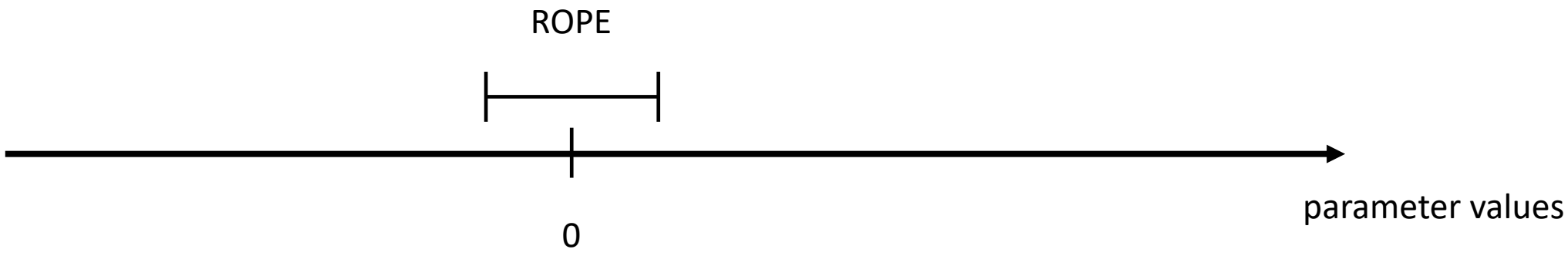
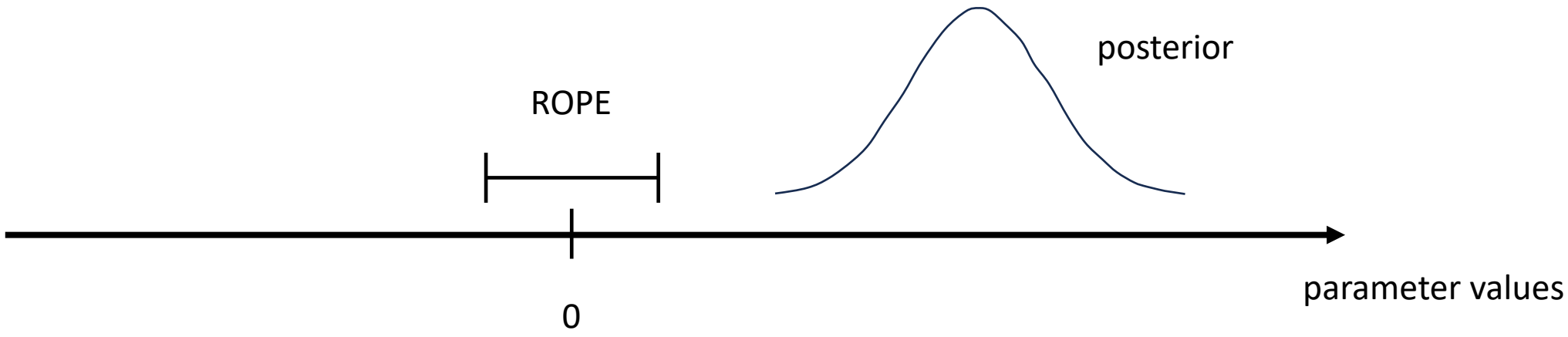
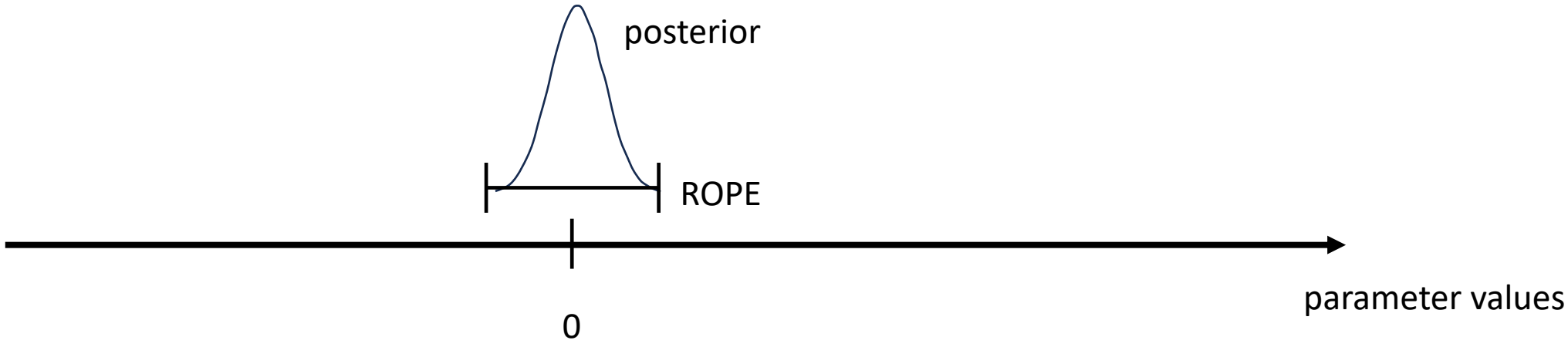
The region of practical equivalence divides the inferred parameter's values into two sets: those that are practically equivalent to no effect from that parameter, and all other parameter values

