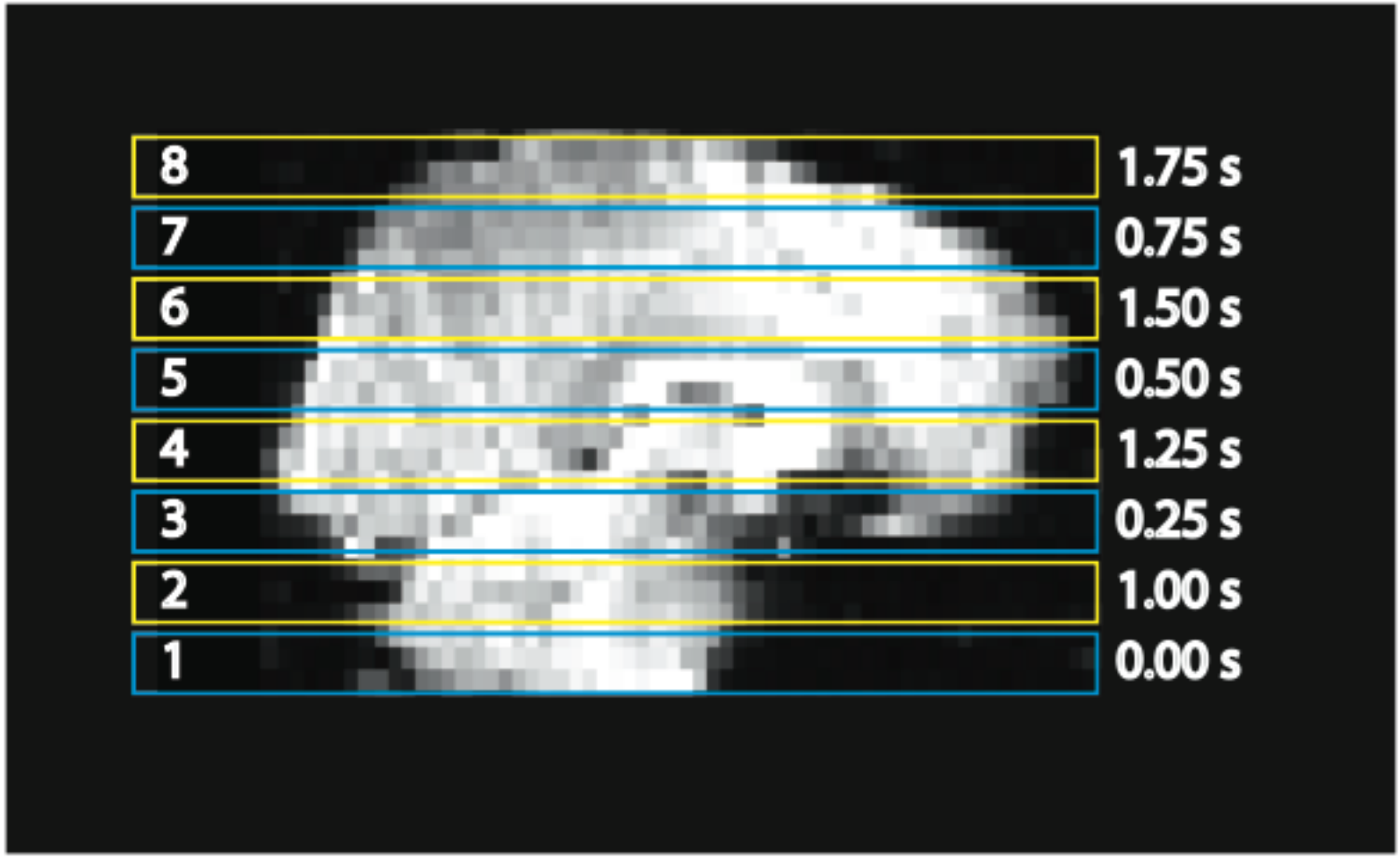
Quick explanation of pros/cons slice timing of correction

Slice Timing Correction

- All slices aren't imaged simultaneously
  - Can collect from top to bottom
  - Interleaved (even and then odd slices)

