

# minimizing loss functions

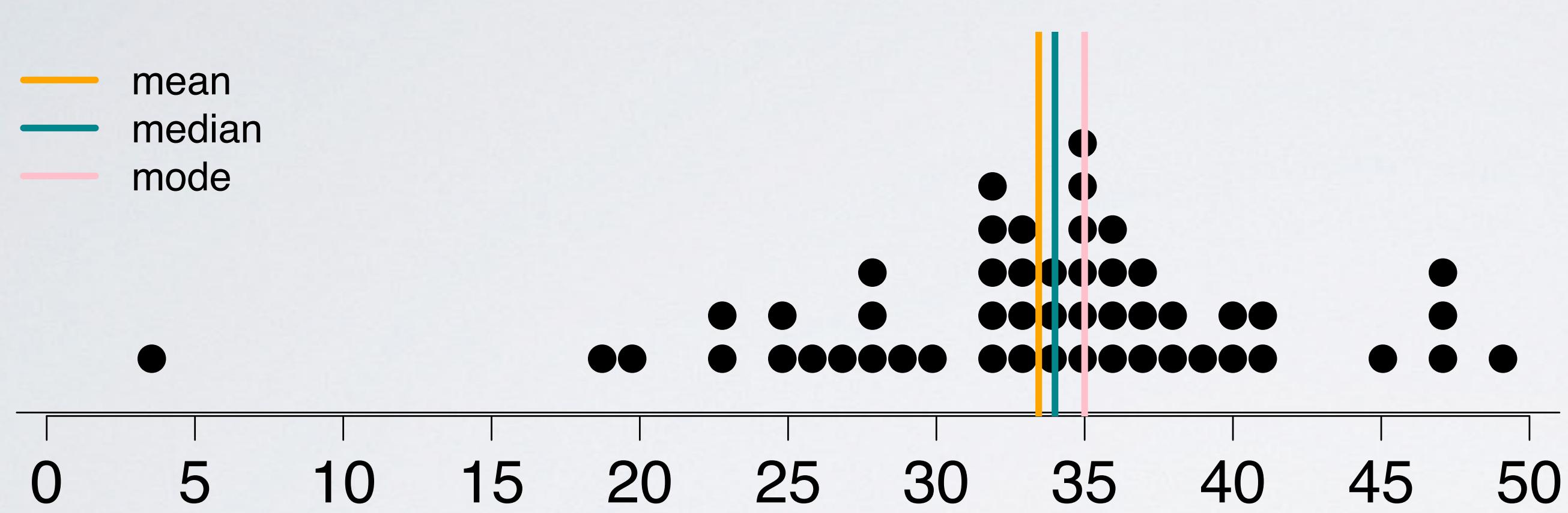


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posterior

$$g = 30$$



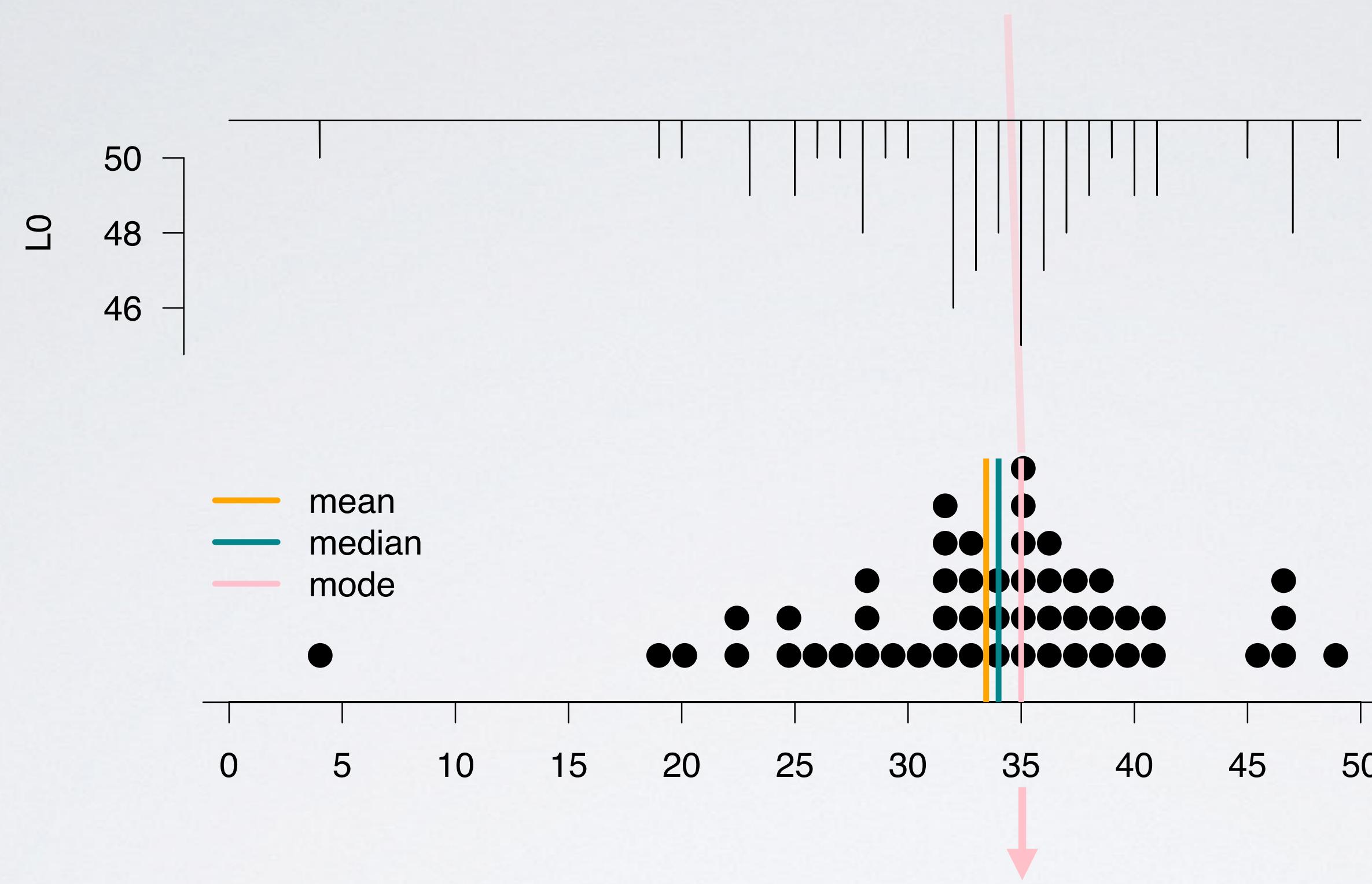
## L<sub>0</sub>: 0/1 loss

$$L_{0,i}(g) = \begin{cases} 0 & \text{if } g = x_i \\ 1 & \text{otherwise} \end{cases}$$

$$L_0 = \sum_i L_{0,i}(g)$$

# $L_0$ : 0/I loss for $g = 30$

$i$	$x_i$	$L_0: 0 / I$
1	4	
2	19	
3	20	
...	...	
14	30	0
...	...	
50	47	
51	49	
Total		50



