Chapter 3

Somatosensory, Olfactory, and Gustatory responses

- Somatosensory = changes at the surface or inside the body.
  - N10 = Reflects Action potential

- Olfactory and gustatory = smell and taste
  - Hard to record due to the nature of these senses.

The N2 Family

- Many different components identified in the time range of the second major negative peak

- Early reports of the N2 components come from oddball experiments

Subdivision into N2a, N2b, and N2c subcomponents

- Basic N2 = repetitive, nontarget stimulus

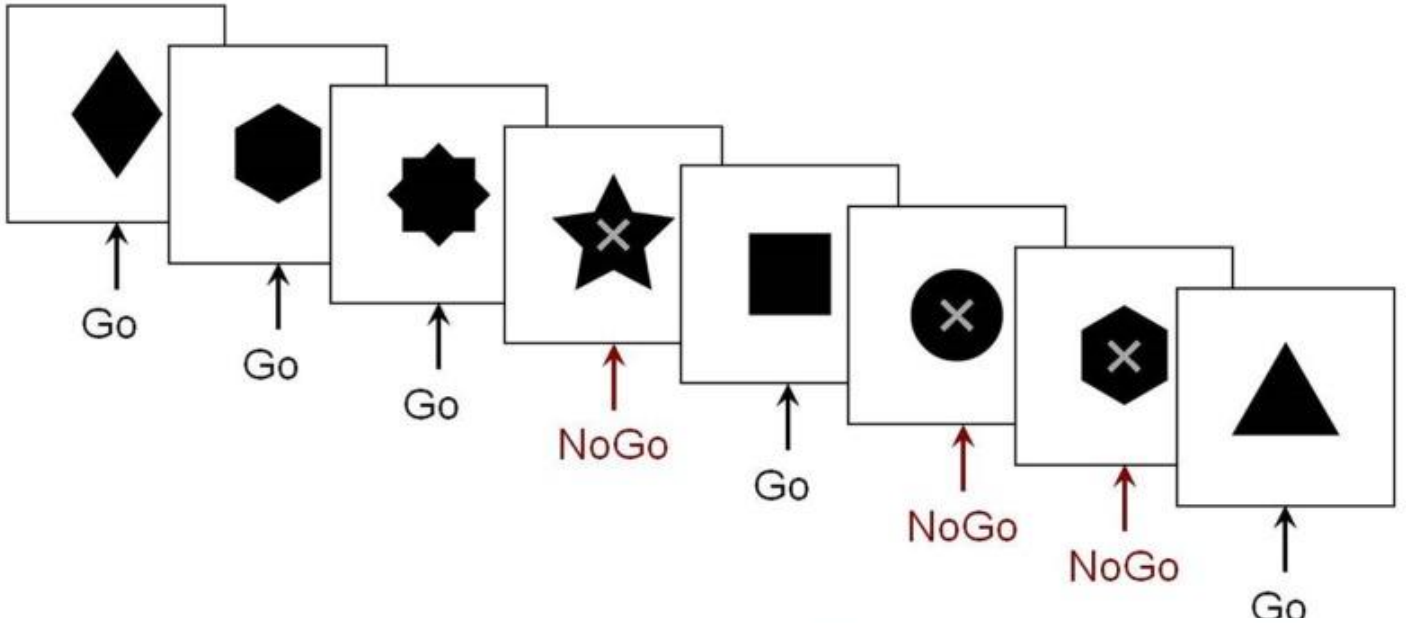
- Division of odd, deviant stimuli into subcomponents
  - N2a = auditory (MMN)
  - N2b = anterior N2 (visual)
  - N2c = posterior N2