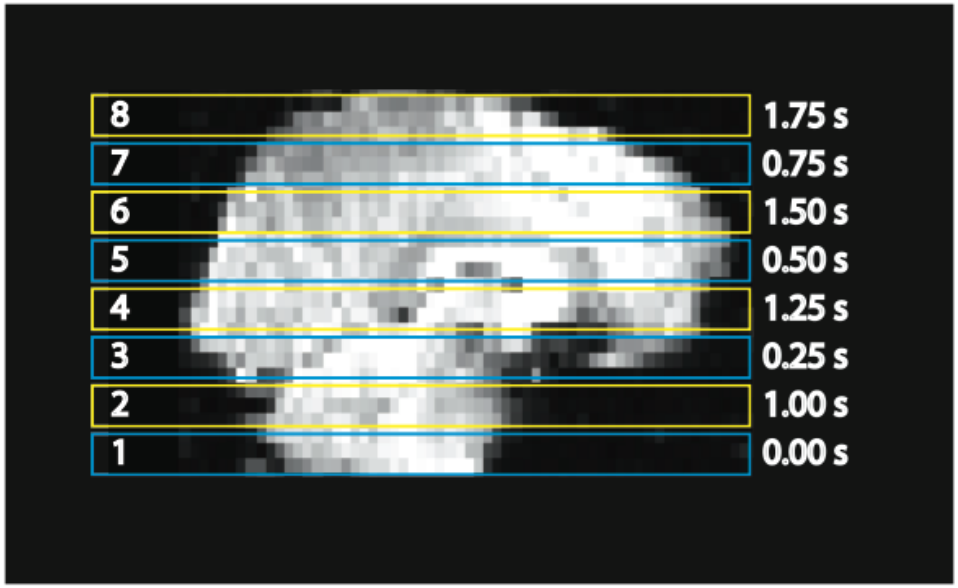

8
1.75 s
7
0.75 s
6
1.50 s
5
0.50 s
4
1.25 s
3
0.25 s
2
1.00 s
1
0.00 s

Slice Timing

- Data are not acquired at the same time
- Our model assumes the data are collected at the same time

