Chapter 6: Artifact Rejection and Correction Part 1

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Overview

- *Artifacts =* Non-EEG signals

- Problematic in 3 ways
  1) May decrease the signal-to-noise ratio(SNR) of averaged ERP waveform, decreasing your ability to find significant differences between groups or conditions
  2) May be systematic rather than random
  3) Ocular artifacts (most common) change the sensory input

- Main classes of techniques for minimizing the effects of artifacts
  1) Artifact rejection
  2) Artifact correction

The General Artifact Rejection Process

- Signal detection problem
  - Hit
  - Miss
  - False alarm
  - Correct rejection
- It is important to be clear about your goal when doing artifact rejection

- Be careful when choosing a system for artifact rejection
- Perform baseline correction prior to artifact rejection when using absolute voltage rejection approach
- Moving window peak-to-peak amplitude method
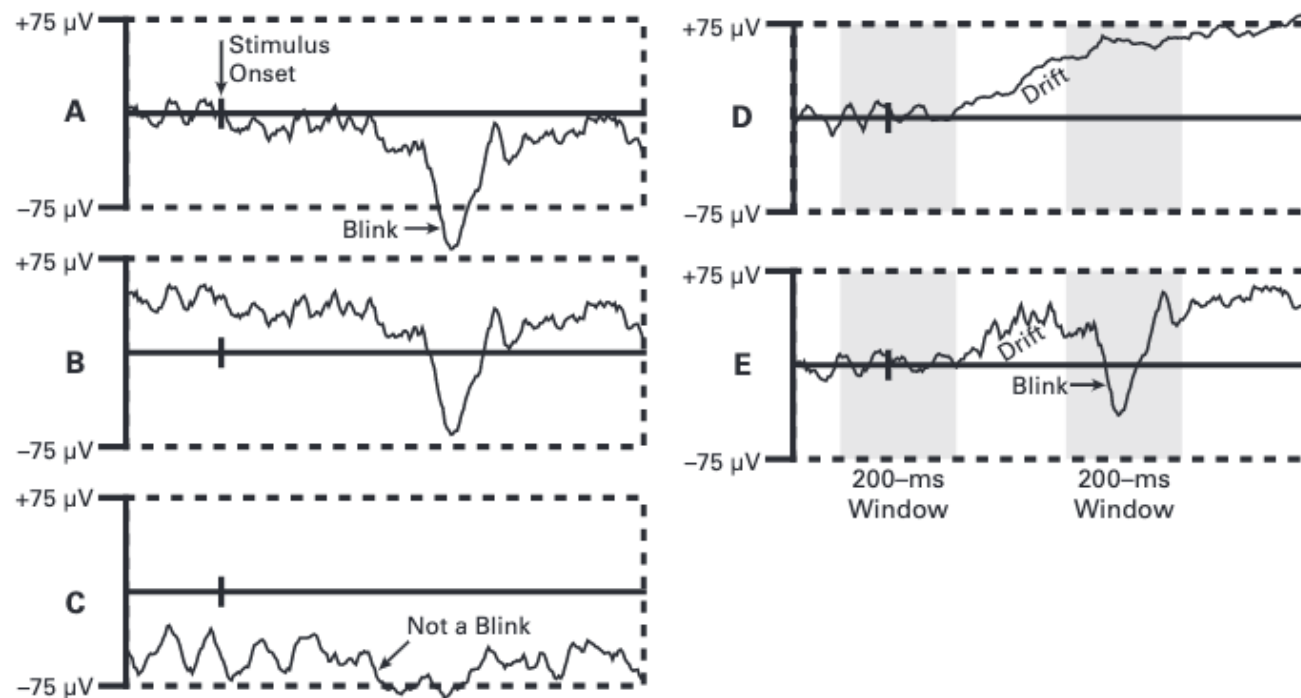
Choosing an Rejection Threshold

- You must choose a threshold that does a good job of balancing misses and false alarms
- Remember that the goal is not to remove all artifacts but to maximize statistical power and avoid confounds
- Will this bias the results?
- Using visual inspection of the raw EEG
  1) Use prior experience or published values to select initial threshold
  2) Adjust threshold and try artifact rejection again
  3) Repeat until you are able to reject all the trials that clearly have artifacts without rejecting too many artifact-free trials
- Ask subjects to make some blinks and eye movements at the beginning of the session

Visual Inspection

- Pro: Human visual system can be trained to do an excellent job of differentiating between real artifacts and normal EEG noise
- Con: Computer algorithm is fast, consistent, and bias-free
- Crucial that the person doing the rejection is blind to groups and conditions