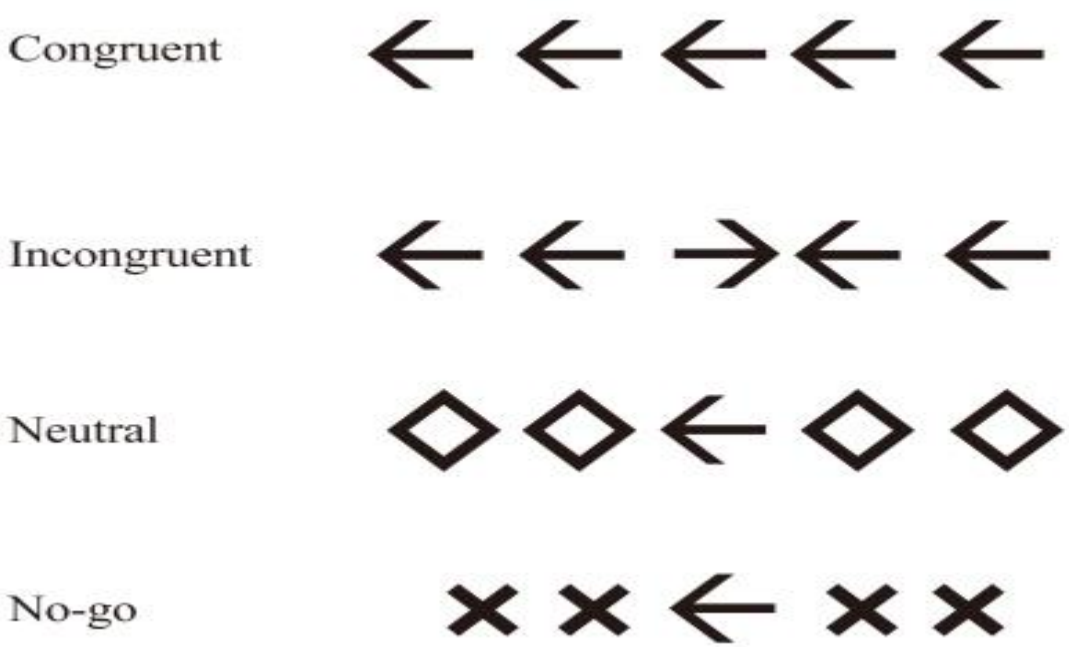
Anterior N2 (N2b)

- Response inhibition
  - Go/no-go paradigm
  - Mismatch
  - Eriksen Flanker Task
  - Stop signal paradigm

  - Feedback-related negativity
    - Conflict between subject response and actual response.

  - fMRI data seem to suggest many frontal brain areas are involved





Posterior N2 (N2c)

- Very similar to P3 wave
  - Seen for task-relevant targets
  - Larger for rare targets than for frequent targets

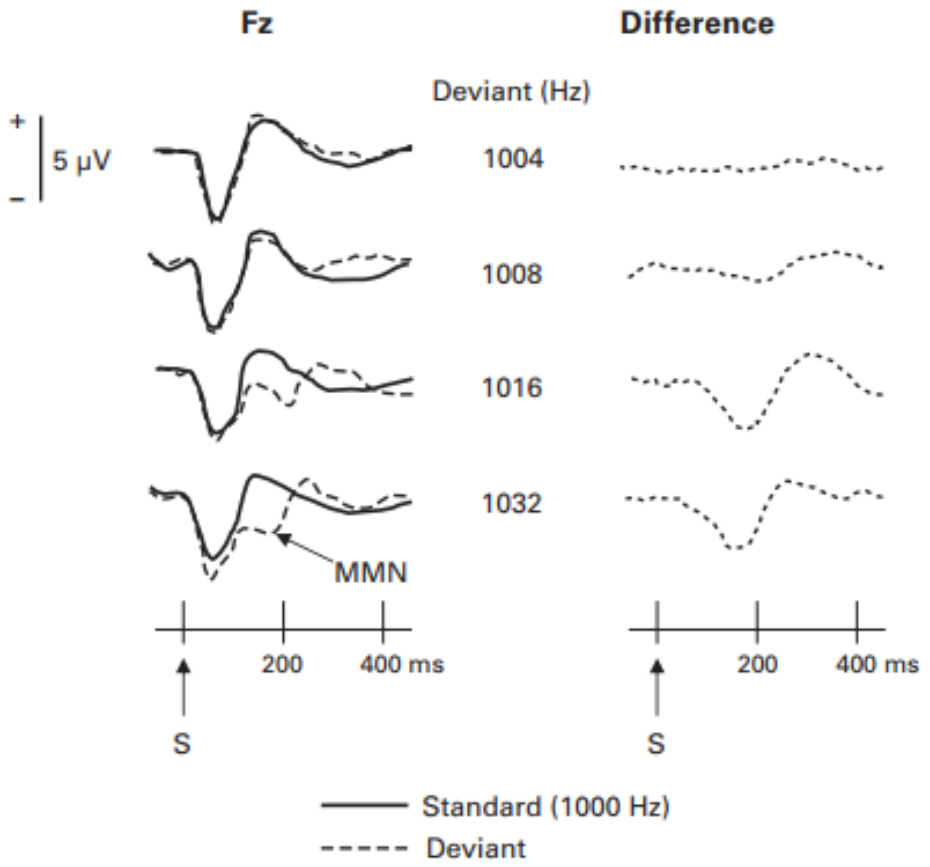
- Process of categorizing a stimulus
  - Duration of the component depends on the difficulty of categorization
  - Increasing the difficulty = increases the duration

