

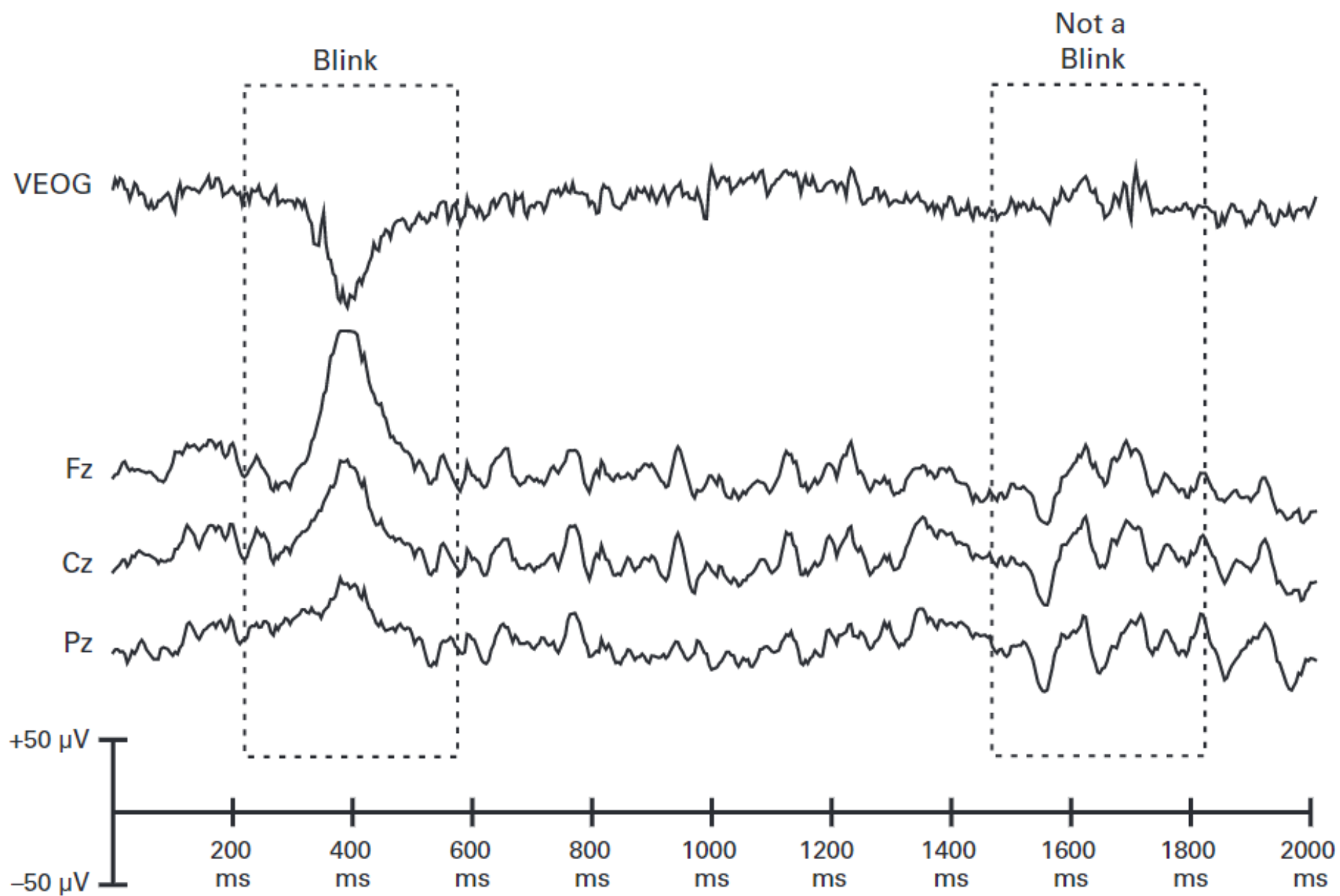


# Chapter 6: Artifact Rejection and Correction Part 2

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# Understanding Blinks

- *Corneal-retinal potential*: Like a dipole with positive at the front of the eye and negative at the back of the eye
- One source of voltage offsets that are seen in EEG and EOG recordings
- Electroculogram (EOG)  $\neq$  Electroretinogram (ERG)
- Movement of eyelid is the main contributor