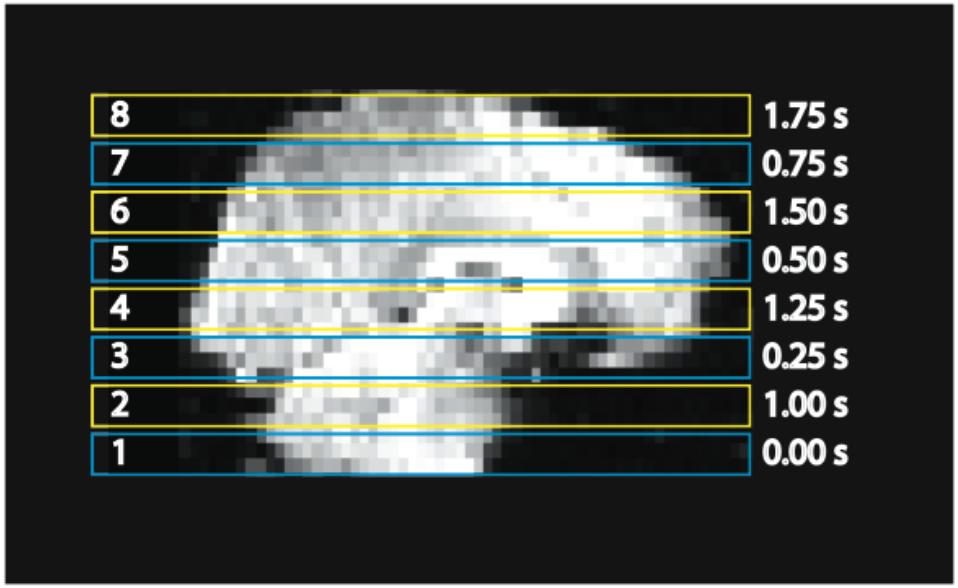
Think about it

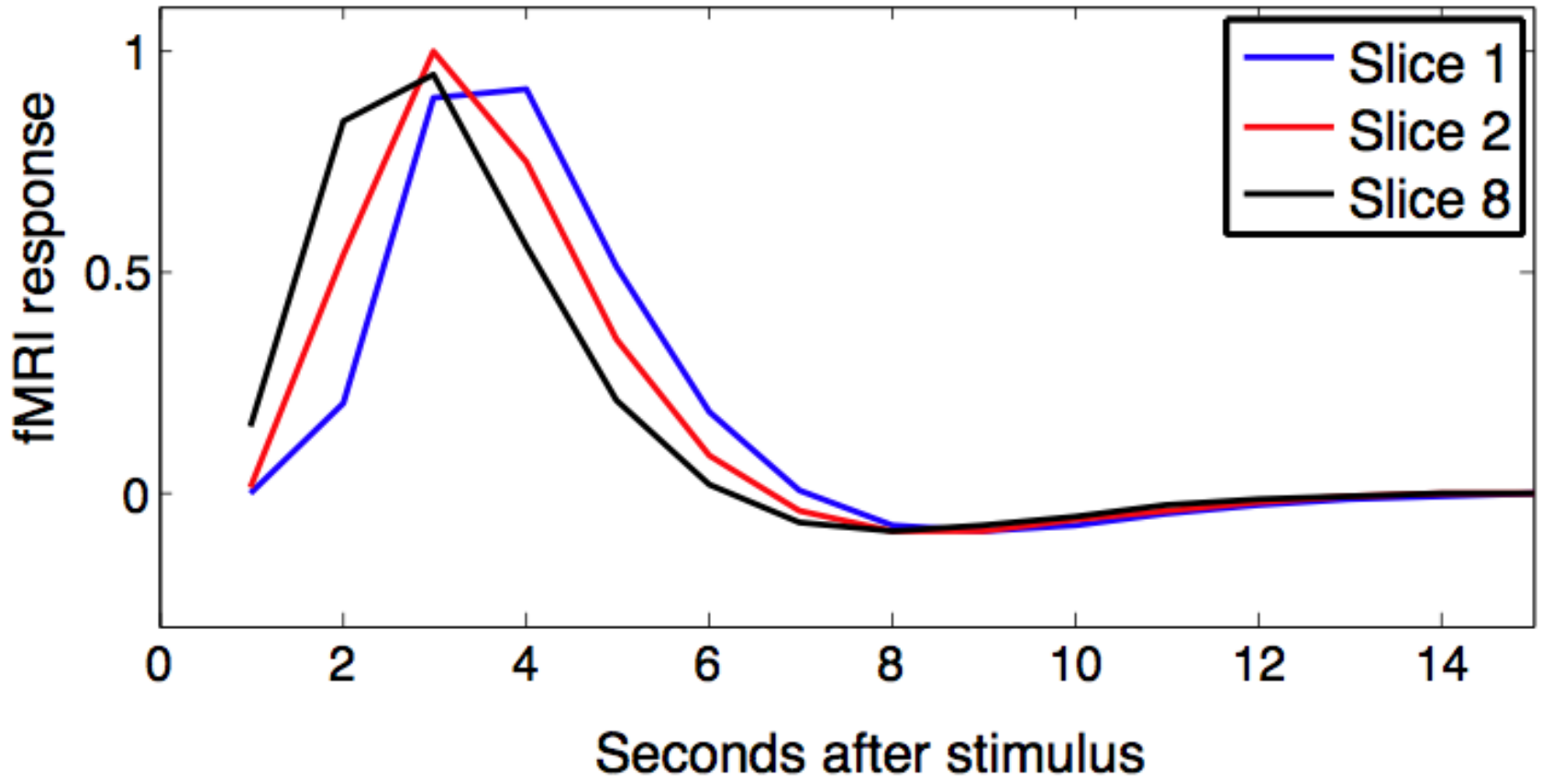
- If something happens in the brain at 3s, when will we see it in
  - slice 1?



Think about it

- If something happens in the brain at 3s, when will we see it in
  - slice 1?
  - slice 2?




fMRI response
1
0.5
0
0
2
4
6
8
10
12
14
Seconds after stimulus
Slice 1
Slice 2
Slice 8

Slice timing problems

- Worse with ER design or blocked design?