- Functional significance is not clear.

Mismatch Negativity (MMN)

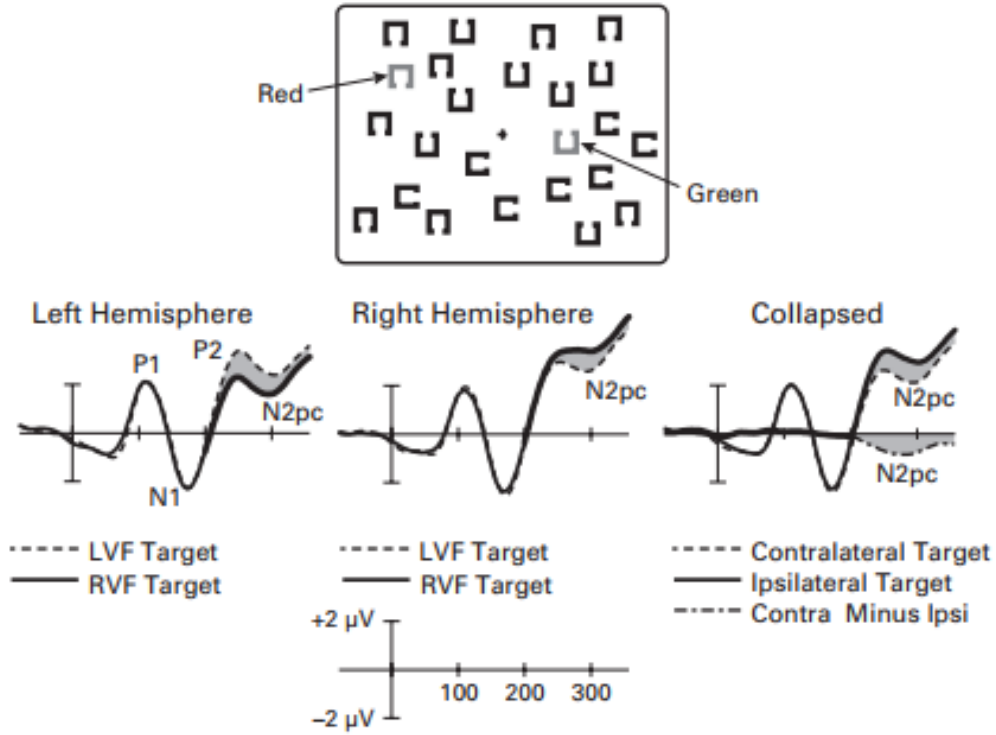
- Relatively automatic response to an auditory stimulus that differs from the preceding stimuli
  - Peaks between 160 and 220ms