# Reducing the Occurrence of Blinks

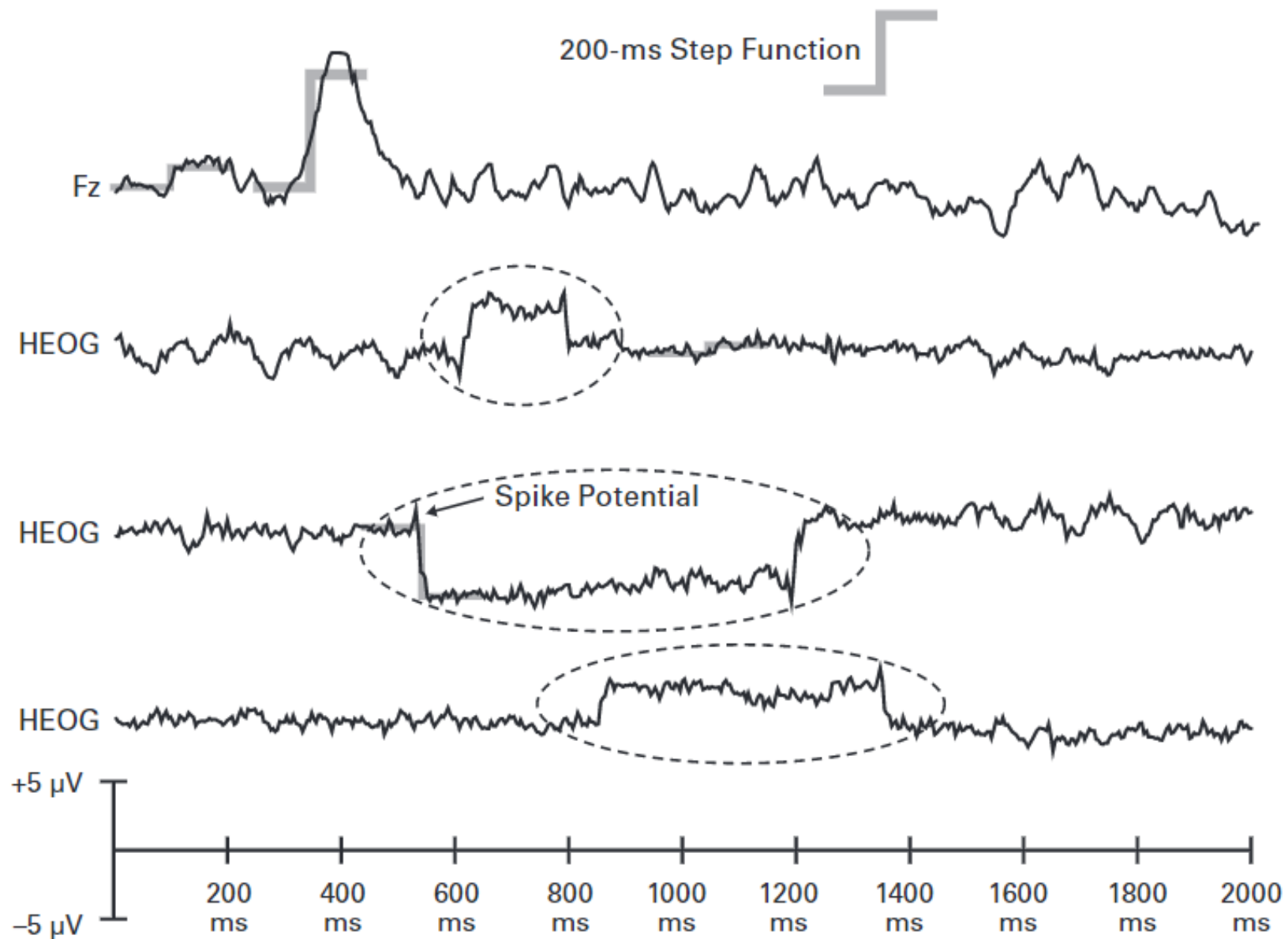
- Wear glasses and use eye-drops
- Use short trial blocks of 1-2 min
- Let the subjects know that they are blinking a lot
- Design experiments so that subjects have a well-defined period during the intertrial interval (ITI)

# Detecting Blinks

- Simple voltage threshold, moving window peak-to-peak amplitude measure, step function
- Use polarity inversion to determine whether the artifact rejection worked properly

