Event Markers/Triggering

Many hypotheses can be investigated by simply analyzing the oscillatory activity of the ongoing EEG (sleep staging, vigilance, memory).
But even more experimental settings will require to analyze event-related activity.
Thus one will need to add event markers to the data stream to mark the times of environmental events or internal decisions, attention shifts, movements etc.
Both the Android- or Windows streaming software offer the option to add event markers into the ongoing data stream.

That means, no additional device and no wiring is necessary to set markers, be it by the subject itself or by another person within the Bluetooth range.

As distinguished from event markers also triggers coming from stimulation programs indicating precise stimulus onsets, reaction times, etc., can be added into the data stream.

The stimulation programs can run simultaneously to the Smarting software on the same device, or on another device within the same WLAN. Such triggers are integrated into the data stream by software. Again, with no wiring the full mobility is preserved.

Cap

For mobile EEG it is essential to reduce movement artifacts. For this goal Easycap constructed an EEG Recording Cap with stable, DC-capable, high-quality sintered Ag/AgCl electrodes, with very short and immobilized cables, and a tornister to carry the SMARTING Amp directly at the cap.

This cap is available with a neutral passepartout electrode layout, or with a layout emphasizing the motor areas. On request, any other electrode layouts or special-purpose-caps, e.g. optimized for Sleep Recordings can be made. It is further possible to cooperate with us to interface still other electrode types to SMARTING, e.g. the cEEGrid (Debener et al., in press). Additionally we supply all necessary consumables.

Support

Easycap will help in all cap-related questions and in questions regarding the usage of the SMARTING software. For more elaborate technical and programming issues, Easycap will get advice from mBrainTrain.

Distribution

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EASYCAP
EEG Recording Caps and Related Products

Mobile, Wireless, Smartphone-Controlled, Low-Cost EEG Amplifier

Light-weight small wireless EEG amplifiers open a whole new world of recording EEG activity outside the lab in ecologically valid environment in real-life situations.
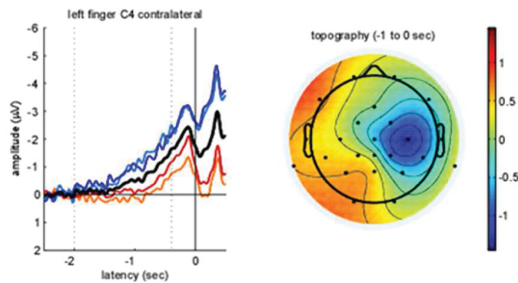
mBT

SMARTING

SMARTING is controlled by and writes data to either a smartphone or Notebook/PC – wireless

SMARTING is DC capable

Readiness Potential recorded with Smarting and Smarting App

Impedance can be measured during the whole EEG Recording

SMARTING is carried directly on special EEG caps, optimized for movement artifact reduction.

Head movements and body movements can be registered separately.

Event Markers can be added to the ongoing data stream – wireless

Stimulation- and Feedback programs can run on the same device as the Smarting Software or on another WLAN-connected device and add triggers to the data - wireless.

Other data streams from programs for e.g. eye-movement recordings, videos, neurofeedback, etc. can be synchronized with the Smarting EEG data.

Hardware and Software

• SMARTING AMPlifier
• SMARTING APP (ANDROID)
• SMARTING STREAMER (WINDOWS)
   with an integrated API to LSL

The SMARTING AMP registers DC to 250 Hz at 24 bits resolution from 24 channels. It has a gyroscope that adds 3D-head movement information on another 3 channels (XYZ) to the data file.

It has a permanent impedance measurement function, that allows to control for impedance throughout the whole EEG recording. SMARTING AMP sends its data via a Bluetooth protocol (~10 meter range) either to SMARTING APP (ANDROID) - an App for smartphone/tablet - or else to SMARTING STREAMER (WINDOWS) - a stand-alone Windows program (Notebook, PC) with API to LSL. Both programs allow to choose channels and change layouts, show impedances, set visualization filter, start/stop recordings, and register event markers. Data are written in common file format .bdf, readable by (among others) Matlab/EEGlab, Brain Vision Analyzer. Smarting is also supported by OpenVibe community.

Additionally SMARTING APP (ANDROID) can also add the movement data of the smartphones built-in accelerometer as another 3 extra channels (XYZ) to the data file, thus allowing to differentiate between head - and body - or smartphone movements.