Slice timing problems

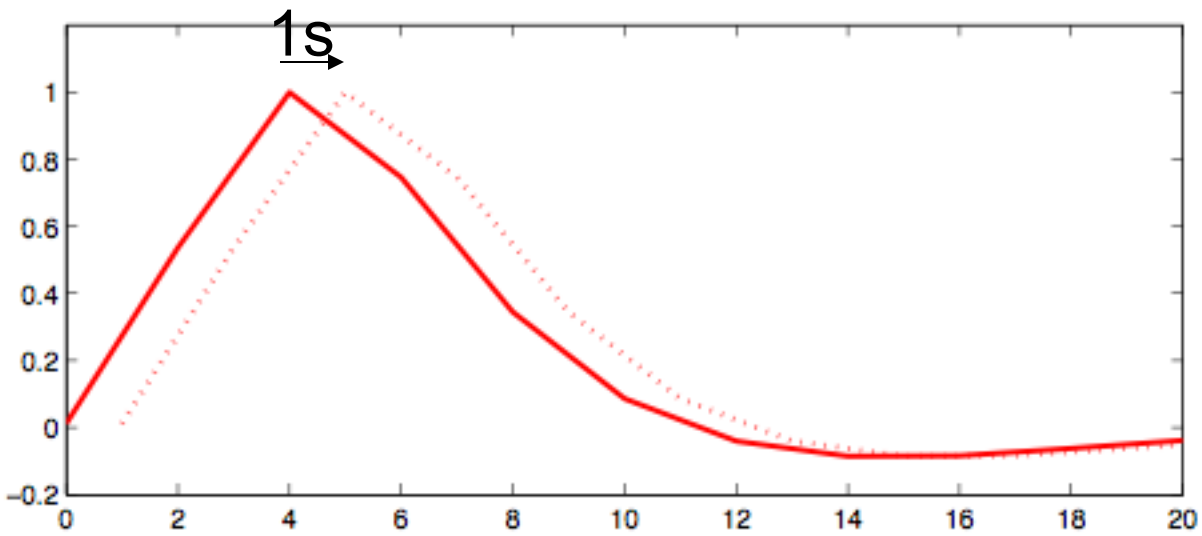
- Worse with ER design or blocked design?
  - ER design (isolated trials)

Slice Timing Correction

- Tries to fix timing issue so the assumption that data were collected at the same time is more closely met
- Uses interpolation
- Must know exact timing of acquisition