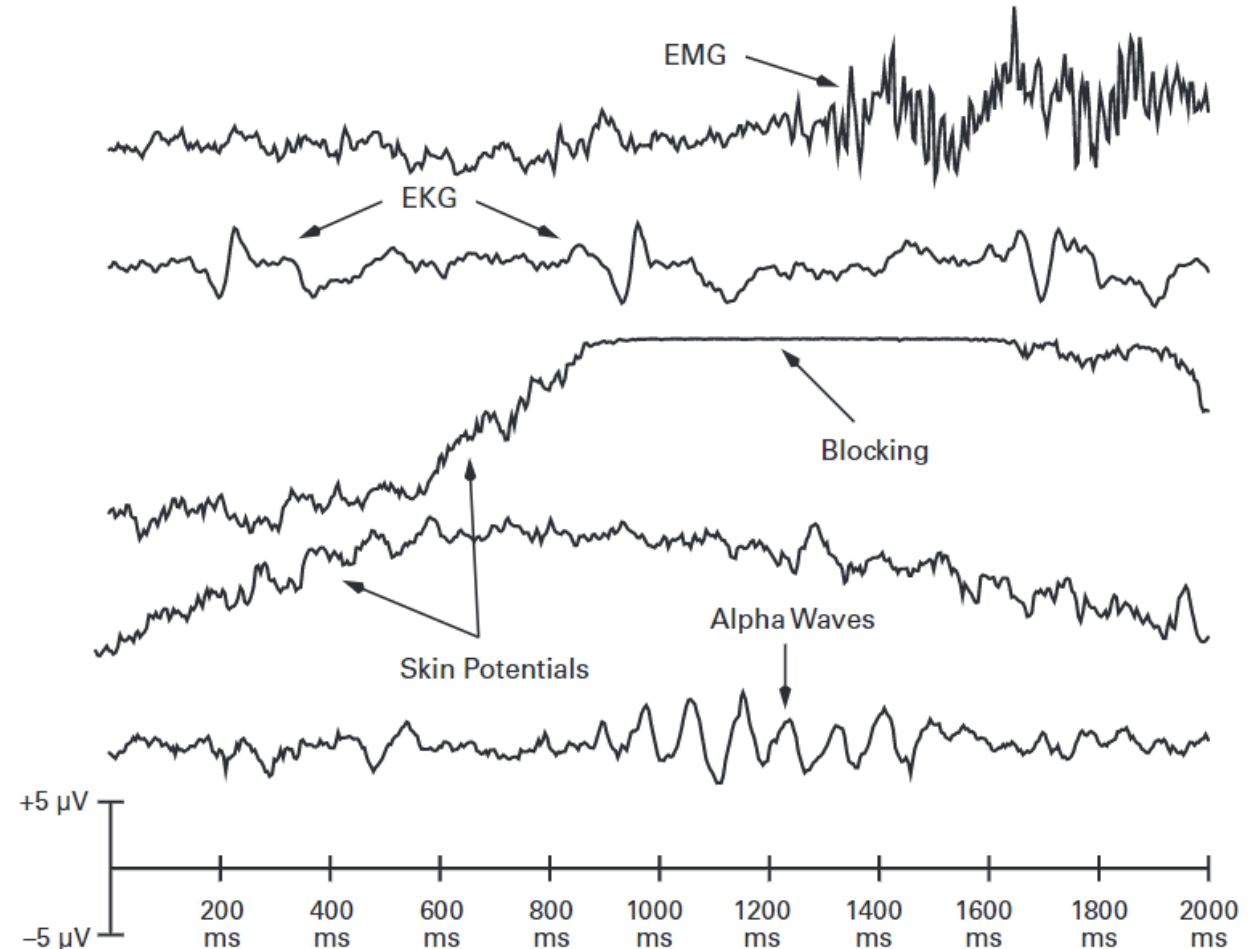
# Eye Movements

- When the eyes move, the voltage becomes more positive over the side of the head that the eyes now point toward
- Horizontal EOG (HEOG) and vertical EOG (VEOG)
- Majority of eye movements will be saccades
- Saccade-induced ERP
- Large eye movements are easy to detect on single trials, but small eye movements are difficult to detect
- *Step function*: A flat period of one voltage level followed immediately by another flat period at a lower or higher voltage level
  - Filters out any high-frequency noise
  - Minimizes the effects of any gradual changes in voltage



# Skin Potentials and Other Slow Voltage Shifts

- Skin potentials are caused by sweat
- Change of electrode position will cause sustained shift in voltage
- Use moving window peak-to-peak or step function





## Amplifier and ADC Saturation/Blocking

- *Blocking*: Slow voltage shifts cause amplifier or ADC to saturate, causing the EEG to be flat for some period of time
- X-within-Y-of-peak method