- MMN effect is often contaminated by other brain activity



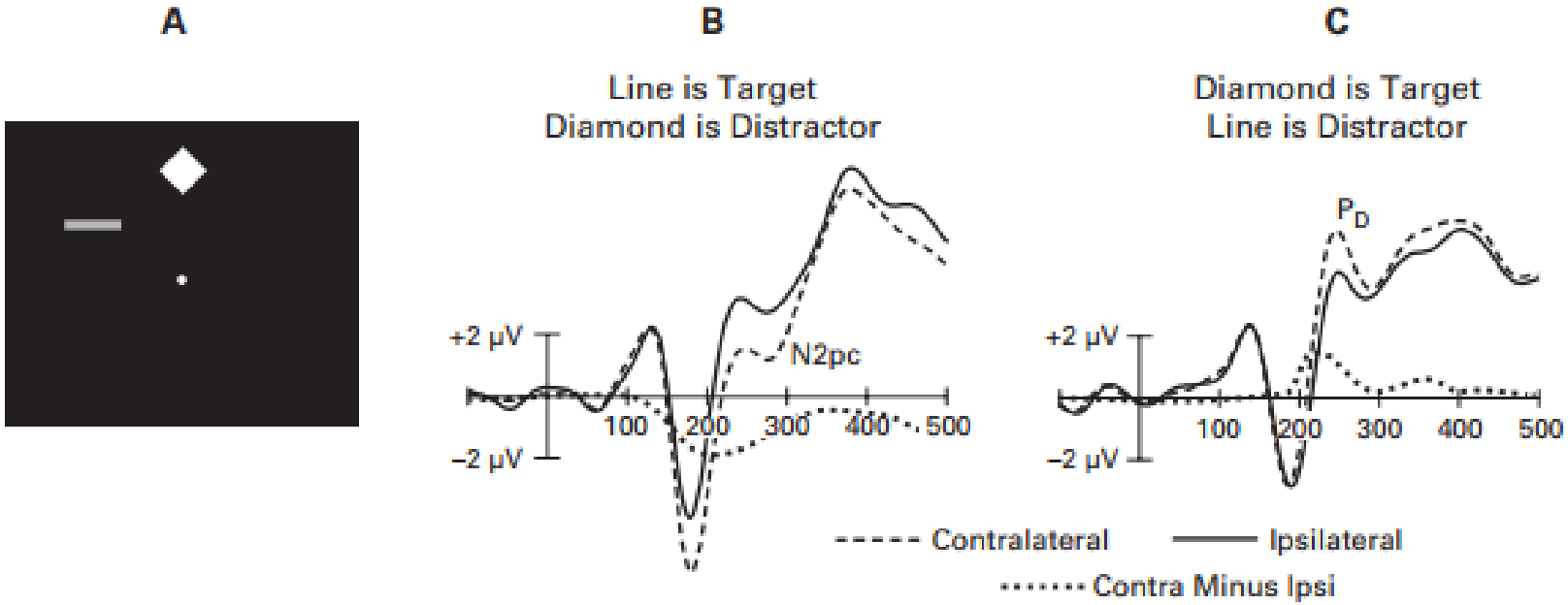
N2pc (N2-posterior-contralateral)

- subcomponent of N2c.
  - Larger at contralateral sites relative to the location of visual object.
  - Useful for determining **attention**
    - Time course of attention orienting
    - Shifts in attention
      - New objects
      - Subliminal objects
  - Influenced by distractors.
  - May reflect consequences of focusing attention onto a lateralized object.



Distractor positivity

- Inhibitory process applied to the distractor
  - Lateralized with respect to distractor
  - Polarity is opposite, scalp distribution is similar.
  - Eliminated if subjects only needed to detect presence of target.