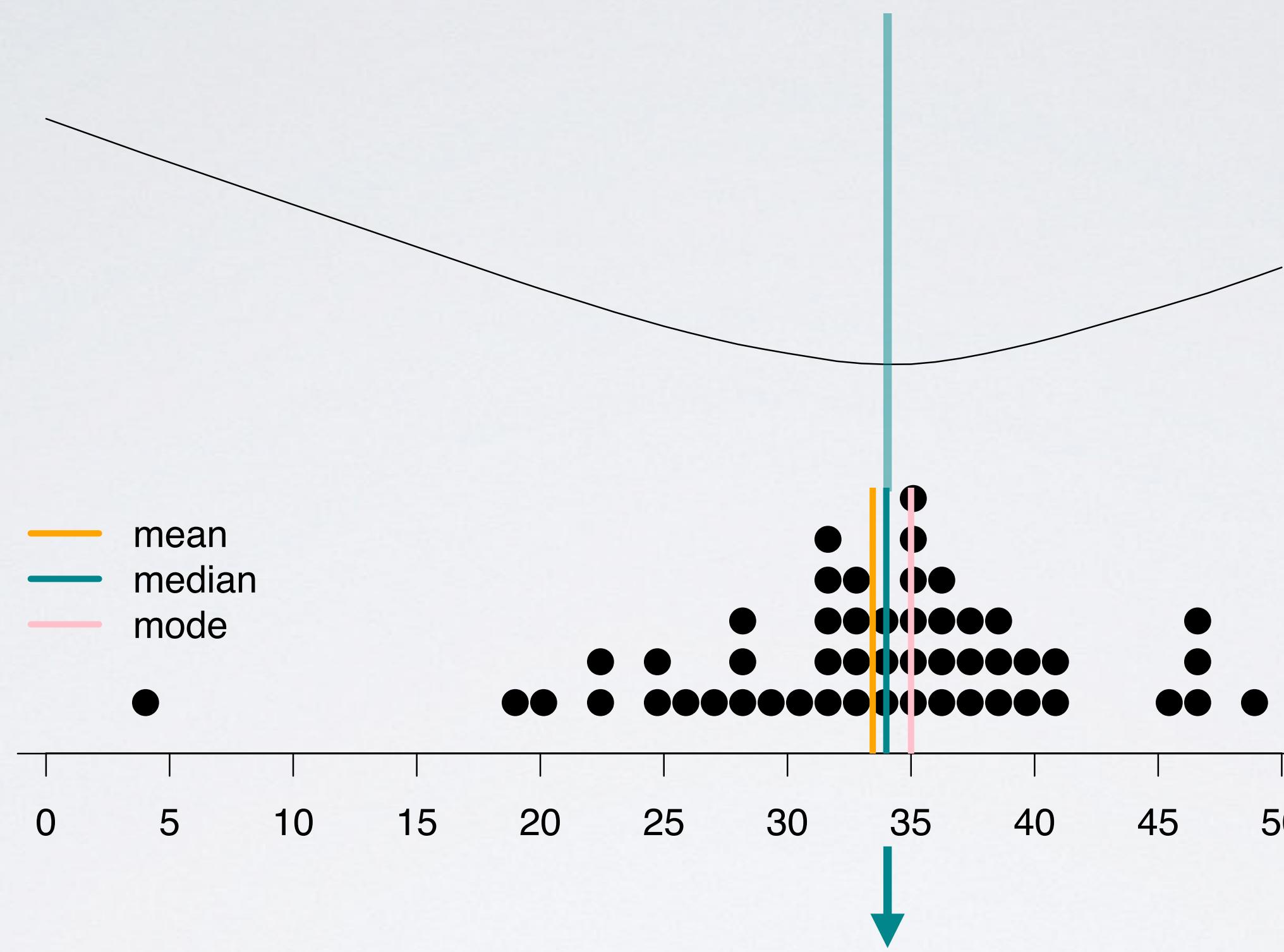
$L_0$  is minimized at the  
**mode** of the posterior

$L_1$ : linear loss

$$L_1(g) = \sum_i |x_i - g|$$

# $L_1$ : linear loss for $g = 30$

$i$	$x_i$	$L_1:  x_i - 30 $
1	4	26
2	19	11
3	20	10
...	...	
14	30	0
...	...	
50	47	17
51	49	19
Total		346



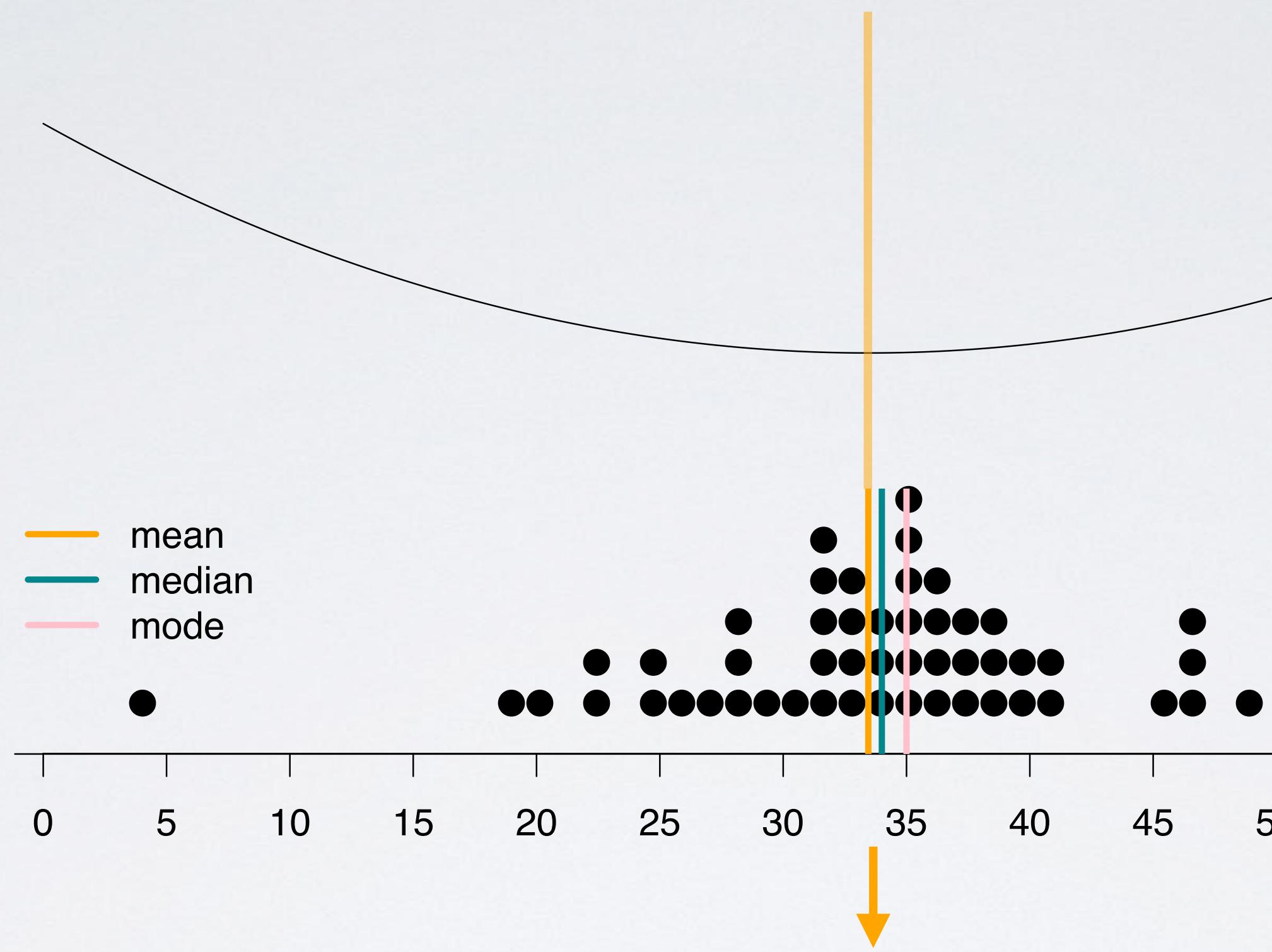
$L_1$  is minimized at the  
**median** of the posterior

## L<sub>2</sub>: squared loss

$$L_2(g) = \sum_i (x_i - g)^2$$

# $L_2$ : squared loss for $g = 30$

$i$	$x_i$	$L_2: (x_i - 30)^2$
1	4	676
2	19	121
3	20	100
...	...	
14	30	0
...	...	
50	47	289
51	49	361
Total		3732



$L_2$  is minimized at the  
**mean** of the posterior

# summary

- ▶ L0 minimized at mode
- ▶ L1 minimized at median
- ▶ L2 minimized at mean
- ▶ point estimate you report depends on your choice of loss function