Equipment Set-up

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The Good Old Days

Permanent Setup

Things to consider:
- Power source
- Electrical Grounding
- Noise (environmental and electrical)
- Temperature control
- Water source
- Proximity of equipment to child
- Security
Basic Equipment

Stimulus presentation system
ERP data collection system
Data analysis software
Basic Equipment

Stimulus Presentation System
Computer software
Stimulus delivery system
Audio amplifier-speaker/Visual display
Stimulus onset markers
Stimulus controls (duration, intensity, position)
Limitations: distortion, visual decay time
Basic Equipment

ERP data collection system
Analogue-to-digital converters
Amplifiers & Filters
Monitor to view EEG on-line
Computer & Software for on-line collection
Software for on-line/off-line data processing
ERP Data Collection System

Subject EEG $\leftrightarrow$ AMPLIFIER $\rightarrow$ ATD

LCD MONITOR $\leftrightarrow$ FILTERS $\leftrightarrow$ RECORDER
ERP Data Analysis System

RECORDER ⟷ FILTERS ⟷ PREPROCESSING
Filtering
Segmenting
Baseline Adjustment
Artifact Rejection
Averaging

MULTIVARIATE ANALYSES ⟷ EXPORT ⟷
Analogue-to-digital (A/D) converters
Relates directly to resolution of ERP.

$2^n$ is the full range of values:
- 8 bit A/D = $2^8 = 256$ (range = 0 - 255)
- 10 bit A/D = $2^{10} = 1024$ (range = 0 - 1023)
- 12 bit A/D = $2^{12} = 4096$ (range = 0 - 4095)
- 16 bit A/D = $2^{16} = 65536$ (range = 0 - 65535)
Electrodes

Made of a variety of substances (gold, silver, carbon, tin) in variety of shapes

Directly in contact with electrolyte (paste, physiological medium around electrode)

Needle electrodes
Shielded room to shield from electromagnetic fields (EMF)

Faraday or Franklin Cage

(Michael Faraday, 1836 or Benjamin Franklin, 1755)
Equipment Placement

Ideally, 2 separate rooms for participant and equipment with 1-way mirror and intercom in between

Alternatively, place equipment behind the participant, operator out of sight of child, control line of sight distracters.
Hospital Testing
Hospital Testing
School Testing
University Lab
Hotel Room (Conference Site)
Make sure your setup is safe!
Easy Access to Equipment & Child
General Principles

Keep track of supplies & order when needed
Start early for testing sessions (an hour before test time)
Make sure that testing sessions properly staffed
Two individuals always staff tests
  1 to monitor equipment, 1 for monitoring child
  Both apply electrodes (saves time)
Clear assignments for lab personnel for all duties
Checklist for set-up & testing sessions
Checklist

Session _____ (1, 2, 3 or 4)

SLEEP EXPERIMENT CHECKLIST (Net Station 4.1.1)

Subject Number: ________ Gender: F M Date of Test: ________ ________ ________

Time: ______ Location of Test: ______________ Date of Birth: ________ ________ ________

Name of Person Running Computer: ______________ Chronological Age: ________ ________ ________

Name of Entertainer: ______________

Net Used: ______; Number of electrodes: 128 256

CB Order: 3x40________ Oddball________ (1000 or 1500 Hz) Boston Dots________

OFFSET: Ba_____ Da _____ Ga _____ Freq _____ Tar _____ B-dots ____ (ST or GR)

1. Turn on the equipment 30 minutes prior to the testing. ______________

2. Make new electrolyte. ______________

3. Select and activate Net Station Software
   a. Click “New Session” ______________
   b. Choose “Standard Session” (or “2nd run” if S’s 2nd test today) ______________
   c. Enter file name: <study>_<Subject#>_<f/m>_<experiment>_<week>
      (e.g., SR_000f_Oddball_1) ______________
   d. Click “Rename Session” and navigate to the study folder ______________
   e. Create new folder for each week within subject folder
      a. SR_000f_week1 ______________
   f. Click “New” to place the file into the selected folder ______________
   g. Click “Begin Session” ______________
   h. Wait until Net Station is finished calibrating the amplifiers ______________

4. Check the sound level for auditory stimuli (75 dB) or response button assignment
   for visual experiments ______________

5. Collect actigraph, download actigraph data & reset actigraph for following week ________

6. Measure the circumference of the subject’s head: __________cm ______________

   and locate vertex. nasion-inion _______ meatus-meatus ________ ______________

7. Perform Ear Check (middle ear monitor): Left Ear____ Right Ear____ ________

   7.5 If monitor reads red, reschedule testing ______________

8. Soak the net in warm Potassium Chloride + Baby shampoo solution. ______________
Testing Room Equipment

Hook-up & Turn-on
- Camera
- Monitor
- VCR & TV (if appropriate)
- Intercom
- Response pad
- Air filter

Check & adjust ambient temperature (70-72 F)*
Check sound level
Testing Room Supplies

Set-up testing room
- Towels, pipettes, measuring tape, markers, gloves
- Toys, videos, baby supplies
- Informed consent forms
- Screening forms
- Contact information forms
- Child gift & parent compensation
Testing Room

Keep testing room child-friendly
   TV/Monitor at child’s eye level
   Bright simple pictures / posters
   Child-proof power outlets
   Secure & hide cables
   Keep potentially SCARY objects out of sight
Should **not** do this...
Control Room

- Computer set-up (1 hour before test)
  - Turn on equipment (amplifiers, computers, intercom, video monitor)
  - Calibrate amplifiers
  - Check system communication
  - Check data acquisition settings
  - Check experimental control settings
  - Set-up data files
- Prepare electrolyte for electrodes
Participant Specific Set-up

Obtain informed consent
Head measurements
Identification of reference points on scalp
Electrode preparation
Training Personnel

Senior Personnel train new additions to Lab

“Boot Camp” review before checkout
  Written answers scored
  Checkout steps through all phases
QUESTIONS ???