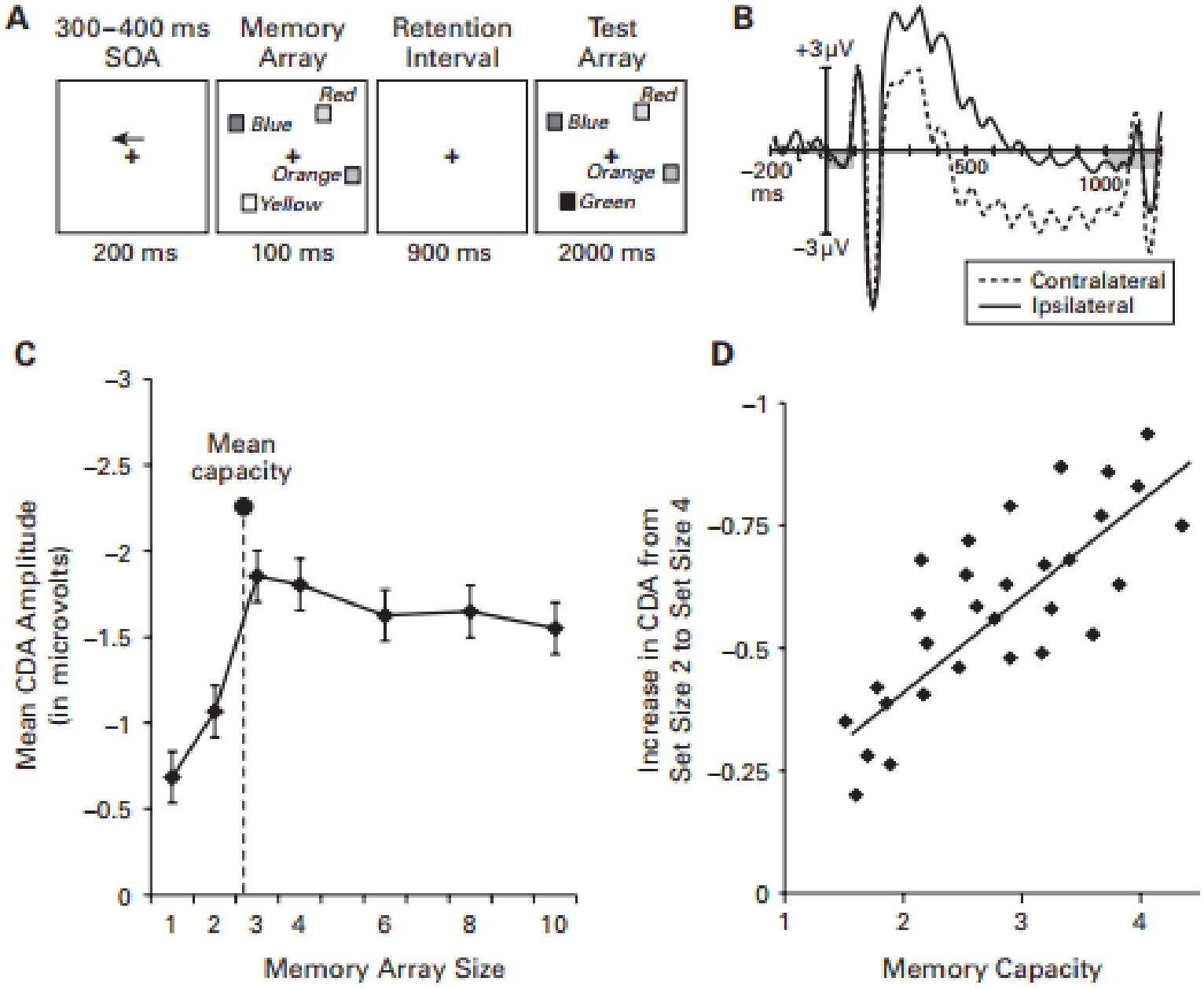


Contralateral decay activity and WM

- Sustained negative voltage during maintenance period of working memory task
  - Termed it the negative slow wave (NSW)

- NSW amplitude increases as memory load increases.
  - Frontal = verbal
  - Temporo-parietal = visual

- Two problems
  - Is it really memory load? Maybe it's also task difficulty.
  - Isolate a memory-related component from other components


A
300–400 ms SOA
Memory Array
Retention Interval
Test Array
Red
Blue
Orange
Yellow
Red
Blue
Orange
Green
200 ms
100 ms
900 ms
2000 ms
B
+3μV
−3μV
−200 ms
500
1000
Contralateral
Ipsilateral
C
Mean capacity
Mean CDA Amplitude (in microvolts)
−3
−2.5
−2
−1.5
−1
−0.5
0
1
2
3
4
6
8
10
Memory Array Size
D
Increase in CDA from Set Size 2 to Set Size 4
−1
−0.75
−0.5
−0.25
0
1
2
3
4
Memory Capacity

Difference between N2pc and CDA

- N2pc – ventral occipito-temporal cortex
- Contralateral delay activity = Posterior parietal Cortex