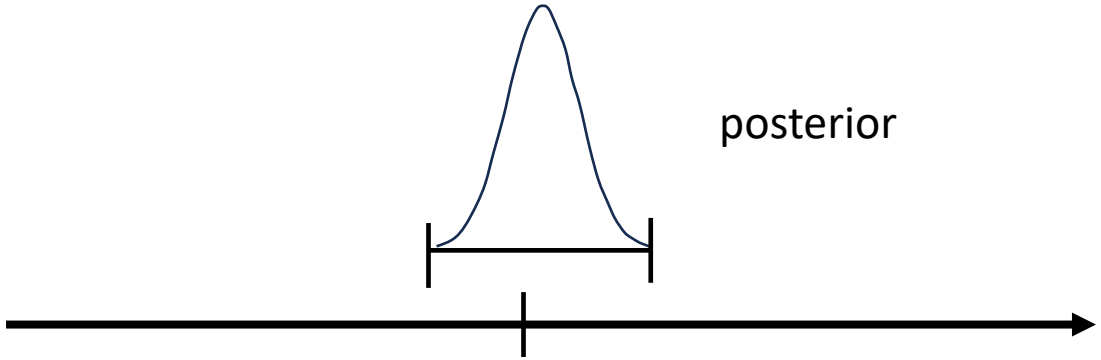


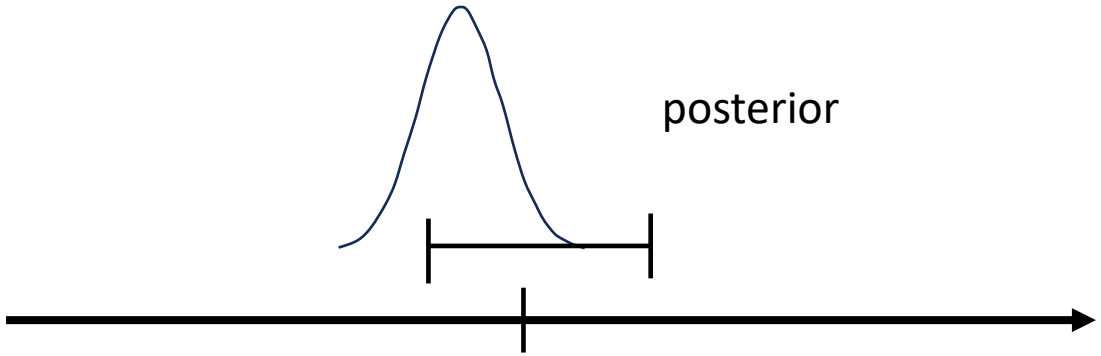
In this example, the entire non-zero density of the posterior is outside the ROPE, and so the probability of effect is 1

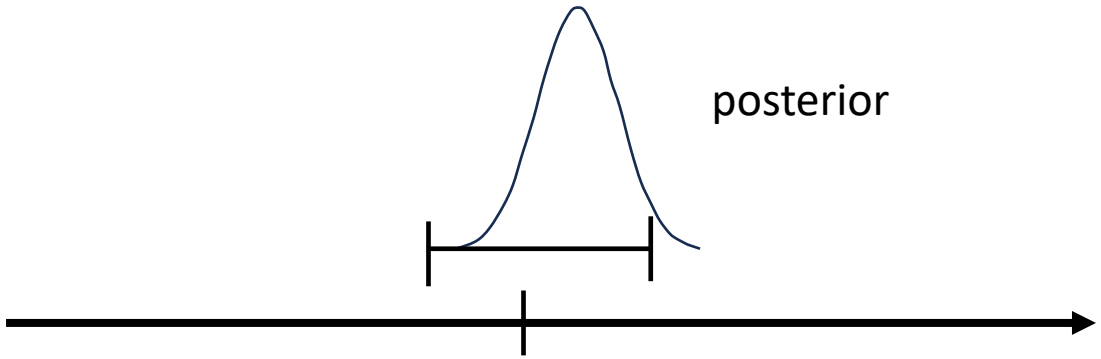


Similarly, if the entire non-zero density of the posterior is in the ROPE, then the probability of effect is 0



