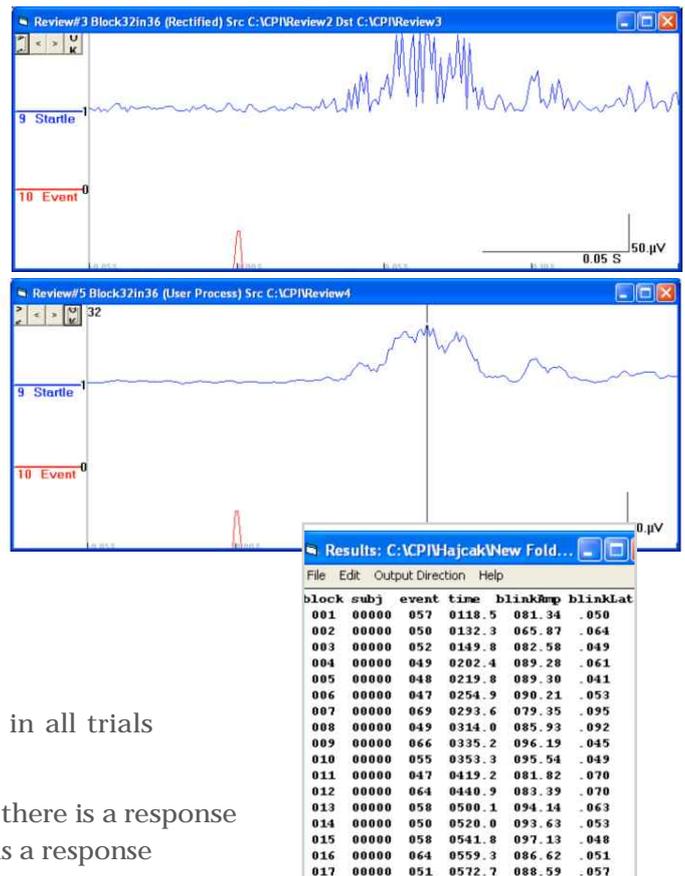


Startle data analysis

During the experiment, data are continuously recorded to disk. This allows complete flexibility when analyzing data, as any part of the record can be accessed should it be decided to modify the analysis after the recording has been made. Continuous measurement mode is also very helpful in accommodating other simultaneous measures such as SC and HR, which require much wider time periods for analysis purposes. Please refer to the appropriate leaflets for details of these measures.

When data are reviewed, trials are identified by stimulus type, as recorded in the event channel while the experiment took place. A typical analysis requires an average of 50mS pre-probe EMG, and then detection of peak EMG in a 100mS window following the probe. Below is shown raw rectified EMG (Review#3) and the same signal integrated (Review#5). Running under macro control PsychLab software automatically produces these data sections for all trials, and performs peak detection as seen in Review#5. The resulting data for

pre-probe average EMG and post-probe peak level are processed in PsychLab intelligent script allowing whichever manipulation of these values the scientist prefers to obtain blink amplitude. The probe is the red mark seen at the bottom of the Review windows.



Some standard startle equations that may be applied to data obtained in grand trial categories are:

Magnitude of blink = $\frac{\text{Total amplitude of all responses in all trials}}{\text{total number of trials}}$

Amplitude of blink = $\frac{\text{Total amplitude of all trials where there is a response}}{\text{number of trials in which there was a response}}$