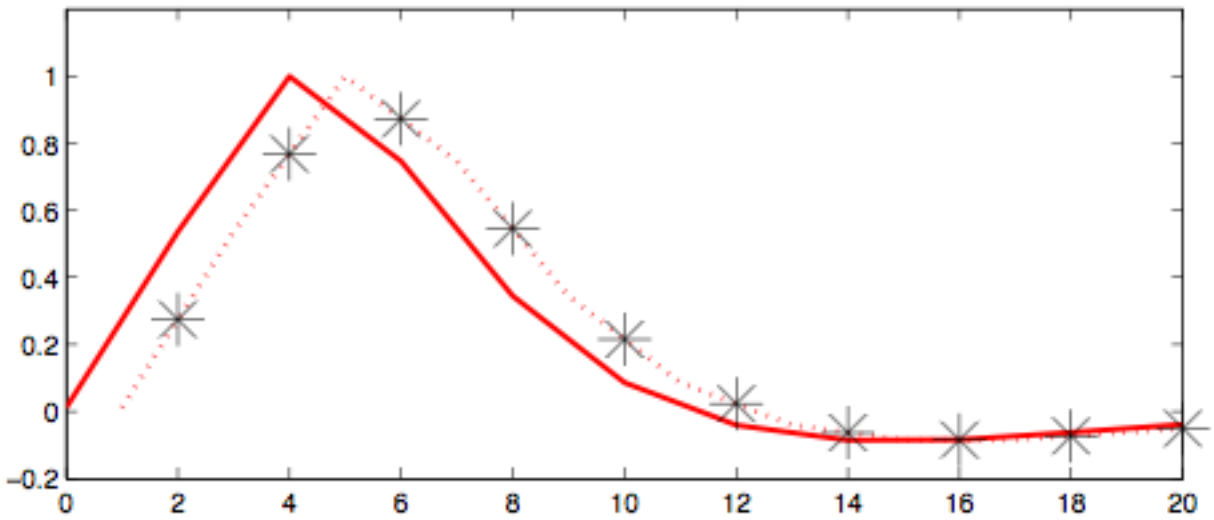
Example: slice 2

- Step 1: Shift response



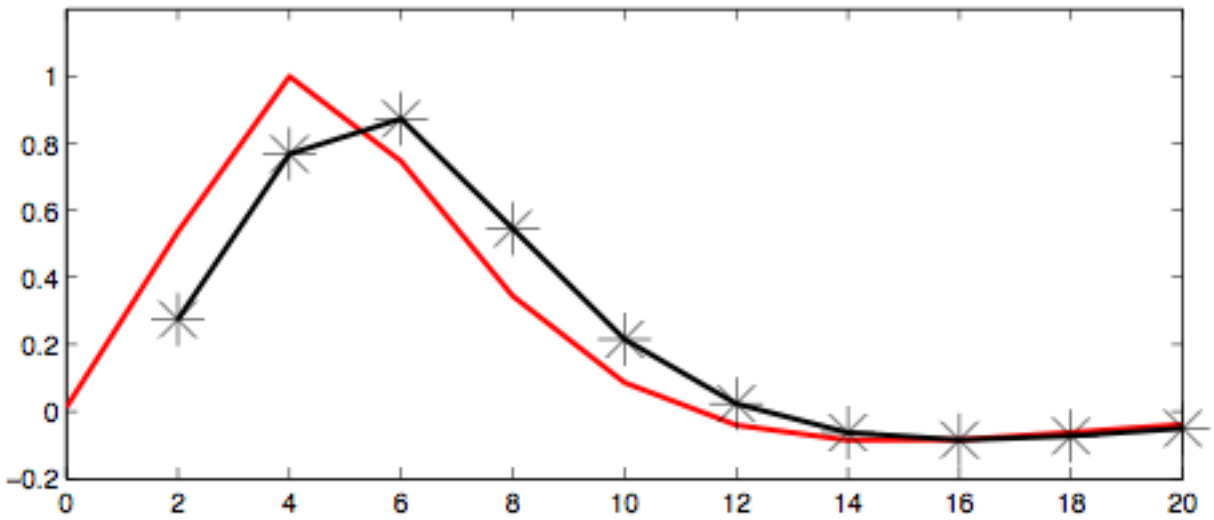
Example: slice 2

- Step 2: Interpolate @ TR



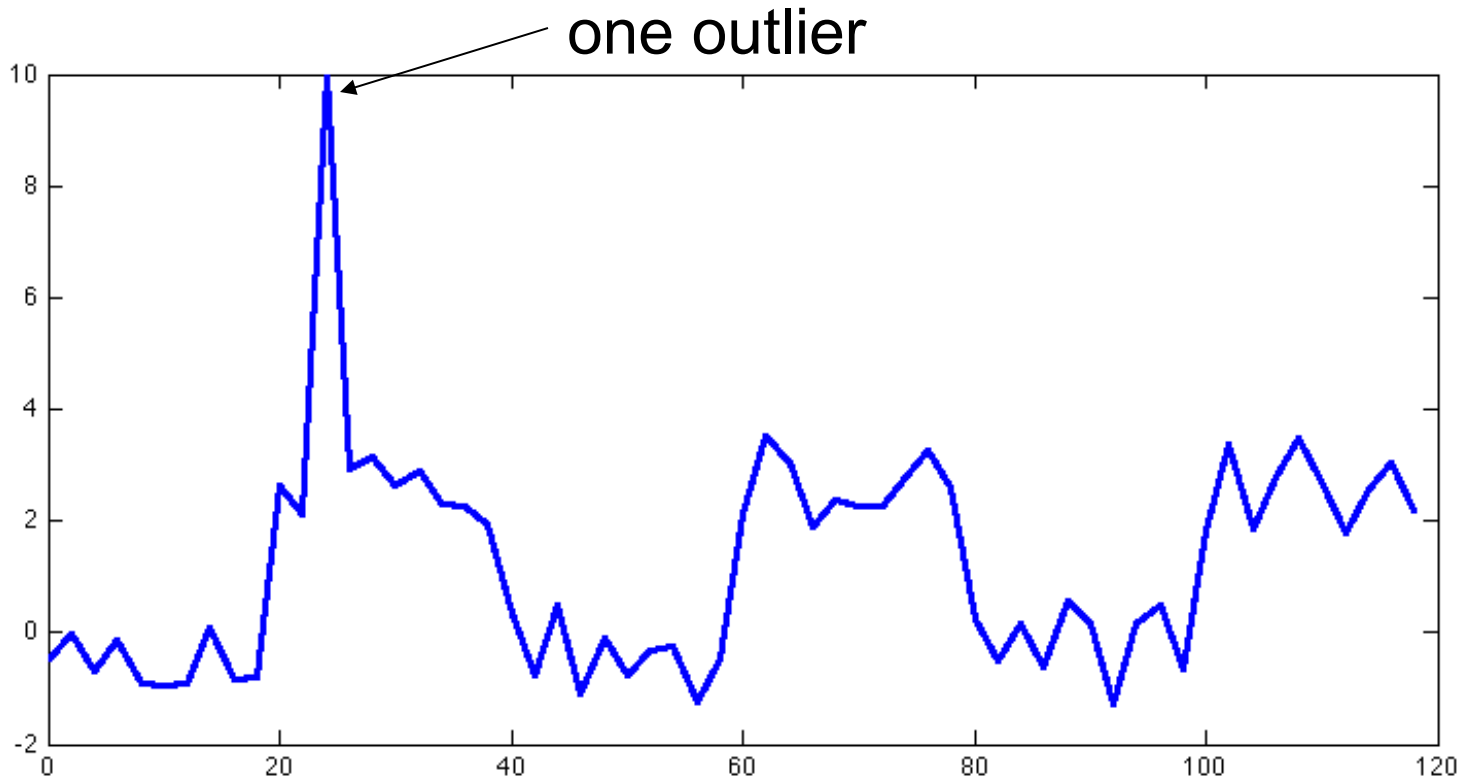
Example: slice 2

- Step 2: Interpolate @ TR



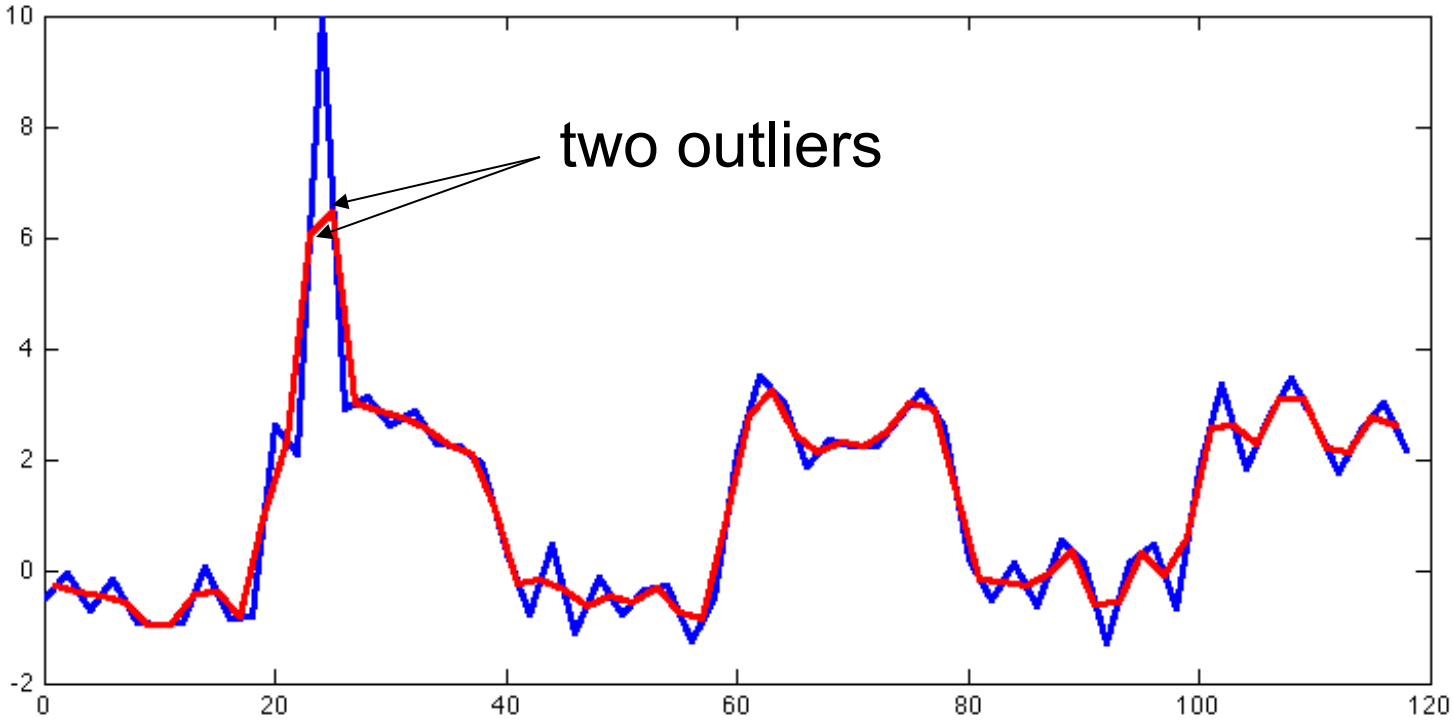
Slice timing issues

- One bad scan gets spread to other time points



Slice timing issues

- One bad scan gets spread to other time points



Slice Timing Correction

- Not used much
- TR≤2 + interleaved acquisition+spatial smoothing
  - Reduces slice timing effects
- Adding temporal derivatives to model helps