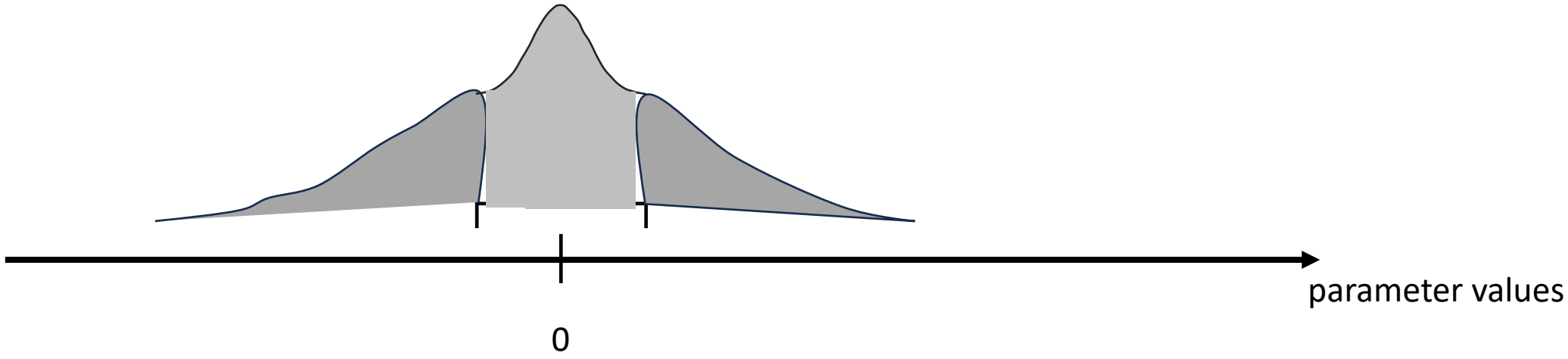




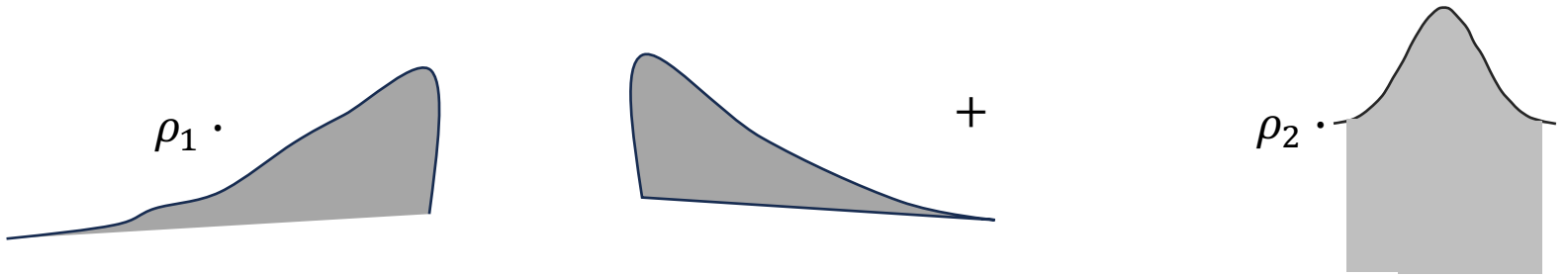


If we use the model multiple times, even if the parameter has no effect on the model, eventually some of the posterior density will be nonzero outside the ROPE

To prevent this problem, we use the ROPE prior



A mixture distribution with one component inside the ROPE, and one outside:



The mixture probabilities are random variables that are shared between all copies of the model. We can infer their Maximum A Posteriori values

$x_i = \alpha + \beta \cdot t + \epsilon$ model for data x

$y_i = \alpha + \beta \cdot t + \epsilon$ model for data y

$z_i = \alpha + \beta \cdot t + \epsilon$ model for data z

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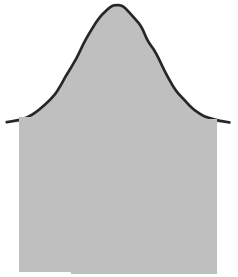
$\rho_1 \sim U[0,1]$

$\rho_2 \sim U[0,1]$



If there is no effect, the MAP value of ρ_2 , the mixture component the corresponds to the ROPE, will be 1, and the posteriors will be restricted to the ROPE: